



CLUSTER
Human Settlement, Engineering, and Transport

UNIT
Engineering

DEPARTMENT
Roads Provision

PROCUREMENT DOCUMENT

INFRASTRUCTURE (SAICE GCC2015)

Documents are to be obtained, free of charge, in electronic format, from the [National Treasury's eTenders website](#) or the [eThekweni Municipality's website](#).

Contract No: 1R-28004

Contract Title: Rehabilitation of various roads located in the Western Region of eThekweni Municipality, as and when required, for a period of 36 months

Est. CIDB Grade/ Class: 8 CE

CLARIFICATION MEETING AND QUERIES

Clarification Meeting: Compulsory Clarification Meeting

Meeting Location, Date, Time: 30 Archie Gumede Place, ETA Building, 2nd floor, room 213
On 25 March 2024 at 11:00am

Queries can be addressed to: Brandon Naidoo
Tel: 031-322-8305
The Employer's Agent's Representative: eMail: Brandon.Naidoo@durban.gov.za. Email queries to be submitted by 04 April 2024 and consolidated answers to questions will be uploaded 11 April 2024

TENDER SUBMISSION

Delivery Location: The Tender Box in the foyer of the Municipal Building
166 KE Masinga Road, Durban

Closing Date/ Time: Friday, 19 April 2024 at 11h00

FACSIMILE, eMAIL, or POSTED TENDERS WILL NOT BE ACCEPTED

Issued by:

ETHEKWINI MUNICIPALITY

Deputy Head: Roads Provision

Date of Issue: 15/03/2024

Document Version 25/10/2023

FOR OFFICIAL USE ONLY

Tenderer Name:			VAT Registered: Yes No
	Price (excl)	VAT	Price (incl)
Submitted: R	R	R	R
Corrected: R	R	R	R

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PART T1: TENDERING PROCEDURES

T1.1.1: TENDER NOTICE AND INVITATION TO TENDER

Tenders are hereby invited for the works to rehabilitate various roads located within the Western area of the eThekweni Municipality as and when required for a period of three (3) years, with no guarantee of any quantum of works. The Municipal wards forming the Western area of the eThekweni Municipality is detailed in part C4.1 of this document.

Subject	Description	Tender Data
Employer	The Employer is the eThekweni Municipality as represented by: Deputy Head: Roads Provision	F.1.1.1
Tender Documents	Documents can only be obtained in electronic format, issued by the eThekweni Municipality. Documentation can be downloaded from the National Treasury's eTenders website or the eThekweni Municipality's Website . The <u>entire document</u> should be printed (on A4 paper) and suitably bound by the tenderer.	F.1.2
CIDB Eligibility	It is <u>estimated</u> that tenderers should have a CIDB contractor grading designation of 8 CE (or higher).	F.2.1.1
Clarification Meeting	30 Archie Gumede Place, ETA Building, 2nd floor, room 213 On 25 March 2024 at 11:00am	F.2.7
Seek Clarification	Queries relating to these documents are to be addressed to the Employer's Agent's Representative whose contact details are: Brandon Naidoo Tel: 031-322-8305 eMail: Brandon.Naidoo@durban.gov.za	F.2.8
Submitting a Tender Offer	Tender offers shall be delivered to: The Tender Box in the foyer of the Municipal Building 166 KE Masinga Road, Durban	F.2.13
Closing Time	Tender offers shall be delivered on or before Friday, 19 April 2024 at or before 11h00 .	F.2.15
Evaluation of Tender Offers	The 90/10 Price Preference Point System, as specified in the PPPFA Regulations 2022 will be applied in the evaluation of tenders. Refer to Clause F.3.11 of the Tender Data for the Specific Goal(S) for the awarding of Preference Points, and other related evaluation requirements.	F.3.11

Requirements for sealing, addressing, delivery, opening, and assessment of tenders are stated in the Tender Data

T1.1.2: NOTES TO TENDERERS

These Notes are intended to provide guidance to tenderers regarding tendering obligations and requirements. Compliance requirements are stated in the relevant parts of the Tender Data.

eThekwini Supply Chain Management Policy (SCMP)

The requirements as stated in the Employer's SCM Policy include, but are not limited to, the following:

1) Clause 14(4): ETM Supplier Database

The eThekwini Supply Chain Management Policy requires suppliers/ service providers/ contractors to be registered on the eThekwini Municipality's Supplier Database (Vendor Portal).

In the event of the Tenderer not being registered on the eThekwini Municipality's Supplier Database, the tenderer must register on the internet at www.durban.gov.za by following these links:

- Business
- Supply Chain Management (SCM)
- Accredited Supplier and Contractor's Database.

The following is to be noted:

- The information for registration as in the possession of the eThekwini Municipality will apply.
- It is the Tenderer's responsibility to ensure that the details submitted to the Municipality are correct.
- Tenderers are to register prior to the submission of tenders.

2) Clause 21(1)(d)(i): Audited Financial Statements

Audited Financial Statements (prepared for auditing) are required to be submitted if the value of the tender offer exceeds R10 million (incl VAT).

3) Clause 21(1)(d)(iii): Contracts Awarded during the past 5 Years

Tenderers are to include with their submission a listing of any contracts awarded to the tenderer during the past 5 years, including particulars of any material non-compliance or dispute concerning the execution of the contracts. Tenderers are referred to **Returnable Form T2.2.3**.

4) Clause 21(1)(d)(ii), Clause 28(1)(c) and Clause 29(10): Municipal Fees

Tenderers are to be referred to **Returnable Form T2.2.12**: "Declaration of Municipal Fees", to certify that they have no undisputed commitments for municipal services towards a municipality. Prior to an award, a Tenderer's municipal rates and taxes cannot be in arrears. Should a Tenderer be in arrears with respect to municipal services and has formalised an agreement with the respective municipality to offset the arrears, the agreement must be in place at time of tender closing.

5) Clause 28(1)(d), Clause 28(1)(h) and Clause 29(10): Certifications and Registrations

CIDB Registration and Status, B-BBEE Certificates, and Tax Compliance Status PIN must be valid at tender closing, and before final award.

The Tenderer's Tax Compliance Status, CIDB Registration and Status, and B-BBEE Level Status (if required), will be confirmed using the National Treasury Central Supplier Database (CSD). Tenderers are referred to **Returnable Form T2.2.1**.

It is the Tenderer's responsibility to ensure that their data on the CSD is kept updated and correctly reflects the status of the tendering entity.

6) Clause 28(1)(e): Joint Ventures (JV)

Each party of a JV must submit separate Tax Compliance Status PINs.

Also, and unless otherwise stated, the requirements for a single entity submission in terms of documentation requirements, will apply to each member of a JV making a submission.

As proof that a JV has been formalised, or that the parties to the JV agree to formalise the JV should they be successful in being recommended for the award of this tender, Tenderers are referred to **Returnable Form T2.2.10**.

The Lead Partner of the Joint Venture is to sign the Form of Offer in **Part C1.1.1**.

CIDB Regulation 25(8)

- 7) It should be noted that this contract is not part of a **Targeted Development Programme (TDP)**. The CIDB provisions in relation to a Contractor's **Potentially Emerging (PE) status** do not apply. Tenderers are referred to **CIDB Inform Practice Note #32**: "Application of the Potentially Emerging (PE) Status".

Test for Responsiveness

- 8) In this regard, Tenderers are referred to **Clause F.3.8** of the Tender Data.

Tenderer's Experience (Returnable Documents)

- 9) The requirements for the submission of the Tenderer' Experience are specified in **Clause F.2.1.3**.

Returnable Form T2.2.16 "ELIGIBILITY: EXPERIENCE OF TENDERER" (consisting of 8 pages) is provided for the return of the experience submissions. The number of pages provided corresponds to the minimum number of submissions required in terms of the **Clause F.2.1.3**.

Should the Tenderer require additional pages, they should include additional copies of the relevant pages.

PART T1: TENDERING PROCEDURES

T1.2: TENDER DATA

T1.2.1 STANDARD CONDITIONS OF TENDER

The conditions of tender are the Standard Conditions of Tender as contained in Annex F of the CIDB Standard for Uniformity in Construction Procurement (July 2015) as published in Government Gazette No 38960, Board Notice 136 of 2015 of 10 July 2015.

The Standard Conditions of Tender make several references to the Tender Data for details that apply specifically to this tender. The Tender Data shall have precedence in the interpretation of any ambiguity or inconsistency between it and the Standard Conditions of Tender.

T1.2.2 TENDER DATA

Each item of data given below is cross-referenced to the clause in the Standard Conditions of Tender to which it mainly applies.

F.1: GENERAL

F.1.1 The employer: The Employer for this Contract is the eThekweni Municipality as represented by: Deputy Head: **Roads Provision**

F.1.2 Tender documents: The Tender Documents issued by the Employer comprise:

- 1) This procurement document.
- 2) "General Conditions of Contract for Construction Works – 3rd Edition 2015" issued by the South African Institution of Civil Engineering (GCC 2015). This document is obtainable separately, and Tenderers shall obtain their own copies.
- 3) "COLTO Specifications " hereinafter referred to as the Standard Engineering Specifications. This document is obtainable separately, and Tenderers shall obtain their own copies of the applicable Sections.
- 4) Drawings, issued separately from this document, or bound in Section C3.4 (as an Annexure).
- 5) In addition, Tenderers are advised, in their own interest, to obtain their own copies of the following acts, regulations, and standards referred to in this document as they are essential for the Tenderer to get acquainted with the basics of construction management, the implementation of preferential construction procurement policies, and the participation of targeted enterprise and labour.
 - The Employer's current (as at advertising date) Supply Chain Management Policy.
 - The Preferential Procurement Policy Framework Act No 5 of 2000, and the Preferential Procurement Policy Framework Act Regulations (2022).
 - The Occupational Health and Safety Act No 85 and Amendment Act No 181 of 1993, and the Construction Regulations (2014).
 - The Construction Industry Development Board Act No 38 of 2000 and the Regulations issued in terms of the Act (July 2013).
 - SANS 1921:2004 – Construction and Management Requirements for Works Contract, Parts 1-3.
 - Any other eThekweni Policy documents referenced in the Tender Documents.

Electronically downloaded documentation is obtainable from the National Treasury's **eTenders Website** or the **eThekwini Municipality's Website** at URLs:

- <https://www.etenders.gov.za/>
- <https://www.durban.gov.za/pages/business/procurement>

The entire downloaded document should be printed on white A4 paper (single-sided) and suitably bound by the tenderer.

F.1.4 Communication and employer's agent: The Employer's Agent is:

Name: [Londa Zwane](#)
 Tel: [031-311-7442](tel:031-311-7442)
 eMail: Zwane.Londa@durban.gov.za

The Employer's Agent's Representative is:

Brandon Naidoo
Tel: 031-322-8305
eMail: Brandon.Naidoo@durban.gov.za

The Tenderer's contact details, as indicated on **Returnable Document T2.2.1: "Compulsory Enterprise Questionnaire"**, shall be deemed as the only valid contact details for the Tenderer for use in communications between the Employer's Agent and the Tenderer during tender evaluation.

F.2: TENDERER'S OBLIGATIONS

F.2.1.1 Eligibility: General

A Tenderer will not be eligible to submit a tender if:

- (a) In the event of a Compulsory Clarification Meeting:
 - i) the Tenderer fails to attend the Compulsory Clarification Meeting.
 - ii) the Tenderer fails to have **Returnable Document T2.2.2: "Certificate of Attendance at Clarification Meeting / Site Inspection"** signed by the Employer's Agent or his representative.
- (b) at the time of tender closing, the Tenderer is not registered on the **National Treasury Central Supplier Database (CSD)** as a service provider. In the case of a Joint Venture, this requirement will apply individually to each party in the Joint Venture.
- (c) in the case of Joint Venture (JV) submissions, two or more JV entities have common directors / shareholders or common entities tendering for the same works.

F.2.1.2 Eligibility: CIDB

Tenderers are to reference the provisions of **Clause F.2.23: "Certificates"** and **Returnable Document T2.2.15: "Verification of CIDB Registration and Status"** with respect to CIDB registration.

Only those tenderers who are registered (as “Active”) with the CIDB (at time of tender closing), in a contractor grading designation equal to or higher than a contractor grading designation determined in accordance with the sum tendered, or a value determined in accordance with Regulation 25 (1B) or 25(7A) of the Construction Industry Development Regulations, for a **CE** class of construction work, are eligible to have their tenders evaluated.

Joint ventures are eligible to submit tenders provided that:

- (a) Every member of the joint venture is registered (as “Active”) with the CIDB (at time of tender closing),
- (b) The lead partner has a contractor grading designation in the **CE** class of construction work and has a grading designation of not lower than one level below the required grading designation, and
- (c) The combined contractor grading designation calculated in accordance with the Construction Industry Development Regulations (2013) is equal to or higher than a contractor grading designation determined in accordance with the sum tendered for a **CE** class of construction work or a value determined in accordance with Regulation 25 (1B) or 25(7A) of the Construction Industry Development Regulations.

F.2.1.3 Eligibility: Tenderer’s Experience

Tenderers are to complete and sign **Returnable Form T2.2.16: “Eligibility: Experience of Tenderer”** (5 pages).

Only those tenderers that can demonstrate experience and submit the associated documentation/information, in works of a similar nature, within the past 10 years, will be eligible to have their tenders evaluated in terms of Clause F.3.11.

- **Table 1:** The **Experience Requirement** is specified on this table.
- **Table 2:** The experience is to be **Similar in Nature** to that specified on this table. Tenderers are to note the exclusions (if any) stated on this table.
- **Table 3:** The **Documentation/ Information** that is required to be included in this submission is specified on this table (which includes the Notes below the table).
- Tenderers may submit experience gained as **Sub-Contractors or Main Contractors**.
- **Guidance** on the completion of the **Experience Submission Form** is provided on the first page of **Returnable Form T2.2.16**.

Tenderers are to indicate the documentation that has been included in the tender submission, in support of each experience submission, in the shaded column on page 42.

Should there be insufficient evidence for verification of the information submitted for any specific experience submission, that experience submission may be deemed invalid.

Table 1: Experience Requirement
A minimum of 5 contracts, with works of a similar nature, within the past 10 years, <u>each</u> with a value of R10m (excluding VAT) or greater.

Table 2: Works of a Similar Nature	
Provision of Roads and Ancillary Works	
<ul style="list-style-type: none"> • Projects of a similar nature that will be considered will be one, or a combination of, the following types of projects: <ul style="list-style-type: none"> ○ road rehabilitation ○ road widening/upgrades ○ new road construction ○ special maintenance ○ intersection improvements ○ access road upgrades ○ major parking areas 	
<ul style="list-style-type: none"> • Each project must consist of <u>at least two</u> of the following elements: <ul style="list-style-type: none"> ○ roadway layer-works ○ asphalt roadway surfacing ○ kerbing / channelling ○ sidewalk / walkway construction ○ stormwater drainage ○ traffic calming measures ○ retaining structures ○ dealing with underground services (watermains, sewers, electricity, communication infrastructure) 	
<ul style="list-style-type: none"> • Projects that will be <u>excluded</u> are: <ul style="list-style-type: none"> ○ the construction of gravel roads ○ materials investigation, analysis and pavement design experience ○ road routine maintenance projects 	

Table 3: Documentation / Information Requirements				
Note: an "X" in this table indicates that the associated documentation should be provided, if applicable.	Works as Sub-Contractor		Works as Main Contractor	
	Current Contracts	Completed Contracts	Current Contracts	Completed Contracts
Proof of Sub-Contract Agreement See Note 1.	X	X	-	-
Letter of Award OR Form of Offer & Acceptance See Note 2.	-	-	X	X
Most recent Payment Certificate OR Invoice with Quantities summary. See Note 3.	X	-	X	-
Final Payment Certificate OR Invoice with Quantities summary. See Note 4.	-	X	-	X
Completion Certificate. See Note 5.	-	-	-	X
Scope of Work See Note 6.	To be indicated on individual experience submission form			

NOTES (for Table 3)

1. To include the names of the parties, the managing entity's name, the effective dates, and the signature(s) page, all pertaining to the agreement.
2. Issued by the Client / Employer.
3. Proof of the most recent payment received from the Main Contractor or Client/ Employer, OR most recent submitted INVOICE, with a summary breakdown of quantities.
4. Proof of the final payment received from the Main Contractor or Client/ Employer, OR most recent submitted INVOICE, with a summary breakdown of quantities.
5. Issued by the Client/ Employer.

6. If executed as a Sub-Contractor, the Scope-of-Work should be indicative of only the works carried out by the Sub-Contractor, and not the overall Scope-of-Work of the main contract.
If executed as a Main Contractor, the overall contract Scope-of-Work is to be indicated.

F.2.1.4 Eligibility: Tenderer's Key Personnel

Only those tenderers that can demonstrate having the human resources, by the submission of the specified documentation / information, will be eligible to have their tenders evaluated in terms of Clause F.3.11.

Returnable form "Experience of Key Personnel" is included in Part T2. This form should be duplicated for each experience submission, as may be required.

- **Contracts Manager:** with more than 10 years of road construction experience or more than 7 years road rehabilitation experience on projects of a similar nature; with relevant accredited 3 year diploma / 4 year degree. Also registered with ECSA as a Professional Civil Engineer or Professional Civil Engineering Technologist or registration with SACPCMP as a Professional Construction Project Manager.
- **Construction Manager:** with more than 5 years road construction experience or more than 3 years road rehabilitation experience on projects of a similar nature; with relevant accredited 3 year diploma / 4 year degree. Also be registered with ECSA as a Professional Civil Engineering: Engineer, Technologist or Technician or registration with SACPCMP as a Professional Construction Project Manager or Professional Construction Manager.

Note 1: Road rehabilitation experience shall include mill and asphalt inlay, asphalt overlay, and rehabilitation of the base, sub-base or subgrade pavement layers.

Note 2: Road construction experience shall include new road construction, road widening/upgrade projects, intersection improvements, special maintenance and routine maintenance, gravel to surface road upgrades, access road upgrades and parking areas, ancillary/secondary works (kerbing, drainage, sidewalks, road signs, gabions etc).

Note 3: The following is excluded – materials investigation and analysis, and all forms of design experience.

Note 4: For tendering purposes, submission of one (1) contracts manager and one (1) construction manager shall be required.

F.2.2.2 The cost of the tender documents: Replace this paragraph with the following:

"Documents are to be obtained, free of charge, in electronic format, from the **National Treasury's eTenders website** or the **eThekwin Municipality's Website**. The entire electronically downloaded document should be printed on white A4 paper (single-sided) and suitably bound by the tenderer.

F.2.6 Acknowledge addenda: Add the following paragraphs to the clause:

"Addenda will be published, in electronic format, on the websites specified in Clause F.1.2. Tenderers are to ensure that the eTenders website is consulted for any published addenda pertaining to this tender up to three days before the tender closing time as stated in the Tender Data."

"Acknowledgement of receipt of the addenda will be by the return of the relevant completed, dated, and signed portion of the addenda, to the physical or email address as specified on the addenda. Failure of the tenderer to comply with the requirements of the addenda may result in the tender submission being made non-responsive."

F.2.7 Clarification meeting:

**30 Archie Gumede Place, ETA Building, 2nd floor, room 213
On 25 March 2024 at 11:00am**

In the event of a Compulsory Clarification Meeting, Tenderers must sign the attendance register in the name of the tendering entity. The Tenderer's representative(s) at the clarification meeting must be able to clearly convey the discussions at the meeting to the person(s) responsible for compiling the entity's tender offer.

F.2.12 Alternative tender offers: No alternative tender offers will be considered.

F.2.13 Submitting a tender offer: Submissions must be submitted on official submission documentation issued (either in hard copy or in electronic format) by the eThekweni Municipality.

Should the **Form of Offer** (C1.1.1) and/ or any part of the **Pricing Data** (C2.2) be completed using erasable ink OR pencil, the tender offer will be deemed non-responsive.

Identification details to be shown on each tender offer package are:

Contract No.: **1R-28004**

Contract Title: **Rehabilitation of various roads located in the Western Region of eThekweni Municipality, as and when required, for a period of 36 months**

The Employer's address for delivery of tender offers is:

**The Tender Box in the foyer of the Municipal Building
166 KE Masinga Road, Durban**

Tenderers are to include, with their paper submission ("hard copy"), a memory-stick containing an electronically scanned (300 dpi resolution) Public Document Format (PDF) copy of their complete bid submission. This PDF file should be named using the contract number and the Tenderer's name, eg. "**1R-28004 – Tenderers Name.PDF**". The memory-stick must be labelled with the Tenderer's name and securely fixed to the paper submission.

Telephonic, telegraphic, telex, facsimile or e-mailed tender offers will not be accepted.

F.2.15 Closing time: The closing time for delivery of tender offers is:

- Date : **Friday, 19 April 2024**
- Time : **11h00**

F.2.16 Tender offer validity: The Tender Offer validity period is **120 Days** from the closing date for submission of tenders.

F.2.23 Certificates: Refer to **T2.1: “List of Returnable Documents”** for a listing of certificates that must be provided with the tender. All certificates must be valid at the time of tender closing.

Tenderers are to include at the back of their tender submission a printout of the required documents/ certificates.

Compensation Commissioner

Reference is to be made to **Returnable Document T2.2.13: “Registration with Compensation Commissioner”**.

If required to be registered in terms of the Occupational Injuries and Diseases Act (130 of 1993 as amended), the Tenderer is to supply proof of being registered and in good standing with the compensation fund by submitting a valid **Letter of Good Standing** from the Compensation Commissioner.

Should the Tenderer’s **Letter of Good Standing** be expired at time of tender closing, but an application for renewal has been made, the Tenderer is to include the expired **Letter of Good Standing** AND proof of application for renewal.

Separate **Letters of Good Standing** are required for each party to a Joint Venture.

Central Supplier Database (CSD)

Reference is to be made to **Returnable Document T2.2.14: “CSD Registration Report”**.

The entities (full) **CSD Registration Report**, obtained from the National Treasury Central Supplier Database, is to be included in the tender submission (<https://secure.csd.gov.za>).

The date of the report, as indicated at the top right of each page, should be on or after the date of advertising of this tender.

Separate **CSD Registration Reports** are required for each party to a Joint Venture.

CIDB Registration

Reference is to be made to **Returnable Document T2.2.15: “Verification of CIDB Registration and Status”**.

Tenderers are to include with their submission a printout of their **CIDB Registration**, obtained from the CIDB website (<https://registers.cidb.org.za/PublicContractors/ContractorSearch>).

The date of obtaining the CIDB printout(s) is to be indicated on the printout, and the Tenderer’s registration with the CIDB must be reflected as “Active” as at the date of tender closing.

Separate **CIDB Registration printouts** are required for each party to a Joint Venture.

The **Joint Venture Grading Designation Calculator** printout should also be included when making a submission as a Joint Venture:

(<https://registers.cidb.org.za/PublicContractors/JVGradingDesignationCalc>).

F.3: THE EMPLOYER'S UNDERTAKINGS

F.3.1.1 Respond to requests from the tenderer: Replace the words “five working days” with “three working days”.

F.3.2 Issue addenda: Add the following paragraph: “Addenda will be published, in electronic format, on the same platform(s) as the Tender Notification (refer to **Clause F.1.2**).

F.3.4 Opening of Tender Submissions: Tenders will be opened immediately after the closing time for tenders. The public reading of tenders will take place in the SCM Boardroom, 6th Floor, Engineering Unit Building, 166 KE Masinga Road, Durban.

F.3.8 Test for Responsiveness

Add the following:

F.3.8.3 “Unless otherwise stated in the tender documentation, the following will be deemed as non-material deviations or omissions, applicable to the documents listed below:

- non-submission of required documentation (including attachments).
- the submission of expired versions of required documentation.
- the submission of incomplete, or unsigned, returnable documentation.”

“The above is applicable to the following returnable documents:

- T2.2.1: Compulsory Enterprise Questionnaire
- T2.2.3: Contracts Awarded by Organs of State in the past 5 years
- T2.2.4: Contractor's Health and Safety Declaration
- T2.2.5: MBD 4: Declaration of Interest
- T2.2.6: MBD 5: Declaration for Procurement Above R10 Million
- T2.2.8: MBD 8: Declaration of Bidder's Past SCM Practices
- T2.2.9: MBD 9: Certificate of Independent Bid Determination
- T2.2.10: Joint Venture Agreements (if applicable)
- T2.2.12: Declaration of Municipal Fees
- T2.2.13: Registration with Compensation Commissioner
- T2.2.14: CSD Registration Report
- T2.2.15: Verification of CIDB Registration and Status”

F.3.8.4 “Should the Employer require the rectification of the non-conforming, non-material, deviation(s) and/ or omission(s), the Tenderer will be requested to address such rectification, within a specified time period, prior to the award of the contract. Failure to provide the rectified documentation within the specified time period will result in the tender offer being deemed non-responsive.”

F.3.8.5 “It must be emphasised that any request for the rectification of deviations or omissions cannot:

- detrimentally affect the scope, quality, or performance of the works identified in the Scope of the Work,
- significantly change the Employer's or the Tenderer's risks and responsibilities under the contract,
- affect the competitive position of other tenderers presenting responsive tenders, if the deviation or omission was rectified.”

F.3.11 Evaluation of Tender Offers:**Eligibility**

Tenders will be checked for compliance with the ELIGIBILITY requirements, as specified in **Clause F.2.1**. Tenderers not in compliance will be deemed non-responsive.

Preference Point System

The procedure for the evaluation of responsive tenders is **PRICE AND PREFERENCE** in accordance with the Employer's current SCM Policy, the Preferential Procurement Policy Framework Act (5 of 2000), and the Preferential Procurement Policy Framework Act Regulations (2022).

Price Points

The **90/10** preference points system will be applied. The Formula used to calculate the **Price Points (max. 90)** will be according to that specified Regulation 5.1.

Preference Points

Reference is also to be made to T2.2.7: "MBD 6.1: Preference Points Claim".

The Preference Points (either 20 or 10) will be derived from points allocated/ claimed for **Specific Goals** as indicated in the table(s) below, according to the specified **Goal/ Category Weightings**.

- **Ownership Goal**

Goal Weighting: 75%

The tendering entity's **Percentage Ownership**, in terms of the **Ownership Category(s)** listed below, is to be used in the determination of the tenderer's claim for **Preference Points**.

Ownership Categories	Criteria	90/10
Race: Black (w1)	Equals 0%	0
	Between 0% and 51%	2.25
	Greater or equal to 51% and less than 100%	4.5
	Equals 100%	5.625
Gender: Female (w2)	Equals 0%	0
	Between 0% and 51%	0.75
	Greater or equal to 51% and less than 100%	1.5
	Equals 100%	1.875
Maximum Goal Points:		7.5

The **Weightings** of the **Ownership Categories** will be:

- w1 = 75%, w2=25% (where: w1 + w2 = 100%)

Proof of claim as declared on MBD 6.1 (1 or more of the following will be used in verifying the tenderer's status)

- Companies and Intellectual Property Commission registration document (CIPC)
- CSD report.
- B-BBEE Certificate of the tendering entity.
- Consolidated BBBEE Certificate if the tendering entity is a Consortium, Joint Venture, or Trust (Issued by verification agency accredited by the South African Accreditation System).
- Agreement for a Consortium, Joint Venture, or Trust.

- **RDP Goal: The promotion of South African owned enterprises**

Goal Weighting: 25%

The tendering entity's **Address** (as stated on the National Treasury Central Supplier Database (CSD) or on the eThekweni Municipality Vendor Portal) is to be used in the determination of the tenderer's claim for **Preference Points** for this Specific Goal.

Location	90/10
Not in South Africa	0
South Africa	0.625
Kwa Zulu Natal	1.25
eThekweni Municipality	2.5
Maximum Goal Points:	2.5

Proof of claim as declared on MBD 6.1 (1 or more of the following will be used in verifying the tenderer's status)

- CSD report

F.3.13 Acceptance of tender offer: In addition to the requirements of **Clause F.3.13** of the Standard Conditions of Tender, tender offers will only be accepted if:

- (a) The Tenderer's municipal rates and taxes are not in arrears, or they have made arrangements to meet outstanding municipal fee obligations.
- (b) The Tenderer's tax compliance status has been verified, or they have made arrangements to meet outstanding tax obligations.
- (c) The Tenderer is **registered**, and "**Active**", with the **Construction Industry Development Board** in an appropriate contractor grading designation.
- (d) If required to be so registered, the Tenderer is **registered and is in good standing with the compensation fund or with a licensed compensation insurer**, as applicable to the requirements of The Occupational Injuries and Diseases Act.
- (e) The Tenderer or any of its directors/ shareholders are **not listed on the Register of Tender Defaulters** in terms of the Prevention and Combating of Corrupt Activities Act of 2004 as a person prohibited from doing business with the public sector.
- (f) The Tenderer has not:
 - i) Abused the Employer's Supply Chain Management System; or
 - ii) Failed to perform on any previous contract and has been given a written notice to this effect.
- (g) The tenderer has completed **Returnable Document T2.2.1: "Compulsory Enterprise Questionnaire"** and there are no conflicts of interest which may impact on the Tenderer's ability to perform the contract in the best interests of the Employer or potentially compromise the tender process.
- (h) The Employer is reasonably satisfied that the tenderer has in terms of the Construction Regulations, 2014, issued in terms of the Occupational Health and Safety Act, 1993, the **necessary competencies and resources to carry out the work safely**.

The Municipality does not bind itself to accept the lowest or any tender. It reserves the right to accept the whole or any part of a tender to place orders. Bidders shall not bind the Municipality to any minimum quantity per order. The successful Tenderer (s) shall be bound to provide any quantities stipulated in the specification.

The municipality has a firm intention to proceed with the work, subject to funding being identified. Notwithstanding clause F.1.1.3 of the Standard Conditions of Tender, the municipality reserves the right to award or not award the tender based on the municipalities available budget.

F.3.15 Complete adjudicator's contract: Refer to the **General Conditions of Contract** and the **Contract Data**.

F.3.17 Copies of contract: The number of paper copies of the signed contract to be provided by the Employer is **ONE (1)**.

T1.2.3 ADDITIONAL CONDITIONS OF TENDER

T1.2.3.1 Appeals

In terms of Regulation 49 of the Municipal Supply Chain Management Regulations persons aggrieved by decisions or actions taken by the Municipality, may lodge an appeal within 14 days of the decision or action, in writing to the Municipality. All appeals (clearly setting out the reasons for the appeal) and queries with regard to the decision of award are to be directed to:

The City Manager
Attention Ms S. Pillay eMail: Simone.Pillay@durban.gov.za
P O Box 1394
DURBAN, 4000

T1.2.3.2 Prohibition on awards to persons in the service of the state

Clause 44 of the Supply Chain Management Regulations states that the Municipality or Municipal Entity may not make any award to a person:

- (a) Who is in the service of the State;
- (b) If that person is not a natural person, of which a director, manager, principal shareholder or stakeholder is a person in the service of the state; or
- (c) Who is an advisor or consultant contracted with the municipality or a municipal entity.

Should a contract be awarded, and it is subsequently established that Clause 44 has been breached, the Employer shall have the right to terminate the contract with immediate effect.

T1.2.3.3 Code of Conduct and Local Labour

The Tenderers shall make themselves familiar with the requirements of the following policies that are available on web address: <ftp://ftp.durban.gov.za/cesu/StdContractDocs/>:

- Code of Conduct;
- The Use of CLOs and Local Labour.

T1.2.3.4 Targeted Procurement

Targeted Procurement provisions are not applicable to this tender.

T1.2.3.5 Functionality Specification

Functionality Evaluation is not applicable to this tender.

T1.2.3.6 Contract and Project Basis

T1.2.3.6.1 Definitions

- **Contract** relates to this Tender Document and is the basis of the Annual Tender evaluation and award.
- **Project** relates to the that work to be undertaken by the successful Tenderer in terms of the Annual Contract together with that as stipulated in the Project Specific Data.

T1.2.3.6.2 Process

- Tenders submitted are to be evaluated for the purpose of awarding the Annual "Contract" to successful Tenderer(s). eThekweni Municipality, however, shall not be obligated to use only

the Annual Tender for Road Rehabilitation Work but may elect to use the conventional tender process for awarding of other road rehabilitation contracts.

- Any reference to the “Works” or “Site” are of a hypothetical nature.
- The quantities provided in the Schedule of Quantities of this Tender Document are only used for evaluation purposes and the Employer may increase or decrease these quantities to suit the requirements of each “Project”.
- The execution of any proposed work shall be carried-out as a “Project” by the successful Tenderer(s) having defined “Works” and “Site” parameters.
- All contractual issues in this Tender Document shall be the basis of the “Annual Contract” and shall also be applicable to any successive “Projects”.
- Specific Contract Data relating to each Project shall be stipulated in the “Project Order”.
- The successful Tenderer(s) shall be obliged to enter into an “Agreement” with the Employer in conjunction with the “Contract’s:” Part C1.1.2 : “Form of Acceptance”. This “Agreement” is directly linked and is to be read in conjunction with the “Project Order”
- For each “Project”, the successful Tenderer(s) shall be obliged sign and conform with the “Project Order” in conjunction with the “Project’s:” Part C1.1 : “Form of Acceptance”.
- A Pro-Forma copy of this “Agreement” and “Project Order” is included in Part C3.6: Annexures.

PART T2: RETURNABLE DOCUMENTS

T2.1 LIST OF RETURNABLE DOCUMENTS

T2.1.1 General

The Tender Submission Documentation must be submitted in its entirety. All forms must be properly completed and signed as required.

The Tenderer is required to complete and sign each and every Schedule and Form listed below to the best of their ability as the evaluation of tenders and the eventual contract will be based on the information provided by the Tenderer. Failure of a Tenderer to complete the Schedules and Forms to the satisfaction of the Employer will inevitably prejudice the tender and may lead to rejection on the grounds that the tender is non-responsive.

T2.1.2 Returnable Schedules, Forms and Certificates

Entity Specific

T2.2.1	Compulsory Enterprise Questionnaire	20
T2.2.2	Certificate of Attendance at Clarification Meeting/ Site Inspection	21
T2.2.3	Contracts Awarded by Organs of State in the past 5 years	22
T2.2.4	Contractor's Health and Safety Declaration	23
T2.2.5	MBD 4: Declaration of Interest	25
T2.2.6	MBD 5: Declaration for Procurement Above R10 Million	27
T2.2.7	MBD 6.1: Preference Points Claim Form ITO the Preferential Regulations	28
T2.2.8	MBD 8: Declaration of Bidder's Past SCM Practices	29
T2.2.9	MBD 9: Certificate of Independent Bid Determination	32
T2.2.10	Joint Venture Agreements	35
T2.2.11	Record of Addenda to Tender Documents	36
T2.2.12	Declaration of Municipal Fees	37
T2.2.13	Registration with Compensation Commissioner	38
T2.2.14	CSD Registration Report	39
T2.2.15	Verification of CIDB Registration and Status	40
T2.2.16	Experience of Tenderer	41
T2.2.17	Experience of Key Personnel	49

T2.2 RETURNABLE SCHEDULES, FORMS, AND CERTIFICATES

The returnable schedules, forms, and certificates, as listed in T2.1.2, can be found on pages [20](#) to 49.

NOTE

The following forms in the **Contract Part** of the Documentation are also required to be completed by the tenderer:

- C1.1.1: **Form of Offer,**
- C1.2.2.2: **Data to be Provided by Contractor,** and
- C2.2: **Bill of Quantities.**

T2.2.1 COMPULSORY ENTERPRISE QUESTIONNAIRE

Ref	Description	Complete or Circle Applicable	
1.1	Name of enterprise		
1.2	Name of enterprise's representative		
1.3	Email address of representative		
1.4	Contact numbers of representative	Tel:	Cell:
1.5	National Treasury Central Supplier Database Registration number	MAAA	
1.6	eThekwini Supplier Database: Reference number, if any:	PR	
1.7	VAT registration number, if any:		
1.8	CIDB registration number, if any:		
1.9	Department of Labour: Registration number		
1.10	Department of Labour: Letter of Good Standing Certificate number		

2.0 Particulars of sole proprietors and partners in partnerships (attach separate pages if more than 4 partners)			
	Full Name	Identity No.	Personal income tax No. *
2.1			
2.2			
2.3			

3.0 Particulars of companies and close corporations	
3.1	Company registration number, if applicable:
3.2	Close corporation number, if applicable:
3.3	Tax Reference number, if any:
3.4	South African Revenue Service: Tax Compliance Status PIN:

4.0	MBD 4, MBD 6, MBD 8, and MBD9 issued by National Treasury must be completed for each tender and be included as a tender requirement.
-----	---

The undersigned, who warrants that he / she is duly authorised to do so on behalf of the enterprise:

- i) authorizes the Employer to verify the tenderers tax clearance status from the South African Revenue Services that it is in order.
- ii) confirms that the neither the name of the enterprise or the name of any partner, manager, director or other person, who wholly or partly exercises or may exercise, control over the enterprise appears on the Register of Tender Defaulters established in terms of the Prevention and Combating of Corrupt Activities Act of 2004.
- iii) confirms that no partner, member, director or other person, who wholly or partly exercises, or may exercise, control over the enterprise appears, has within the last five years been convicted of fraud or corruption.
- iv) confirms that I / we are not associated, linked or involved with any other tendering entities submitting tender offers and have no other relationship with any of the tenderers or those responsible for compiling the scope of work that could cause or be interpreted as a conflict of interest.
- v) confirms that the contents of this questionnaire are within my personal knowledge and are to the best of my belief both true and correct.

NAME (Block Capitals): _____

Date

SIGNATURE: _____

T2.2.2 CERTIFICATE OF ATTENDANCE AT CLARIFICATION MEETING / SITE INSPECTION

Reference is to be made to Clauses F.2.1.1(a) and F.2.7 of the Tender Data.

This is to certify that:

(entity name):

.....

of (address):

.....

.....

.....

was represented by the person(s) named below at the Clarification Meeting held for all tenderers, the details of which are stated in the Tender Data (F.2.7).

I / We acknowledge that the purpose of the meeting was to acquaint myself / ourselves with the site of the works and / or matters incidental to doing the work specified in the tender documents in order for me / us to take account of everything necessary when compiling our rates and prices included in the tender.

Particulars of person(s) attending the meeting:

Name:

Name:

Signature:

Signature:

Capacity:

Capacity:.....

Attendance of the above person(s) at the meeting is confirmed by the Employer's Agent's Representative, namely:

Name:

Signature:

Date:

T2.2.4 CONTRACTOR'S HEALTH AND SAFETY DECLARATION

If Functionality is applicable as part of tender evaluation, reference is to be made to Clause F3.11.9 of the of the Conditions of Tender.

Reference is to be made to **Clause F.3.13(h)** of the Tender Data.

In terms of Clause 5(1)(h) of the OHSA 1993 Construction Regulations 2014 (referred to as "the Regulations" hereafter), a Principal Contractor may only be appointed to perform construction work if the Client is satisfied that the Principal Contractor has the necessary competencies and resources to carry out the work safely in accordance with the Occupational Health and Safety Act No 85 of 1993 and the OHSA 1993 Construction Regulations 2014.

To that effect, a person duly authorised by the tenderer, must complete and sign the declaration hereafter in detail.

Declaration by Tenderer

- 1 I, the undersigned, hereby declare and confirm that I am fully conversant with the Occupational Health and Safety Act No 85 of 1993 (as amended by the Occupational Health and Safety Amendment Act No 181 of 1993), and the OHSA 1993 Construction Regulations 2014.
- 2 I hereby declare that my company has the competence and the necessary resources to safely carry out the construction work under this contract in compliance with the Construction Regulations and the Employer's Health and Safety Specifications.
- 3 I propose to achieve compliance with the Regulations by one of the following **(Tenderers are to Circle Applicable - Yes or No)**:

Circle Applicable	
Yes	NO
Yes	NO
YES	NO

- (a) From my own competent resources as detailed in 4(a) hereafter.
- (b) From my own resources still to be appointed or trained until competency is achieved, as detailed in 4(b) hereafter:
- (c) From outside sources by appointment of competent specialist Subcontractors as detailed in 4(c) hereafter:

4 Details of resources I propose:

(Note: Competent resources shall include safety personnel such as a construction supervisor and construction safety officer as defined in Regulation 8, and competent persons as defined in Regulations 9, 10, 11, 12, 13, 14, 16, 17, 20, 21, 22, 23(1), 24, 25, 26, 27, 28 and 29, as applicable).

(a) Details of the competent and qualified key persons from my company's own resources, who will form part of the contract team:

NAMES OF COMPETENT PERSONS	POSITIONS TO BE FILLED BY COMPETENT PERSONS

(b) Details of training of persons from my company's own resources (or to be hired) who still have to be trained to achieve the necessary competency:

- (i) By whom will training be provided?
- (ii) When will training be undertaken?
- (iii) Positions to be filled by persons to be trained or hired:

(c) Details of competent resources to be appointed as subcontractors if competent persons cannot be supplied from own company:

- Name of proposed subcontractor:
- Qualifications or details of competency of the subcontractor:

- 5 I, the undersigned, hereby undertake, if this tender is accepted, to provide, before commencement of the works under the contract, a suitable and sufficiently documented Health and Safety Plan in accordance with Regulation 7(1) of the Construction Regulations, which plan shall be subject to approval by the Client.
- 6 I, the undersigned, confirm that copies of this company's approved Health and Safety Plan, the Client's Safety Specifications as well as the OHS 1993 Construction Regulations 2014 will be provided on site and will at all times be available for inspection by the Principal Contractor's personnel, the Client's personnel, the Employer's Agent, visitors, and officials and inspectors of the Department of Labour.
- 7 I, the undersigned, hereby confirm that adequate provision has been made in the tendered rates and prices in the Bill of Quantities to cover the cost of all resources, actions, training and all health and safety measures envisaged in the OHS 1993 Construction Regulations 2014, and that I will be liable for any penalties that may be applied by the Client in terms of the said Regulations (Regulation 33) for failure on the Principal Contractor's part to comply with the provisions of the Act and the Regulations.
- 8 I, the undersigned, agree that failure to complete and execute this declaration to the satisfaction of the Client will mean that this company is unable to comply with the requirements of the OHS 1993 Construction Regulations (2014) and accept that this tender will be prejudiced and may be rejected at the discretion of the Client.

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct.

NAME (Block Capitals): _____

Date

SIGNATURE: _____

T2.2.5 MBD 4: DECLARATION OF INTEREST

MSCM Regulations: **“in the service of the state”** means to be:

- (a) a member of:
 - (i) any municipal council.
 - (ii) any provincial legislature.
 - (iii) the national Assembly or the national Council of provinces.
- (b) a member of the board of directors of any municipal enterprise.
- (c) an official of any municipality or municipal enterprise.
- (d) an employee of any national or provincial department, national or provincial public enterprise or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act No.1 of 1999).
- (e) a member of the accounting authority of any national or provincial public enterprise.
- (f) an employee of Parliament or a provincial legislature.

“Shareholder” means a person who owns shares in the company and is actively involved in the management of the company or business and exercises control over the company.

- 1 No bid will be accepted from persons **in the service of the state**¹.
- 2 Any person, having a kinship with persons **in the service of the state**, including a blood relationship, may make an offer or offers in terms of this invitation to bid. In view of possible allegations of favouritism, should the resulting bid, or part thereof, be awarded to persons connected with or related to **persons in service of the state**, it is required that the bidder or their authorised representative declare their position in relation to the evaluating/adjudicating authority and/or take an oath declaring his/her interest.
- 3 In order to give effect to the above, the following questionnaire must be completed and submitted with the bid.

- 3.1 Name of enterprise
- Name of enterprise’s representative
- 3.2 ID Number of enterprise’s representative
- 3.3 Position enterprise’s representative occupies in the enterprise
- 3.4 Company Registration number
- 3.5 Tax Reference number
- 3.6 VAT registration number

3.7 The names of all directors / trustees / shareholders / members / sole proprietors / partners in partnerships, their individual identity numbers and state employee numbers must be indicated in paragraph 4 below. In the case of a joint venture, information in respect of each partnering enterprise must be completed and submitted.

3.8 Are you presently in the service of the state?

Circle Applicable	
YES	NO

If yes, furnish particulars:

.....

3.9 Have you been in the service of the state for the past twelve months?

YES	NO
-----	----

 If yes, furnish particulars:

3.10 Do you have any relationship (family, friend, other) with persons in the service of the state and who may be involved with the evaluation and or adjudication of this bid?

YES	NO
-----	----

 If yes, furnish particulars:

3.11 Are you, aware of any relationship (family, friend, other) between any other bidder and any persons in the service of the state who may be involved with the evaluation and or adjudication of this bid?

YES	NO
-----	----

 If yes, furnish particulars:

3.12 Are any of the company's directors, trustees, managers, principle shareholders or stakeholders in service of the state?

YES	NO
-----	----

 If yes, furnish particulars:

3.13 Are any spouse, child or parent of the company's directors, trustees, managers, principle shareholders or stakeholders in service of the state?

YES	NO
-----	----

 If yes, furnish particulars:

3.14 Do you or any of the directors, trustees, managers, principle shareholders, or stakeholders of this company have any interest in any other related companies or business whether or not they are bidding for this contract ?

YES	NO
-----	----

 If yes, furnish particulars:

4 The names of all directors / trustees / shareholders / members / sole proprietors / partners in partnerships, their individual identity numbers and state employee numbers must be indicated below. In the case of a joint venture, information in respect of each partnering enterprise must be completed and submitted

Full Name	Identity No.	State Employee No.	Personal income tax No.
Use additional pages if necessary			

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct.

NAME (Block Capitals):

Date

SIGNATURE:

**T2.2.6 MBD 5: DECLARATION FOR PROCUREMENT ABOVE R10 MILLION
(ALL APPLICABLE TAXES INCLUDED)**

For all procurement expected to exceed R10 million (all applicable taxes included), bidders must complete the following questionnaire.

	Circle Applicable	
1.0 Are you by law required to prepare annual financial statements for auditing?	YES	NO
1.1 If YES, submit audited annual financial statements for the past three years or since the date of establishment if established during the past three years.		
2.0 Do you have any outstanding undisputed commitments for municipal services towards any municipality for more than three months or any other service provider in respect of which payment is overdue for more than 30 days?	YES	NO
2.1 If NO, this serves to certify that the bidder has no undisputed commitments for municipal services towards any municipality for more than three months or other service provider in respect of which payment is overdue for more than 30 days.		
2.2 If YES, provide particulars.		
3.0 Has any contract been awarded to you by an organ of state during the past five years, including particulars of any material non-compliance or dispute concerning the execution of such contract?	YES	NO
3.1 If YES, provide particulars.		
4.0 Will any portion of goods or services be sourced from outside the Republic, and, if so, what portion and whether any portion of payment from the municipality / municipal entity is expected to be transferred out of the Republic?	YES	NO
4.1 If YES, provide particulars.		

If required by 1.1 above, Tenderers are to include, at the back of their tender submission, a printout of their audited annual financial statements.

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct, and, if required, that the requested documentation has been included in the tender submission.

NAME (Block Capitals): **Date**

SIGNATURE:

T2.2.7 **MBD 6.1: PREFERENCE POINTS CLAIM** **In terms of THE PREFERENTIAL PROCUREMENT REGULATIONS (2022)**

Reference is to be made to Clause F.3.11 of the Tender Data.

This preference form must form part of all tenders invited. It contains general information and serves as a claim form for preference points for specific goals.

NB: BEFORE COMPLETING THIS FORM, TENDERERS MUST STUDY THE GENERAL CONDITIONS, DEFINITIONS AND DIRECTIVES APPLICABLE IN RESPECT OF THE TENDER AND PREFERENTIAL PROCUREMENT REGULATIONS, 2022

1.0 GENERAL CONDITIONS

- 1.1 The following preference point systems are applicable to invitations to tender:
- the 80/20 system for requirements with a Rand value of up to R50 000 000 (all applicable taxes included).
 - the 90/10 system for requirements with a Rand value above R50 000 000 (all applicable taxes included).
- 1.2 The applicable preference point system for this tender is the 90/10 preference point system.
- 1.3 Preference Points for this tender shall be awarded for:
- **Price and Specific Goals:** Either 80 or 90 (price) and 20 or 10 (specific goals), in terms of 1.2 above.
 - The total Preference Points, for Price and Specific Goals, is 100.
- 1.4 Failure on the part of the tenderer to submit the required proof or documentation, in terms of the requirements in the Conditions of Tender for claiming specific goal preference points, will be interpreted that preference points for specific goals are not claimed.
- 1.5 The Municipality reserves the right to require of a tenderer, either before a tender is adjudicated or at any time subsequently, to substantiate any claim in regard of preferences, in any manner required by the Municipality.

2.0 DEFINITIONS

- 2.1 **“tender”** means a written offer in the form determined by an organ of state in response to an invitation to provide goods or services through price quotations, competitive tendering process or any other method envisaged in legislation.
- 2.2 **“price”** means an amount of money tendered for goods or services, and includes all applicable taxes less all unconditional discounts.
- 2.3 **“rand value”** means the total estimated value of a contract in Rand, calculated at the time of bid invitation, and includes all applicable taxes.
- 2.4 **“tender for income-generating contracts”** means a written offer in the form determined by Municipality in response to an invitation for the origination of income-generating contracts through any method envisaged in legislation that will result in a legal agreement between the Municipality and a third party that produces revenue for the Municipality, and includes, but is not limited to, leasing and disposal of assets and concession contracts, excluding direct sales and disposal of assets through public auctions.
- 2.5 **“the Act”** means the Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000).

3.0 FORMULA FOR CALCULATION OF PREFERENCE PRICE POINTS

3.1 PROCUREMENT OF GOODS AND SERVICES

POINTS AWARDED FOR PRICE: A maximum of 80 or 90 points is allocated for price on the following basis:

<u>80 / 20 Points System</u>	OR	<u>90 / 10 Points System</u>
$P_s = 80 \left(1 - \frac{P_t - P_{min}}{P_{min}} \right)$		$P_s = 90 \left(1 - \frac{P_t - P_{min}}{P_{min}} \right)$

Where: P_s = Points scored for price of tender under consideration, P_t = Price of tender under consideration, P_{min} = Price of lowest acceptable tender

4.0 POINTS AWARDED FOR SPECIFIC GOALS

- 4.1 In terms of Regulation 4(2); 5(2); 6(2) and 7(2) of the Preferential Procurement Regulations, preference points must be awarded for specific goals stated in the tender. For the purposes of this tender the tenderer will be allocated points based on the goal(s) stated in **Table 1** below, as supported by proof/ documentation stated in the **Conditions of Tender**:
- 4.2 In cases where organs of state intend to use Regulation 3(2) of the Regulations, which states that if it is unclear whether the 80/20 or 90/10 preference point system applies, an organ of state must, in the tender documents, stipulate in the case of:
- an invitation for tender for income-generating contracts, that either the 80/20 or 90/10 preference point system will apply and that the highest acceptable tender will be used to determine the applicable preference point system, or
 - any other invitation for tender, that either the 80/20 or 90/10 preference point system will apply and that the lowest acceptable tender will be used to determine the applicable preference point system,
- then the organ of state must indicate the points allocated for specific goals for both the 90/10 and 80/20 preference point system.

TABLE 1: Specific Goals for the tender and maximum points for each goal are indicated per the table below. **Tenderers are to indicate their points claim for each of the Specific Goals in the shaded blocks.**

The Specific Goals to be allocated points in terms of this tender	Maximum Number of points ALLOCATED (90/10 system)	Number of points CLAIMED (90/10 system)
Ownership Goal: Race (black)	5.625	
Ownership Goal: Gender (female)	1.875	
RDP Goal: The promotion of South African owned enterprises	2.5	
Total CLAIMED Points (Maximum 10)		

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, certify that the points claimed, based on the specific goals as specified in the tender, qualifies the tendering entity for the preference(s) shown.

I acknowledge that:

- The information furnished is true and correct.
- The preference points claimed are in accordance with the General Conditions as indicated in paragraph 1 of this form.
- In the event of a contract being awarded as a result of points claimed as shown in paragraphs 1.4 and 4.2, the contractor may be required to furnish documentary proof to the satisfaction of the organ of state that the claims are correct.
- If the specific goals have been claimed or obtained on a fraudulent basis, or any of the conditions of contract have not been fulfilled, the organ of state may, in addition to any other remedy it may have:
 - disqualify the person from the tendering process.
 - recover costs, losses or damages it has incurred or suffered as a result of that person's conduct.
 - cancel the contract and claim any damages which it has suffered as a result of having to make less favourable arrangements due to such cancellation.
 - recommend that the tenderer or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, be restricted from obtaining business from any organ of state for a period not exceeding 10 years, after the *audi alteram partem* (hear the other side) rule has been applied; and
 - forward the matter for criminal prosecution, if deemed necessary.

NAME (Block Capitals): _____

Date

SIGNATURE: _____

T2.2.8 MBD 8: DECLARATION OF BIDDER'S PAST SUPPLY CHAIN MANAGEMENT PRACTICES

- 1.0 This Municipal Bidding Document must form part of all bids invited.
- 2.0 It serves as a declaration to be used by municipalities and municipal entities in ensuring that when goods and services are being procured, all reasonable steps are taken to combat the abuse of the supply chain management system.
- 3.0 The bid of any bidder may be rejected if that bidder, or any of its directors have:
 - a) abused the municipal entity’s supply chain management system or committed any improper conduct in relation to such system.
 - b) been convicted for fraud or corruption during the past five years.
 - c) wilfully neglected, reneged on or failed to comply with any government, municipal or other public sector contract during the past five years.
 - d) been listed in the Register for Tender Defaulters in terms of section 29 of the Prevention and Combating of Corrupt Activities Act (No 12 of 2004).

4.0 In order to give effect to the above, the following questions must be completed and submitted with the bid.

4.1 Is the bidder or any of its directors listed on the National Treasury’s Database of Restricted Suppliers as companies or persons prohibited from doing business with the public sector?

(Companies or persons who are listed on this Database were informed in writing of this restriction by the Accounting Officer / Authority of the institution that imposed the restriction after the audi alteram partem rule was applied.)

The Database of Restricted Suppliers now resides on the National Treasury’s website (www.treasury.gov.za) and can be accessed by clicking on its link at the bottom of the home page.

Circle Applicable	
YES	NO

4.1.1 If YES, provide particulars.

.....

.....

4.2 Is the bidder or any of its directors listed on the Register for Tender Defaulters in terms of section 29 of the Prevention and Combating of Corrupt Activities Act (No 12 of 2004)?

The Register for Tender Defaulters can be accessed on the National Treasury’s website (www.treasury.gov.za) by clicking on its link at the bottom of the home page.

YES	NO
-----	----

4.2.1 If YES, provide particulars.

.....

.....

4.3 Was the bidder or any of its directors convicted by a court of law (including a court of law outside the Republic of South Africa) for fraud or corruption during the past five years?

YES	NO
-----	----

4.3.1 If YES, provide particulars.

.....

.....

4.4 Does the bidder or any of its directors owe any municipal rates and taxes or municipal charges to the municipality / municipal entity, or to any other municipality / municipal entity, that is in arrears for more than three months?

YES	NO
-----	----

4.4.1 If YES, provide particulars.

.....

.....

4.5 Was any contract between the bidder and the municipality / municipal entity or any other organ of state terminated during the past five years on account of failure to perform on or comply with the contract?

YES	NO
-----	----

4.5.1 If YES, provide particulars.

.....

.....

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct.

I accept that, in addition to cancellation of a contract, action may be taken against me should this declaration prove to be false.

NAME (Block Capitals):

Date

.....

SIGNATURE:

.....

T2.2.9 MBD 9: CERTIFICATE OF INDEPENDENT BID DETERMINATION**NOTES**

- ¹ Includes price quotations, advertised competitive bids, limited bids and proposals.
- ² Bid rigging (or collusive bidding) occurs when businesses, that would otherwise be expected to compete, secretly conspire to raise prices or lower the quality of goods and / or services for purchasers who wish to acquire goods and / or services through a bidding process. Bid rigging is, therefore, an agreement between competitors not to compete.
- ³ Joint venture or Consortium means an association of persons for the purpose of combining their expertise, property, capital, efforts, skill and knowledge in an activity for the execution of a contract.

- 1.0 This Municipal Bidding Document (MBD) must form part of all **bids**¹ invited.
- 2.0 Section 4 (1) (b) (iii) of the Competition Act No. 89 of 1998, as amended, prohibits an agreement between, or concerted practice by, firms, or a decision by an association of firms, if it is between parties in a horizontal relationship and if it involves collusive bidding (or **bid rigging**).² Collusive bidding is a *pe se* prohibition meaning that it cannot be justified under any grounds.
- 3.0 Municipal Supply Regulation 38 (1) prescribes that a supply chain management policy must provide measures for the combating of abuse of the supply chain management system, and must enable the accounting officer, among others, to:
- a. take all reasonable steps to prevent such abuse;
 - b. reject the bid of any bidder if that bidder or any of its directors has abused the supply chain management system of the municipality or municipal entity or has committed any improper conduct in relation to such system; and
 - c. cancel a contract awarded to a person if the person committed any corrupt or fraudulent act during the bidding process or the execution of the contract.
- 4.0 This MBD serves as a certificate of declaration that would be used by institutions to ensure that, when bids are considered, reasonable steps are taken to prevent any form of **bid rigging**.
- 5.0 In order to give effect to the above, the attached Certificate of Bid Determination (MBD 9) must be completed and submitted with the bid.

CERTIFICATE OF INDEPENDENT BID DETERMINATION

I, the undersigned, in submitting the accompanying bid:

(Bid Number and Description)

in response to the invitation for the bid made by:

(Name of Municipality / Municipal Entity)

do hereby make the following statements that I certify to be true and complete in every respect.

I certify, on behalf of:

(Name of Bidder)

that:

1. I have read and I understand the contents of this Certificate.
2. I understand that the accompanying bid will be disqualified if this Certificate is found not to be true and complete in every respect.
3. I am authorized by the bidder to sign this Certificate, and to submit the accompanying bid, on behalf of the bidder;
4. Each person whose signature appears on the accompanying bid has been authorized by the bidder to determine the terms of, and to sign, the bid, on behalf of the bidder;
5. For the purposes of this Certificate and the accompanying bid, I understand that the word "competitor" shall include any individual or organization, other than the bidder, whether or not affiliated with the bidder, who:
 - (a) has been requested to submit a bid in response to this bid invitation.
 - (b) could potentially submit a bid in response to this bid invitation, based on their qualifications, abilities or experience.
 - (c) provides the same goods and services as the bidder and/or is in the same line of business as the bidder.
6. The bidder has arrived at the accompanying bid independently from, and without consultation, communication, agreement, or arrangement with any competitor. However, communication between partners in a joint venture or consortium³ will not be construed as collusive bidding.

-
7. In particular, without limiting the generality of paragraphs 6 above, there has been no consultation, communication, agreement or arrangement with any competitor regarding:
- (a) prices.
 - (b) geographical area where product or service will be rendered (market allocation).
 - (c) methods, factors or formulas used to calculate prices.
 - (d) the intention or decision to submit or not to submit, a bid.
 - (e) the submission of a bid which does not meet the specifications and conditions of the bid.
 - (f) bidding with the intention not to win the bid.
8. In addition, there have been no consultations, communications, agreements, or arrangements with any competitor regarding the quality, quantity, specifications and conditions or delivery particulars of the products or services to which this bid invitation relates.
9. The terms of the accompanying bid have not been, and will not be, disclosed by the bidder, directly or indirectly, to any competitor, prior to the date and time of the official bid opening or of the awarding of the contract.
10. I am aware that, in addition and without prejudice to any other remedy provided to combat any restrictive practices related to bids and contracts, bids that are suspicious will be reported to the Competition Commission for investigation and possible imposition of administrative penalties in terms of section 59 of the Competition Act No 89 of 1998 and or may be reported to the National Prosecuting Authority (NPA) for criminal investigation and or may be restricted from conducting business with the public sector for a period not exceeding ten (10) years in terms of the Prevention and Combating of Corrupt Activities Act No 12 of 2004 or any other applicable legislation.

NAME (Block Capitals): _____

Date

SIGNATURE: _____

T2.2.10 JOINT VENTURES AGREEMENTS

If this tender submission is to be made by an established Joint Venture, the Joint Venture Agreements and Power of Attorney Agreements are to be attached here.

Should the Joint Venture, at the time of submission, not yet be formalised, this form is to be completed in full and signed by all parties to the proposed Joint Venture.

The Lead Partner of the Joint Venture is to sign the Form of Offer in **Part C1.1.1**.

INTENT TO FORM A JOINT VENTURE

Should our submission for CONTRACT: **1R-28004** be successful, a Joint Venture will be established by the parties as listed below, as an unincorporated association, with the purposes of securing and executing the Contract, for the benefit of the Members.

Proposed Joint Venture

Joint Venture Title (name):

Represented by (name): Tel:

Lead Partner/ Member 1

Entity Name:

Ownership Interest in JV %: CSD Registration:

CIDB #: Vendor Portal:

Represented by (name): _____ Signature: _____

Partner/ Member 2

Entity Name:

Ownership Interest in JV %: CSD Registration:

CIDB #: Vendor Portal:

Represented by (name): _____ Signature: _____

Partner/ Member 3

Entity Name:

Ownership Interest in JV %: CSD Registration:

CIDB #: Vendor Portal:

Represented by (name): _____ Signature: _____

Note: All requirements for Joint Ventures, as stated elsewhere in this procurement document, must be complied with in full.

T2.2.11 RECORD OF ADDENDA TO TENDER DOCUMENTS

I / We confirm that the following communications received from the Employer or his representative before the date of submission of this tender offer, amending the tender documents, have been taken into account in this tender offer.

ADD.No	DATE	TITLE OR DETAILS
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct.

It is also confirmed that the requirements, as stated on the Addenda, have been complied with.

NAME (Block Capitals): _____

Date

SIGNATURE: _____

T2.2.12 DECLARATION OF MUNICIPAL FEES

Reference is to be made to **Clauses F.2.23 and F.3.13(a)** of the Tender Data.

I, the undersigned, do hereby declare that the Municipal fees of:

.....
 (full name of Company / Close Corporation / partnership / sole proprietary/Joint Venture)

(hereinafter referred to as the TENDERER) are, as at the date hereunder, fully paid or an Acknowledgement of Debt has been concluded with the Municipality to pay the said charges in instalments.

The following account details relate to property of the said TENDERER:

<u>Account</u>	<u>Account Number: to be completed by tenderer</u>											
Consolidated Account												
Electricity												
Water												
Rates												
JSB Levies												
Other												

- If applicable, a copy of a recent (within the past 3 months) Metro Bill is to be provided.

I acknowledge that should the aforesaid Municipal charges fall into arrears, the Municipality may take such remedial action as is required, including termination of any contract, and any payments due to the Contractor by the Municipality shall be first set off against such arrears.

- Where the tenderer’s place of business or business interests are outside the jurisdiction of eThekweni municipality, a copy of the accounts/ agreements from the relevant municipality are to be provided.
- Where the tenderer’s Municipal Accounts are part of their lease agreement, then a copy of the agreement, or an official letter to that effect, is to be provided.
- Where a tenderer’s place of business or business interests are carried out from premises as part of any other agreement, then a copy of the agreement, or an official letter to that effect, is to be provided.

Tenderers are to include, at the back of their tender submission, copies of the above-mentioned account’s, agreements signed with the municipality, lease agreements, or official letters.

*I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct, **and that the requested documentation has been included in the tender submission.***

NAME (Block Capitals): _____

Date

SIGNATURE: _____

T2.2.13 REGISTRATION WITH COMPENSATION COMMISSIONER

Reference is to be made to **Clauses F.2.23 and F.3.13(d)** of the Tender Data.

The Occupational Injuries and Diseases Act (130 of 1993 as amended) (the Act) refers. A summary of the pertinent Clauses are listed below. The act is to be referenced for the full text of the clauses.

Clause 80: Employer to register with commissioner and furnish him with particulars

The Act requires that an Employer carrying out business in the Republic to register with the Compensation Commissioner. Any person who fails to comply with the provisions of the this clause is guilty of an offence.

Clause 82: Employer to furnish returns of earnings

The Act requires an Employer to furnish the commissioner with a return showing:

- The amount of earnings paid by him to his employees.
- Any further information as may be prescribed or as the commissioner may require.

Any Employer who fails to comply with the provisions of the this clause is guilty of an offence.

Clause 86: Assessment to be paid by an employer to commissioner

The Act states that an Employer will receive notices of assessment from the commissioner. The Employer must pay the commissioner the assessment amount on the notices.

Clause 89: Mandators and contractors

The Act requires a contractor (a person with a contract with a mandator) to register as an Employer in accordance with the provisions of the Act and pay the necessary assessments. Failing registration or payment of assessments, the mandator is required to pay the assessments in respect of the employees of the contractor. The mandator is allowed to recover the assessment amounts paid from the contractor.

The Department of labour issues contractors with a **Letter of Good Standing** if the contractor has complied with the requirement(s) of the Act and is in "good standing" with the Compensation Fund. Employers can check the validity of such Letters of Good Standing on the internet (<https://cfoonline.labour.gov.za/VerifyLOGS>).

If required to be registered in terms of the Occupational Injuries and Diseases Act, Tenderers are to include, at the back of their tender submission, a printout of their most recent Letter of Good Standing from the Department of Labour, and if application for renewal has been made, proof of such application.

*I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct, **and that the requested documentation has been included in the tender submission.***

NAME (Block Capitals): _____

Date

SIGNATURE: _____

T2.2.14 CSD REGISTRATION REPORT

Reference is to be made to **Clauses F.2.1.1(b) and F.2.23** of the Tender Data.

The Conditions of Tender, Clause F.2.1: Eligibility, requires a tenderer to be registered, at the time of tender closing, on the **National Treasury Central Supplier Database (CSD)** as a service provider.

CSD Registration Reports can be obtained from the National Treasury’s CSD website at <https://secure.csd.gov.za/Account/Login>.

The date of obtaining the printout is to be indicated on the printout.

The following is an example of the beginning of the printout obtained from the above website.

Tenderers are to include, at the back of their tender submission, a printout of their (full) CSD Registration Report.

*I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct, **and that the requested documentation has been included in the tender submission.***

NAME (Block Capitals): _____

Date

SIGNATURE: _____

T2.2.15 VERIFICATION OF CIDB REGISTRATION AND STATUS

Reference is to be made to **Clauses F.2.1.2, F.2.23, and F.3.13(c)** of the Tender Data.

The Conditions of Tender, **Clause F.2.1.1: Eligibility**, requires a tenderer to be registered, as "Active", with the CIDB (at time of tender closing), in a contractor grading designation equal to or higher than a contractor grading designation determined in accordance with the sum tendered, or a value determined in accordance with Regulation 25 (1B) or 25(7A) of the Construction Industry Development Regulations.

The required class of construction work is specified in **Clause F.2.1.2** of the Tender Data.

CIDB Registrations can be obtained from the CIDB website at:

<https://registers.cidb.org.za/PublicContractors/ContractorSearch>.

The date of obtaining the printout is to be indicated on the printout.

The following is an example of the beginning of the printout obtained from the above website.

Home

Contractor Detail Print

Contractor Detail

CRS Number: Type of Enterprise:

Contractor Name: Registration Date:

Trading Name: Expiry Date:

Status:

Contractor Grades

Grade:

Back

Copyright © cidb 2011. All rights reserved
[Website technical enquires contact](#)

01/01/2017

Tenderers are to include, at the back of their tender submission, a printout of their registration with the CIDB.

*I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct, **and that the requested documentation has been included in the tender submission.***

NAME (Block Capitals): _____

Date

SIGNATURE: _____

T2.2.16 ELIGIBILITY: EXPERIENCE OF TENDERER

Reference is to be made to F.2.1.3 of the Tender Data.

Only those Tenderers that can demonstrate experience and submit the associated documentation/ information, in works of a similar nature, within the past 10 years, will be eligible to have their tenders evaluated in terms of Clause F.3.11.

- The **Eligibility Criteria Requirement** is as stated on **Table 1: “Experience Requirement”**.
- The experience is to be **“Similar in Nature”** to that specified on **Table 2: “Works of a Similar Nature”**. Tenderers are to note the exclusions (if any) stated on this table.
- The **Documentation/ Information** that is required is specified on **Table 3: “Documentation/ Information Requirements”** (which includes the Notes below the table).
- Tenderers may submit experience gained as **Sub-Contractors or Main Contractors**.

It is the responsibility of the tenderer to ensure that the experience submissions comply with the requirements as stated in F.2.1.3 of the Tender Data.

Guidance to Tenderers: Experience Submission Form

Client / Employer Details

- Provide details for whom the works were carried out (works owner).
- Provide **Contact details of the Client or Main Contractor** (if experience was gained as a sub-contractor) is required to be provided.

The contact details may be used by the Employer to verify the information, pertaining to the experience submission. Should the Employer’s reasonable attempts to make contact with the Client or Main Contractor fail (for whatever reason), that specific experience submission may be considered invalid.

Contract Details

- Provide the **Contract Reference Number** and **Contract Title**.
- Indicate if this contract has been completed or is still in progress.
- Provide **Contract Dates**.
- Provide **Contract Values** - Where works are still in progress, provide the value of works that have been completed as detailed on the most recent payment to the Contractor / Sub-Contractor. If the works are complete, provide the Final Value of the sub-contract or Final Contract Price.

Scope of Works

- Indicate the **Works Type(s)** that best describe the works included in the project.
Select the most applicable option (only 1).
- Indicate the **Works Elements(s)** that were included in the project.
Select any elements that were included in the contract.

Joint Ventures

In the event of a Joint Venture (JV) tendering for this contract, experience gained by the separate entities making up the JV may be used as experience, provided that the experience complies with the requirements, as stipulated in **Table 1**, and that the required documentation/ information is provided.

(T2.2.16 is continued on the next page)

Confirmation of submission of Information/ Documentation

The Tenderer is to indicate (by marking with an “X” in the shaded column) the documentation that has been included in this tender submission, in support of each experience submission.

		If submitted, mark with an “X”
SUBMISSION #1	Experience Submission Form (completed and signed)	
	Proof of Sub-Contract Agreement (if experience was gained as a sub-contractor)	
	Letter of Award OR Form of Offer & Acceptance	
	Most recent Payment Certificate, OR most recent INVOICE, with Quantities summary	
	Final Payment Certificate, OR most recent INVOICE, with Quantities summary	
	Completion Certificate	
SUBMISSION #2	Experience Submission Form (completed and signed)	
	Proof of Sub-Contract Agreement (if experience was gained as a sub-contractor)	
	Letter of Award OR Form of Offer & Acceptance	
	Most recent Payment Certificate, OR most recent INVOICE, with Quantities summary	
	Final Payment Certificate, OR most recent INVOICE, with Quantities summary	
	Completion Certificate	
SUBMISSION #3	Experience Submission Form (completed and signed)	
	Proof of Sub-Contract Agreement (if experience was gained as a sub-contractor)	
	Letter of Award OR Form of Offer & Acceptance	
	Most recent Payment Certificate, OR most recent INVOICE, with Quantities summary	
	Final Payment Certificate, OR most recent INVOICE, with Quantities summary	
	Completion Certificate	
SUBMISSION #4	Experience Submission Form (completed and signed)	
	Proof of Sub-Contract Agreement (if experience was gained as a sub-contractor)	
	Letter of Award OR Form of Offer & Acceptance	
	Most recent Payment Certificate, OR most recent INVOICE, with Quantities summary	
	Final Payment Certificate, OR most recent INVOICE, with Quantities summary	
	Completion Certificate	
SUBMISSION #5	Experience Submission Form (completed and signed)	
	Proof of Sub-Contract Agreement (if experience was gained as a sub-contractor)	
	Letter of Award OR Form of Offer & Acceptance	
	Most recent Payment Certificate, OR most recent INVOICE, with Quantities summary	
	Final Payment Certificate, OR most recent INVOICE, with Quantities summary	
	Completion Certificate	

Note: Should there be insufficient evidence for verification of the information submitted for any specific experience submission, that experience submission may be deemed invalid.

*I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct, **and that the requested documentation has been included in the tender submission.***

NAME (Block Capitals): _____

Date

SIGNATURE: _____

EXPERIENCE SUBMISSION #1

Reference is to be made to **Clause F.2.1.3** of the Tender Data.

(Where required, in the shaded areas, clearly mark selection with an "X" or circle applicable)

Experience as a:	Sub-Contractor:		Main Contractor:																	
Client/ Employer OR Main Contractor's Details Should the Employer's reasonable attempts to make contact, to verify the information provided, fail (for whatever reason) this experience submission may be considered invalid.	Entity Name:																			
	Contact Name:																			
	Contact Tel:					-														
	Contact Cell:					-														
	Contact email / other:																			
Enter the Client/ Employer's details, OR, if the works was done as a sub-contractor, enter the Main Contractor's Details																				

Contract Details	Contract (Reference) Number:																			
	Contract Title:																			
	Has this Contract been completed?	Y	N	Commencement Date:	d	d	m	m	2	0	y	y	Completion Date (if applicable):	d	d	m	m	2	0	y
Tendered Value (Contract Sum) OR Sub-Contract Value:	R	Final Contract Price OR Final Value of Sub-Contract:										R								

Contract Scope-of-Work (Type of Project and Works Elements):

Which Works Type(s) best describe the project?		special maintenance	
road rehabilitation		intersection improvements	
road widening/upgrades		access road upgrades	
new road construction		major parking areas	
OTHER: provide a description of the type of project			

Which Works Element(s) were included in the project?		asphalt roadway surfacing	
roadway layer-works		sidewalk/ walkway construction	
kerbing/ channelling		stormwater drainage	
traffic calming measures		dealing with underground services	
retaining structures			
OTHER: List works elements included in project			

Confirmation of documentation submitted is to be recorded on Page 42.

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct, and that the requested documentation has been included in the tender submission.

NAME (Block Capitals): _____ **Date**

SIGNATURE: _____

EXPERIENCE SUBMISSION #2

Reference is to be made to **Clause F.2.1.3** of the Tender Data.

(Where required, in the shaded areas, clearly mark selection with an "X" or circle applicable)

Experience as a:	Sub-Contractor:		Main Contractor:									
Client/ Employer OR Main Contractor's Details Should the Employer's reasonable attempts to make contact, to verify the information provided, fail (for whatever reason) this experience submission may be considered invalid.	Entity Name:											
	Contact Name:											
	Contact Tel:			-				-				
	Contact Cell:			-				-				
	Contact email / other:											
Enter the Client/ Employer's details, OR, if the works was done as a sub-contractor, enter the Main Contractor's Details												

Contract Details	Contract (Reference) Number:																			
	Contract Title:																			
	Has this Contract been completed?	Y	N	Commencement Date:	d	d	m	m	2	0	y	y	Completion Date (if applicable):	d	d	m	m	2	0	y
Tendered Value (Contract Sum) OR Sub-Contract Value:	R	Final Contract Price OR Final Value of Sub-Contract:		R																

Contract Scope-of-Work (Type of Project and Works Elements):

Which Works Type(s) best describe the project?		special maintenance	
road rehabilitation		intersection improvements	
road widening/upgrades		access road upgrades	
new road construction		major parking areas	
OTHER: provide a description of the type of project			

Which Works Element(s) were included in the project?		asphalt roadway surfacing	
roadway layer-works		sidewalk/ walkway construction	
kerbing/ channelling		stormwater drainage	
traffic calming measures		dealing with underground services	
retaining structures			
OTHER: List works elements included in project			

Confirmation of documentation submitted is to be recorded on Page 42.

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct, and that the requested documentation has been included in the tender submission.

NAME (Block Capitals): _____ **Date**

SIGNATURE: _____

EXPERIENCE SUBMISSION #3

Reference is to be made to **Clause F.2.1.3** of the Tender Data.

(Where required, in the shaded areas, clearly mark selection with an "X" or circle applicable)

Experience as a:	Sub-Contractor:		Main Contractor:
-------------------------	-----------------	--	------------------

Client/ Employer OR Main Contractor's Details <small>Should the Employer's reasonable attempts to make contact, to verify the information provided, fail (for whatever reason) this experience submission may be considered invalid.</small>	Entity Name:	
	Contact Name:	
	Contact Tel:	- - - - -
	Contact Cell:	- - - - -
	Contact email / other:	
Enter the Client/ Employer's details, OR, if the works was done as a sub-contractor, enter the Main Contractor's Details		

Contract Details	Contract (Reference) Number:	
	Contract Title:	
	Has this Contract been completed?	Y N
	Commencement Date:	d d m m 2 0 y y
	Completion Date (if applicable):	d d m m 2 0 y y
Tendered Value (Contract Sum) OR Sub-Contract Value:	R	Final Contract Price OR Final Value of Sub-Contract: R

Contract Scope-of-Work (Type of Project and Works Elements):

Which Works Type(s) best describe the project?		
road rehabilitation		special maintenance
road widening/upgrades		intersection improvements
new road construction		access road upgrades
OTHER: provide a description of the type of project		major parking areas

Which Works Element(s) were included in the project?		
roadway layer-works		asphalt roadway surfacing
kerbing/ channelling		sidewalk/ walkway construction
traffic calming measures		stormwater drainage
retaining structures		dealing with underground services
OTHER: List works elements included in project		

Confirmation of documentation submitted is to be recorded on Page 42.

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct, and that the requested documentation has been included in the tender submission.

NAME (Block Capitals): _____

Date

SIGNATURE: _____

EXPERIENCE SUBMISSION #4

Reference is to be made to **Clause F.2.1.3** of the Tender Data.

(Where required, in the shaded areas, clearly mark selection with an "X" or circle applicable)

Experience as a:	Sub-Contractor:		Main Contractor:											
Client/ Employer OR Main Contractor's Details Should the Employer's reasonable attempts to make contact, to verify the information provided, fail (for whatever reason) this experience submission may be considered invalid.	Entity Name:													
	Contact Name:													
	Contact Tel:					-				-				
	Contact Cell:					-				-				
	Contact email / other:													
Enter the Client/ Employer's details, OR, if the works was done as a sub-contractor, enter the Main Contractor's Details														

Contract Details	Contract (Reference) Number:																			
	Contract Title:																			
	Has this Contract been completed?	Y	N	Commencement Date:	d	d	m	m	2	0	y	y	Completion Date (if applicable):	d	d	m	m	2	0	y
Tendered Value (Contract Sum) OR Sub-Contract Value:	R	Final Contract Price OR Final Value of Sub-Contract:						R												

Contract Scope-of-Work (Type of Project and Works Elements):

Which Works Type(s) best describe the project?		special maintenance	
road rehabilitation		intersection improvements	
road widening/upgrades		access road upgrades	
new road construction		major parking areas	
OTHER: provide a description of the type of project			

Which Works Element(s) were included in the project?		asphalt roadway surfacing	
roadway layer-works		sidewalk/ walkway construction	
kerbing/ channelling		stormwater drainage	
traffic calming measures		dealing with underground services	
retaining structures			
OTHER: List works elements included in project			

Confirmation of documentation submitted is to be recorded on Page 42.

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct, and that the requested documentation has been included in the tender submission.

NAME (Block Capitals): _____ **Date**

SIGNATURE: _____

EXPERIENCE SUBMISSION #5

Reference is to be made to **Clause F.2.1.3** of the Tender Data.

(Where required, in the shaded areas, clearly mark selection with an "X" or circle applicable)

Experience as a:	Sub-Contractor:		Main Contractor:											
Client/ Employer OR Main Contractor's Details Should the Employer's reasonable attempts to make contact, to verify the information provided, fail (for whatever reason) this experience submission may be considered invalid.	Entity Name:													
	Contact Name:													
	Contact Tel:					-				-				
	Contact Cell:					-				-				
	Contact email / other:													
Enter the Client/ Employer's details, OR, if the works was done as a sub-contractor, enter the Main Contractor's Details														

Contract Details	Contract (Reference) Number:																			
	Contract Title:																			
	Has this Contract been completed?	Y	N	Commencement Date:	d	d	m	m	2	0	y	y	Completion Date (if applicable):	d	d	m	m	2	0	y
Tendered Value (Contract Sum) OR Sub-Contract Value:	R	Final Contract Price OR Final Value of Sub-Contract:						R												

Contract Scope-of-Work (Type of Project and Works Elements):

Which Works Type(s) best describe the project?		special maintenance	
road rehabilitation		intersection improvements	
road widening/upgrades		access road upgrades	
new road construction		major parking areas	
OTHER: provide a description of the type of project			

Which Works Element(s) were included in the project?		asphalt roadway surfacing	
roadway layer-works		sidewalk/ walkway construction	
kerbing/ channelling		stormwater drainage	
traffic calming measures		dealing with underground services	
retaining structures			
OTHER: List works elements included in project			

Confirmation of documentation submitted is to be recorded on Page 42.

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct, and that the requested documentation has been included in the tender submission.

NAME (Block Capitals): _____

Date

SIGNATURE: _____

T2.2.17 EXPERIENCE OF KEY PERSONNEL

The experience of assigned staff member in relation to the Scope of Work will be evaluated from three different points of view:

- 1) General experience (total duration of professional activity), level of education and training and positions held of each discipline specific team leader.
- 2) The education, training, skills and experience of the Assigned Staff in the specific sector, field, subject, etc which is directly linked to the scope of work.
- 3) The key staff members' / experts' knowledge of issues which the tenderer considers pertinent to the project e.g. local conditions, affected communities, legislation, techniques etc.

A CV of the contract manager, site agent(s) and general foreman of not more than 2 pages should be attached to this schedule:

Each CV should be structured under the following headings:

- a) Personal particulars
 - name
 - date and place of birth
 - place (s) of tertiary education and dates associated therewith
 - professional awards
- b) Qualifications (degrees, diplomas, grades of membership of professional societies and professional registrations) - including certified copies.
- c) Skills
- d) Name of current employer and position in enterprise
- e) Overview of post-graduate / diploma experience (year, organization and position)
- f) Outline of recent assignments / experience that has a bearing on the scope of work in the following format:

Position / Role	Project Description	Works category (road construction / road rehabilitation)	Start date (mm-yyyy)	End date (mm-yyyy)

I, the undersigned, who warrants that they are authorised to sign on behalf of the Tenderer, confirms that the information contained in this form is within my personal knowledge and is to the best of my belief both true and correct.

NAME (Block Capitals): _____

Date

SIGNATURE: _____

PART C1: AGREEMENT AND CONTRACT DATA

C1.1: FORM OF OFFER AND ACCEPTANCE

C1.1.1: OFFER

The Employer, identified in the Acceptance signature block, has solicited offers to enter into a contract in respect of the following works:

Contract No.: 1R-28004

Contract Title: Rehabilitation of various roads located in the Western Region of eThekweni Municipality, as and when required, for a period of 36 months

The Tenderer, identified in the Offer signature block below, has examined the documents listed in the Tender Data and addenda thereto as listed in the Tender Schedules, and by submitting this Offer has accepted the Conditions of Tender.

By the representative of the Tenderer, deemed to be duly authorised, signing this part of this Form of Offer and Acceptance, the Tenderer offers to perform all of the obligations and liabilities of the Contractor under the Contract including compliance with all its terms and conditions according to their true intent and meaning for an amount to be determined in accordance with the Conditions of Contract identified in the Contract Data.

*** The offered total of the prices inclusive of Value Added Tax is:**

R..... (In words
.....)

This Offer may be accepted by the Employer by signing the Acceptance part of this Form of Offer and Acceptance and returning one copy of this document to the Tenderer before the end of the period of validity stated in the Tender Data, whereupon the Tenderer becomes the party named as the Contractor in the Conditions of Contract identified in the Contract Data.

For the Tenderer:

* **Name of Tenderer** (organisation) :

* **Signature** (of person authorized to sign the tender) :

* **Name** (of signatory in capitals) :

Capacity (of Signatory) :

Address :
:

Telephone :

Witness:

Signature : **Date** :

Name (in capitals) : :

Notes:

* **Indicates what information is mandatory.**

Failure to complete the mandatory information and sign this form will invalidate the tender.

C1.1: FORM OF OFFER AND ACCEPTANCE

C1.1.2: FORM OF ACCEPTANCE

This Form will be completed by the Employer

By signing this part of the Form of Offer and Acceptance, the Employer identified below accepts the Tenderer's Offer. In consideration thereof, the Employer shall pay the Contractor the amount due in accordance with the Conditions of Contract identified in the Contract Data. Acceptance of the Tenderer's Offer shall form an agreement between the Employer and the Tenderer upon the terms and conditions contained in this Agreement and in the Contract that is the subject of this Agreement.

The terms of the contract are contained in:

- Part C1 : Agreement and Contract Data, (which includes this Agreement)
- Part C2 : Pricing Data, including the Bill of Quantities
- Part C3 : Scope of Work
- Part C4 : Site Information

and the schedules, forms, drawings and documents or parts thereof, which may be incorporated by reference into Parts C1 to C4 above.

Deviations from and amendments to the documents listed in the Tender Data and any addenda thereto listed in the Tender Schedules as well as any changes to the terms of the Offer agreed by the Tenderer and the Employer during this process of offer and acceptance, are contained in the Schedule of Deviations attached to and forming part of this Agreement. No amendments to or deviations from said documents are valid unless contained in this Schedule, which must be duly signed by the authorised representatives of both parties.

The Tenderer shall within two weeks after receiving a completed copy of this Agreement, including the Schedule of Deviations (if any), contact the Employer's agent (whose details are given in the Contract Data) to arrange the delivery of any bonds, guarantees, proof of insurance and any other documentation to be provided in terms of the Conditions of Contract identified in the Contract Data at, or just after, the date this Agreement comes into effect. Failure to fulfill any of these obligations in accordance with those terms shall constitute a repudiation of this Agreement.

Notwithstanding anything contained herein, this Agreement comes into effect on the date when the Tenderer receives one fully completed original copy of this document, including the Schedule of Deviations (if any). Unless the Tenderer (now Contractor) within five days of the date of such receipt notifies the Employer in writing of any reason why he cannot accept the contents of this Agreement, this Agreement shall constitute a binding contract between the parties.

Signature (*person authorized to sign the acceptance*) :

Name (*of signatory in capitals*) :

Capacity (*of Signatory*) :

Name of Employer (*organisation*) :

Address :

:

Witness:

Signature : **Date** :

Name(*in capitals*) : :

C1.1: FORM OF OFFER AND ACCEPTANCE

C1.1.3: SCHEDULE OF DEVIATIONS

This form will be completed by THE EMPLOYER and ONLY THE SUCCESSFUL TENDERER

1. **Subject** :
- Details** :
- :
2. **Subject** :
- Details** :
- :
3. **Subject** :
- Details** :
- :

By the duly authorised representatives signing this Schedule of Deviations, the Employer and the Tenderer agree to and accept the foregoing Schedule of Deviations as the only deviations from and amendments to the documents listed in the Tender Data and addenda thereto as listed in the Tender Schedules, as well as any confirmation, clarification or change to the terms of the offer agreed by the Tenderer and the Employer during this process of offer and acceptance.

FOR THE TENDERER

FOR THE EMPLOYER

	Signature	
	Name (<i>in capitals</i>)	
	Capacity	
	Name and Address of	
	Organisation	
	Witness Signature	
	Witness Name	
	Date	

C1.2: CONTRACT DATA

C1.2.1 CONDITIONS OF CONTRACT

C1.2.1.1 GENERAL CONDITIONS OF CONTRACT

The Conditions of Contract are the **General Conditions of Contract for Construction Works (2015 3rd Edition)**, (**GCC 2015**) published by the South African Institution of Civil Engineering. Copies of these conditions of contract may be obtained from the South African Institution of Civil Engineering (Tel: 011-805-5947, Fax: 011-805-5971, E-mail: civilinfo@saice.org.za).

The Contract Data (including variations and additions) shall amplify, modify, or supersede, the GCC 2015 to the extent specified below, and shall take precedence and shall govern.

Each item of data given below is cross-referenced to the clause in the GCC 2015 to which it mainly applies.

C1.2.2 CONTRACT DATA

C1.2.2.1 DATA TO BE PROVIDED BY THE EMPLOYER

1.1.1.13 The **Defects Liability Period**, from the date of the Certificate of Completion, per project order, is **1 Year**.

1.1.1.14 “**Due Completion Date**” Amend to read: ‘Due Completion Date for the Contract’ This Contract shall be awarded for a period of **three (3) years**, which shall elapse on the day immediately preceding the 3rd anniversary of the commencement date.

1.1.1.15 The Employer is the eThekweni Municipality as represented by:
Deputy Head: **Roads Provision**

1.2.1.2 The address of the Employer is:
Physical: Engineering Unit, 166 K.E. Masinga Road, DURBAN, 4001
Postal: Engineering Unit, P O Box 680, DURBAN, 4000
Telephone: **031-311-7326 (t)**
Fax: **031-311-7321 (f)**
E-Mail: **Sandile.Masondo@durban.gov.za**

1.1.1.16 The **name of the Employer’s Agent** is Londa Zwane

1.2.1.2 The address of the Employer’ Agent is:
Physical: Engineering Unit, 166 K.E. Masinga Road, DURBAN, 4001
Postal: Engineering Unit, P O Box 680, DURBAN, 4000
Telephone: **031-311-7442 (t)**
Fax: **031-311-7321 (f)**
E-Mail: **Zwane.Londa@durban.gov.za**

1.1.1.26 The **Pricing Strategy** is by **Re-measurement Contract**.

5.3.1 The **documentation required** before commencement with Works execution are:

- Health and Safety Plan, per project order (refer to Clause 4.3)
- Initial Programme, per project order (refer to Clause 5.6)
- Security (refer to Clause 6.2)
- Insurance (refer to Clause 8.6)
- CV(s) of Key Site Staff, per project order
- CPG Implementation Plan, per project order

5.3.2 The **time to submit the documentation** required before commencement with Works is **14 Days**.

5.3.3 Add the following paragraph:

“If a construction work permit, in terms of Clause 3(1) of the Construction Regulations (2014), is applicable, the instruction to commence carrying out of the works may only be issued once the construction work permit has been obtained by the Employer’s Agent. If a construction work permit is applicable, the contractor shall allow for a minimum period of 37 days, after the submission (or re-submission) of the documentation referred to in Clause 5.3.1., for the issuing of the construction work permit.”

5.8.1 The **non-working days** are **Saturdays and** Sundays.

(5.1.1) The **special non-working** days are:

- All statutory holidays as declared by National or Regional Government.
- The year-end break:
 - Commencing on the first working day after 15 December.
 - Work resumes on the first working day after 5 January of the next year.

5.8.1 Delete the words “sunset and sunrise” and replace with “17:00 and 07:00”.

5.12.2.2 **Abnormal Climatic Conditions (Rain Delays)** - The numbers of days per month, on which work is expected not to be possible as a result of rainfall, for which the Contractor shall make provision, is given in the table below. During the execution of the Works, the Employer’s Agent’s Representative will certify a day lost due to rainfall only if at least 75% of the work force and plant on site could not work during that specific working day.

Extension of time as a result of rainfall shall be calculated monthly being equal to the number days certified by the Employer’s Agent’s Representative as lost due to rainfall, less the number of days allowed for as in table below, which could result in a negative figure for certain months. The total extension of time for which the Contractor may apply, shall be the cumulative algebraic sum of the monthly extensions. Should the sum thus obtained be negative, the extension of time shall be taken as NIL.

<u>Month</u>	<u>Days Lost</u>	<u>Average Rainfall</u>	<u>Month</u>	<u>Days Lost</u>	<u>Average Rainfall</u>
January	4*	134	July	1	39
February	3	113	August	2	62
March	3	120	September	2	73
April	2	73	October	3	98
May	2	59	November	3	108
June	1	28	December	1*	102
TOTAL	27	1009mm	* = The number of working days lost allows for the annual statutory Construction holiday in December and January of each year.		

- 5.13.1 The **penalty for delay** in failing to complete the Works is **R 5000, per project order** (per Day).
- 5.16.3 The **latent defect liability** period is **10 Years**.
- 6.2.1 **Security (Performance Guarantee)**: Delete the word “selected” and replace it with “stated”.
- The liability of the Performance Guarantee shall be R3m.
- 6.5.1.2.3 The **percentage allowance** to cover overhead charges for daywork are as follows:
- **80%** of the gross remuneration of workmen and foremen actually engaged in the daywork;
 - **20%** on the net cost of materials actually used in the completed work.
- No allowance will be made for work done, or for materials and equipment for which daywork rates have been quoted at tender stage.
- 6.8.2 **Contract Price Adjustment Factor**: The value of the certificates issued shall be adjusted in accordance with the Contract Price Adjustment Schedule (GCC 2015 - page 86) with the following Indices / Descriptions / Coefficients:
- The proportion not subject to adjustment: **x = 0.10**.
 - The base month will be the month prior to the month in which tenders close.
 - The Index for Labour, Plant, and Materials shall be based on **December 2021 = 100**.
 - The Index for Fuel shall be based on **December 2020 = 100**.
- | | STATS SA
Statistical Release | Table | Description | Coefficient |
|---|---------------------------------|---------|--|----------------|
| • “L” is the
“Labour Index” | P0141 | Table A | Geographic Indices;
CPI per Province;
Kwa-Zulu Natal | a = 0.2 |
| • “P” is the
• “Contractor’s
Equipment Index” | P0151.1 | Table 4 | Plant and Equipment | b = 0.3 |
| • “M” is the
“Materials Index” | P0151.1 | Table 6 | Civil Engineering Material
(excluding bitumen) | c = 0.3 |
| • “F” is the
“Fuel Index” | P0142.1 | Table 1 | Coke, petroleum, chemical,
rubber and plastic products;
Coal and petroleum products;
Diesel | d = 0.2 |
- 6.8.3 Price adjustments for **variation in the cost of the special material(s)** listed below, will be allowed.
- Bitumen** - escalation will be calculated using the “Rise and Fall” method as determined by the Employer. The base price for bitumen on this contract shall be the ruling price of 50/70 grade bitumen based on the “Shell Whole Sale List Selling Price for Penetration Grade Bitumen”, seven (7) days prior to the closing date of tenders.
- 6.10.1.5 The **percentage advance** on materials not yet built into the Permanent Works is **Nil**.

- 6.10.3 **Retention Money:** Delete the word “selected”.
The percentage retention on the amounts due to the Contractor is 10%.
The limit of “retention money” is 10% of the Project Order Sum.
Should the Project Order Price exceed the Project Order Sum then the limit of “retention money” is 10% of the Project Order Price.
Interest will not be paid on retention withheld by the Employer.
- 8.6.1.1.2 The **value of Plant and materials** supplied by the Employer to be included in the insurance sum: **Not Required.**
- 8.6.1.1.3 The **amount to cover professional fees** for repairing damage and loss to be included in the insurance sum: **R 5000 per day.**
- 8.6.1.2 **SASRIA Coupon Policy** for Special Risks to be issued in joint names of Council and Contractor for the full value of the works (including VAT).
- 8.6.1.3 The limit of indemnity for **liability insurance:** **R 10,000,000.**
- 8.6.1.4 **Ground Support Insurance:**
- Minimum amount for any one occurrence, unlimited as to the number of occurrences, against any claim for damages or loss caused by vibration and / or removal of lateral support: **R 1,000,000.**
 - Maximum first excess: **R 20,000.**
- 8.6.1.5 Furthermore, the insurance cover effected by the Contractor shall meet the following requirements:
- Third Party Insurance (Public Liability)**
- Minimum amount for any one occurrence, unlimited as to the number of occurrences, for the period of the contract, inclusive of the maintenance period: **R 1,000,000.**
 - Consequential loss to be covered by policy: **Yes**
 - Liability section of policy to be extended to cover blasting: **Nil**
 - Maximum excess per claim or series of claims arising out of any one occurrence: **R20,000.**
- Principal’s own surrounding Property Insurance**
- Minimum amount for any one occurrence unlimited as to the number of occurrences against any claim for damage which may occur to the Council’s own surrounding property: **R1,000,000.**
 - Maximum first excess: **R 20,000.**
- Insurance of Works**
- Minimum amount for additional removal of debris (no damage): **Nil**
 - Minimum amount for temporary storage of materials off site, excluding Contractor’s own premises: **Nil.**
 - Minimum amount for transit of materials to site: **Nil.**

8.6.5 **Approval by Employer:** At the end of the sub-clause, add the following paragraph:

"Except where otherwise provided in the Special Conditions of Contract, the insurance cover effected by the Contractor in terms of this clause shall not carry a first loss amount greater than those set out below:

Contract Price	First Loss
Less than R 100,000	R 5,000
R 100,000 to R 500,000	R 10,000
R 500,000 to R 1,000,000	R 20,000
R 1,000,000 to R 2,000,000	R 30,000
R 2,000,000 to R 4,000,000	R 40,000
Greater than R 4,000,000	R 50,000

The insurance policy shall contain a specific provision whereby cancellation of the policy prior to the end of the period referred to in Cause 8.2.1 cannot take place without the prior written approval of the Employer."

10.5.2 Dispute resolution shall be by ad-hoc adjudication.

10.7.1 Failing ad-hoc adjudication, the determination of disputes shall be by arbitration.

C1.2.2.2 DATA TO BE PROVIDED BY CONTRACTOR

1.1.1.9 The legal name of Contractor is:

.....
.....
.....
.....

1.2.1.2 The Physical address of the Contractor is:

.....
.....
.....
.....

The Postal address of the Contractor is:

.....
.....
.....
.....

The contact numbers of the Contractor are:

Telephone:

Fax:

The E-Mail address of the Contractor is:

.....

C1.2.1.2 SPECIAL CONDITIONS OF CONTRACT

These Special Conditions of contract shall amplify, modify or supercede, as the case may be, the General Conditions of Contract 2015 to the extent specified, and shall take precedence and shall govern for individual Project Orders issued under this Contract.

- 5.5 “Time for Practical Completion” : delete this clause and all references thereto throughout the General Conditions of Contract.
- 5.13.1 “Penalty for Delay” : delete the first paragraph and replace with “If the Contractor fails to complete the whole Works specified in the Project Order by the Due Completion Date of the Project Order or as amended, the Contractor shall be liable to the Employer for the sum stated in the Project Order Contract Specific Data as a penalty for every day that elapses after the Due Completion Date or as amended, including non-working and special non-working days”.
- 5.13.2 “Reduction of penalty” : delete this clause and all references thereto throughout the General Conditions of Contract.
- 5.14.1 “Practical Completion” : delete this clause and all references thereto throughout the General Conditions of Contract.
- 1.14.7 “Completion” Delete the words “Contract Data” and replace with “Project Order Specific Contract Data”
- 6.11 “Variations exceeding 15%”: Delete this clause and all references thereto throughout the General Conditions of Contract.
- 8.3.1.7 “Epidemic famine or plague”, add the following, “ including the pandemic in relation to Coronavirus Disease 2019 caused by the SARS-CoV-2 virus”
- 4.4 Subcontracting: Add the following sub-clauses
- 4.4.8.1 The Contractor shall enter into a written subcontract agreement with the Sub-contractors. The subcontract agreement between the Contractor and the Sub-contractors shall be the standard General Conditions of Subcontract for Construction Works (First Edition, GCSC 2018).
- 4.4.8.1.1 Each subcontract shall include the provisions:
- (a) The Contractor undertakes to make payment within 14 days after the date on which the Sub-contractor has submitted a statement for payment or a claim for payment to the Contractor for work completed or goods delivered in accordance with the contract between the Contractor and Sub-contractor; and
- (b) The Contractor undertakes to supply the sub-contractors with the relevant and sufficient data to undertake the works as specified by the Employer’s Agent /Employer, which shall include but not limited to the relevant contract data and special and/or additional conditions of contract, standard and/or amended specifications, contract standard and project specific drawings etc.
- (c) The training, coaching, guidance or mentoring to be provided to the sub-contractors workforce (as required and subject to the approval of the Employer’s Agent), and an obligation on the sub-contractor to participate and co-operate in such support as is provided for in this Contract.
- (d) Dispute avoidance and resolution procedures, including any sanctions in the event of failure by the sub-contractor to comply with the terms and conditions of the subcontract agreement.

- 4.4.8.2 The Contractor shall disclose all subcontracting arrangements to the Employer upon request thereof, within 3 working days.
- 4.4.8.3 No performance security shall be required for sub-contractors.
- 4.4.8.4 Delay Damages for sub-contractors shall be limited to 10% of the accepted sub-contract amount.

C1.2.3 ADDITIONAL CONDITIONS OF CONTRACT

C1.2.3.1 COMMUNITY LIAISON OFFICER

The Ward Councillor(s) in whose ward(s) work is to be done will, collectively, identify a community liaison officer (CLO) for the project and make the person known to the Contractor within two days of being requested to do so. The Contractor will be required to enter a written contract with the CLO that specifies:

- The hours of work (in accordance to the Basic Conditions of Employment Act No.75, 1997, Clause No.9) and the wage rate of the CLO (200% of the Civil Engineering Industry minimum wage).
- The duration of the appointment.
- The duties to be undertaken by the CLO which could include :
 - Assisting in all respects relating to the recruitment of local labour.
 - Acting as a source of information for the community and councillors on issues related to the contract.
 - Keeping the Contractor advised on community issues and issues pertaining to local security.
 - Assisting in setting up any meetings or negotiations with affected parties.
 - Keeping a written record of any labour or community issue that may arise.
 - Any other duties that may be required by the Contractor.

Responsibility for the identification of a pool of suitable local labour shall rest with the CLO, although the Contractor shall have the right to choose from that pool. The Contractor shall have the right to determine the total number labourers required at any one time and this may vary during the contract.

The Contractor shall have the right to replace labour that is not performing adequately. Should such occasion arise, it must be done in conjunction with the CLO.

Payment: The CLO will be reimbursed from the PC Sum item in the Preliminary & General Section of the Bill of Quantities.

Note: The Employers Agent shall determine, based on the extent of works issued in the Project Order(s), the number of CLO(s) required to ensure successful operations of the works.

Note: Should the Contractor request for permission to work on non-working or special non-working days or any other overtime, this shall be at the Contractors cost, and such request be approved by the Employer's Agent in writing. The Contractor shall be liable to make payment to the CLO for these working hours/day(s) including any overtime or other benefits as provided by the Contractor. Such request must be submitted to the Employer's Agent at least 3 working days prior to the day/s for which permission is being requested. All overtime and benefits shall not be re-imbursed by the Employer, i.e. at the Contractors cost.

C1.2.3.2 EMPLOYMENT OF LOCAL LABOUR

It is a condition of contract that the Contractor will be required to employ local labour as specified in eThekweni Council Policy "The use of CLOs and Local Labour". The Contractor will be required to ensure that a minimum of 50% of the unskilled labour force is made up of local labour. The wage rate for the local labour is the Civil Engineering Industry minimum wage as defined by the current applicable Bargaining Council for the Civil Engineering Industry (BCCEI) agreement.

For the purposes of this contract, "Local labour" will be deemed to be any **persons who reside within Ward(s) where work is taking place**. The contractor will be required to provide proof of authenticity of local labour. Signed confirmation by the appointed CLO(s) will suffice for this.

The penalty for not employing local labour shall be taken as the number of local labour not employed, multiplied by the number days local labour was not employed, multiplied by the daily wage rate, multiplied by a factor of two (2).

No additional costs will be entertained due to this Particular Specification. The contractor will remain responsible for providing proper supervision of all labour and will be responsible for the quality of work produced.

C1.2.1.3.3 ENTERPRISE DEVELOPMENT & CONTRACT PARTICIPATION GOAL (CPG)

C1.2.1.3.3.1 Overview

It is a condition of contract, in line with the Council approved Economic Empowerment Framework as stipulated in the Employers Supply Chain Management Policy, that sub-contracting opportunities are made available.

It is a condition of contract that the Contractor must allow all ancillary work to be sub-contracted (irrespective of value) to local Business Enterprises. This includes the following type of work, but not limited to:

- Patching
- Raising/lowering of services
- Construction/re-construction of sidewalks
- Laying of kerbs or kerb & channel
- Laying of asphalt haunching
- Laying of subsoil drains
- Laying of service ducts
- Construction of stormwater drainage infrastructure

Sub-contracting thresholds:

- a. In the event of the project order value being less than R5m (incl. VAT), the Contractor is required to sub-contract all ancillary works as stated above, irregardless of the ancillary work value in comparison to the project order value.**
- b. In the event of the project order value being greater than R5m (incl. VAT), the Contractor is required to sub-contract all ancillary works as stated above whilst achieving the minimum requirement of 30% of the value of works being sub-contracted. If the ancillary works exceeds 30% of the project value, there would be no further impositions on the Contractor. Where the ancillary works amount to less than 30% of the project value, the Contractor would be required to sub-contract additional works to achieve the minimum CPG component requirement of 30%.**

The successful tenderer shall and must sub-contract to an EME or QSE which is at least 51% owned by black people. These Enterprises must be from the ward(s) where work is taking place in the first instance and, if the Contractor cannot procure such enterprises from the ward(s), this may be achieved by sub-contracting with such qualifying Enterprises located within adjacent wards, failing which the sub-contractors may be sourced within the jurisdiction of eThekweni Municipality. CPG sub-contracting may be to:

- o Contractors who are registered with the Construction Industry Development Board in the Categories ranging from 1 to 4
- o Material and equipment suppliers

and who shall also meet the requirements of an EME or QSE as detailed above.

Payment certificates (where applicable), Tax invoices, Proof of payment to the subcontractors and equipment and material suppliers will be required to verify that this has been achieved.

For any work being sub-contracted, documents of the relevant sub-contractor must therefore be submitted to the Employer's Agent in writing for approval well in advance before commencement of any of the activities on the programme.

In addition to this, the sub-contractors must have a, (where applicable):

- traceable track record of work undertaken for the past 3years
- must be registered with CIDB category CE and grading equivalent to the work being issued; (not applicable for equipment and materials suppliers);
- must have suitable qualified staff and plant to undertake the works
- must comply to the OCHSA
- must comply to the main contractors safety plan
- must be registered on the eThekweni Municipality Procurement Database.
- must be registered on the Central Supplier Database.
- Materials suppliers must have proof of necessary permits/licences for the mining and sales of materials, as may be applicable.

The contractor shall be fully responsible for the management of all sub-contractors appointed. The contractor shall therefore ensure that a suitable quality monitoring process is in place for each element of the works and that the appointed sub-contractors is conversant on the requirements thereof.

No additional costs will be entertained due to this Particular Specification.

C1.2.1.3.3.2 Submission of CPG Plan

At the commencement of each Project Order, the Contractor shall provide a Contract Participation Goal Plan (CPG Plan) for the Sub-Contracting using the Scope of Work and its related cost to demonstrate how he shall achieve stipulated CPG targets.

Prior to commencement of works, as per Clause 5.3.1 of the Contract Data, the Contractor shall provide such comprehensive CPG Plan for approval by the Employer's Agent. Should the Sub-contractors be allocated work that exceeds their CIDB grading, then the work allocated to these sub-contractors shall be reduced to the upper limit of their CIDB Grading, and the Main Contractor shall be required to source additional sub-contractors to achieve the tendered Sub-Contract CPG Value. The Primary Contractor shall be required to update the CPG Plan for approval by the Employer's Agent before work commences. This plan may be updated during the contract period but shall still be for the approval of the Employer's Agent. The CPG Plan shall ensure an adequate and acceptable distribution of works across the identified CIDB grading range (viz. 1 CE to 4 CE); the plan shall be subject to approval by the Employer, (taking into consideration the scope of works risk profile and associated allocation of works), and any amendments required to achieve an acceptable distribution of works shall be implemented by the Contractor at no additional cost to the contract.

Rates of works allocated to CPG sub-contractors shall be evaluated to ensure they are market related. The Contractor will be required to demonstrate that the rates provided are fair and reasonable, taking into consideration the limitations that CPG contractors may face to procure materials and equipment at discounted rates. Where it is found that the rates provided are unrealistic/not market related and the CPG contractor cannot undertake the works at the rates tendered by the main contractor, the main contractor will be required to balance his rates, at no additional cost to the contract, to address the non-market related rates tendered by the main contractor; (market related rates will be based on cost structures applicable to the level of CPG company undertaking the works). The approval of the CPG Plan shall not absolve the main contractor of his contractual responsibility or for any rates dispute that may arise during the implementation of the contract, based on the rates tendered or adjusted during the award process.

The following is a template of the CPG Plan for sub-contracting, required at commencement of each Project order.

CPG PLAN FOR SUB CONTRACTORS

SUB CONTRACTING: CONSTRUCTION WORKS										
Item Number	Item	% CPG	CPG Value	CIDB Contractor range						No of companies benefiting
				1CE	2CE	3CE	4CE	5CE	6CE	
Example 1	Asphalt sidewalks	2%	R200,000		R200,000					1
Example 2	Barrier kerbs and channel	5%	R500,000				R300,000	R100,000	R100,000	3
Subtotal										

SUB CONTRACTING: MATERIALS PROCUREMENT										
Item Number	Item	% CPG	CPG Value							No of companies benefiting
Example 1	Bitumen	8%	R3,000,000							3
Example 2	19mm stone	5%	R1,000,000							2
Subtotal										

SUB CONTRACTING: EQUIPMENT HIRE AND LOGISTICS										
Item Number	Item	% CPG	CPG Value							No of companies benefiting
Example 1	Crane truck hire	5%	R1,000,000							2
Example 2	Small plant hire	1%	R100,000							1
Subtotal										

Total										
-------	--	--	--	--	--	--	--	--	--	--

C1.2.3.4 SUB-CONTRACTING OF MAIN WORKS - SURFACING, RECYCLING, GRANULAR, SUGRADE IMPROVEMENT AND CONCRETE PAVEMENT WORKS

The definitions of all the above rehabilitation categories are as stipulated in Section 1100 of the Project Specifications.

Any work under this item being sub contracted will be subjected to evaluation, and must therefore be submitted to the Employer's Agent in writing for his approval well in advance of any project being allocated. Failure to comply will result in termination of the contract.

In addition to this, the sub-contractor(s) must have a:

- traceable track record of work undertaken for the past 3-5years
- must be registered with CIDB category CE and grading equivalent to the work being issued
- must have suitably qualified staff and plant to undertake the works
- must comply to the OCHSA
- must comply to the main contractors safety plan

C1.2.3.5 FTE (Full Time Equivalent) EMPLOYMENT INFORMATION

It is a condition of contract that the Contractor supplies the Employer's Agent's Representative with information in respect of the employment of all foremen, artisans and labour (skilled and unskilled) employed to work on this contract. The information required is:

- Initials (per ID doc)
- Last Name (per ID doc)
- ID Number
- Disability (y / n)
- Education Level

Level 1 Unknown	Level 2 No Schooling	Level 3 Grade 1-3	Level 4 Grade 4	Level 5 Grade 5-6
Level 6 Grade 7-8	Level 7 Grade 9	Level 8 Grade 10-11	Level 9 Grade 12	Level 10 Post Matric

- Category of Employment

Category A: Employed as Local Labour for this contract only Category B: Temporarily employed by the Contractor Category C: Permanently employed by the Contractor

In addition, the following information is required in respect of each person listed above, on a monthly basis:

- Number of days worked during the month;
- Daily wage rate;
- Number of training days during the month;
- Copies of identity documents;
- Proof of employment contracts, and
- Proof of payment.

The information is to be forwarded in a format acceptable to the Employer's Agent's Representative, but preferably in the form of an emailed EXCEL file (an original file, to be used as a template, will be issued to the Contractor). Contractors without computer facilities will be required to submit a hard copy of the information in a format as agreed to between the Contractor and the Employer's Agent's Representative.

In addition to the tax invoice, to be submitted by the Contractor with his monthly statement, mentioned in Clause 6.10.4 of GCC 2015, the Employer reserves the right to withhold payment until the monthly FTE information has been forwarded to the Employer's Agent's Representative. No additional payment for complying with the above will be made and the Contractor is to make allowance for complying through the time related Preliminary and General items (sum) under Section 1300 : Contractor's establishment on site and general Obligations, of the Bill of Quantities.

C1.2.1.3.6 DUTIES AND RESPONSIBILITIES OF A CONTRACTS MANAGER

In addition to requirements laid down in the Code of Conduct for the registered professionals by ECSA or SACPCMP, the Contracts Manager shall undertake the following minimum requirements;

The Contracts Manager shall:

- Be available at all times during the execution of any Project Orders, and physically available when requested immediately.
- Be the link between the employer's Agent and the Contractor.
- Monitor the contract's progress and performance to ensure goods and services conform to the contract requirements.
- Ensure proper co-ordination of all projects (Project Orders) within the Contract.

- Ensure that sufficient human resources are available to function adequately, for example Construction Managers.
- Ensure that sufficient constructional plant and equipment resources are available to complete all projects allocated.
- Ensure that the proper sub-contracting resources are arranged on time for the timeous completion of all projects.
- Prepare and submit the combined weekly programme of works within the Contract to the Employer's Agent's Representative.
- Prepare and submit the combined monthly cashflow of all projects within the Contract to the Employer's Agent's Representative.
- Prepare and submit the combined weekly progress report of all projects within the Contract to the Employer's Agent's Representative.
- Prepare and submit the combined monthly quality report of all projects within the Contract to the Employer's Agent's Representative.
- Authorize payment claims consistence with the contract terms.
- Always be up-to-date with the activities and problems on all projects within the Contract.
- Oversee and ensure that construction managers are carrying out all projects to the required specification.
- Ensure that all sites/projects are in compliance with the Health and Safety specifications.
- Resolve disputes in a timely manner.
- Establish control of correspondence, data and reports.
- Establish a procedure, identifying a responsible person and establish a timeframe for handling non-compliance.

C1.2.3.7 PERFORMANCE MONITORING OF SERVICE PROVIDERS

The performance of service providers that have been selected to provide assistance in the provision of a municipal service, otherwise than in circumstances where Chapter 8 of the Municipal Systems Act applies, is required, by Section 116 of the Municipal Finance Management Act, to be monitored and reported on (see Cl.53 of the SCM Policy).

Appropriate key performance indicators (KPIs) for the contract must be set by the Municipality as a yardstick for measuring performance.

The following KPIs will be applicable to this contract, or as otherwise specified in the individual Project Orders:

- (a) Compliance with CPG targets..
- (b) Works achieved as per the approved programme.
- (c) Construction of pavement layers (where applicable) must be to specification.
- (d) Traffic accommodation requirements to be addressed at all times

C1.2.3.8 EXCEPTED RISKS (Clause 8.3)

Pursuant to Clause 8.3 of the Conditions of Contract (GCC 2015), the Employer shall not be liable for the payment of standing time costs as a result of the occurrence of any of the "Excepted Risks" as defined under Clause 8.3.

However, the Employer shall reimburse the Contractor in respect of plant de-establishment and re-establishment costs as a result of "Excepted risks" when a written instruction to de-establish is issued to the Contractor.

C1.2.3.9 NON-EXCLUSIVE APPOINTMENT

The Contractor must note that, whilst this contract is intended to execute Infrastructure projects within the identified wards and region, there is no guarantee of works being allocated via this appointment.

The Employer may elect, at any time, to implement projects using other available procurement mechanisms in place to as to ensure necessary expenditure and service delivery time-frames are met. It is further noted that the Employer currently has existing programmes in place to undertake works in selected disciplines; and related works will be executed via these existing appointments as necessary, until such time as these existing contracts are concluded and future works arising can be executed under this contract.

The works undertaken for this contract are on a non-exclusive basis and the Contractor shall have no recourse against the Employer for any works allocated to other parties/through other Employer procurement mechanisms.

C1.2.3.10 KEY PERSONNEL MANDATORY REQUIREMENTS

The following experience of key personnel is a requirement during the contractual period once awarded to the successful tenderer:

- **Contracts Manager:** with more than 10 years of road construction experience or more than 7 years road rehabilitation experience on projects of a similar nature; with relevant accredited 3 year diploma / 4 year degree. Also registered with ECSA as a Professional Civil Engineer or Professional Civil Engineering Technologist or registration with SACPCMP as a Professional Construction Project Manager.
- **Construction Manager:** with more than 5 years road construction experience or more than 3 years road rehabilitation experience on projects of a similar nature; with relevant accredited 3 year diploma /4 year degree. Also be registered with ECSA as a Professional Civil Engineering: Engineer, Technologist or Technician or registration with SACPCMP as a Professional Construction Project Manager or Professional Construction Manager.

Note 1: Road rehabilitation experience shall include mill and asphalt inlay, asphalt overlay, and rehabilitation of the base, sub-base or subgrade pavement layers.

Note 2: Road construction experience shall include new road construction, road widening/upgrade projects, intersection improvements, special maintenance and routine maintenance, gravel to surface road upgrades, access road upgrades and parking areas, ancillary/secondary works (kerbing, drainage, sidewalks, road signs, gabions etc).

Note 3: The following is excluded – materials investigation and analysis, and all forms of design experience.

C2: PRICING DATA

C2.1: PRICING ASSUMPTIONS / INSTRUCTIONS

- C2.1.1 Measurement and payment shall be in accordance with the relevant provisions of the Standard Specifications as amended in the Scope of Works.
- C2.1.2 The units of measurement described in the Bill of Quantities are metric units. Abbreviations used in the Bill of Quantities are detailed in the Standard Specifications.
- C2.1.3 For the purposes of the Bill of Quantities, the following words shall have the meanings hereby assigned to them.
- Unit: The unit of measurement for each item of work as defined in the Standard Specifications or the Scope of Works.
- Quantity: The number of units of work for each item.
- Rate: The payment per unit of work for which the Contractor tenders to do the work.
- Amount: The product of the quantity and the rate tendered for an item.
- Lump Sum: An amount tendered for an item, the extent of which is described in the Bill of Quantities, the Scope of Work or elsewhere, but of which the quantity of work is not measured in units.
- Prime cost: Is a specific type of Provisional Sum where payment is made on the production of invoices showing the cost price of the implementation or installation of the service required. Services rendered in this manner carry a mark-up for which a rate is offered at tender stage to cover all the Contractor's overhead charges and profit in providing the item or services.
- Provisional Sum: A sum (if any) which is specified in the contract as a provisional sum, for the execution of any part of the works or the supply of plant, materials or services.
- C2.1.4 Unless otherwise stated, items are measured net in accordance with the drawings, and no allowance is made for waste.
- C2.1.5 It will be assumed that prices included in the Bill of Quantities are based on Acts, Ordinances, Regulations, By-laws, International Standards and National Standards that were published 28 days before the closing date for tenders. (Refer to www.stanza.org.za or www.iso.org for information standards).
- C2.1.6 The prices and rates in the Bill of Quantities are fully inclusive prices for the work described under the items, and include all duties, taxes (except Value Added Tax) and other levies payable by the Contractor. Such prices and rates cover all costs and expenses that may be required in and for the execution of the work described in accordance with the provisions of the Scope of Work, and shall cover the cost of all general risks, liabilities and obligations set forth or implied, as well as overhead charges and profit. These prices will be used as a basis for assessment of payment for additional work that may have to be carried out. A complete breakdown of all rates in electronic format (Excel) on a separate CD must be submitted with the completed pricing schedule. The rates are to be clearly referenced to the relevant pay item numbers, with each rate broken down into its labour, materials, plant, fuel, overhead charges (where applicable) and profit components (where applicable). The Employer reserves the right to withhold the award of such Project Order to the Contractor until such time that the rate breakdown has been provided as required in compliance to this clause.
- C2.1.7 Where the Scope of Work requires detailed drawings and designs or other information to be provided, all costs associated therewith are deemed to have been provided for and included in the unit rates and sum amount tendered such items.

- C2.1.8 An item against which no price is entered will be considered to be covered by the other prices or rates in the Pricing Schedule. A single lump sum will apply should a number of items be grouped together for pricing purposes.
- C2.1.9 The quantities set out in the Bill of Quantities are approximate and do not necessarily represent the actual amount of work to be done. The quantities of work accepted and certified for payment will be used for determining payments due and not the quantities given in the Bill of Quantities.
- C2.1.10 Reasonable compensation will be received where no pay item appears in the Bill of Quantities in respect of work required in terms of the Contract and which is not covered in any other pay item.
- C2.1.11 The short descriptions of the items of payment given in the Bill of Quantities are only for the purposes of identifying the items. More details regarding the extent of the work entailed under each item appear in the Scope of Work.
- C2.1.12 The item numbers appearing in the Bill of Quantities refer to the corresponding item numbers in the Standard Specifications or as amended in the project specification.
- C2.1.13 Determination of quantities in respect of materials delivery notes

Material delivery notes supplied by the Contractor and submitted to the Employer's Agent shall be for purposes of confirming the type of material supplied and date of delivery to site. The delivery notes shall also be used as a basis for rejecting any materials to be used for the works that may have exceeded the materials shelf-life as prescribed by the materials supplier data sheets.

Unless specified by the Employer's Agent, the quantities to be certified shall be verified on the approved and authorized dimensions of the works, multiplied by the relevant material bulking/conversation factors where applicable.

C2.2: BILL OF QUANTITIES

The Bill of Quantities follows and comprises of 19 pages. The pages are numbered BoQ 1 to BoQ 19



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Item	Description	Unit	Qty	Rate	Total
	SECTION 1200				
12.00	GENERAL REQUIREMENTS AND PROVISIONS				
PS12.01	Services				
	(a) Protection, removal, realignment and replacement of services	Prov Sum	100000.00		
	(b) Handling costs and profit in respect of item PS12.01(a)	%	100000.00		
PS12.02	(a) Construction of new survey beacons or for existing beacons to be protected and for construction setting-out with level control and	Prov Sum	100000.00		
	(b) Handling costs and profit in respect of item PS12.02(a)	%	100000.00		
PS12.03	Capturing of as-built data at the completion of the project				
	(i) Surfacing Works	no.	50.00		
	(ii) Recycling Works	no.	10.00		
	(iii) Granular Works	no.	10.00		
	(iv) Subgrade Improvement Works	no.	10.00		
	(v) Ancillary Works	no.	10.00		
	TOTAL CARRIED TO SUMMARY				
	SECTION 1300				
13.00	CONTRACTOR'S GENERAL OBLIGATIONS				
PS13.01	Contractor's general obligations				
	(a) Principal Contractor(s) Fixed obligations for the following Rehabilitation Categories, for all road categories:				
	(i) Surfacing Works	%	10000000.00		
	(ii) Recycling Works	%	2000000.00		
	(iii) Granular Works	%	2000000.00		
	(iv) Subgrade Improvement Works	%	2000000.00		
	(v) Ancillary Works	%	2000000.00		
	(c) Principal Contractor(s) Time-related obligations for the following Rehabilitation Categories, for all road categories				
	(i) Surfacing Works	Pro. Month	8.00		
	(ii) Recycling Works	Pro. Month	1.00		
	(iii) Granular Works	Pro. Month	1.00		
	(iv) Subgrade Improvement Works	Pro. Month	1.00		
	(v) Ancillary Works	Pro. Month	1.00		
PS13.02	Principal Contractor(s) Health and Safety				
	(a) Fixed obligation for preparation of risk assessment, H&S, etc.	Sum	1.00		
	(b) Time related obligation for updating risk assessment, safe work procedures, etc. for the following categories of rehabilitation:				
	(i) Surfacing Works	Pro. Month	8.00		
	(ii) Recycling Works	Pro. Month	1.00		
	(iii) Granular Works	Pro. Month	1.00		
	(iv) Subgrade Improvement Works	Pro. Month	1.00		
	(v) Ancillary Works	Pro. Month	1.00		
PS13.03	(a) Project sign boards	No.	10.00		
	(b) Reusing of existing signboards. Rate to include amending the relevant text	No	5.00		
PS13.04	Remuneration for Community Liaison Officer:				
	(a) Monthly payment	Prov.Sum	500000.00		
	(b) Handling costs and profit in respect of sub-item PS13.04(a)	%	500000.00		
PS13.05	Offices				
	(a) Establishment of offices	No.	4.00		
	(b) Maintenance of offices	Month	4.00		
	TOTAL CARRIED TO SUMMARY				

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Item	Description	Unit	Qty	Rate	Total
	SECTION 1500				
15.00	ACCOMODATION OF TRAFFIC				
PS15.01	The provision of temporary traffic control facilities (except traffic lights and amber flicker lights for the supervisory staff) for the				
	(a) All rehabilitation categories				
	(1) Category A : Major Arterials or Freeways	Pro. Month	2.00		
	(i) Extra-over for Night Work	Pro. Month	2.00		
	(2) Category B : Urban Arterials, Major Bus Routes, CBD and Industrial Roads	Pro. Month	2.00		
	(i) Extra-over for Night Work	Pro. Month	2.00		
	(3) Category C : Minor Bus Routes and Collectors	Pro. Month	4.00		
	(4) Category D : Residential Streets	Pro. Month	4.00		
	TOTAL CARRIED TO SUMMARY				
	SECTION 1700				
17.00	CLEARING AND GRUBBING				
PS17.01	Road edge definition and cleaning				
	(i) Light cleaning	m ²	10000.00		
	(ii) Heavy cleaning	m ²	5000.00		
	TOTAL CARRIED TO SUMMARY				
	SECTION 2100				
21.00	DRAINS				
21.02	Clearing and shaping existing open drains	m ³	100.00		
21.03	Excavation for subsoil drainage systems:				
	(a) Excavating soft material situated within the following depth ranges below the surface level:				
	(i) 0 m up to 1,5 m	m ³	350.00		
	(b) Extra over subitem 21.03(a) for excavation in hard material irrespective of depth	m ³	20.00		
21.04	Impermeable backfilling to subsoil drainage systems	m ³	200.00		
21.06	Natural permeable material in subsoil drainage systems (crushed stone):				
	(b) Crushed stone obtained from commercial sources				
	(l) Coarse-Grade	m ³	200.00		
21.07	Natural permeable material in subsoil drainage systems :				
	(b) Sand from commercial sources				
	(i) Coarse Grade	m ³	100.00		
21.08	Pipes in subsoil drainage systems:				
	(b) Unplasticised PVC pipes and fittings, normal duty complete with couplings				
	(i) 110 mm internal dia. perforated or slotted	m	700.00		
	(ii) 110 mm internal dia. unperforated	m	200.00		
21.10	Synthetic-fibre filter fabric				
	(a) Grade A	m ²	2000.00		
21.12	Concrete outlet structures, manhole boxes, junction boxes and cleaning eyes for subsoil drainage systems all :				
	(d) Cleaning eyes	No	10.00		
21.13	Concrete caps for subsoil drain pipes	No	10.00		
21.14	Repairing or replacing existing drainage systems	Prov Sum	100000.00		
PS21.15	Overhaul for material hauled in excess of 10,0 km free-haul (normal overhaul)	m ³ .km	2000.00		
21.17	Test flushing of pipe subsoil drains	No	10.00		
	TOTAL CARRIED TO SUMMARY				

Item	Description	Unit	Qty	Rate	Total
	SECTION 2200				
22.00	PREFABRICATED CULVERTS				
22.01	Excavation				
	(a) Excavating soft material situated within the following depth ranges below the surface level:				
	(i) 0 m up to 1.5 m	m ³	300.00		
	(b) Extra over subitem 22.01(a) for excavation in hard material, irrespective of depth	m ³	100.00		
22.02	Backfilling:				
	(a) Using the excavated material	m ³	200.00		
	(b) Using imported selected material	m ³	200.00		
	(c) Extra over subitems 22.02(a) and (b) for soil cement backfilling				
	(ii) with 5% Cement	m ³	20.00		
PS22.02	(d) using the in-plant foamed BSM from EtheKweni Municipality's Asphalt Plant stockpile	m ³	200.00		
PS22.03	Concrete pipe culverts (Class 75D)				
	(c) On class C bedding				
	(ii) 450mm diameter	m	50.00		
	(iii) 600mm diameter	m	150.00		
	(d) On sand bedding				
	(ii) 450mm diameter	m	50.00		
	(iii) 600mm diameter	m	150.00		
	(e) On 19 mm crushed stone bedding				
	(ii) 450mm diameter	m	50.00		
	(iii) 600mm diameter	m	150.00		
22.12	Removing existing concrete				
	(a) Plain concrete	m ³	100.00		
	(b) Reinforced concrete	m ³	50.00		
22.17	Manholes, catchpits, precast inlet and outlet structures complete:				
	(b) Catchpits constructed as per EtheKweni Municipality Standard Drawings (no. 38572/3)				
	(i) Type S1 upto 1.5m deep	No.	5.00		
	(ii) Type S2 upto 1.5m deep	No.	5.00		
	(iii) Type D3 upto 1.5m deep	No.	5.00		
	(e) Extra over for subitem 22.17(b)				
	(i) Type S1 constructed to a depth exceeding 1.5m but not 2m	No.	5.00		
	(ii) Type S2 constructed to a depth exceeding 1.5m but not 2m	No.	5.00		
	(iii) Type D3 constructed to a depth exceeding 1.5m but not 2m	No.	5.00		
22.18	Brickwork				
	(a) 115 mm thick	m ²	50.00		
	(b) 230 mm thick	m ²	100.00		
	(c) 345 mm thick	m ²	100.00		
22.19	Plaster	m ²	50.00		
22.20	Benching	m ²	50.00		
22.21	Accessories (as per EtheKweni Standard Details)				
	(a) Concrete Manhole cover including frame				
	(i) Light Duty left/right hand splay	No	10.00		
	(ii) Heavy Duty left/right hand splay	No	10.00		
	(iii) Light Duty Inlet Slab including cover	No	10.00		
	(v) Heavy Duty Inlet Slab including cover	No	10.00		
	(vi) Light Duty Support Beam	No	10.00		
	(vii) Heavy Duty Support Beam	No	10.00		
	(viii) Light/Heavy Duty cover	No	10.00		
22.23	Service ducts: refer to standard drawing no. 38589				
	(a) Ordinary pipes				
	(iii) Unplasticised PVC pipes				



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Item	Description	Unit	Qty	Rate	Total
	(1) 110mm dia.	m	200.00		
	(2) 160 mm dia.	m	200.00		
22.24	Duct marker blocks				
	(a) Concrete marker	No	50.00		
22.26	Hand excavation to determine the positions of existing services	m ³	100.00		
PS22.30	Repairs to drainage structures	Prov Sum	50000.00		
PS22.31	Raising or lowering of the following services' structures:				
	(a) Existing manhole with concrete cover and frame in paved areas: (0 mm to 50 mm)	No.	10.00		
	(ii) Extra over item PS22.31(a) for manhole fitted with concrete cover (50mm to 130 mm)	No.	10.00		
	(b) Existing manhole with cast-iron cover and frame in paved areas: (0 mm to 50 mm)	No.	10.00		
	(i) Extra over item PS22.31(b) for supply of new heavy duty cast iron covers and frames	No.	10.00		
	(ii) Extra over item PS22.31(b) for manhole fitted with cast-iron cover (50 mm to 130 mm)	No.	10.00		
	(c) Existing chamber with cast-iron water valve cover in paved areas (0 mm to 50 mm)	No.	10.00		
	(i) Extra over item PS22.31 (c) for cast-iron water valve cover: (50 mm to 130 mm)	No.	10.00		
	(d) Existing cast-iron T.S.M. cover in paved areas: (0 mm to 50 mm)	No.	10.00		
	(i) Extra over item PS22.31(d) for cast-iron water valve cover: (50 mm to 130 mm)	No.	10.00		
	(e) Existing stormwater Type S1 inlets (depths between 0 mm to 130 mm)	No.	10.00		
	(f) Existing stormwater Type S2 inlets (depth between 0 mm to 130 mm)	No.	10.00		
	(g) Existing stormwater Type D3 inlets (depths between 0 mm to 130 mm)	No.	10.00		
	(h) Existing stormwater Type S1 inlets (depths between 0 mm to 250 mm)	No.	10.00		
	(j) Existing stormwater Type S2 inlets (depths between 0 mm to 250 mm)	No.	10.00		
	(k) Existing stormwater Type D3 inlets (depths between 0 mm to 250 mm)	No.	10.00		
	(l) Existing stormwater Type S1 inlets (depths between 0 mm to 500 mm)	No.	10.00		
	(m) Existing stormwater Type S2 inlets (depths between 0 mm to 500 mm)	No.	10.00		
	(n) Existing stormwater Type D3 inlets (depths between 0 mm to 500 mm)	No.	10.00		
	TOTAL CARRIED TO SUMMARY				
	SECTION 2300				
23.00	CONCRETE KERBING, CONCRETE CHANNELLING, CHUTES AND DOWNPIPES, AND CONCRETE LININGS FOR OPEN				
23.01	Concrete kerbing				
	(a) Precast kerbing to SABS 927				
	(i) Figure 4 kerb	m	200.00		
	(ii) Figure 6 kerb	m	1000.00		
	(iii) Figure 12 kerb	m	1000.00		
	(b) Extra-over item 23.01 (a) for :				
	(i) Radius of 1 m to 4 m	m	100.00		
	(ii) Radius of 4 m to 20 m	m	100.00		
23.02	Concrete kerbing-channelling combination				
	(a) Precast kerb to SABS 927 and cast in situ channel 300 mm concrete class 20/13)				
	(i) Figure 4 kerb	m	200.00		
	(ii) Figure 6 kerb	m	1000.00		
	(iii) Figure 12 kerb	m	100.00		
	(b) Concrete kerbing-channelling combination constructed to standard drawing detail no. 38577				
	(i) Type A: Barrier kerb and cast in-situ channel/fillet (Arterial Road)	m	300.00		

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Item	Description	Unit	Qty	Rate	Total
	(ii) Type B: Barrier kerb and cast in-situ channel/fillet	m	300.00		
	(iii) Type C: Mountable kerb and cast in-situ channel/fillet	m	750.00		
	(iv) Type D: Barrier kerb and cast in-situ channel/fillet (Minor Road)	m	1000.00		
	(v) Type E: Semi-mountable kerb placed on road surface (Minor Road)	m	1000.00		
	(vi) Type F: Mountable kerb with cast in-situ filet (Minor Road)	m	500.00		
23.05	Inlet, outlet, transition and similar structures (typical designs)	No	50.00		
23.06	Inlet, outlet, transition and similar structures (measured by components)				
	(a) Concrete class 20/13	m ³	50.00		
	(b) Formwork (F3 surface finish)	m ²	100.00		
23.08	Concrete lining for open drains				
	(a) Cast in situ concrete lining class 20/13 for:				
	(i) Open Drains	m ³	10.00		
	(ii) Other concrete work (Pedestrian, vehicular scoops, bullnosing and driveways)	m ³	10.00		
	(b) Class U2 surface finish to cast in situ concrete for :				
	(i) Open Drains	m ²	1000.00		
	(ii) Other concrete work (Pedestrian, vehicular scoops, bullnosing and driveways)	m ²	1000.00		
23.10	Sealed joints in concrete linings				
	(a) Polysulphide-based sealant	m	200.00		
23.13	Polyethylene sheeting (0,15 mm thick)	m ²	1000.00		
PS23.17	Repairs to damaged kerbs	Prov Sum	20000.00		
PS23.18	Break-out and remove the following roadway elements and cart to spoil :				
	(a) Kerbs	m	500.00		
	(b) Kerb and channel	m	500.00		
	(c) Medians	m ²	1000.00		
	(d) Sidewalks	m ²	2000.00		
	(e) Driveways	m ²	1000.00		
	(f) Extra-over item PS23.18 (a), (b), (c), (d) and (e) for selection of concrete suitable for recycling and stockpile as directed	m ³	200.00		
	(g) Extra-over item PS23.18 (a) and (b) for selection of Kerbs suitable for re-use and stockpile as directed	m	200.00		
	(h) Extra-over item PS23.18 (a), to (g) for hauling of suitable material as directed, in excess of 10km freehaul	m ³ .km	5000.00		
23.14	Saw Cutting Bituminous surfacing and pavement layers for concrete lined drains	m	1000.00		
	TOTAL CARRIED TO SUMMARY				
	SECTION 2400				
24.00	ASPHALT AND CONCRETE BERMS				
PS24.01	Asphalt berms				
	(c) Placed where specified by the Employer's Agent using mix Sa-H10 (50/70) - Standard drawing no. 38577				
	(i) Type G: Extruded barrier kerb	m	100.00		
	(ii) Type H: Extruded mountable kerb	m	100.00		
24.03	Prime and tack coats				
	(b) Tack coat (Grade 60 anionic bitumen emulsion)	m ²	1000.00		
PS24.05	Removal of asphalt haunch to:				
	(a) Spoil/tip site	m	2000.00		
	(b) (i) Stockpile site	m	2000.00		



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Item	Description	Unit	Qty	Rate	Total
	(b) (ii) Extra-over item PS24.05 (b)(i) for hauling of suitable material as directed, in excess of 10km freehaul	m ³ .km	10000.00		
	TOTAL CARRIED TO SUMMARY				
	SECTION 3300				
33.00	MASS EARTHWORKS				
PS33.01	Cut and borrow to fill, including free-haul up to 10,0 km (backfill to undercut)				
	(a) Gravel material in compacted layer thickness of 200 mm and less:				
	(i) Compacted to 90% of modified AASHTO density	m ³	100.00		
	(ii) Compacted to 93% of modified AASHTO density	m ³	100.00		
	(e) Pioneer layer	m ³	50.00		
PS33.07	Removal of unsuitable material (including free-haul of 10,0 km):				
	(a) In layer thicknesses of 200 mm and less:				
	(i) Stable material	m ³	200.00		
	(ii) Unstable material	m ³	400.00		
PS33/16.02	Overhaul on material hauled in excess of 10,0 km	m ³ .km	1000.00		
33/32.06	Stockpiling of material	m ³	500.00		
	TOTAL CARRIED TO SUMMARY				
	SECTION 3400				
34.00	PAVEMENT LAYERS OF GRANULAR MATERIAL				
PS34.01	Pavement layers constructed from granular material taken from commercial sources				
	(a) Gravel selected layer compacted to:				
	(ii) 95% of modified AASHTO density				
	(1) Lower selected layer (G9) 150mm thick	m ³	50.00		
	(2) Upper selected layer (G7) 150mm thick	m ³	50.00		
	(c) Gravel subbase (unstabilized gravel) compacted to:				
	(ii) 97% of modified AASHTO density				
	(1) G5 150mm thick	m ³	200.00		
	(2) G4 150mm thick	m ³	100.00		
	(3) G5 200mm thick	m ³	50.00		
	(4) G5 300mm thick	m ³	50.00		
	(5) G4 200mm thick	m ³	50.00		
	(6) G4 300mm thick	m ³	50.00		
34.10	Compacting the floors of pavement excavations (5 roller passes) with:				
	(a) Vibratory rollers	m ²	2000.00		
	TOTAL CARRIED TO SUMMARY				
	SECTION 3600				
36.00	CRUSHED STONE BASE				
36.01	Crushed-stone base sources and compacted to 85% of bulk relative density (150mm thick)				
	(i) 37,5 mm nominal maximum size stone	t	2000.00		
PS36.01	(g) Crushed dump rock subbase (-150 mm maximum size stone) obtained from commercial sources and constructed to a thickness as directed by the Employer's Agent	t	3000.00		
PS36.01	(f) Blinding the Dump Rock Layer with evenly graded 10mm crushed stone obtained from commercial sources and constructed to a thickness as directed by the Employer's Agent	t	500.00		
PS36.01	(h) Synthetic-fibre filter fabric for the lining of the Crushed Dump Rock material				
	(i) Grade A7 or similar	m ²	10000.00		
	TOTAL CARRIED TO SUMMARY				

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Item	Description	Unit	Qty	Rate	Total
	SECTION 3800				
38.00	BREAKING UP EXISTING PAVEMENT LAYERS				
38.02	Milling out existing bituminous material with an average milling depth:				
38.02	(a) Not exceeding 30mm	m ³	1000.00		
	(b) Exceeding 30 mm but not exceeding 60 mm	m ³	4000.00		
PS38.02	(c) Exceeding 60 mm but not exceeding 120 mm	m ³	3000.00		
PS38.02	(d) Exceeding 120 mm	m ³	100.00		
38.04	Excavating and spoiling material from an existing pavement and/or the underlying fill:				
	(a) Non-cemented material	m ³	200.00		
PS38/16.02	Hauling of matreial in excess of 10.0km (ordinary overhaul)	m ³ -km	2000.00		
PS38.15	Moving the milling or recycling machine from site to site by lowbed as agreed with the Employer's Agent for the following size machines				
	(i) 0,0 m to 1,0 m	No.	10.00		
	(ii) greater 1,0 m to 1,5 m	No.	5.00		
	(iii) greater than 1,5 m	No.	5.00		
	TOTAL CARRIED TO SUMMARY				
	SECTION 4200				
	ASPHALT BASE AND SURFACING				
PS 4209.01	Supply and Lay the following asphalt mixes by paver from commercial sources:				
	(a) Sand Skeleton Asphalt Layers (Contineously Graded Asphalt)				
	(i) Sa-S10	t	1000.00		
	(ii) Sa-S14	t	500.00		
	(iii) Sa-H10	t	2000.00		
	(iv) Sa-H14	t	7500.00		
	(v) Sa-H20	t	500.00		
	(vi) Sa-V14	t	500.00		
	(vii) Sa-V20	t	200.00		
	(viii) Sa-E14	t	100.00		
	(x) Sa-S7	t	500.00		
	(b) Stone Skeleton Asphalt Layers				
	(i) SMA-V10	t	1000.00		
	(ii) SMA-V14	t	100.00		
	(iii) SMA-E10	t	500.00		
	(iv) SMA-E14	t	100.00		
	(c) Enrobé á Module Élevé (EME)				
	(i) EME-E14	t	500.00		
	(ii) EME-E20	t	200.00		
	(d) By hand				
	(i) Sa-S10	t	50.00		
	(e) Variations				
	(i) Bitumen	t			
	(ii) Aggregate	t			
	(iii) Active filler	t			
PS 4209.02	Supply and Lay the following asphalt mixes from Ethekwini Municipality Asphalt Plant (Collect and Deliver):				
	(a) By paver				
	(i) Sa-S14	t	100.00		
	(ii) Sa-S10	t	100.00		
	(b) By hand				
	(i) Sa-S10	t	100.00		
PS 4206	Tie in Joints				
PS 4206(a)	(i) Transverse Joints	m	500.00		



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Item	Description	Unit	Qty	Rate	Total
PS 4206(b)	(ii) Longitudinal Joints	m	500.00		
PS 4206 (c)	(iii) Feathered Transverse Joints	m	100.00		
	(iv) Extra over item (i),(ii),(iii) for material hauled to stockpile site as instructed, in excess of 10km freehaul	m ³ -km	1000.00		
PS 4205.02	Tack Coat				
	Spray surface using 60% anionic stable grade emulsion @ 0,3 l/ m ²	m ²	20000.00		
PS 4209.03	Testing				
PS 4209.03(b)	Density testing of Asphalt using Nuclear Gauge	No.	100.00		
PS 4209.03 (a)	Coring for Density Testing				
	(i) 0-50mm	No.	50.00		
	(ii) 0-100mm	No.	25.00		
	Extra over item (ii) per 10mm of additional cored	mm	1000.00		
PS 4209.04	Patching of Existing Surface				
PS 4209.04(a) & (d)(i)	Patching (Surface Repairs - Asphalt Wearing Course)				
	(i) Deep patching with asphalt (101 mm to 160 mm)	m ²	300.00		
	(ii) Deep patching with asphalt (51 mm to 100 mm)	m ²	1000.00		
	(iii) Shallow patching (0 mm to 50 mm deep)	m ²	4500.00		
PS 4209.04(b) & (d)(ii)	Patching (Structural Repairs - Various Road Categories)				
	(i) Category B	m ²	100.00		
	(ii) Category C	m ²	200.00		
	(iii) Category D	m ²	1000.00		
PS 4209.04(b) & (d)(ii)	Patching (Structural Repairs - Various Road Categories using in-plant foamed BSM)				
	(i) Category B	m ²	100.00		
	(ii) Category C	m ²	200.00		
	(iii) Category D	m ²	1000.00		
PS 4212	Patching or Reconstruction of Existing Asphalt Sidewalk/Driveway Access Scoops				
	(i) Repairs or reconstruction of existing Sidewalks or Vehicular Access Scoops using the crusher run (G2) material.	m ²	500.00		
	(ii) Repairs or reconstruction of existing Sidewalks or Vehicular Access Scoops using the in-plant foamed BSM from EtheKwini Municipality's Asphalt Plant stockpile.	m ²	500.00		
PS 4211	Application of Weedkiller	m	10000.00		
PS 4213	Removal of Speed humps	m	200.00		
	(i) Extra over item PS4213 for material hauled to stockpile site as instructed, in excess of 10km freehaul	m ³ -km	1000.00		
PS 4214	Reinstating of Speed humps	m	200.00		
	(i) Extra over item PS4214 for material hauled to stockpile site as instructed, in excess of 10km freehaul	m ³ -km	1000.00		
PS 4215	Reinforced of Asphalt using Geotextiles				
PS 4215.02 (I)	Supply and deliver:				
	(a) Glass Fibre Reinforced Fabric				
	(i) Grade 205 g/m ²	Roll	10.00		
	(ii) Grade 405 g/m ²	Roll	10.00		
	(iii) Grade 610 g/m ²	Roll	10.00		
	(b) Glass Fibre Woven Fabric	Roll	10.00		
PS 4215.02 (II)	Installation of Glass Fibre Reinforced Fabric and Glass Fibre Woven Fabric as per technical specification or the manufacturer's specifications as approved by the Employers Agent				
	a) Areas up to 500 m ²	m ²	2000.00		
	b) Areas greater than 500 m ² up to 1 000 m ²	m ²	2000.00		
	c) Areas greater than 1 000m ²	m ²	2000.00		
	TOTAL CARRIED TO SUMMARY				



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Item	Description	Unit	Qty	Rate	Total
	SECTION 4400				
	SINGLE SEALS				
44.01	Single seals (70/100 penetration grade bitumen) (Grade of aggregate to be specified)				
	(b) Using 7.1 mm aggregate	m ²	10000.00		
	(c) Using 10 mm aggregate	m ²	10000.00		
	(d) Using 14 mm aggregate	m ²	10000.00		
	Single seals (SE-1 Binder) (Grade of aggregate to be specified)				
	(b) Using 7.1 mm aggregate	m ²	10000.00		
	(c) Using 10 mm aggregate	m ²	10000.00		
	(d) Using 14 mm aggregate	m ²	10000.00		
44.02	Bituminous binder variations:				
	(b) Road grade B8 bitumen (70/100 penetration grade)	l	50000.00		
	(h) Homogeneous modified binder (hot plied):				
	(i) S-E1 binder	l	10000.00		
	(ii) S-E2 binder	l	10000.00		
	(iii) S-R1 binder	l	10000.00		
	(j) Precoating fluid	l	1000.00		
	(k) Power Parrafin Cutter	l	1000.00		
44.03	Aggregate variations (Grade of aggregate to be specified)				
	(b) 7.1mm aggregate	m ³	50.00		
	(c) 10.0mm aggregate	m ³	50.00		
	(d) 14.0mm aggregate	m ³	50.00		
44.04	Application of a fog spray:				
	(b) 30% spray-grade emulsion:				
	(i) Cationic	l	10000.00		
PS44.05	Precoating the aggregate at a rate specified using petroleum based pre-coating fluid or similar and approved:				
	(a) Precoating the 14.0mm aggregate at a rate of 16 l/m3	m ³	500.00		
	(b) Precoating the 10.0mm aggregate at a rate of 19 l/m3	m ³	300.00		
	(c) Precoating the 7.1mm aggregate at a rate of 22 l/m3	m ³	200.00		
44.07	Aggregate for blinding:				
	(b) Crusher sand	m ³	200.00		
44.08	Extra over 44.01 for work in areas inaccessible to Mechanical Equipment	m ²	5000.00		
PS44.10	Moving of the Single Seal paving team in access of a 10km radius (subject to the Employer's Agents approval)	No	10.00		
	TOTAL CARRIED TO SUMMARY				



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Item	Description	Unit	Qty	Rate	Total
	SECTION 4800				
	TREATMENT OF AN EXISTING SURFACE EXHIBITING CERTAIN DEFECTS				
48.01	Treatment with diluted bituminous emulsion (fog spray)				
	(a) 30% bitumen emulsion				
	(i) Cationic	l	10000.00		
	(d) 60% bitumen emulsion				
	(i) Cationic	l	10000.00		
	Slurry seal:				
PS48.03a	(a) Tack Coat using 60% bitumen emulsion cationic (applied at 0.6l/m2)	l	10000.00		
48.03	(b) Slurry applied by hand	m ³	100.00		
48.03	(c) Slurry applied by spreader box	m ³	200.00		
PS48.03a	(f) For texture improvement with natural or crusher sand applied by hand	m ³	200.00		
PS48.03	(g) Microsurfacing (Rapid Setting)				
	i. Type II - Overlay or rut fill up to 12mm	m ³	100.00		
	ii. Type III - Rut fill more than 12mm	m ³	100.00		
PS48.04	Screed of asphalt or coarse slurry:				
	(d) Coarse grade slurry				
	(i) type 1 aggregate with 60% stable grade emulsion and cement filler	m ³	50.00		
	(ii) type 1 aggregate with 60% stable grade emulsion,3% latex and cement filler	m ³	50.00		
PS48.15	Moving of slurry seal paving team in excess of a 10km radius	No.	10.00		
PS48.16	Emulsion variation to slurry mix design	l	50.00		
46.05	Variation in the Rate of application of the slurry	m ³	20.00		
46.07	Variation in active filler content (Portland cement)	t	20.00		
PS46.08	Extra over items PS48.03 and PS48.04 for work in areas inaccessible to mechanical equipment	m ²	2000.00		
PS48.14	Cleaning cracks with compressed air, and Sealing of cracks using C-E1 Sealant (conforms to TG1 2019)	m	30000.00		
PS48.17	Supply and install a 200mm wide crack sealing system to manufacturers specifications- nonwoven continuous filament polyester Paving Fabric, or similar approved				
	(a) Crack sealing strip (to manufacturers specifications inclusive of tack)	m	500.00		
	TOTAL CARRIED TO SUMMARY				
	SECTION 5100				
51.00	PITCHING, STONEMWORK AND PROTECTION AGAINST EROSION				
51.04	Concrete pitching and block paving				
	(b) Segmental block paving				
	(i) 100 mm thick interlocking	m ²	100.00		
	(ii) 100 mm thick rectangular	m ²	100.00		
	(d) Prefabricated concrete paving blocks for sidewalk pavement				
	(i) 60 mm thick	m ²	100.00		
	(ii) 80 mm thick	m ²	100.00		
	(iii) 100 mm thick	m ²	100.00		
51.06	Provision of approved herbicide and ant poison:				
	(a) Provision of materials	PC Sum	20000.00		
	(b) Contractor's charges and profit added to the prime cost sum	%	20000.00		
	TOTAL CARRIED TO SUMMARY				
	SECTION 5200				
52.00	GABIONS				
52.01	Foundation trench excavation and backfilling				
	(b) In all other classes of material	m ³	100.00		



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Item	Description	Unit	Qty	Rate	Total
52.02	Surface preparation for bedding the gabions	m ²	500.00		
52.03	Gabions (Diameter of mesh wire and mesh size to be specified)				
	(a) (i) Galvanized gabion boxes (1m x 1m x 1m)	m ³	50.00		
	(ii) Galvanized gabion boxes (1.5m x 1m x 1m)	m ³	50.00		
	(iii) Galvanized gabion boxes (2m x 1m x 1m)	m ³	50.00		
	(b) (i) PVC-coated gabion boxes (1m x 1m x 1m)	m ³	50.00		
	(ii) PVC-coated gabion boxes (1.5m x 1m x 1m)	m ³	50.00		
	(iii) PVC-coated gabion boxes (2m x 1m x 1m)	m ³	50.00		
52.04	Filter fabric (Type to be specified)				
	(a) Grade 3 filter fabric	m ²	200.00		
	TOTAL CARRIED TO SUMMARY				
	SECTION 5400				
54.00	GUARDRAILS				
PS54.01	Guardrails on concrete posts, in accordance to standard drawing no. 38580				
	(a) Galvanized	m	200.00		
54.03	Extra over items 54.01, 54.02 and 54.11 for horizontally curved guardrails factory bent to a radius less than 45m	m	20.00		
54.04	End treatments:				
	(a) End wings	No.	10.00		
	(b) Bull noises	No.	10.00		
	(d) End treatments in accordance with the drawings where single guardrail sections are used	No.	10.00		
PS54.05	Additional guardrail posts				
	(c) Concrete	No.	20.00		
PS54.07	Removing existing guardrails	m	20.00		
PS54.09	Re-erection of guardrails with recovered materials:				
PS54.09.01	Guardrails including concrete posts				
	(a) Single guardrail	m	50.00		
	(b) Double guardrail	m	20.00		
PS54.09.02	Guardrails only				
	(a) Single guardrail	m	50.00		
	(b) Double guardrail	m	20.00		
54.10	Re-erection of end treatments with recovered material				
	(a) End wings	No.	10.00		
	(b) Bull noises	No.	10.00		
	(d) End treatments with single guardrails	No.	10.00		
	TOTAL CARRIED TO SUMMARY				
	SECTION 5600				
PS5600	ROAD SIGNS				
	Control Signs:				
PS56.01	R1-STOP sign:600mm	no.	10.00		
PS56.01	R1-STOP sign:900mm	no.	10.00		
PS56.01	R1.4-4 Way Stop 600mm	no.	10.00		
PS56.01	R2-Yield sign: 900mm	no.	10.00		
PS56.01	R2-Yield sign: 1200mm	no.	10.00		
	Prohibition Signs:				
PS56.01	R201 to R241 : 600mm	no.	10.00		
PS56.01	R201 to R241: 900 mm	no.	10.00		
PS56.01	R201 to R 241: 1200mm	no.	10.00		
	Warning Signs-Road Layout Signs				
PS56.01	W101 to W363: 900mm	no.	20.00		
PS56.01	W101 to W363: 1200mm	no.	20.00		
	Information Signs:				
PS56.01	Speed hump sign, including 30km/hr sign	no.	50.00		

Item	Description	Unit	Qty	Rate	Total
	Supply of Posts:-				
PS56.02	Supply of creosote/CCA treated post 75-100mm diameter of length 2500mm	no.	10.00		
PS56.02	Ditto of length 3000mm	no.	10.00		
PS56.02	Ditto of length 3600mm	no.	10.00		
PS56.02	Supply of creosote/CCA treated post 100-125mm diameter of length 2500mm	no.	10.00		
PS56.02	Ditto of length 3000mm	no.	10.00		
PS56.02	Ditto of length 3600mm	no.	10.00		
PS56.02	Supply of creosote/CCA treated post 125-150mm diameter of length 2500mm	no.	10.00		
PS56.02	Ditto of length 3000mm	no.	10.00		
PS56.02	Ditto of length 3600mm	no.	10.00		
PS56.02	Supply of 76mm diameter hot dipped galv. Post of length 2500mm	no.	10.00		
PS56.02	Ditto of length 3000mm	no.	10.00		
PS56.02	Ditto of length 3600mm	no.	10.00		
	Supply of Fasteners:-	no.	10.00		
PS56.02	Supply of stainless steel bridges(incl. nut& washer)	no.	10.00		
PS56.02	Supply of uni-strut clamps (incl. S/S 304 M8 bolt,nut & washer)	no.	10.00		
PS56.02	Supply of M8 S/S 304 self tapping bolts	no.	10.00		
	Installation of Posts:-				
PS56.03	Installation of post (soilcrete)	no.	10.00		
	Installation of Signs:-				
PS56.04	Installation of signs using bridges	no.	10.00		
PS56.04	Installation of signs of using uni-strut clamps	no.	10.00		
PS56.04	Installation of signs using self-tapping bolts	no.	10.00		
	Removal and Disposal of Damaged Signs and Posts:-				
PS56.05	Dismantling and removal of sign from post/ELP for disposal	no.	10.00		
PS56.05	Removal of damaged post from ground for disposal	no.	10.00		
	Removal and Re-erection of Signs and Posts:-				
PS56.06	Dismantling and removal of sign from post/ELP for re-erection	no.	10.00		
PS56.06	Removal of post from ground for re-erection	no.	10.00		
	TOTAL CARRIED TO SUMMARY				
	SECTION 5700				
57.00	ROAD MARKINGS				
57.01	Road marking paint:				
	(a) White lines (broken or unbroken) (for temporary roadmarking)				
	(i) 100 mm wide	m	500.00		
57.02	Retro-reflective road marking paint:				
	(a) White lines (broken or unbroken)				
	(i) 100 mm wide	m	500.00		
	(ii) 150 mm wide		200.00		
	(iii) 200 mm wide	m	200.00		
	(iv) 300 mm wide	m	200.00		
	(b) Yellow lines (broken or unbroken)				
	(i) 100 mm wide	m	500.00		
	(ii) 150 mm wide	m	500.00		
	(c) Red lines (broken or unbroken)				
	(i) 100 mm wide	m	500.00		
	(ii) 150 mm wide	m	500.00		
	(d) White lettering and symbols	m ²	1000.00		
	(e) Yellow lettering and symbols	m ²	200.00		
	(f) Transverse lines, painted island and arrestor bed markings (any colour)	m ²	200.00		

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Item	Description	Unit	Qty	Rate	Total
PS57.03	Hot-melt plastic road-marking material (complying to SANS 731-1)				
	(a) White lines (Broken or Unbroken)				
	(i) 100mm wide	m	5000.00		
	(ii) 150mm wide	m	500.00		
	(iii) 200mm wide	m	200.00		
	(iv) 300mm wide	m	200.00		
	(v) Marking speed-humps in accordance to standard drawing no. 43924A/1 (200mm wide)	m	500.00		
	(b) Yellow lines (Broken or Unbroken)				
	(i) 100mm wide	m	500.00		
	(ii) 150mm wide	m	500.00		
	(iii) 200mm wide	m	200.00		
	(iv) 300mm wide	m	200.00		
	(c) Red lines (Broken or Unbroken)				
	(i) 100mm wide	m	500.00		
	(ii) 150mm wide	m	500.00		
	(d) White letter and Symbols	m ²	200.00		
	(e) Yellow letter and Symbols	m ²	200.00		
	(f) Transverse lines, painted island and arrestor bed markings (any colour)	m ²	200.00		
57.04	Variation in rate of application for Hot-melt plastic road marking material (complying to SANS 731-1)				
	(a) White	litre	200.00		
	(b) Yellow	litre	200.00		
	(c) Red	litre	200.00		
PS57.05	Roadstuds				
	(a) Heavy duty aluminium road stud (K-lite SKU-304 or similar and approved by Employers Agent)	No	200.00		
	(b) Glass dome road stud (holophane type or similar and approved by Employers Agent)	No	200.00		
57.06	Setting out and premarking the lines (Excluding traffic-island markings, lettering and symbols)	km	100.00		
57.08	Removal of existing, temporary or permanent road markings by:				
	(a) Sandblasting	m ²	100.00		
	(b) Overpainting as temporary measure	m ²	200.00		
57.09	Removal of existing roadstuds	No	100.00		
	TOTAL CARRIED TO SUMMARY				
	SECTION 5800				
	LANDSCAPING AND PLANTING PLANTS				
58.01	Trimming				
	(a) Machine	m ²	500.00		
	(b) Hand	m ²	1000.00		
PS58.03	Preparing the areas for grassing				
	(c) Topsoiling within the road reserve, where the following materials are used:				
	(i) Topsoil obtained from within the road reserve or borrow areas (freehaul 10km)	m ³	100.00		
	(ii) Topsoil obtained from commercial sources (incl. all haul)	m ³	100.00		
	(f) Stockpiling topsoil (freehaul 10km)	m ³	100.00		
PS58.04	Grassing				
	(a) Planting of grass cuttings - kikuyu	m ²	1000.00		
	(b) Sodding by using the following types of sods:				



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Item	Description	Unit	Qty	Rate	Total
	(i) Nursery sods	m ²	200.00		
	(c) Hydroseeding				
	(iii) Hydroseeding including the seed mixture for areas < 10,000m ²	m ²	2500.00		
	(iii) Hydroseeding including the seed mixture for areas > 10,000m ²	m ²	10000.00		
	TOTAL CARRIED TO SUMMARY				
	SECTION 7400				
	PATENTED EARTH RETAINING SYSTEMS				
74.01	(a) Loffelstein precast concrete blocks (Drawing No. 7400/1)				
	(i) Wall type A: L300	m ²	200.00		
	(ii) Wall type B: L500	m ²	200.00		
	(c) Terrace Blok precast concrete blocks (Drawing No. 7400/1)				
	(i) Wall type A: D300	m ²	200.00		
	(ii) Wall type B: D500	m ²	200.00		
74.02	Excavation for concrete bases for earth retaining systems (Drawing No. 7400/1)				
	(a) In soft material				
	(i) Base type A	m ³	500.00		
	(ii) Base type B	m ³	200.00		
	(b) Extra-over sub-item 74.02(a) for excavation in hard material	m ³	50.00		
74.03	Concrete bases for eath retaining systems - Class 25/26 (Drawing No. 7400/1)				
	(i) Base type A	m ³	50.00		
	(ii) Base type B	m ³	50.00		
	TOTAL CARRIED TO SUMMARY				
	SECTION 8100				
81.00	TESTING MATERIALS AND WORKMANSHIP				
81.02	Other special tests requested by the Engineer	Prov Sum	100000.00		
	(b) Contractor's handling costs, profit and all other charges in respect of item 81.02	%	100000.00		
	TOTAL CARRIED TO SUMMARY				
	SECTION 10100				
	COLD INSITU RECYCLING WORK				
PS10111.1	Preperations for pavement rehabilitation	lane-km	20.00		
PS10111.2	Pre-pulverising material in the existing pavement using a milling machine				
	(i) Milling to breakdown asphalt layers exceeding 40mm but not 60mm	m ²	2000.00		
	(ii) Milling to breakdown asphalt layers exceeding 61mm but not 100mm	m ²	500.00		
	(iii) Milling to breakdown asphalt layers exceedign 101mm but not 160mm	m ²	500.00		
	(iv) Milling to breakdown asphalt layers exceeding 160mm	m ²	500.00		
PS10111.3	New material imported for modification of existing pavement layers:				
	(a) Crushed stone (G2) from commercial sources	t	500.00		
	(b) Crusher dust from commercial sources	t	100.00		
PS10111.4	New pavement layers constructed by insitu recycling with chemical or bitumen stabilising agents				
	(a) Layers (all material) Insitu recycled, and compacted to 102% of modified AASHTO density for layers up to:				
	(i) 100mm to 150mm	m ³	500.00		
	(ii) 151mm to 200mm	m ³	200.00		
	(iii) 201mm to 250mm	m ³	100.00		
	(iv) 251mm to 300mm	m ³	100.00		



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Item	Description	Unit	Qty	Rate	Total
	(b) Layers (all material) Insitu recycled, either chemical or bituminous stabilized and compacted to 100% of modified AASHTO density for layers up to:				
	(i) 100mm to 150mm	m ³	500.00		
	(ii) 151mm to 200mm	m ³	200.00		
	(iii) 201mm to 250mm	m ³	100.00		
	(iv) 251mm to 300mm	m ³	100.00		
	(c) Layers (all material) Insitu recycled, either chemical or bituminous stabilized and compacted to 98% of modified AASHTO density for layers up to:				
	(i) 100mm to 150mm	m ³	500.00		
	(ii) 151mm to 200mm	m ³	200.00		
	(iii) 201mm to 250mm	m ³	100.00		
	(iv) 251mm to 300mm	m ³	100.00		
PS10111.5	Stabilizing agent:				
	(a) Cementitious stabilising agents and active fillers				
	(i) Ordinary portland cement	t	20.00		
	(ii) Slaked road lime	t	20.00		
	(b) Bituminous stabilizing agents				
	(i) Bitumen Emulsion - Anionic stable grade bituminous emulsion (60% net bitumen)	t	20.00		
	(ii) Foam bitumen using 70/100 penetration grade bitumen	t	100.00		
PS10111.6	Trial sections where ordered by the Employer's Agent	m ³	200.00		
PS10111.7 / 48.01	Application of a fog spray of diluted emulsion				
	(a) 65% Cationic spray grade emulsion	l	3000.00		
	(b) 32.5% Cationic spray grade emulsion	l	2000.00		
	(c) 16% Cationic spray grade emulsion	l	5000.00		
	TOTAL CARRIED TO SUMMARY				
	SECTION 10200				
	STATIC PLANT RECYCLING WORK				
PS10212.02	Processing/Mixing Bitumen Stabilised Reclaimed Asphalt in a Static Plant recycler - KMA or similar and stockpiling on site	m ³	100.00		
PS10212.03	Processing/Mixing Bitumen Stabilised Reclaimed Asphalt in a Static Plant recycler - KMA or similar and laid				
	(a) Materials, Bitumen stabilised in a Static Plant Recycler, paver layed and compacted to 102% Mod AASHTO density, to compacted layer thickness:				
	(i) 100mm upto and including 150mm	m ³	500.00		
	(ii) Exceeding 150mm and not 200mm	m ³	100.00		
	(iii) Exceeding 200mm and not 300mm	m ³	100.00		
	(b) Materials, Bitumen stabilised in a Static Plant Recycler, laid and compacted to 100% Mod AASHTO density, to compacted layer thickness:				
	Paver laid:				
	(i) 100mm upto and including 150mm	m ³	500.00		
	(ii) Exceeding 150mm and not 200mm	m ³	100.00		
	(iii) Exceeding 200mm and not 300mm	m ³	100.00		
	Grader finished:				
	(i) 100mm upto and including 150mm	m ³	100.00		
	(c) Materials, Bitumen stabilised in a Static Plant Recycler, laid and compacted to 98% Mod AASHTO density, to compacted layer thickness:				
	Paver laid:				
	(i) 100mm upto and including 150mm	m ³	500.00		
	(ii) Exceeding 150mm and not 200mm	m ³	100.00		
	(iii) Exceeding 200mm and not 300mm	m ³	100.00		
	Hand laid:				
	(i) 100mm upto and including 150mm	m ³	50.00		
	Grader finished:				



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Item	Description	Unit	Qty	Rate	Total
	(i) 100mm upto and including 150mm	m ³	50.00		
	(d) Extra over item (a), (b) and (c) for crushing the Reclaimed asphalt prior to screening/processing in a Static Plant Recycler	m ³	1000.00		
	(e) Extra over item (a), (b) and (c) for screening the raw/crushed Reclaimed Asphalt prior to processing in a Static Plant Recycler	m ³	1000.00		
	(f) Extra over item (a), (b) and (c) for mechanically modifying the reclaimed asphalt by blending in a specified amount of crusher dust prior to processing in a Static Plant Recycler	m ³	1000.00		
	(g) Extra over item (a), (b) or (c) for overhaul of material in excess of 10km	m ³ .km	10000.00		
PS10212.04	Trial sections where ordered by the Employer's Agent	m ³	200.00		
	TOTAL CARRIED TO SUMMARY				
	SECTION 10300				
	ESTABLISHMENT OF CONSTRUCTION PLANT				
PS10302.01	Establishment of:				
	(a) Plant necessary for paving asphalt layers	No	10.00		
	(b) Plant necessary for milling operations	No	5.00		
	(c) Plant necessary for constructing in-plant BSM layers by				
	(i) Paver	No	2.00		
	(ii) Grader	No	2.00		
	(d) Plant necessary for constructing an in-situ BSM layer	No	2.00		
	(e) Plant necessary for constructing granular layers	No	2.00		
	(f) Plant necessary for completing subgrade improvements (undercuts)	No	2.00		
	(g) Plant necessary for carrying out the required ancillary works				
	(i) Pre-treatment (per sub-contractor)	No	10.00		
	(ii) Post-treatment (per sub-contractor)	No	10.00		
	(h) Static Plant Recycler – KMA or similar	No	2.00		
	(i) Crusher	No	2.00		
	(j) Screen (26.5/19mm max particle stone size), as specified by the Employer's Agent	No	2.00		
	(k) Establishment of single seal paving team	No	2.00		
	(l) Establishment of slurry seal paving team	No	2.00		
	TOTAL CARRIED TO SUMMARY				
	SECTION 10400				
	SMALL CONTRACTOR DEVELOPMENT				
PS10404.01	Provision of key personnel				
	(a) Foreman / Clerk of Works / Site Technician	Person-month	12.00		
PS10404.02	Training, coaching, guidance and mentoring				
	(a) Conducting a skills audit and gap analysis	Prov. Sum	50000.00		
	(b) Preparing the Support Development Programmes	Prov. Sum	50000.00		
	(c) Implementing the Support Development Programmes	Prov. Sum	20000.00		
	(d) Portfolio of evidence	Prov. Sum	20000.00		
	(e) Training facilities	Prov. Sum	50000.00		
	(f) Remuneration for workers undergoing training	Prov. Sum	50000.00		
	(g) Handling costs and profit in respect of payment associated with sub-item PS10404.02 (a) to (f)	%	240000.00		
	TOTAL CARRIED TO SUMMARY				
C1000	DAYWORKS				
C10.1	Personnel during normal working hours:				
	(a) Unskilled labour	hr	20.00		
	(b) Semi-skilled labour	hr	20.00		
	(c) Skilled labour	hr	20.00		
	(d) Flag-person	hr	20.00		



Engineering Unit: Roads Provision Department

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Item	Description	Unit	Qty	Rate	Total
C10.2	Plant: (Working)				
	(a) Tipper trucks:				
	(i) 6 m ³ capacity	hr	20.00		
	(ii) 10 m ³ capacity	hr	20.00		
	(b) Water truck (7 000 litre)	hr	20.00		
	(c) TLB	hr	20.00		
	(d) Front end loader	hr	20.00		
	(e) Grader CAT (Cat 140G or similar)	hr	20.00		
	(f) Vibratory roller (Bomag 212 or similar)	hr	20.00		
	(g) Pneumatic tyred roller (14 t)	hr	20.00		
	(h) Milling machine (2,0 m)	hr	20.00		
	(i) Recycling machine (2,0 m)	hr	20.00		
	(j) Screening Plant	hr	20.00		
	(k) Milling machine (0,5 m)	hr	20.00		
	(l) Milling machine (1,0 m)	hr	20.00		
	(m) Excavator	hr	20.00		
	(n) lowbed establishment for plant that cannot be driven on open road, which will require the Employer's Agents approval and must be substantiated with an invoice	No	5.00		
C10.3	Materials:				
	(a) Procurement of materials	Prov Sum	50000.00		
	(b) Contractor's handling costs, profit and all other charges in respect of item C10.3(a)	%	50000.00		
	TOTAL CARRIED TO SUMMARY				

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Section	Description	Value (Rands)
1200	GENERAL REQUIREMENTS AND PROVISIONS	
1300	CONTRACTOR'S ESTABLISHMENT ON SITE AND GENERAL OBLIGATIONS	
1500	ACCOMMODATION OF TRAFFIC	
1700	CLEARING AND GRUBBING	
2100	DRAINS	
2200	PREFABRICATED CULVERTS	
2300	CONCRETE KERBING, CONCRETE CHANNELLING, CHUTES AND DOWNPIPES, AND CONCRETE LININGS FOR OPEN DRAINS	
2400	ASPHALT AND CONCRETE BERMS	
3300	MASS EARTHWORKS	
3400	PAVEMENT LAYERS OF GRAVEL MATERIAL	
3600	CRUSHED STONE BASE	
3800	BREAKING UP EXISTING PAVEMENT LAYERS	
PS4200	ROAD ASPHALT	
4400	SINGLE SEALS	
4800	TREATMENT OF AN EXISTING SURFACE EXHIBITING CERTAIN DEFECTS	
5100	PITCHING, STONEMASONRY AND PROTECTION AGAINST EROSION	
5200	GABIONS	
5400	GUARDRAILS	
PS5600	ROAD SIGNS	
5700	ROAD MARKINGS	
5800	LANDSCAPING AND TREE PLANTING	
7400	PATENTED EARTH RETAINING SYSTEMS	
8100	TESTING MATERIALS AND WORKMANSHIP	
PS10100	INSITU COLD RECYCLING	
PS10200	STATIC PLANT RECYCLING WORK	
PS10300	ESTABLISHMENT OF CONSTRUCTION PLANT	
PS10400	SMALL CONTRACTOR DEVELOPMENT	
C1000	DAYWORKS	
TOTALS		

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TENDER SUMMARY

DESCRIPTION	AMOUNT
TOTAL : SUMMARY OF SECTIONS :	R
SUBTOTAL	R
ADD: VAT (15% OF SUBTOTAL)	R
TOTAL : CARRIED FORWARD TO FORM OF OFFER (PAGE C3)	R

Signed on behalf of the Tenderer: (Signature)

Date:

Tenderer's Name: (Company Name)

PART C3: SCOPE OF WORK

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C3.1: PROJECT DESCRIPTION AND SCOPE OF CONTRACT

C3.1.1 Client's / employer's objectives

The purpose of this Annual Contract is to provide a sound mechanism for the implementation of rehabilitation work to the eThekweni Municipality's road network.

To provide a contractual framework for the implementation of this work and to facilitate the management of the individual contractual issues, the concept of "Contract" versus "Project" has been adopted. This concept is described as follows :

- **Contract** : This document forms the basis for the tendering procedure, evaluating the tenders and ultimately the awarding of the **Annual Contract** to the successful Tenderer(s). Once the Employer accepts the Tenderer's offer, an **Agreement** will be signed by both parties and all the conditions pertaining to the **Contract** are binding.
- **Project** : The **Annual Contract** provides a vehicle for individual **Projects** to be carried-out by the Employer varying in complexity and magnitude and where the quantities will also vary. Each **Project** is to be executed in terms of the **Project Order** and **Agreement** signed by both parties forming part of the **Project** Document which shall *inter-alia* include the relevant schedule of quantities, specifications and standard details.

Provided that the Projects are awarded within the period of validity of the Contract, the completion dates for the Projects may be extended beyond the contract completion date provided that the Project itself may not exceed three years.

C3.1.2 Description of Works

This contract is intended to cover the rehabilitation of the eThekwini Municipality's road network. The works are classified as follows:

"Surfacing Works" - Projects which include the construction of new pavement layers which are all asphalt layers, or layers which may be described as bituminous surfacings such as slurries, single seals, microsurfacing etc shall be classified under "Surfacing Works".

"Recycling Works" - Projects which include construction of BSM (Bitumen Stabilised Material) layers shall be classified under "Recycling Works". This category shall include both in-situ recycling and in-plant recycling. This category shall also include cement or lime stabilization of pavement layers, and the construction of asphalt layers.

"Granular Works" - Projects which include the construction of new granular pavement layers above the formation level (i.e. Base and/or Subbase) shall be classified under "Granular Works". These works shall include construction of layers using both virgin materials and reuse of existing granular materials. This category shall also include the construction of BSM layers and asphalt layers.

"Subgrade Improvement Works" - Projects which include improvements/re-construction of the subgrade layers below the formation level of the pavement shall be classified under "Subgrade Improvement Works". This shall only be applicable to projects where greater than 25% of the length

of the road requires subgrade improvements. These works shall also involve reconstruction of the layers above formation and the construction of all types of layers shall be covered by this category of rehabilitation.

“Ancillary Works” - Projects where the scope of works is not rehabilitation of pavement layers shall be classified under “Ancillary Works”. Examples of the projects this category is intended to cover include raising/lowering of services, construction/re-construction of sidewalks, laying of kerbs or kerb & channel or asphalt haunching, repairs or reconstruction of sidewalks and laying of sub-soil drains.

C3.1.3 Description of Site and Access

The roads subjected to the rehabilitation works are located within the eThekweni Municipal boundary, specifically in the Western Region.

The Municipal wards forming the Western area of the eThekweni Municipality is detailed in part C4.1 of this document

C3.2: PROJECT SPECIFICATION

PART A : GENERAL

C3.2.1 GENERAL

PS.1 PROGRAMME, METHOD OF WORK, AND ACCOMMODATION OF TRAFFIC

This Clause is to be read in conjunction with the provisions and obligations as contained in **SANS 1921-1 and SANS 1921-2** and the COLTO Specifications Section 1200.

PS.1.1 Preliminary Programme

1.1.1. Programme

The maximum time for completion of the Works, in terms of Clause 5.5.1 of the General Conditions of Contract, shall be specified in the Contract Data Sheet. The Works shall be considered complete when the permanent roadmarking has been completed, temporary signs have been removed and all the lanes are open to public traffic.

The Contractor shall within 7 days **of the Project Commencement Date**, provide a detailed programme, conforming to Clause 5.6.1 of the General Conditions of Contract.

The Contractor shall submit weekly labour and plant returns during the duration of the Contract. Should the Contractor fail to keep up to the submitted programme, then a revised programme shall be submitted at the discretion of the Employer's Agent.

When preparing the programme and method statements the Contractor shall take cognizance of the following matters which may impact on progress:

- (a) Existing covers and frames, which will need to be dealt with prior to resurfacing.
- (b) Work will have to be done under traffic and partially during the wet season.
- (c) Work on the category C & D streets, will only be allowed between the hours of 08h00 and 16h00, and work on category A & B roads, will only be allowed between the hours of 8h30 and 15h30 to avoid peak traffic periods, including erection and removal of traffic control facilities. A Contractor may seek approval for working outside these times, at his cost, in writing to the Employer's Agent.
- (d) The Contractor shall timeously submit samples of specified materials, together with test results, which must be approved by the Employer's Agent prior to any material being delivered to site.
- (e) Correlation with the proposed Cash Flow.

The programme shall show at least the following information:

- (a) A description of each of the various activities that are to be carried out during the contract and the sequence in which the items will be done.
- (b) The programmed time for carrying out each activity.

- (c) The dependencies that exist between the various activities given and whether these are time related or resource limited or both.
- (d) Time required for the preliminary establishment on site of camps etc. prior to the commencement of permanent work.
- (e) Timing for the activities or items of work in each construction work area of the Site.

The following details shall also accompany the programme :

- a) Proposed number of working hours per day, working days per week and of any proposed holiday or other shut down periods.
- b) Schedule of proposed weekly labour resources (giving a separate breakdown of Employer's agents, foremen, supervisors, tradesmen and unskilled labour) for each construction activity or item of work as well as for the project as a whole.
- c) Schedule of proposed weekly plant resources (giving a separate breakdown of description, number of units, make/model/type) for each construction activity or item of work.
- d) Schedule of proposed lane closures (giving breakdown of lengths, number, timing) on each carriageway for each work area within each roadwork section.

It should be noted that where lists are given of activities that the Contractor is required to indicate on the various programmes, these lists shall not be considered as being comprehensive but rather as the minimum information required by Employer's Agent.

It is in the Contractor's interest to give as much information as possible about times allowed for construction as well as resource or other limitations on programme times, since this programme will form the basis for any contractual negotiations about extensions of time once the Project has commenced.

Once approved by the Employer's Agent in writing, this programme shall be known as the Project Programme. The contractor shall take such steps as are necessary at all times to ensure that the work is carried out and controlled in such a way that the Contract is completed within the time stated in the Tender and/or as extended by the Employer's Agent in writing.

Should the Employer's Agent require a revision to the Programme for whatever reason, four paper prints of the revised Project Programme, shall accompany each approval request.

Tenderers may submit tenders for an alternative Time for Completion in addition to a tender based on the specified Time for Completion. Each such alternative tender shall include a preliminary programme similar to the programme above for the execution of the works, and shall motivate his proposal clearly by stating all the financial implications of the alternative completion time.

The Contractor shall be deemed to have allowed fully in his tendered rates and prices as well as in his programme for all possible delays due to normal adverse **weather conditions (refer to Clause 5.12.2.2)** and special non-working days **(refer to Clause 5.1.1.1)** as specified in the in the Contract Data.

1.1.2 Continuity of Works

As a result of the need to accommodate heavy traffic and to relocate to a number of work zones there will be disruption to the continuity of the works.

Tenderers must make allowances in both programme and tendered rates for delays and costs respectively, incurred as a result of the effects of the above on his operations and those of any sub-contractors.

PS.1.2 Programme in Terms of Clause 5.6 of the General Conditions of Contract

It is essential that the construction programme, which shall conform in all respects to **Clause 5.6 of the General Conditions of Contract**, be furnished within the time stated in the Contract Data (refer to Clause 5.3.1/2).

The preliminary programme to be submitted with the tender shall be used as basis for this programme.

The Tenderer's attention is drawn to the fact that a number of factors will affect the programming of and method of carrying out the works. The more important of these are:

- (1) Time allowances to be made for the ordering of special items.
- (2) Notification required by service organisations.
- (3) Any special sequence in which work must be carried out. Must certain areas of work be finished before work commences on others?
- (4) If delays are anticipated with service relocations the contractor should be asked to allow time.
- (5) Is work required out of normal hours? (eg. to accesses).
- (6) Vehicular access to private property is to be maintained.
- (7) Traffic restrictions.

Those known, existing services in the area of the works have been depicted on the contract drawings. It is evident, however, that the status of existing service records as far as can be ascertained might not reflect the actual situation in the field. As such, due allowance has been made in the Bill of Quantities for the proving of services where directed by the Employer's Agent.

PS.1.3 Requirements for Accommodation of Traffic

PS.1.3.1 General

Accommodation of traffic, where applicable, shall comply with the requirements of COLTO specification Section 1500 and the Amendments to the Standard Specification PS1500.

The Contractor shall obtain this specification from Standards South Africa if accommodation of traffic will be involved on any part of the construction works.

The contractor is to provide a traffic management/accommodation plan to the Employer's Agent for approval prior to commencement of works.

PS.1.3.2 Basic Requirements

The travelling public shall have the right of way on public roads, and the Contractor shall make use of approved methods to control the movement of his equipment and vehicles so as not to constitute a hazard on the road.

The Contractor shall ensure that all road signs, barricades, delineators, flagmen and speed controls are effective and that courtesy is extended to the public at all times.

Failure to maintain road signs, warning signs or flicker lights, etc, in a good condition shall constitute ample reason for the Employer's Agent to suspend the work until the road signs, etc, have been repaired to his satisfaction.

The Contractor may not commence constructional activities affecting existing roads before adequate provision has been made to accommodate traffic in accordance with the requirements of this document and the South African Road Traffic Signs Manual.

The Contractor shall construct and maintain all temporary drainage works necessary for temporary deviations. The Contractor shall ensure that the existing property accesses are maintained at all times. Where necessary the Contractor shall make allowance in the rates for completing the work required to the accesses out of normal and stipulated hours.

PS.1.3.3 Traffic Safety Officer

Where warranted by traffic conditions on or near the site, the Contractor shall nominate a suitable member of his staff as traffic safety officer to be responsible for the arrangement and maintenance of all the measures for the accommodation of traffic for the duration of the project. Duties of the traffic safety officer shall be in compliance with the Occupational Health and Safety Act 1993 and the Construction Regulations 2014, and as described in the COLTO Specification Clause 1502 and the Amendments to the COLTO Standard Specification PS1502.

PS.1.3.4 Payment

The Contractor's tendered rates for the relevant items in the Bill of Quantities shall include full compensation for all possible additional costs which may arise from this, and no claims for extra payment due to inconvenience as a result of the modus operandi will be considered.

PS.1.3.5 Pedestrian movement

The Contractor shall make provision for accommodating all pedestrian movements in the area of the works. Allowance shall be made in the relevant rates for any barricades and signs required.

PS.1.3.6 Temporary Reinstatement

Provided always that if in the course or for the purpose of the execution of the works or any part thereof any road or way shall have been broken up, then notwithstanding anything herein contained:

- (a) if the permanent reinstatement of such road or way is to be carried out by the appropriate authority or by some person other than the contractor (or any subcontractor to him), the contractor shall at his own cost and independently of any requirement of or notice from the Employer's Agent be responsible for the making good of any subsidence or shrinkage or other defect, imperfection or fault in the temporary reinstatement of such road or way, and for the execution of any necessary repair or amendment thereof from whatever cause the necessity arises, until the end of the period of maintenance in respect of works beneath such road or way until the authority or other person as aforesaid shall have taken possession of the site for the purpose of carrying out permanent reinstatement (whichever is the earlier), and shall indemnify and save harmless that Council against and from any damage or injury to the Council or to third parties arising out of or in consequence of any neglect or failure of the Contractor to comply with the foregoing obligations or any of them and against and from all claims, demands, proceedings, damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto.

- (b) where the authority or person as aforesaid shall take possession of the site as aforesaid in sections or lengths, the responsibility of the contractor under paragraph (a) of this sub-clause shall cease in regard to any such section or length at the time possession thereof is so taken, but shall during the continuance of the said period of maintenance continue in regard to any length of which possession has not been taken and the indemnity given by the contractor under the said paragraph shall be construed and have effect accordingly.

PS.2 SERVICES

This Clause is to be read in conjunction with the provisions and obligations as contained in **SANS 1921-1 and SANS 1921-2**.

PS.2.1 Existing Services

The Tenderer's attention is drawn to the numerous existing services in the area. Although every effort has been made to depict these services accurately the positions shown must be regarded as approximate.

All known existing services and those services which require relocation and protection, will be available on service plans which can be obtained from the relevant service provider (it is the Contractor's responsibility to obtain the services drawings prior to works commencement on-site, the cost of which is deemed to be included in the tendered construction rates). The Contractor's attention is drawn to the fact that such services information is based on information supplied by others, and the accuracy and completeness of this information has not been confirmed. The Contractor will therefore be required to proceed with extreme caution in order to avoid damage to existing services. Before commencing any work in the vicinity of services, the Contractor shall contact the relevant service authorities for assistance in locating the exact position of the services and where necessary the Contractor shall accurately locate the services by careful hand excavation.

In general, the Employer's Agent may call upon the Contractor to re-excavate trenches previously dug and backfilled by others where in the opinion of the Employer's Agent such work is necessary to ensure the stability of any other works over such trenches. This in no way relieves the Contractor of his responsibilities in terms of the works.

PS.2.2 Proving Underground Services

This clause must be read in conjunction with Clause PS1202, the requirements of which shall be extended to cover all earthworks operations whether for trenching or bulk earthworks, in the vicinity of underground services.

It is stressed that all services in a particular area must be proven before commencing work in that area.

Insofar as bulk earthworks are concerned, where services are indicated on the drawings or where from site observations can reasonably be expected that such services are likely to exist where excavations are to take place, the Contractor shall without instructions from the Employer's Agent carefully excavate by hand to expose and prove their positions.

When a service is not located in its expected position the Contractor shall immediately report such circumstances to the Employer's Agent who will decide what further searching or other necessary action is to be carried out and shall instruct the Contractor accordingly. The cost of this additional searching shall be to the Council's cost and shall be paid for under the items listed in the Bill of Quantities.

Should any service be damaged by the Contractor in carrying out the works and should it be found that the procedure as laid down in this clause has not been followed then all costs in connection with the repair of the service will be to the Contractor's account.

When electrical cables are not in the positions shown on drawings of eThekwini Electricity and cannot be found after proving trenches have been put down, assistance may be obtained by calling an official of the Works Branch on Telephone No. 311-1111 during office hours, or by contacting Control on Telephone No. 305-7171 after hours.

It should be noted that 33,000 Volt and 132,000 Volt cables may only be exposed by the eThekwini Electricity's personnel. The cables are usually protected by concrete covering slabs, and therefore if the slabs are inadvertently exposed, excavation work must stop, and the eThekwini Electricity shall be contacted immediately on the above telephone numbers.

Proving of services shall be completed at least four weeks in advance of the actual programmed date for commencing work in the area. The position of these services located must be co-ordinated and levelled by the Contractor, and the information given in writing to the Employer's Agent's Representative.

The requirements of this clause do not relieve the Contractor of any obligations as detailed in the Conditions of Contract or under Clause 4.17 of SANS 1921-1.

PS.2.3 New Services and Relocation of Existing

This clause shall be read in conjunction with **Clause PS.1**.

New services are either to be installed by the Contractor as part of the contract or by others during the contract period. In the latter case excavation and subsequent backfilling of the trench from the top of the bedding layer shall generally be carried out by the Contractor.

Relocation of services shall generally be carried out by the relevant services organisation. Generally their work shall include the excavating and bedding the service which will include backfilling to a depth of approximately 300 mm above the service. The remainder of the backfilling shall be carried out by the Contractor.

Generally work shall only commence on the installation of new services once the bulk earthworks have been completed and roughly trimmed to level along a substantial portion of the services route. In addition no sidewalk, verge, median or island shall be surfaced or topsoiled until all work on the services has been completed.

Services which may be affected by the contract are described as follows:

- **PS.3 : Watermains;**
- **PS.4 : Sewers;**
- **PS.5 : Stormwater;**
- **PS.6 : Electrical Cables / Lighting;**
- **PS.7 : Telkom / Neotel;**
- **PS.8 : CCTV;**

Further to the above, tenderers are referred to the services drawing and are to note that several minor cables / pipes may be encountered during excavation works which may require to be relocated to some extent.

PS.2.4 Accommodation of Services

Further to [Clauses PS.1 and PS.2](#) of this specification, tenderers are to note that allowance must be made under this item and / or the appropriate rates, for all costs incurred as a result of complying with these clauses. It shall also cover liaison with the services organisations and accommodation of their work gangs / contractors on site.

PS.3 WATERMANS

PS.3.1 Water Main Valve Access

Due to the dangerous situation occurring when water main valves are covered over, the Contractor shall maintain access to all water main valves at all times. During asphalt layer work, after each pass by the paving machine, the valves shall be exposed and access maintained in a safe condition.

Whatever method the Contractor chooses to use for this work, the cost of raising the valves from existing level to ultimate level shall be paid only once, irrespective of the number of times the valve is uncovered. Before final setting in position of valve covers the Contractor shall liaise with the Employer's Agent regarding the direction in which covers shall be placed.

PS.3.2 Restriction on Compactive Equipment

The Contractor is to note that existing watermains traverse the site of the works and special care is to be taken in close proximity to these mains and connections. The existing mains and connections shall be proved on site by the Contractor prior to any construction work commencing in the vicinity of the watermains.

Under no circumstances will heavy road-making equipment, other heavy plant or vibratory compaction equipment be permitted to operate within 800 mm vertically or horizontally of the existing mains or connections. The permissible compaction plant within this restricted area shall be the equivalent of a "Bomag 90" under static compaction, or similar approved plant. When the roadworks are far enough advanced to provide a minimum of 800 mm cover to the existing mains, the above restriction will fall away.

The Contractor is to take cognisance of the above requirements when entering rates in the Bill of Quantities and in the programming of the works. No claim for additional payment based on the inability to use plant as a result of the requirements of this clause will be accepted. The Contractor will be held liable for any costs should the watermain or electrical cables be damaged during construction of the road.

PS.4 SEWERS

PS.4.1 Blockage of Foul Water Sewers

The Contractor shall be responsible for ensuring that cementitious sludge, sand and rubble from the works do not enter the foul water reticulation system. The Contractor shall be liable for any costs incurred by the Council or others as a result of blockages in the reticulation system attributed to failure to comply with the above requirement.

PS.5 STORMWATER**PS.5.1 Blockage Stormwater Sewers**

The Contractor shall be responsible for ensuring that cementitious sludge, sand and rubble from the works do not enter the stormwater reticulation system. The Contractor shall be liable for any costs incurred by the Council or others as a result of blockages in the reticulation system attributed to failure to comply with the above requirement.

PS.6 ELECTRICAL PLANT**PS.6.1 General**

Various types of electrical cables including high voltage, low voltage, street lighting and domestic connection cables may be affected by the contract. The laying, relocation and jointing of all cables will be carried out by eThekweni Electricity's work gangs, or agents appointed by them, whilst the excavation and backfilling forms part of this contract. Close liaison will therefore be necessary with eThekweni Electricity throughout the contract.

PS.6.2 Street Lighting

Relocation, if necessary, shall take place during this contract and be executed by eThekweni Electricity or their agents. It is a requirement that the street lighting be operational at all times.

PS.6.3 MV / LV Cables

Should certain M.V / L.V. cables require to be replaced within the contract area, the actual cable work associated with this relocation and / or replacement of these cables will be carried out by EtheKwini Electricity and it is stressed that the **two** week period referred to in Clause PS.2 is the minimum period required to enable eThekweni Electricity to be on site timeously.

PS.6.4 Relocation of Existing Services

Should it be necessary to adjust the line, level and / or position of any service not catered for in the contract to enable the construction to proceed the Contractor shall on no account effect such adjustment himself but shall notify the Employer's Agent who will arrange for the work to be carried out at no cost to the Contractor.

PS.9 MANAGEMENT OF THE ENVIRONMENT

The Contractor shall pay special attention to the following :

PS.9.1 Natural Vegetation

The Contractor shall confine his operation to as small an area of the site as may be practical for the purpose of constructing the works.

Only those trees and shrubs directly affected by the works and such others as the Employer's Agent may direct in writing shall be cut down and stumped. The natural vegetation, grassing and other plants shall not be

disturbed other than in areas where it is essential for the execution of the work or where directed by the Employer's Agent.

PS.9.2 Fires

The Contractor shall comply with the statutory and local fire regulations. He shall also take all necessary precautions to prevent any fires. In the event of fire the Contractor shall take active steps to limit and extinguish the fire and shall accept full responsibility for damages and claims resulting from such fires which may have been caused by him or his employees.

PS.9.3 Environmental Management Plan

In addition to the above, all requirements according to the Environmental Management Plan as detailed in **C3.4 : Particular Specifications**, will be adhered to.

PS.10 OCCUPATIONAL HEALTH AND SAFETY

PS.10.1 General Statement

When considering the safety on site the Contractor's attention is drawn to the following:

It is a requirement of this contract that the Contractor shall provide a safe and healthy working environment and to direct all his activities in such a manner that his employees and any other persons, who may be directly affected by his activities, are not exposed to hazards to their health and safety. To this end the Contractor shall assume full responsibility to conform to all the provisions of the Occupational Health and Safety Act No 85 and Amendment Act No 181 of 1993, and the OHS Act 1993 Construction Regulations 2014 issued on 7 February 2014 by the Department of Labour.

For the purpose of this contract the Contractor is required to confirm his status as mandatory and employer in his own right for the execution of the contract by entering into an agreement with the Employer in terms of Section 37(2) of the Occupational Health and Safety Act.

PS.10.2 Health and Safety Specifications and Plans to be submitted at tender stage

PS.10.2.1 Employer's Health and Safety Specification

The Employer's Health and Safety Specification is included in **Part C3.4 : Particular Specifications**.

PS.10.2.2 Tenderer's Health and Safety Plan

Only the successful Tenderer shall submit a separate Health and Safety Plan (per project order) as required in terms of Regulation 7 of the Occupational Health and Safety Act 1993 Construction Regulations 2014, and referred to in **Part T2.2 : Contractor's Health and Safety Plan**.

The detailed safety plan will take into consideration the **site specific risks as mentioned under PS.10.1** and must cover at least the following:

- (i) A proper risk assessment of the works, risk items, work methods and procedures in terms of

Regulations 9 to 29;

- (ii) Pro-active identification of potential hazards and unsafe working conditions;
- (iii) Provision of a safe working environment and equipment;
- (iv) Statements of methods to ensure the health and safety of subcontractors, employees and visitors to the site, including safety training in hazards and risk areas (*Regulation 7*);
- (v) Monitoring health and safety on the site of works on a regular basis, and keeping of records and registers as provided for in the Construction Regulations;
- (vi) Details of the Construction Supervisor, the Construction Safety Officers and other competent persons he intends to appoint for the construction works in terms of Regulation 8 and other applicable regulations; and
- (vii) Details of methods to ensure that his Health and Safety Plan is carried out effectively in accordance with the Construction Regulations 2014.

The Contractor's Health and Safety Plan will be subject to approval by the Employer, or amendment if necessary, before commencement of construction work. The Contractor will not be allowed to commence work, or his work will be suspended if he had already commenced work, before he has obtained the Employer's written approval of his Health and Safety Plan.

Time lost due to delayed commencement or suspension of the work as a result of the Contractor's failure to obtain approval for his safety plan, shall not be used as a reason to claim for extension of time or standing time and related costs

A generic plan will not be acceptable.

PS.10.3 Cost of compliance with the OHSA Construction Regulations

The rates and prices tendered by the Contractor shall be deemed to include all costs for conforming to the requirements of the Act, the Construction Regulations and the Employer's Health and Safety Specification as applicable to this contract. Should the Contractor fail to comply with the provisions of the Construction Regulations, he will be liable for penalties as provided in the Construction Regulations and in the Employer's Health and Safety Specification.

Items that may qualify for remuneration will be specified in the Employer's Health and Safety Specification.

PS.11 OCCUPATION OF THE SITE

The Site will be handed-over to the Contractor on or before the Project Commencement Date.

The Employer may from time to time be carrying out routine maintenance in the immediate vicinity of the Works. The Contractor shall therefore liaise closely with the Employer in this regard and shall ensure that their adjacent operational requirements and activities are catered for in the programming of the work. No claims for delay or additional payments will be entertained, if, in the opinion of the Employer's Agent, claims are due the Contractor's failure to liaise with and plan for the adjacent activities of the Employer.

The site includes portions of public roads, which will remain in use during the course of the work. The Contractor shall note that no roads or traffic lanes, other than sections being rehabilitated, may be closed to traffic without the prior written permission of the Employer's Agent. Every effort shall be made by the Contractor to keep the disruption of existing traffic and pedestrian flows to a minimum during construction.

The Contractor shall, as far as possible confine his operations to within the limits of the site or the land provided by the Employer, but if this is inadequate for his purpose, he shall make all arrangements for any further land he may require in accordance with the specifications and shall pay all costs and charges in this connection.

PS.12 RISKS ASSOCIATED WITH THE WORKS

In addition to traffic related risks as stipulated in Section 1500, the Contractor is advised on some other risks associated with different treatments applicable in this contract in order to make allowances for such in the Health and Safety Plan.

- Working with hot poured bitumen based sealant that could cause skin burn when mishandled or poured on water.
- Exposure to dust during the pressure cleaning operation that could have an effect on labourer's respiratory systems if proper protection is not provided, and other significant safety risks.
- Working with hazardous materials that can cause harm on both the skin and the respiratory system i.e. lime
- Exposure to fumes from hot asphalt.
- Nature of work requires specialized skills and knowledge,
- Use of heavy specialized equipment,
- Handling and utilization of specialized and hazardous (combustible) materials i.e. hot bitumen etc.
- Construction under live heavy traffic conditions,
- Need to provide continuous access to general road users, businesses and residents,
- Due to works requiring a number of labourer's, the potential of transmission of bacteria/viruses due to close proximity with one another.

The Contractor is to further note the risks involved in the planning processes, including production rates, as well as health and safety compliance where multiple activities are being undertaken concurrently on a number of roads, as may be the Project Order as issued by the Employers Agent.

PS.13 CONSTRUCTION AND MANAGEMENT REQUIREMENTS

Quality Assurance (QA)

The Contractor will be solely responsible for the production of work that complies with the Specifications to the satisfaction of the Employer's Agent. To this end it will be the full responsibility of the Contractor to institute an appropriate Quality Assurance (QA) system on site. The Employer's Agent will audit the Contractor's quality assurance (QA) system on a regular basis to verify that adequate independent checks and tests are being carried out and to ensure that the Contractor's own control is sufficient to identify any possible quality problems, which could cause a delay or failure.

The Contractor shall ensure that efficient supervisory staff, the required transport, instruments, equipment and tools are available to control the quality of his own workmanship in accordance with his QA-system. His attention is drawn to the fact that it is not the duty of the Employer's Agent or the Employer's Agent's representative to act as supervisor, foreman or surveyor.

PS.14 CONTRACTORS RESOURCES (KEY PERSONAL, STAFFING AND PLANT)

It is the intention of the Employer that each Project Order issued is adequately resourced in terms of personnel and equipment. The minimum requirement for projects issued in terms of human resource shall be an adequately qualified and experienced Contracts Manager, and a dedicated Construction Manager for each project. Failure to provide the required resource will delay the Project Order issuing, with a possibility of Contract termination should it be proven that the Contractor lacks capacity to timeously execute issued Work.

PS.15 CONTRACTORS PLANT

The Employer's Agent shall have the right to order the immediate removal from the site of any plant which he may deem to be unsatisfactory for the proper execution of the work. The Contractor shall obtain without delay satisfactory plant to replace that removed. Any costs arising from the removal and subsequent replacement of plant shall be to the Contractor's account.

PS.16 VARIATIONS FROM SPECIFIED NOMINAL RATES OF APPLICATION OR NOMINAL MIX PROPORTIONS

The various sections of these specifications specify nominal rates of application or nominal mix proportions for materials such as bituminous materials, aggregates, fillers, stabilizing agents, paint and the like. Tenderers shall base their tenders on these nominal rates of application and mix proportions.

Where such nominal rates of application or mix proportions are specified, provision is made for deviations in quantities of material due to amendments to nominal rates or mix proportions as ordered by the Employer's Agent in writing from time to time. These changes may be necessitated by varying site conditions or availability of materials.

Where actual rates of application or mix proportions are varied, adjustment of compensation will be made -
(a) as a payment to the Contractor in respect of any authorised increase in quantities which exceed those specified, where such increase is as a result of a written order by the Employer's Agent ; or

(b) as a refund to the Employer in respect of a decrease in quantities which are less than those specified, irrespective of whether such decreases result from an authorised decrease in the rates of application or mix proportions, or from unauthorised reductions on the part of the Contractor.

Payment for a prescribed rate of application or mix proportion shall be based on the actual rate of application or mix proportion used, provided that this does not exceed the prescribed rate of application or mix proportion, plus any allowable tolerance. If the actual rate of application or mix proportion exceeds the prescribed rate of application or mix proportion, payment shall be based on the prescribed rate of application or mix proportion plus any tolerance allowed. If the actual rate of application or mix proportion is below that prescribed, payment shall be based on the actual rate of application or mix proportion regardless of any tolerance allowed. Notwithstanding the above, the Employer's Agent shall be fully entitled to reject work, which has not been constructed in accordance with the specifications or the rates of application, or mix proportions prescribed.

The Employer shall be refunded for any decrease in the specified rate of application or mix proportion at the same rate per unit measurement as that tendered by the Contractor for additional materials required by an increase in the rates of application or mix proportions.

PS.17 OVERLOADING OF TRUCKS

Trucks must have a mounted plate depicting the allowed mass allowed to be carried. Failure to have this in place will result in that truck being barred from delivering to any of the Sites within this Contract.

Overloading will not be entertained and the following penalty shall be implemented:

The amount over weight will be multiplied by a factor of 2. This total will then be multiplied by the supply and application rate most applicable in the bill of quantities, which total will be subtracted from the invoiced amount.

For which the formula is;

= Invoiced amount - [(supply load – legal load) x2 x (Rate of supplying and laying the material)]

PS.18 REMOVAL OF CONSTRUCTION RUBBLE

Material removed or excavated from the road construction shall not be left on site for more than two days (48 hours). Cost of removing or hauling this material shall be included in the breaking or excavation rate for the relevant item and no extra cost shall be paid for this item. Failure or refusal on the part of the contractor to remove rubble within two days or 48 hours shall be sufficient cause for the Employer's Agent to apply penalties as follows:

A fixed penalty of R5000 per day shall be deducted for non-compliance immediately after the Employer's Agent has given an instruction to this effect. The Employer's Agent's instruction shall state the time of incidence, Should the Contractor fail to adhere to this instruction within two hours, the time-related penalty of R500 per hour shall be applied from the time the instruction was given.

PS.19 PRE-CUTTING OF PAVEMENT SURFACINGS

Due to the deterioration of pavement materials caused by water ingress into the pavement layers, the Contractor and Sub-Contractors, where applicable, shall not be permitted to pre-cut the pavement surfacing, for the following activities, but not limited to:

- i. Patching works,
- ii. Raising/Lowering services within the pavement structure,
- iii. Works related to the construction of kerbing or kerb-channel combinations,
- iv. Construction of sub-soil drains which require cutting of surfaced sidewalks,
- v. Speed-hump construction works,
- vi. Milling of asphalt material.

All work activities that require saw-cutting or milling (which exposes granular base layers) of any kind shall be planned and programmed in sections such that these works activities shall be completed within that particular day.

Non-compliance to this specification shall result in a penalty imposed which shall be calculated as follows:

Penalty = 2 x quantity of incomplete work for that day x tendered rate of that works activity

PS.20 DETERMINATION OF QUANTITIES IN RESPECT OF MATERIALS DELIVERY NOTES

Material delivery notes supplied by the Contractor and submitted to the Employer's Agent shall be for purposes of confirming the type of material supplied and date of delivery to site. The delivery notes shall also be used as a basis for rejecting any materials to be used for the works that may have exceeded the materials shelf-life as prescribed by the materials supplier data sheets.

Unless specified by the Employer's Agent, the quantities to be certified shall be based on the approved and authorized dimensions of the works, multiplied by the relevant material bulking/conversation factors where applicable.

PS.21 UNDERTAKING OF CONSTRUCTION ACTIVITIES OUTSIDE THE SPECIFIED AND AGREED WORKING HOURS

Unless specified and agreed by the Employer's Agent in writing, all construction activities are to be carried out within the working hours as stipulated in Clause PS1.1 of Part A: General, of this section. The penalty for non-compliance to this specification shall be as follows:

Penalty (per road) = R 5000 (fixed) + R 500 per hour (time related for every hour until the works are complete)

The Employer's Agent shall, at his discretion, upon written explanation from the Contractor within 3 working days after the event, evaluate whether the reasons for working outside the specified hours are within the Contractors control. Circumstances beyond the Contractors control shall not result in any penalties being imposed. Poor planning in respect of delivery of materials to site does not absolve the penalty.

PS.23 SITE SECURITY

The Contractor shall, for the duration of the contract, provide sufficient security and watchmen to adequately ensure the safety and protection of the works, the Contractor's staff, including local labour and subcontractors, and all site plant and construction equipment required for the works.

Site Security, in conjunction with the SAPS (where necessary), shall be responsible for removal of disruptive elements, that may interrupt the progress of the contract through acts such as, but not limited to, intimidation, threats of disruption, violent disruption, or criminal and illegal activity by the local community or independent organisations or entities that may result in slowing down or partial or total stoppage of the works.

There shall be no separate payment for this item and shall be deemed to be included in the Contractors time related obligations costs.

C3.3: STANDARD SPECIFICATIONS

C3.3.1 The Standard Specifications on which this contract is based are the **COLTO Standard Specifications for Road and Bridge Works for State Road Authorities 1998 edition** excluding Section 4200 (Asphalt Base and Surfacing) which has been replaced by the new specification as included in Section PS 4200.

The Project Specification, consisting of two parts, forms and integral part of the Project and supplements the Standard Specifications.

Part A contains a general description of the works, the site and the requirements to be met (Part C3.2 – Project Specification).

Part B contains variations, amendments and additions to the Standardised Specifications and, if applicable, the Particular Specifications.

In the event of any discrepancy between part or parts of the Standardised or Particular Specifications and the Project Specification, the Project Specification shall take precedence. In the event of a discrepancy between the Specifications, (including the Project Specifications) and the drawings and/or the Bill of Quantities, the discrepancy shall be resolved by the Employer's Agent before the execution of the work under the relevant item.

The Standard Specifications, which form part of this contract, have been written to cover all phases of work normally required for road contracts, and may therefore cover items not applicable to this particular contract.

C3.3.2 PART B: AMENDMENTS TO THE STANDARD SPECIFICATIONS

PROJECT SPECIFICATIONS RELATING TO THE STANDARD SPECIFICATIONS AND OTHER ADDITIONAL SPECIFICATIONS

In certain clauses in the COLTO Standard Specifications, allowance is made for a choice to be specified in the Project Specifications between alternative materials or methods of construction, and for additional requirements to be specified to suit a particular contract. Details of such alternatives or additional requirements applicable to this Contract are contained in this part of the Project Specifications. It also contains the necessary additional specifications required for this Contract.

The clauses and payment items dealt with in this part of the Project Specifications are numbered 'PS' with a number corresponding to the relevant clause or item number in the COLTO Standard Specifications.

New clauses and payment items not covered by clauses or items in the COLTO Standard Specifications have been included here and have also been designated with the prefix 'PS'. Such clauses and items have been given a new number following upon the last number used in the particular section referred to in the COLTO Standard Specifications.

SECTION 1100: DEFINITIONS AND TERMS

Add the following definitions:

“commercial source” - a source of supply of materials chosen by the Contractor. The Contractor shall take full responsibility for the quality of all materials and services supplied from commercial sources.

“sand” - sand is defined as a non-plastic material that conforms to the HRB classification for an A3 material as follows :

% passing	5 mm sieve	95 min
	0,425 mm sieve	50 min
	0,075 mm sieve	10 max

“process control” - process control means all testing required to be carried out by the Contractor at his cost in order ensure that the completed permanent works comply with specifications and drawings. All such testing will be subject to inspection and approval by the Employer’s Agent.

“acceptance control” - acceptance control means whatever testing the Employer’s Agent carries out over the above the process control testing already carried out by the Contractor in order to decide on acceptability of any work submitted by the Contractor. Such testing will be carried out at the cost of the Employer in either the Employer’s Agent’s laboratory or one approved by him.

“work in restricted areas” - no additional or extra over payment will be made for work in restricted or confined areas, unless the items of work to which it will apply and the pay items under which payment will be effected, are explicitly specified in these Standard Specifications or in the Project Specifications and included in the Schedule of Quantities.

Road Categories

“Category A” – Major Arterials or Freeways

“Category B” – Urban Arterials, Major Bus Routes, CBD and Industrial Roads

“Category C” – Minor Bus Routes and Collectors

“Category D” – Residential Streets

Rehabilitation Categories

“Surfacing Works” - Projects which include the construction of new pavement layers which are all asphalt layers, or layers which may be described as bituminous surfacings such as slurries, single seals, microsurfacing etc shall be classified under “Surfacing Works”.

“Recycling Works” - Projects which include construction of BSM (Bitumen Stabilised Material) layers shall be classified under “Recycling Works”. This category shall include both in-situ recycling and in-plant recycling. This category shall also include cement or lime stabilization of pavement layers, and the construction of asphalt layers.

“Granular Works” - Projects which include the construction of new granular pavement layers above the formation level (i.e. Base and/or Subbase) shall be classified under “Granular Works”. These works shall include construction of layers using both virgin materials and reuse of existing granular materials. This category shall also include the construction of BSM layers and asphalt layers.

“Subgrade Improvement Works” - Projects which include improvements/re-construction of the subgrade layers below the formation level of the pavement shall be classified under “Subgrade Improvement Works”. This shall only be applicable to projects where greater than 15% of the length of the road requires subgrade improvements. These works shall also involve reconstruction of the layers above formation and the construction of all types of layers shall be covered by this category of rehabilitation.

“Ancillary Works” - Projects where the scope of works is not rehabilitation of pavement layers shall be classified under “Ancillary Works”. Examples of the projects this category is intended to cover include raising/lowering of services, construction/re-construction of sidewalks, laying of kerbs or kerb & channel or asphalt haunching, repairs or reconstruction of sidewalks and laying of sub-soil drains.

“Contracts Manager” A competent person responsible for managing the Contract, including all the Projects within a Contract. The responsibilities include Contract administration, works programming, Contract cashflow and managing all the Construction Managers and other resources within a contract.

“Business Enterprise”: A sole trader, partnership or legal entity which adheres to statutory labour practices, is registered with the South African Revenue Services and is a continuing and Independent Enterprise for profit, providing a Commercially Useful Function.

PS1115 GENERAL CONDITIONS OF CONTRACT

Replace clause 1115 with the following:

“The General Conditions of Contract for Construction Works 3rd edition 2015 published by the South African Institution of Civil Engineering (SAICE), together with the Special Conditions of Contract form part of the contract.

All references in the COLTO Standard Specifications for Road and Bridge Works are to the COLTO General Conditions of Contract for Road and Bridge Works for State Road Authorities. Consequently all references in the COLTO Standard Specifications have to be amended accordingly to reflect the appropriate General Conditions of Contract relevant to the Contract. The COLTO Standard Specifications have been scrutinized and the clauses, which refer to the COLTO General Conditions of Contract, identified. Each COLTO clause reference is tabulated in Table PS1115 below (context of reference is also given) together with the relevant equivalent clause in the SAICE General Conditions of Contract for Construction Works 3rd edition 2015 applicable for this Contract.

Whereas every effort has been made to include all of the affected clauses in the table, there may be some omissions. In every case, however, the SAICE General Conditions of Contract for Construction Works 3rd edition 2015 reference, as amended by the Special Conditions of Contract in the Contract Data, shall apply and the Contractor shall be responsible for interpretation of the equivalent clause.

TABLE PS1115: REFERENCES IN COLTO STANDARD SPECIFICATIONS TO THE COLTO GENERAL CONDITIONS OF CONTRACT AND RELEVANT SAICE GENERAL CONDITIONS OF CONTRACT FOR CONSTRUCTION WORKS 3rd EDITION 2015

COLTO Standard Specification		COLTO General Conditions of Contract 1998		SAICE General Conditions of Contract for Construction Works 3 rd edition 2015	
Clause No	Page No	Clause No	Description or Reference	Clause No	Description or Reference
1202	1200-2	15	Programme	5.6	Programme of the Works
1209(e)	1200-5	52:	Monthly payments (documentary evidence of ownership of materials)	6.9 & 6.10 :	Vesting of materials
		52(1)(e)		6.9	
		52(2)	Valuation of material brought onto Site	6.10.2	Valuation of material brought onto Site
1210	1200-5	54:	Certificate of practical completion	5.14:	Certificate of Practical Completion
		54(1)		5.14.1	
		54(2)		5.14.2	
		54(3)		5.14.3	
1212(l)	1200-7	49:	Contract Price Adjustment Factor	6.8:	Contract Price Adjustment Factor
		49(2)		6.8.2	

COLTO Standard Specification		COLTO General Conditions of Contract 1998		SAICE General Conditions of Contract for Construction Works 3 rd edition 2015	
Clause No	Page No	Clause No	Description or Reference	Clause No	Description or Reference
1215	1200-9	45	Extension of time for completion	5.12	Extension of time for Practical Completion
1217	1200-10	35	Care of the Works	8.2	Care of the Works
1303	1300-1 and 1300-2	49 & 53: 49(2) and 49(3)	Contract Price Adjustment Factor and special materials	6.8 & 6.11: 6.8.2 and 6.8.3	Contract Price Adjustment Factor and Special materials
1303	1300-2	12 & 45: 12 45	Commencement of Works and Commencement Date Extension of time for completion	5.3 & 5.12: 5.3.1 5.12	Commencement of the Works Extension of time for Practical Completion
1403 (c)(ii)	1400-4	40(1)	Valuation of variations	6.4.1	Valuation of variations
1505	1500-3	40: 40(1)	Valuation of variations	6.4 6.4.1	Valuation of variations
1507 Items: 15.08 15.09 15.11	1500-8	48: 48.1	Provisional Sums	6.6: 6.6.1	Provisional Sums
3108 Note (2)	3100-4	40: 40(1)	Valuation of variations	6.4: 6.4.1	Valuation of variations
3204 (b)(iii)	3200-2	40: 40(1)	Valuation of variations	6.4: 6.4.1	Valuation of variations
3303(b)	3300-2	2	Engineer and Engineer's Representative	3	Employer's Agent and Employer's Agent's Representative
5803(c)	5800-3	40: 40(1)	Valuation of variations	6.4: 6.4.1	Valuation of variations
5805(d)	5800-4	40: 40(1)	Valuation of variations	6.4: 6.4.1	Valuation of variations
5809 Item 58.10	5800-10	48: 48.1	Provisional Sums	6.6: 6.6.1	Provisional Sums
8103(c)	8100-1	40: 40(1)	Valuation of variations	6.4: 6.4.1	Valuation of variations
8117 Item 81.03	8100-26	22	Clearance of site on completion	5.15	Clearance of site

SECTION 1200: GENERAL REQUIREMENTS AND PROVISIONS**PS1202 SERVICES**

Delete the following :

- (i) The second paragraph of this clause entirely.
- (ii) The second sentence of the second last paragraph starting with : “Details regarding the state” and ending with : “.....made available to tenderers”.

Add the following at the end of clause 1202:

Before work begins on site, a meeting is to be convened with the Contractor and affected service owners to discuss the relocation of any services. The relevant Service Provider shall furnish the Contractor with drawings indicating the services positions for each Project. Subsequently, the Contractor shall verify the actual position of each service and bring to the attention of the Employer’s Agent any service that is not recorded. As the Contractor is not authorized to remove or replace these facilities he shall:

- (i) Give preliminary notice in writing to the relevant service provider, that the services on the site will require removal or protection prior to works being carried out in the vicinity of each facility. The Contractor shall advise the service provider of:
 - a) The number of services and their locations and
 - b) The proposed dates when works will commence in the vicinity of each service.
- 1) (ii) In addition to the above preliminary notice, give the service provider reasonable notice in writing of the intention to commence work in the vicinity of each facility.
- 2) (iii) Upon completion of the work in the vicinity of each facility, the contractor shall notify the service provider, in writing, that work is complete and the service may be reinstated.

Any cost of repairs, replacement and/or installation of the services resulting from the Contractor’s negligence or unauthorised action shall be to the Contractor’s account.’

PS1205 WORKMANSHIP AND QUALITY CONTROL

Add the following paragraph to the end of clause 1205:

“Testing for quality control shall be conducted in accordance with the requirements of Section 8200 for Quality Control (Scheme 1).”

PS1206 THE SETTING-OUT OF WORK AND PROTECTION OF BEACONS

Delete the first paragraph of clause 1206 in its entirety and replace it with the following:

“The contractor shall comply with all legal provisions in regard to surveying and setting out work.”

Revise the second last paragraph as follows :

Replace the word “fill” with “subbase”

Add the following paragraph to the end of clause 1206:

“It may become necessary to construct level and coordinate new survey beacons during the course of the contract, or to protect existing survey beacons. A Provisional Sum is included in the Schedule of Quantities to cover the costs of such work.”

PS1209 PAYMENT**(a) Contract rates**

Add the following new paragraph at the end of subclause PS1209(a):

“All rates tendered are to be exclusive of VAT.”

PS1215 EXTENSION OF TIME RESULTING FROM ABNORMAL RAINFALL

Extension of time resulting from abnormal rainfall shall be calculated according to the requirements of Method (ii) (Critical-path method). The Contractor shall be entitled to claim for the tendered time related pay items for any extension of time period approved by the Employer’s Agent.

Method (ii) (Critical-path method)

Add the following to the end of Method (ii):

"The value of "n" working days expected delay caused by normal rainy weather as referred to in Method (ii) shall be as given in Table PS1215 below for each respective calendar month of any year:

Table PS1215

Month	Expected delay of "n" working days due to normal rainy weather	Month	Expected delay of "n" working days due to normal rainy weather
January	4	July	1
February	3	August	2
March	3	September	2
April	2	October	3
May	2	November	3
June	1	December	1

Refer to Clause 5.12.2.2 of the Contract Data for detailed specification.

PS1224 THE HANDING-OVER OF THE ROAD RESERVE

Add the following paragraph to the end of clause 1224:

"The handing-over of the road reserve for each Project shall be subject to the following restriction:

The Contractor shall be required to accommodate public traffic, businesses and pedestrians as well as any service providers in the execution of their duties."

PS1229 SABS CEMENT SPECIFICATIONS

Add the following paragraphs to the end of clause 1229:

"All cement used for each Project shall comply with SANS 50197-1: Cement Part 1: Composition, specifications and conformity criteria for common cements.

Where reference is made in these Project Specifications or in the COLTO Standard Specifications to the former SABS cement specifications (e.g., SABS 471, SABS 626, SABS 831, SABS 1491), such reference shall be replaced with the new specification:

- *SANS 50197-1: Cement Part 1: Composition, specifications and conformity criteria for common cements.*

The blending of cements on site shall not be permitted."

Add the following new clauses at the end of Section 1200:

PS1230 COMPENSATION FOR OCCUPATIONAL INJURIES AND DISEASES ACT, 1993

All labour employed on the site shall be covered by the Compensation for Occupational Injuries and Diseases Act, 1993, as amended. The Contractor shall pay in full, including the payment of the necessary levies, such amounts as are due in terms of the Act. The manner in which compensation in terms of this Act shall be handled shall be resolved by the Contractor at the commencement of each Project.

PS1231 COMPLIANCE WITH THE ROAD TRAFFIC ACT

When vehicles or plant are travelling or working on a public road, the following shall apply:

- *The vehicles and plant shall be licensed in terms of the National Road Traffic Act 1996 (Act No. 93 of 1996) as amended.*
- *Every driver and operator of a vehicle or an item of plant shall be in possession of a valid permit in respect of the class of vehicle or item of plant he / she is driving or operating.*

The Contractor shall provide, erect and maintain sufficient road signs, barricades, fencing and guarding as may be necessary or required by the Employer's Agent or by any act, regulation or statutory authority in order to minimise the danger and inconvenience caused to vehicle and pedestrian traffic. The Contractor by accepting this contract shall be deemed to have indemnified the Employer and the Employer's Agent against any claims, damages and / or costs that may arise in this regard.

The Contractor's acceptance of this Contract shall also indemnify the Employer and the Employer's Agent against any claims that may arise as a result of works done not to specification until the End of Maintenance period.

PS1232 ENVIRONMENTAL IMPACT CONTROL

In addition to aspects of the design which are intended to avoid or reduce environmental impact, and in addition to normal good construction practice expected of the Contractor, the following requirements shall also be observed:

- (a) The Contractor shall comply with the requirements of Part C: Environmental Management, Specification contained in section C3.4.2 Particular Specifications.
- (b) Clearing shall be limited to the road prism.
- (c) No littering by construction workers shall be allowed. A refuse control system shall be established for the collection and removal of refuse to the satisfaction of the employer's Agent.
- (d) Adequate provision shall be made for temporary toilet requirements in construction areas. Use of the veld/bush for this purpose shall not be allowed under any circumstances.
- (e) Streams, rivers and dams shall be protected from direct or indirect spillage of pollutants, such as refuse, garbage, cement, concrete, sewage, chemicals, fuels, oils, aggregate tailings, wash water, organic materials and bituminous products. In the event of spillage, prompt action shall be taken to clear the affected area. Emergency measures in the event of spillage shall be set out and the responsible person shall be made aware of the required action.
- (f) Bituminous and / or other hazardous products shall not be spoiled on site and shall only be disposed of at licensed authorised disposal facilities.
- (g) Provision shall be made to prevent excessive erosion and siltation throughout the Contract and in particular on adjacent land. Should excessive erosion and / or siltation take place outside the road reserve as a direct result of the Contractor's construction activities, the Contractor shall be responsible for making good the erosion / siltation to the satisfaction of the landowner and the Employer's Agent.
- (h) Invader species of plants shall be controlled.
- (i) As the works are located in a peri-urban business and residential environment, dust and noise pollution shall be monitored and restricted to acceptable levels.

No separate payment shall be made for observing these requirements as such payment shall be deemed to be included in the amount tendered for item 13.01(c) (The Contractor's General Obligations: Time-related Obligations). Any avoidable non-compliance with these requirements shall be considered sufficient grounds for withholding payment of part or all of the amounts to be paid for the above item in order to pay for the repairs to any damages.

PS1233 CONTRACTOR'S CAMP SITE

The Contractor shall make his own arrangements regarding the acquisitions and location of the camp site/store yard. The proposed location of the camp site must be approved by the Employer's Agent and the landowner concerned. If the Employer can make any specific site available to the Contractor, such site will be pointed out to the Contractor.

All necessary toilet/ablution facilities, suitably screened, shall be provided by the Contractor to the satisfaction of the Health Department. The provision of portable chemical toilets is advised.

The Contractor shall make his own arrangements with Ethekwini Municipality's Water Department for the necessary water connections he requires for the execution of the works. Applications for a metered water connection must be made timeously to Ethekwini Municipality's Water Department.

The Contractor shall make his own arrangements with EtheKwini Municipality's Electricity Department for the necessary power connections he requires for the execution of the work under this contract. Again timeous applications must be made for this connection.

In addition the following requirements are to be observed:

- (a) The ground levels of the camp site must not be altered without the permission of the employer's Agent.
- (b) The Employer is indemnified in all respects through the occupation and use of the land including all claims by third parties.
- (c) The site must not be used for the accommodation of staff employed by the Contractor other than a night watchman for security purposes.
- (d) No housing is available for the Contractor's employees and the Contractor shall make his own arrangements to house his employees and to transport them to site.
- (e) No informal housing or squatting will be allowed.
- (f) The Contractor shall provide the necessary ablution facilities at his campsite and the site of the works for the use of his employees. Chemical toilets only will be allowed where temporary facilities have to be provided.
- (g) When the land is vacated it must be left in a clean and tidy state, which is acceptable to the Employer's Agent.
- (h) The campsite/store yard shall be cleared and vacated by the Contractor no later than 14 days after the date of completion of the Project unless written permission from the Employer's Agent is obtained to occupy the site for a longer period.

PS1234 CONTRACTOR'S SERVICES CONNECTION FEE

The Contractor shall make his own arrangements concerning the supply of electrical power, water and all other services. No direct payment will be made for the provision of electricity, water and other services. The cost thereof shall be deemed to be included in the rates and amounts tendered for the various items of work for which these services are required.

PS1235 PUBLIC AWARENESS NOTICE BOARDS

The Contractor shall arrange for pre-made Notice Boards (refer to Section C3.5, standard drawing – Typical Notice Board for Engineering Unit, Road Rehabilitation), which are to be erected on site (strapped to ELPs, etc) atleast at every 50m spacing (in both directions of travel) together with the delivery of the "Notice to Residents" to all the affected residents well in advance of the work commencing. The cost thereof and for the removal of the boards shall be deemed to be included in the rates and amounts tendered for the various items of work for each Project. The Contractor shall remove the Notice Boards within 14 days upon completion of works on that particular road.

Photographs supplied to the Employer's Agent for the installation and removal of the Notice Boards shall be deemed to satisfy the requirements and serve as evidence of meeting such requirements. Note that the Employer's Agent may determine in instances where such notice to residents are not appropriate/required such as the rehabilitation of Major Freeways.

The Employer's Agent shall impose a penalty for non-compliance to the requirements of this section, which shall be calculated as follows:

Penalty for installation of Notice Boards (per road) = R 1000 per day, effective until compliance to this specification

Penalty for removal of Notice Boards (per road) = R 1000 per day, effective until compliance to this specification

It is a condition of this contract that this works shall not be sub-contracted to local enterprises who are undertaking ancillary works. The Contractor shall remain responsible for the installation and removal on the Notice Boards. Any penalties imposed onto the Contractor for non-compliance shall not be transposed onto the sub-contractors. In the event of such penalties being transferred onto the sub-contractors, the Employer reserves the right to apply Clause 1.2.3.8 of the Additional Conditions of Contract.

No additional payment will be made for this item and will therefore be deemed to be included in the construction rates.

PS1236 TESTING**PS1236(a) Process Control Testing**

The Contractor must have his systems in place to undertake process control testing, which must be approved and made available to the Employer's Agent as and when requested. Cost to undertake this type of testing must be included in the rates and no additional payment will be made. Failure to comply will result in the Employer's Agent requesting for acceptance testing at the Contractors cost.

PS1236(b) Acceptance Control Testing

Acceptance testing is undertaken by the Employer or approved independent laboratory:

(a) When requested by the Contractor; or

(b) At the discretion of the Employer's Agent after reviewing the results of the process control testing.

Should the acceptance tests indicate that the work is not to specification; the cost of any retest by the Employer's Agent shall be to the Contractor's account and shall be deducted from any payments due to the Contractor.

PS1237 OCCUPATIONAL HEALTH AND SAFETY**General Statement**

It is a requirement for each Project that the Contractor shall provide a safe and healthy working environment and to direct all his activities in such a manner that his employees and any other persons, who may be directly affected by his activities, are not exposed to hazards to their health and safety. To this end the Contractor shall assume full responsibility to conform to all the provisions of the Occupational Health and Safety Act No 85 and Amendment Act No 181 of 1993, and the OHS 1993 Construction Regulations 2014 issued on 18 July 2003 by the Department of Labour.

For the purpose of this contract the Contractor is required to confirm his status as mandatory and employer in his own right for the execution of the contract by entering into an agreement with the Employer in terms of the Occupational Health and Safety Act in the form as included in Returnable Schedule (Occupational Health and Safety Questionnaire).

The Employer's Health and Safety Specification has been included in this document as part of the Particular Specifications.

(b) Tenderer's Health and Safety Plan

The Contractor's Health and Safety Plan will be subject to approval by the Employer's Agent, or amendment if necessary, before commencement of any construction work. The Contractor will not be allowed to commence work, or his work will be suspended if he had already commenced work, before he has obtained the Employer's written approval of his Health and Safety Plan.

Time lost due to delayed commencement or suspension of the work as a result of the Contractor's failure to obtain approval for his safety plan, shall not be used as a reason to claim for extension of time or standing time and related costs

PS1238 SITE DIARY AND OTHER SITE RETURNABLES

The Contractor must keep a triplicate site diary on site, which must record the daily site activities, plant, site supervision, rainfall, site visitors, incidents and accidents. This diary must be filled in daily and signed by the Contractor's Representative.

The Contractor must in addition to the site diaries, provide to the Employer's Agent on a daily basis where applicable, daily construction works checklists, plant and equipment pre-start checklists, traffic accommodation reports, quality control test reports, foremans reports, paving spreadsheets, timesheets for local labour employed, construction and traffic accommodation daily photographs and all other requirements as detailed in the Contractors Quality Control and Quality Management Plans and required by the Employers Agent.

The requirement for compliance to this specification shall be deemed to be included in the Contractors time related obligations.

PS1239 APPROVED SPOIL/TIP SITE

The approved tip sites for this contract are as follows in accordance with the Ethekekwini Regions :

- North and North Central Regions : Buffelsdraai (Verulam) and Bisasar (Springfield)
- West and West Central Regions : Marianhill and Bisasar (Springfield)
- South and South Central Regions : Bisasar (Springfield)

Haulage shall only be to the above tip sites based on the regional boundaries. Should the Contractor wish to dispose the material outside the Contract's region then, prior approval shall be obtained from the Employer's Agent which it shall not be unreasonably withheld.

All haulage to these tip sites shall be free haul, ie. tendered rates shall include for any haulage to the tip site. Unless otherwise specified or agreed to by the Employer's Agent in writing all material to spoil shall be disposed of at this tip site.

Only material which can be used as cover at this tip will be accepted free of charge being : sand, clay and builders rubble less than 500 mm in diameter, all other material shall be subject to a tariff charge, which will be to this Departments cost. Contractors are required to make request in writing to this branch well in advance of this activity taking place.

PS1240 MEASUREMENT AND PAYMENT

Item	Unit
PS12.01 Relocation and protection of existing services	
(a) Protection, removal, re-alignment and replacement of services	Provisional Sum (Prov. Sum)
(b) Handling cost and profit in respect of subitem PS12.01(a) above	Percentage (%)

Expenditure under this item shall be made in accordance with clause 6.6 of the General Conditions of Contract 2015.

The tendered percentage is a percentage of the amount of expenditure approved by the Employer's Agent under subitem PS12.01(a), and shall include full compensation for the handling costs of the Contractor and the profit in connection with the relocation and / or protection of the relevant services.

PS12.02 Construction of new survey beacons and protection of existing survey beacons

(a) Provisional sum for new survey beacons to be constructed or for existing survey beacons to be protected during construction	Provisional Sum (Prov. Sum)
(b) Handling cost and profit in respect of subitem PS12.02(a) above	Percentage (%)

Expenditure under this item shall be made in accordance with clause 6.6 of the General Conditions of Contract 2015..

The tendered percentage is a percentage of the amount of expenditure approved by the Employer's Agent under subitem PS12.02(a), and shall include full compensation for the handling costs of the Contractor and the profit in connection with the construction of new survey beacons or the protection of existing survey beacons, including construction setting out with level control."

PS12.03 As-builts Data

(a) Capturing of as-built data at the completion of the project	Number (No.)
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(i)	Surfacing Works	no.
(ii)	Recycling Works	no.
(iii)	Granular Works	no.
(iv)	Subgrade Improvement Works	no.
(v)	Ancillary Works	no.

The unit of measurement shall be the number (No.) of as-builts captured (one per road), submitted in full to the Employers Agent Representative and as approved.

The rate shall cover full compensation for capturing a full material and layer as-built data which shall include layer thickness, levels, compaction, asphalt delivery and material quality for each layer. The completed file must be submitted to the Employer's Agent within atleast two (2) weeks after the completion of each project. The template for capturing the as-built data will be obtained from the Employer's Agent's Representative.

The capturing of as-built data is compulsory on all projects.

SECTION 1300: CONTRACTOR'S ESTABLISHMENT ON SITE AND GENERAL OBLIGATIONS**PS1301 SCOPE**

Delete the first sentence and replace with the following:

"This section covers the establishment of the contractor's organization and camp".

NOTE: *Establishment of constructional plant including the respective teams (human resources) and removal on completion of the project shall be priced separately and covered under Section 10300.*

Add the following:

Rehabilitation Categories

For each project order issued, a category of rehabilitation will be assigned dependent on the scope of works. The following five categories shall apply to the Contract:

- **Surfacing Works**

Projects which include the construction of new pavement layers which are all asphalt layers, or layers which may be described as bituminous surfacings such as slurries, single seals, microsurfacing etc shall be classified under "Surfacing Works".

- **Recycling Works**

Projects which include construction of BSM (Bitumen Stabilised Material) layers shall be classified under "Recycling Works". This category shall include both in-situ recycling and in-plant recycling. This category shall also include cement or lime stabilization of pavement layers, and the construction of asphalt layers.

- **Granular Works**

Projects which include the construction of new granular pavement layers above the formation level (i.e. Base and/or Subbase) shall be classified under "Granular Works". These works shall include construction of layers using both virgin materials and reuse of existing granular materials. This category shall also include the construction of BSM layers and asphalt layers.

- **Subgrade Improvement Works**

Projects which include improvements/re-construction of the subgrade layers below the formation level of the pavement shall be classified under "Subgrade Improvement Works". This shall only be applicable to projects where greater than 15% of the length of the road requires subgrade improvements. These works shall also involve reconstruction of the layers above formation and the construction of all types of layers shall be covered by this category of rehabilitation.

- **Ancillary Works**

Projects where the scope of works is not rehabilitation of pavement layers shall be classified under "Ancillary Works". Examples of the projects this category is intended to cover include raising/lowering of services, construction/re-construction of sidewalks, laying of kerbs or kerb & channel or asphalt haunching, patch work and laying of sub-soil drains

PS1302 GENERAL REQUIREMENTS**(a) Camps, constructional plant and testing facilities**

Delete the entire sub-clause and replace with the following:

The Contractor shall establish his construction camps and stores on the site. The exact location of these facilities shall be approved beforehand by the Employer's Agent. Ablution and other facilities for site staff shall also be provided as required and the location of all facilities shall comply with the requirements of the authorities concerned and those of the Employer's Agent.

Prior to starting with construction, the Contractor shall also move all constructional plant and personnel to the site. On completion of the work, all constructional plant, buildings, fencing and other temporary structures shall be removed and the camp site be restored to its original condition and left neat and tidy.

Accommodation, workshops and testing facilities are not required in this contract. Separate provision has been made in the Schedule of Quantities for the pricing of the Contractor's general obligations with regard to offices.

(c) Legal and contractual requirements and responsibility to the public

Add the following paragraph to the end of subclause 1302(c):

"The Contractor's general obligations shall also include the training of temporary labour, the management of labour enhanced work and ABEs, the application of the Compensation for Occupational Injuries and Diseases Act, 1993, and compliance with the requirements of Part C: Environmental Management Specification and Part E: OHS 1993 Safety Specification and further referenced in section C3.4.2 Particular Specifications."

PS1303 COMMUNITY LIASON OFFICER

The Ward Councillor(s) in whose ward(s) work is to be done will, collectively, identify a community liaison officer (CLO) for the project and make the person known to the Contractor within two days of being requested to do so. The Contractor will be required to enter a written contract with the CLO that specifies:

- The hours of work (in accordance to the Basic Conditions of Employment Act No.75, 1997, Clause No.9) and the wage rate of the CLO (200% of the Civil Engineering Industry minimum wage).
- The duration of the appointment.
- The duties to be undertaken by the CLO which could include :
 - Assisting in all respects relating to the recruitment of local labour.
 - Acting as a source of information for the community and councillors on issues related to the contract.
 - Keeping the Contractor advised on community issues and issues pertaining to local security.
 - Assisting in setting up any meetings or negotiations with affected parties.
 - Keeping a written record of any labour or community issue that may arise.
 - Any other duties that may be required by the Contractor.

Responsibility for the identification of a pool of suitable local labour shall rest with the CLO, although the Contractor shall have the right to choose from that pool. The Contractor shall have the right to determine the total number labourers required at any one time and this may vary during the contract.

The Contractor shall have the right to replace labour that is not performing adequately. Should such occasion arise, it must be done in conjunction with the CLO.

Payment: The CLO will be reimbursed from the PC Sum item in the Preliminary & General Section of the Bill of Quantities.

Note: The Employers Agent shall determine, based on the extent of works issued in the Project Order(s), the number of CLO(s) required to ensure successful operations of the works.

Note: Should the Contractor request for permission to work on non-working or special non-working days or any other overtime, this shall be at the Contractors cost, and such request be approved by the Employer’s Agent in writing. The Contractor shall be liable to make payment to the CLO for these working hours/day including any overtime or other benefits as provided by the Contractor. Such request must be submitted to the Employer’s Agent atleast 3 working days prior to the day/s for which permission is being requested. All overtime and benefits shall not be re-imbursed by the Employer, i.e.at the Contractors cost.

PS1304 OFFICES

Offices shall only be required, and therefore paid for, when specifically requested by the Employer’s Agent in the Project Order. The offices shall be for the joint use of the Employer’s Agent and the Construction Manager.

The office shall be a minimum size of 4m x 6m with a minimum height to ceiling of 2.5m. It shall be provided with an air conditioner whose capacity is acceptable by the Employer’s Agent as reasonably adequate for the size of the office actually provided and shall have adequate fluorescent lighting. It shall be furnished with two desks, each having a size of at least 1.5m x 0.9m with a lockable drawer. At least 4 (four) suitable chairs shall be provided.

The offices shall be sited in a position agreed upon between the Employer’s Agent and the Construction Manager. Each office shall be weather-proof, shall have a wooden boarded floor that is at least 150mm above ground and shall be provided with a ceiling and lining to the walls or equivalent insulation, with an approved type of door with a secure lock and 4 keys and two opening windows of glazed area at least 3m². Each office shall be well ventilated and shall be so insulated as to provide comfortable working conditions.

The Contractor shall provide for the duration of the project period proper maintenance of the offices and its approach. Daily cleaning shall be completed by 08h00.

The Contractor, upon completion of the project, shall arrange for the complete removal of the offices together with the disconnection of all services.

PS1305 PAYMENT

Delete payment subitem 13.01(b) and revise item with the following:

Item	Unit
PS13.01 The contractor’s general obligations:	
(a) Fixed obligations.....	Percentage (%)
(c) Time related obligations.....	Project Month

NOTE: The value-related obligations shall be included in the construction rates.

Delete the sixth paragraph in its entirety :

Starting with “ *Should the final value of the work*” and ending with : “ *which is in excess of twenty (20) percent of the tendered amount.*”.

Delete the seventh paragraph in its entirety with all its related sub-paragraphs :

Starting with “*Payment of the lump sum*” and ending with : “ *has fulfilled all the requirements of this section*”.

Separate provision has been made in the Schedule of Quantities for the pricing of the Contractor’s general obligations with regard to Health and Safety.

Refer to the second sentence of the fourth last paragraph of Clause 1303, page 1300-2 of the COLTO Standard Specifications and delete the words “*from the date on which the contractor has received the letter of acceptance in terms of Clause 12 of the General Conditions of Contract*” and replace these words with the following:

“from the Commencement Date in terms of Clause 5.3.1 of the General Conditions of Contract (2015), as specified in the Project Specific Data Sheet”.

Add the following at the end of clause 1303:

"The amount payable to the Contractor for time-related obligations arising from extensions of time per "Project" granted by the Employer, where the Contractor is fairly entitled to such compensation in terms of clause 5.12 of the General Conditions of Contract 2015, shall be calculated as follows:

- (i) The Contractor shall apply for the extension of time in terms of the number of working days delay incurred per "Project".
- (ii) The number of working days extension of time finally granted shall then be added to the "Project" by the Employer, commencing on the first working day after the day of the original completion date. Special non-working days as defined in the contract data shall not be counted as working days in calculating the extended completion date.
- (iii) The number of calendar days extension of time granted from the original completion date to the extended completion date as calculated in (ii) above shall then be calculated, commencing on the first calendar day after the day of the original completion date.
- (iv) The number of days extension of time granted calculated as in (iii) above shall be the number of additional days measured for payment for time-related obligations under item 13.01(c) as a result of the extensions of time granted.

Note: The number of days extension of time granted calculated as in (iii) above shall also be included in the measurement of any other items scheduled under Sections 1300, 1500 or elsewhere in the Schedule of Quantities that involve the unit of measurement "month" and that were provided on site for the full duration of the extended period. Where such items were provided for a portion of the extended period only, a pro rata payment shall be made, based on the number of calendar days the item was provided on site after the original completion date divided by the number of calendar days as calculated in (iii) above for the extension of time granted."

Revise the following pay items:

Item	Unit
<i>PS13.01(a) Principal Contractor(s) Fixed obligations for the following Rehabilitation Categories, for all road categories:</i>	
(i) Surfacing Works	Percentage (%)
(ii) Recycling Works	Percentage (%)
(iii) Granular Works	Percentage (%)
(iv) Subgrade Improvement Works	Percentage (%)
(v) Ancillary Works	Percentage (%)
- The tendered percentage (%) shall be the percentage of the value of work done.	
- The final sum amount for this pay item shall be determined at the end of each Project.	
- The inclusions and the calculations for the fixed obligations of the Principal Contractor's general obligations shall be as follows:	
<ul style="list-style-type: none"> • The final sum will be determined from the total value of work done by the Principal Contractor(s) for each payment claim. • The value must include the Contract Price Adjustment. • The value must include the special materials • The value must exclude all the Provisional Sum items. • The value must exclude all the PC Sum items • The value must exclude the time-related obligations • The value must exclude the Value Added Tax (VAT) 	

- **The value of the fixed obligations shall be the product of the tendered percentage and the value of work done (plus CPA, plus special materials and excluding Provisional Sum items, excluding PC Sums, excluding time related obligations and excluding VAT)**

For which the formula is;

Fixed obligations = Tendered % x [value of work done + CPA + special materials – Provisional Sums – PC Sums – time related obligations - VAT]

Note: Fixed obligation costs for sub-contractors shall not be measured for and paid separately. Provision of fixed obligation costs payable to local ward based enterprises/sub-contractors undertaking works shall be factored into the tendered rates for items payable to these sub-contractors.

PS13.01(c) Principal Contractor(s) Time-related obligations for the following Rehabilitation Categories, for all road categories:

(I)	<i>Surfacing Works</i>	<i>Project Month</i>
(II)	<i>Recycling Works</i>	<i>Project Month</i>
(III)	<i>Granular Works</i>	<i>Project Month</i>
(IV)	<i>Subgrade Improvement Works</i>	<i>Project Month</i>
(V)	<i>Ancillary Works</i>	<i>Project Month</i>

Project Month shall mean a calendar month as applicable for each project allocated.

Note: Supervision of sub-contractors are not be factored into the construction rates, but rather factored into the Principal Contractor(s) time related cost. The time related obligation cost shall also include all handling, overheads, profit, risk and other obligations and for all other incidentals necessary for the completion of the sub-contractors work and maintenance during the period of maintenance.

Note: Time-related obligation costs for sub-contractors shall not be measured for and paid separately. Provision of time-related obligation costs payable to local ward based enterprises/sub-contractors undertaking works shall be factored into the tendered rates for items payable to these sub-contractors.

Item	Unit
PS13.02	Principal Contractor(s) Health and Safety
(a)	<i>Sum</i>
<i>Fixed obligations for the preparation of risk assessments, safe work procedures, the project H & S file, the H & S plan and any other H & S matters that the Contractor deems necessary for the project.</i>	
(b)	<i>Project Month</i>
<i>Time related obligations for updating and amending the risk assessments, the safe work procedures, the project H & S file and the H & S plan, and for full compliance with all H & S matters during the construction of the Works under the project.</i>	
(I)	<i>Project Month</i>
(II)	<i>Project Month</i>
(III)	<i>Project Month</i>
(IV)	<i>Project Month</i>
(V)	<i>Project Month</i>

Note: Costs associated for health and safety compliance (fixed or time-related in nature) for sub-contractors shall not be measured for and paid separately. Provision of costs payable to local ward based enterprises/sub-contractors undertaking works shall be factored into the tendered rates for items payable to these sub-contractors.

Project Month shall mean a calendar month as applicable for each project allocated.

- Rate tendered under subitems PS13.02(a) and the rate per month for subitem PS13.02(b) shall, for the two subitems together, include full compensation for all the Contractor's and Sub-Contractor's costs in respect of compliance with the OHS Act and Construction Regulations.
- Payment of the lump sum tendered under subitem PS13.02(a) shall be made once off at the beginning of the project, subject to the Contractor delivering the plan and it is approved by the Employer's Agent.
- And payment for the tendered rate for subitem PS13.02(b) shall be paid per month or part thereof for the duration of each project.

Item	Description	Unit
PS13.03	(a) Project signboards	Number (No)
	(b) Re-using of existing signboards	Number (No)

The unit of measurement shall be the number of contract signboards erected as instructed by the Employer's Agent or Employer's Agent Representative.

The tendered rate under subitem PS13.03 (a) shall include full compensation for providing and erecting each Project signboard complete including for timber poles and fixings, excavation and backfill, and for dismantling and removing the signboard structures and reinstating the signboard area on completion." The Project Board shall be priced based on a sign face area of 3.2m².

The tendered rate under subitem PS13.03 (b) shall include full compensation for erecting existing/re-usable Project signboard complete including for the alteration of Project Description, for timber poles and fixings, excavation and backfill, and for dismantling and removing the signboard structures and reinstating the signboard area on completion."

PS13.04	Community Liaison Officer	
(a)	Allow for a CLO to be appointed and paid for on a monthly basis	Provisional Sum
(b)	Handling and profit in respect of subitem PS13.04 (a)	Percentage (%)

Expenditure under these items shall be made in accordance with Clause 6.6 of the General Conditions of Contract 2015. The cost of providing a CLO paid for on a monthly basis as described in PS1303 and shall be subject to the approval of the Employer's Agent or Employer's Agent Representative.

The tendered percentage is a percentage of the amount of expenditure approved by the Employer's Agent under subitem PS13.04 (a) and shall include full compensation for the handling costs of the Contractor and the profit in connection with the provision of the CLO.

PS13.05 Offices

Item	Description	Unit
(a)	Establishment of Office	Number (No)
(b)	Maintenance of Office	Month

PS13.05(a) shall be paid once off upon establishment of the office, when an office is required by the Employer's Agent. This item shall cover the cost of the provision and establishment of the office and all furnishings. It shall also cover the provision of all services together with the payment of all necessary fees and the removal of the

office and services together with the restoration of the camp site to the Employer's Agent's or Employer's Agent's Representative satisfaction, upon completion of the project.

PS13.05(b) shall cover the cost for the duration of the project of the maintenance of the office and furnishings, site rentals (if applicable) and the daily cleaning.

Note: The payment for employing the professional site supervision personnel shall not be included in the Preliminary and General. The payment for site supervision shall be included in the construction rates as stated in clause 1205 and 1209(b) of the COLTO Standard Specifications, with the exception of site supervision for sub-contractors being priced in the Preliminary and General Principal Contractor(s) Time Related Obligations.

SECTION 1500: ACCOMMODATION OF TRAFFIC**PS1501 SCOPE**

Add the following to the end of clause 1501:

“Throughout the course of each project, the Contractor shall ensure that the works do not prevent service owners from gaining access through/to the site.

All work shall be assumed to be constructed under traffic with no deviations permitted unless authority has been obtained from the Employer’s Agent. The public has the right to use the roads and therefore the safety of the traveling public and pedestrians shall take precedence in the accommodation of traffic. In this regard, the contents of Clause PS1231 (Compliance with the Road Safety Act) are to be complied with.”

PS1502 GENERAL REQUIREMENTS**(b) Providing temporary deviations**

Delete the second paragraph and replace with the following :

“No road deviations have been specifically called for in tender documentation, however should the Contractor require such deviations, then the following requirements apply:

- (a) Deviations required by the Contractor shall comply with the requirements of the Standard Specifications. Details shall be submitted to the Employer’s Agent for approval at least two weeks in advance of the date on which it is anticipated that work on the deviation will commence.*
- (b) On all deviations the Contractor shall ensure that all times and during all weather conditions that all temporary surfaces that are intended to carry traffic are in fact trafficable with regard to reasonable standards of safety and comfort. No additional payment shall be made to the Contractor for compliance with this Clause.*
- (c) Unless indicated otherwise over the entire length and for the duration of the Project, traffic is required to be accommodated in both directions at all times. The Contractor shall ensure that the full width of the road is available for traffic outside the working hours.*
- (d) At all times signposting shall be in accordance with the latest edition of the South African Road Traffic Signs Manual (SARTSM), volume 2, chapter 13 of the June 1999 edition. The Ethekweni Transport Authority “Roadworks Signing” Manual may be used as a guideline.*
- (e) Should the Contractor arrange with a landowner for road deviations to traverse private property, the Contractor shall supply the Employer’s Agent with written proof of this arrangement which outlines the measures to be taken to reinstate the land affected by the deviation.*
- (g) The contractor shall submit sketches of his proposed accommodation of traffic facilities for each work section to the Employer’s Agent for his approval one week prior to commencement of that section of work.*
- (h) Contractor shall ensure that adequate signage is in place after any part of the works has been completed until such time that the work site is deemed to be safe, can it be removed.*

Delete the second paragraph and replace with :

“Should the Project effect any designated bus-routes then the Contractor shall identify an alternative route and in liaison with the public transport authorities, make due allowance for a deviation.”

(e) Access to properties

Add the following :

“As Projects will be undertaken in both CBD and residential areas, the Contractor shall make due allowance in the traffic accommodation measures for the provision of access to private properties and deliveries to businesses.

(i) Traffic Safety Officer

Add the following to the end of the second paragraph:

“The contractor shall submit a CV of the candidate to the Employer’s Agent or Employer’s Agent Representative for approval before the candidate is appointed as the traffic safety officer.

Insert the following as the opening phrase to subclause (i)

“make himself available to discuss road safety and traffic accommodation matters whenever required by the employer’s Agent and shall be responsible...”

Delete subclause (iii) and replace with the following

- (iii) *Personally inspect the position and condition of each traffic accommodation feature on the whole site of works twice each day by 9h30 and by 14h00, to record all irregularities discovered and the remedial action taken, and to sign off as correct and submit to the Employer’s Agent or Employer’s Agent Representative such record sheets by midday of the next working day. The traffic safety officer shall keep a duplicate book for this specific purpose.*

The traffic safety officer shall also submit with this report the daily labour returns of flagmen employed.

Add the following subclauses:

- (ix) *The traffic safety officer shall be equipped with a cellular telephone and shall have a vehicle and sufficient labour at his disposal 24 hours a day, including all prescribed non working days, and shall not be utilised for other duties. He shall be directly answerable to the contractor’s Construction Manager.*

The traffic safety vehicle shall be equipped with a high visibility rear panel in accordance with the requirements of the SARTSM. The words TRAFFIC CONTROL shall be written on a warning sign in highly legible letters, not less than 150 mm high, and the sign shall be mounted on the vehicle at least 1,5 m above ground level. The proposed sign and letter dimensions shall be submitted to the Employer’s Agent for his approval.

The vehicle shall also be equipped with an amber-coloured flashing light of the rotating parabolic reflector type with a minimum intensity of 100 W. The warning light shall be switched on at all times and the sign shall be displayed when the vehicle is used on site.

The traffic safety officer shall have a direct line of communication at all times with the police and traffic officers responsible for the area within limits of the contract. The provision of the road safety vehicle, driver, labourers and the cost of the cellular telephone shall be deemed to be included in the rates tendered for the contractor’s establishment on site

- (x) *Ensure that all obstructions related to the contractor’s activities be removed before nightfall where applicable as instructed by the Employer’s Agent and that the roads are safe for night traffic.*
- (xi) *The traffic safety officer shall, in addition to the duties listed in paragraph 1502 (i), also be available to assist in the removal of broken down vehicles off the roadway and implementing actions requested by the traffic authorities with regard to the work to be carried out, be responsible for the erection and maintenance of all traffic signs necessary for the accommodation of traffic.*
- (xii) *In the event of an accident the traffic officer shall record in a written report the details of the accident, record the position of all temporary road signs, barricades, delineators, flagmen and any other devices used for traffic accommodation. In addition the report shall include a neat dimensional sketch, photographs, identifiable permanent features, and any other relevant information.”*

(j) Failure to comply with provisions

Failure or refusal on the part of the Contractor to take the necessary steps to ensure the safety and convenience of the travelling public, accommodation of traffic, plant and personnel in accordance with these specifications or as required by statutory authorities or ordered by the Employer’s Agent, shall be sufficient cause for the employer’s Agent to apply penalties as follows:

A fixed penalty of R5 000.00 per occurrence shall be deducted for each and every occurrence of non-compliance with any of the requirements of Section 1500 of the standard specifications and section PS1500 of the project specifications.

In addition a time-related penalty of R500.00 per hour over and above the fixed penalty shall be deducted for non-compliance to rectify any defects in the accommodation of traffic immediately after the Employer's Agent has given an instruction to this effect. The Employer's Agent's instruction shall state the time of incidence, Should the Contractor fail to adhere to this instruction within 10 minutes, the time-related penalty shall be applied from the time the instruction was given.

PS1503 TEMPORARY TRAFFIC-CONTROL FACILITIES

Replace the first sentence of the first paragraph of Clause 1503 with the following:

"The Contractor shall provide, erect and maintain the necessary traffic-control devices, road signs, channelisation devices, barricades, warning devices and road markings (hereinafter referred to as traffic-control facilities) in accordance with these project specifications and deemed necessary by the Contractor for the execution of each Project in conjunction with the latest edition of the South African Road Traffic Signs Manual (SARTSM), volume 2, chapter 13 of the June 1999 edition and shall remove them when no longer required.

The Contractor shall replace at his own cost any traffic-control facilities that have been damaged, lost or stolen. The Contractor shall also remove all bituminous or other foreign material from the traffic-control facilities in order to keep them clean and visible at all times. Traffic-control facilities that can no longer be cleaned effectively shall be replaced with new ones at the cost of the Contractor."

Replace the first sentence of the third paragraph of clause 1503 with the following:

"The type of construction, spacing and placement of traffic-control facilities shall be in accordance with the latest edition of South African Road Traffic Signs Manual (SARTSM), volume 2, chapter 13 of the June 1999 edition, these project specifications and the road category for each Project. The Ethekweni Transport Authority "Roadworks Signing" Manual may be used as a guideline to assist the Contractor with the traffic accommodation proposal for each of the road categories, viz. A, B, C or D.

(b) Road signs and barricades

Add the following to the end of subclause 1503(b):

"The Contractor shall be responsible for the protection and maintenance of all signs, and shall at his own cost replace any that have been damaged, lost or stolen.

Where temporary signs such as delineators are mounted on portable supports, the only permitted method of ballasting such sign supports shall consist of durable sandbags filled with sand of adequate mass to prevent the signs from being blown over by wind. The cost of the sandbags shall be included in the tendered rates for the applicable types of temporary road signs.

The covering of permanent road signs, if applicable, shall be carried out by utilising a hessian bag which shall be pulled over the sign in the form of a hood and fastened to the sign posts using wire ties. Plastic bags or other materials, and fastening by means of adhesive tape, shall not be permitted for this purpose. The cost of covering permanent road signs shall be deemed to be covered by the tendered rates.

No work may proceed on any section where accommodation of traffic is required until such time as the relevant requirements are met and the written approval of the employer's Agent has been obtained. The Contractor shall keep sufficient surplus signs, delineators and barricades on the site to allow for the replacement of damaged or missing items immediately upon discovery, or within three hours of instructions to such effect having been given by the Employer's Agent. Delineators shall be of the flexible plastic / rubber reversible variety and not of the rigid metal variety."

(c) Channelization devices and barricades

Add the following paragraphs at the end of subclause 1503(c):

"Delineators shall be manufactured from plastic / rubber materials and shall be adequately ballasted with sand bags to prevent the signs from being blown over by wind or wind turbulence from moving traffic.

Traffic cones shall be manufactured from fluorescent orange or red plastic material, and shall be used only at short term lane deviations during daylight hours. All traffic cones used on deviations shall be 750 mm high. Lane closures which continue into the night time shall be demarcated by delineators only.

The use of steel drums as channelization devices shall not be allowed on this Contract. Channelization shall be effected by the use of delineators or cones as detailed in the South African Road Traffic Signs Manual (SARTSM), volume 2, chapter 13 of the June 1999 edition."

The safe channelization of pedestrians (where necessary) is to be carried-out by the utilization of portable pedestrian barricades. The Contractor shall identify the need and make due allowance in this regard for each Project.

(e) Warning devices

Add the following to subclause 1503(e):

"All construction vehicles and plant used on the works shall be equipped with 200mm diameter rotating amber flashing lights and with "Construction Vehicle" warning signs. All vehicles and plant shall obtain a clearance permit from the Employer's Agent before being allowed onto the site.

(i) Vehicle mounted flashing lights

Rotating lights shall have an amber lens of minimum height of 200mm and shall be mounted to ensure clear visibility from all directions. The lights on construction vehicles shall be switched on as the vehicles decelerate to enter a construction area, while construction vehicles are operating within the accommodation of traffic area, and as the vehicles accelerate to the general speed when entering the road from a construction area. Lights on plant shall operate continuously while the plant is working alongside sections of road open to public traffic.

All LDVs and cars operating on site shall also be equipped with rotating amber flashing lights which shall be placed so as to be clearly visible and shall be operated continuously while the vehicles are manoeuvring in or out of traffic or while the vehicles are travelling alongside or parked alongside roads open to public traffic.

Rotating lights and the "Construction Vehicle" warning signs on the Contractor's vehicles and plant shall not be paid for separately but shall be included in the rates covering the use of the vehicles.

The Contractor shall apply and maintain to the approval of the Employer's Agent such rotating amber lights and warning signs, together with any temporary mounting brackets. Vehicles and plant that do not comply with these requirements shall be removed from the site."

(ii) Sign mounted flashing lights

Where sections of road cannot be opened to traffic at night, two amber flashing lights shall be vertically mounted on top of the road closure barricades at each end of the section in question, and a Stop Go Flagmen must be provided to control traffic through the construction site. Also if street lighting is not sufficient, arrangements must be made to light up the site so is visible to motorists approaching it.

Add the following new subclauses to clause 1503:

(g) Other traffic control measures ordered by the Employer's Agent

"The Employer's Agent may instruct the Contractor to provide any other road sign, reflective tape, etc not provided for and for which the Contractor shall be compensated. Such road signs shall conform to the requirements of the SARTSM, or specification provided by the Employer's Agent. Similarly, in order to ensure that the travelling public is kept fully informed and warned on matters relating to the accommodation of traffic, construction sign posting and the effect of the construction on the free flow of traffic through the site, the Employer's Agent may arrange for advertising in the press and/or for other forms of publicity.

(h) Flagmen

Flagmen shall be adequately trained in the standard flagging techniques as described in the SARTSM (refer to figure 13.23 of detail 13.23.1) and be provided with conspicuous clothing such as safety jackets utilizing retro-reflective and / or fluorescent panels in red, yellow and / or white.

Flagmen shall have in their possession, at all times, certification that they have attended and passed an accredited course in flagging techniques before being allowed onto the construction site.

Flagmen shall be rotated every 2 to 3 hours in order to ensure that there is always a fresh person holding the flag to counter fatigue. At no point should the flagmen leave their posts unattended, the flagman shall ensure that he/she leaves someone to control the traffic at his/her post if he wishes to go somewhere.

Flags shall be made from bright red or red-orange material and shall be square with a minimum side length of 600 mm. The flag shall be attached to a staff at least 1,0 m in length.

In terms of lateral clearance and safety, flagmen shall stand on the shoulder of the lane of traffic that is being controlled and under no circumstances shall flagmen be permitted to stand within the traffic lane. In order to obtain maximum visual impact for the travelling public, flagmen shall stand-alone.

Failure to comply with this specification will lead to the Contractor being penalized in terms of PS 1502(j).

(i) Public traffic

The Contractor must plan and conduct his activities so as to bring about the least possible disruption to the traffic on the road. All halting of traffic will require the prior approval of the Employer's Agent and must be pre-arranged with the appropriate traffic authorities.

In all dealings with the public the Contractor shall bear in mind the public's right to enjoy the use of the road, and the Employer's desire to interfere as little as possible with this right. At all points of contact with the public, the Contractor shall deal with deliberate courtesy and understanding in any discussions or disputes.

(k) High visibility safety vests and hard hats

The Contractor shall ensure that all his own personnel, excluding those who are permanently office bound, all other construction workers on the site (including CLO and local labour), staff of the Employer's Agent and visitors are equipped with high visibility reflective safety vests and hard hats. High visibility reflective safety vests shall be worn at all times when working on or near to the travelled way and hard hats shall be worn at all times when working on or near to the bridges or box culvert construction areas. High visibility reflective safety vests and hard hats shall be kept in good condition and any such safety vests and hard hats that are, in the opinion of the Employer's Agent, ineffective shall be replaced immediately by the Contractor."

Add the following new Clause :

PS1518 LIGHTING REQUIREMENTS DURING NIGHT WORK

Where night work is deemed necessary and approved by the Employer's Agent, the following specification shall be complied with :

The Contractor shall provide sufficient lighting for night work to ensure that all inspection and work areas are illuminated to a minimum average of 100 lux at an overall uniformity of 0.33. The illuminance for active work areas shall comply with the OHS Act 1993 (as amended) requirements and all lighting shall be subject to a minimum glare control of 5. Luminaries mounted on masts shall have a minimum mounting height of 5 m. The Contractor shall ensure sufficient backup lighting to replace faulty lighting.

The lighting shall be positioned so as not to cause a hazard to the travelling public using the road. Should the Employer's Agent be of the opinion that the lighting is insufficient or that it is a hazard to the road users, the Contractor will be instructed to stop work immediately.

Mobile lighting units, including a towing vehicle and operators shall be made available on request to the Employer's Agent for night time inspections.

The Contractor shall submit his lighting operational plan to the Employer's Agent for approval and demonstrate the effectiveness of the lights before the commencing of any night work. The Employer's Agent shall also inspect and approve all lighting equipment prior to the commencement of the night work. A trial set up of the lighting equipment shall be made at an appropriate site. The Contractor shall arrange for the measurement and certification of the lighting adequacy by a reputable service provider. Once the lighting plan and equipment has been approved, the Contractor shall not deviate from it unless agreed to by the Employer's Agent. If lighting requirements are not met for any particular activity, the Employer's Agent may order that activity to be stopped until the required lighting has been re-instated.

Add the following clause:

PS1519 NIGHT WORK AND WEEKEND WORK

Where night work has been approved by the Employer's Agent, the following specification shall be complied with:

Road closures can only commence at 18:00 until 06:00, where the road shall be open to traffic. The road shall not be closed off to traffic before 18:00, unless permission to do so has been granted by the Employer's Agent.

For night and weekend work, the contractor must ensure that he:

- Makes arrangements for all the necessary testing required.
- Undertakes all checks for all activities and populates the necessary checklists.
- Submits all the necessary documents to the Employer's Agent's Representative on the very next working day.
- Submits the traffic report and site diary to the Employer's Agent's Representative on the very next working day.
- Site safety and traffic signage is monitored even outside working hours, as the Contractor is responsible for the site safety 24/7.

No additional payment will be made for this item and will therefore be deemed to be included in the construction rates.

PS1520 NOTICE TO RESIDENTS

Should it be necessary to temporarily close any part of any road to vehicular traffic, suitable notice shall be given to the affected residents and/or property owners. The duly completed "Notice to Residents" provided in Section C3.6 shall be distributed at least 48 hours prior to the closure, indicating the date on which and the period of time for which the road will be closed.

No additional payment will be made for this item and will therefore be deemed to be included in the construction rates. Refer to PS1235 for detailed requirements regarding public awareness notice boards.

PS1521 SUB-CONTRACTING OF TRAFFIC ACCOMMODATION

Due to the nature and risks involved with working under live traffic conditions, it is of paramount importance to maximize safety of road users, general public and the labour force. It is therefore a condition of this contract that traffic accommodation shall not be sub-contracted to local enterprises. The Contractor shall remain responsible for the traffic accommodation designs in accordance to the relevant specifications, provision of traffic accommodation devices, supervision and all other requirements in relation to this specification. Any penalties imposed onto the Contractor for non-compliance to the approved traffic accommodation plans on-site shall not be transposed onto the sub-contractors. In the event of such penalties being transferred onto the sub-contractors, the Employer reserves the right to apply Clause 1.2.3.8 of the Additional Conditions of Contract.

The Employers Agent, may at his discretion, permit the sub-contracting of traffic accommodation upon written request from the Contractor. The Contractor is to include in his motivation the skills, competencies and resources that the sub-contractors possess to adequately and safely undertake the works to a standard or better as if the Contractor was undertaking the traffic accommodation himself.

No additional payment will be made for this item and will therefore be deemed to be included in the construction rates.

PS1517 MEASUREMENT AND PAYMENT

Project Month shall mean a calendar month as applicable for each project allocated.

Replace item 15.01 to read as follows:

Item	Description	Unit
PS15.01	The provision of temporary traffic control facilities (except traffic lights and amber flicker lights for the supervisory staff) for the following road categories :	
	(a) All rehabilitation categories:	
	(1) Category A : Major Arterials or Freeways	Project Month
	(i) Extra-over for Night Work	Project Month
	(2) Category B : Urban Arterials, Major Bus Routes, CBD and Industrial Roads	Project Month
	(i) Extra-over for Night Work	Project Month
	(3) Category C : Minor Bus Routes and Collectors	Project Month
	(4) Category D : Residential Streets	Project Month

The unit of measurement shall be per month for the duration of the works of each Project for the provision of temporary traffic accommodation and control facilities over the length of road on which such control facilities has to be provided irrespective of the number of lanes used by traffic or it being single or double carriageway roads, width of the road or the number of road areas on which the contractor elects to work at any one time or the number of relocations of such facilities during the contract period. It shall also include the length of road where construction is done in half widths.

The tendered monthly rate shall include full compensation for accommodating traffic on the existing road, or diversions alongside work areas or where the road is constructed in half widths where required including the provision of a traffic safety officer, adequate road signs, delineators, traffic cones, pedestrian barricades, plant, labour, transport, communication equipment, amber rotating lights, safety clothing, etc. required to install, maintain, relocate and monitor traffic control facilities as specified and to the satisfaction of the Employer's Agent or Employer's Agent's Representative. The rate shall **exclude** the provision of traffic lights where the road is constructed in half widths and amber rotating lights for use by the supervisory staff."

Note: The Principal Contractor(s) remain fully responsible for the accommodation of traffic of work done by the sub-contractor(s) and this requirement is to be factored into the tendered rate.

The requirements and provisions shall be as deemed necessary for each type of rehabilitation work and respective road categories.

The tendered sum for the extra-over item shall include for all the additional measures deemed necessary for the safe execution of the work at night such as lighting for all activities and any additional personnel deemed necessary, etc.

Payment for the tendered rate for subitems of PS15.01 shall be paid per month or part thereof for the duration of each Project.

SECTION 1600: OVERHAUL

PS1602 DEFINITIONS

(a) Overhaul material

Add the following to the end of subclause 1602(a):

“Overhaul shall not be measured separately for payment for materials obtained from commercial sources, and the rates tendered for such materials shall be fully inclusive of all haul required.”

(b) Overhaul

Delete sub-clause 1602(b) second paragraph and replace with the following:

“Restricted overhaul shall not apply to any material. Ordinary overhaul only shall apply.”

(d) Free-haul distance

Amend the last sentence to read :

“The distance shall be 10,0 km radius in the case of all overhaul materials”.

SECTION 1700: CLEARING AND GRUBBING**PS1702 DESCRIPTION OF WORK**

Add the following descriptions:

(a) Light Cleaning

Light cleaning shall consist of the removal of material within the road reserve which only requires the use of hand tools i.e. spades and brooms, etc. all which shall be necessary as deemed by the Employer's Agent. Normal cleaning for activities such as paving shall be deemed to be covered in the tendered rates for those respective activities.

(b) Heavy Cleaning

Heavy cleaning shall consist of the removal of material within the road reserve which has been washed into the road or otherwise and will requires the use of machinery i.e. TLB and payloader, etc. all which shall be necessary as deemed by the Employer's Agent.

PS1704 MEASUREMENT AND PAYMENT**PS17.07 Road edge definition and cleaning**

*The unit of measurement for clearing and grubbing shall be **square meter**. The quantity shall be taken as the area in square meters designated by the Employer's Agent and cleared and grubbed in accordance with these specifications.*

Add the following to the end of the first paragraph of item 17.01:

"Only clearing and grubbing necessarily required for road works within the road reserve shall be measured for payment. Payment for clearing and grubbing for the construction of campsites shall be regarded as being included in the rates tendered for item 13.01 for the contractor's general obligations, and shall not be measured separately."

SECTION 2200: PREFABRICATED CULVERTS**PS2201 SCOPE**

Add the following :

This section also covers the possible improvements to the existing drainage systems together with the raising or lowering of manhole or catchpit covers for stormwater drainage or utility services.

PS2203 MATERIALS**(a) Prefabricated concrete pipe culvert units**

Delete last sentence of Clause 2203(a), "Pipes with ogee joints shall be provided, unless otherwise specified."

Add the following to Clause 2203(a):

"All pipes will be spigot and socket pipes with rubber rings to the manufacturer's specification".

(j) In-plant foamed BSM for backfilling

Add the following Clause:

The in-plant foamed BSM backfill material shall conform to Section PS10200 of the Project Specification. This material shall be compacted to a density of 100% Mod AASHTO.

PS2204 CONSTRUCTION METHODS

Add to Clause 2204 the following:

Generally, prefabricated stormwater drainage pipes and rectangular culverts will be installed using the 'trench method'.

PS2218 MEASUREMENT AND PAYMENT

Add the following payment item:

Item	Description	Unit
PS22.02	Backfilling :	
(d)	Using the in-plant foamed BSM from Ethekewini Municipality's Asphalt Plant or Malacca Road stockpiles or other	cubic metre (m ³)

The unit of measurement shall be the cubic metres of the material in place after compaction. The Quantity shall be calculated from the leading dimensions of the backfilling as specified or authorised by the Employer's Agent or Employer's Agent's Representative.

The tendered rate shall include full compensation for backfilling under, alongside or over conduits, for watering, and for compacting the backfill material to the specified density. The rate shall also include full compensation for supplying (including transporting) the in-plant foamed BSM material from Ethekewini Municipality's Asphalt Plant stockpile but shall exclude mixing/processing of the in-plant BSM, provision and addition of the stabilizing agents, screening and crushing which all shall be paid for under the respective items in Section PS10200.

Add the following payment item:

Item	Description	Unit
PS22.03	Concrete pipe culverts :	
(d)	On sand bedding	metre (m)
(e)	On 19 mm crushed stone bedding	metre (m)

The unit of measurement for the concrete pipe culverts shall be the linear metre of pipe laid.

In the second paragraph replace the words “selected granular material” and replace with :

Either “sand” or “19 mm crushed stone” as specified.

PS22.30 Repairs to drainage structures

Provisional Sum (Prov Sum)

The provisional sum given for repairing or replacing existing drainage systems shall be expended in terms of Clause 6.6 of the General Conditions of Contract, 2015.

PS22.31 Raising or lowering of various drainage or service structures

No.

The unit of measurement shall be the number of drainage or service structures to be raised or lowered. Type of structure and depth range indicated in the schedule of quantities.

The tendered rate shall include for all work necessary for the breaking-down or removal of brickwork or making-good where necessary, re-setting of cover frames and the reinstatement of the surrounding roadway or sidewalk. This rate shall also be deemed to include for all labour and material costs including any finishes such as plastering or rendering of brickwork. It should also be noted that the roadway is to be opened to traffic as soon as possible and therefore the Contractor is to ensure that the concrete has set sufficiently. This will involve the use of rapid curing cement. Failure to use the prescribed cement will result in the work being rejected and the Contractor being instructed to re-do this work.

SECTION 2300: CONCRETE KERBING, CONCRETE CHANNELLING, CHUTES AND DOWNPIPES, AND CONCRETE LININGS FOR OPEN DRAINS

PS2301 SCOPE

Add the following :

This section also covers the removal, repairs and reinstatement of the following elements:

- kerbs, channels, sidewalks, medians, islands, pedestrian and vehicular scoops and driveways.

PS2304 CONSTRUCTION

(j) Protection

Add the following :

The condition of all kerbs, channels and inlets on affected roads will be assessed prior to commencement of any Project. All damage to kerbs and channels caused thereafter by construction operations shall be made good by the Contractor at his own expense.

Tenderers are therefore advised to assess whether their anticipated method of construction will damage kerbs and channels and make allowances for the repair thereof in their unit rates.

The Contractor must take due precautions to protect kerbs, channels, guttering, manholes, guardrails, bridge railings, walls, poles and any other structures against soiling from bituminous binders during operations. Any soiling that does occur must be completely removed so as not to show any stains. The Contractor shall replace at his own cost any items that cannot be cleaned entirely.

The painting of soiled surfaces will not be acceptable as a suitable remedy.

Add the following new Sub-clauses to Clause 2304:

(l) Shrinkage joints for cast in-situ concrete work.

Unless shown otherwise on the drawings, cast in situ channels shall be provided with shrinkage joints spaced a maximum of 2m apart. Shrinkage joints shall be constructed so that shrinkage cracks are generated at the joints. Sections of channel which have cracked between shrinkage joints shall be removed and replaced by the contractor at his own cost.

(m) Formwork and finish

All visible edges of cast insitu channels shall be rounded with a rounding tool.

2307 MEASUREMENT AND PAYMENT

Add the following new pay items :

Item	Description	Unit
PS23.17	Repairs to kerbs	Provisional Sum (Prov Sum)

The provisional sum given for repairing damaged kerbing systems shall be expended in terms of Clause 6.6 of the General Conditions of Contract, 2015. Any damage to kerbs caused by poor workmanship shall be repaired at the Contractor's cost.

Item	Description	Unit
PS23.18	Break-out and remove the following concrete roadway elements and cart to spoil	
	(a) Kerbs	metre (m)
	(b) Kerb and channel	metre (m)
	(c) Medians	square metre (m ²)
	(d) Sidewalks	square metre (m ²)
	(e) Driveways	square metre (m ²)
	(f) Extra-over for selection of concrete for recycling	cubic metre (m ³)
	(g) Extra-over for selection of re-usable kerbs	metre (m)

(h) Extra-over for haulage of suitable material

cubic metre (m). kilometer (km)

The unit of measurement shall be either the metre, square metre, cubic metre or cubic metre-kilometer as stated.

The tendered rate shall include full compensation for the breaking-out, removing, loading and carting to an approved spoil/tip site. The Employers Agent may instruct the Contractor to cart the material to a stockpile site with a freehaul distance of 10 km

The extra-over rate (f) shall include the cost of selection of concrete larger than 50 mm (nominal size) without reinforcing and stockpiling within 10 km.

The extra-over rate (g) shall include the cost of selection of concrete kerbs that can be re-used and stockpiling within 10km.

The extra-over rate (h) shall cover items PS23.18 (a), to (g) for hauling of suitable material as directed, in excess of 10km freehaul

SECTION 2400: ASPHALT AND CONCRETE BERMS**2407 MEASUREMENT AND PAYMENT**

Add the following new pay items :

Item	Description	Unit
PS24.01	Asphalt berms	
	(c) Placed where specified by the Employers Agent using mix Sa-H10 (50/70) – Standard drawing no. 38577	
	(i) Type G: Extruded barrier kerb	metre (m)
	(ii) Type H: Extruded mountable kerb	metre (m)

The unit of measurement shall be the metre of asphalt berm placed as specified.

The tendered rates shall include full compensation for procuring, furnishing, mixing and placing the material, and all other work necessary for completing the asphalt berms as specified.

Item	Description	Unit
PS24.05	Removal of asphalt berm to:	
(a) Spoil		metre (m)

The unit of measurement shall be the metre of asphalt haunching/berm removed.

The tendered rate shall include full compensation for the breaking-out, removing, loading and carting to an approved spoil/tip site.

(b)(i) Stockpile		metre (m)
------------------	--	-----------

The unit of measurement shall be the metre of asphalt haunching/berm removed.

The tendered rate shall include full compensation for the breaking-out, removing, loading and carting the material to a stockpile site within a freehaul distance of 10 km

(b)(ii) Extra-over for haulage of suitable material		cubic metre (m). kilometer (km)
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The unit of measurement shall be cubic metre-kilometer of asphalt haunching/berm removed and carted to stockpile.

The extra-over rate (b)(ii) shall cover item PS24.05 (b)(i) for hauling of suitable material as directed, in excess of 10km freehaul

SECTION 3300: MASS EARTHWORKS

3312 MEASUREMENT AND PAYMENT

Revise the following pay items:

Item 33.01

Amend the item description to read :

“Cut and borrow to fill including free-haul up to 10 km:”

Delete the fourth paragraph and replace with: *“The tendered rates shall include full compensation for procuring furnishing and placing the material, including excavating as if in soft excavation, the cutting of benches, for transporting the material for a free-haul distance of 10km; for preparing, processing, shaping, watering, mixing, and compacting the materials to the densities or in the manner specified herein and for removing and disposing of up to 5% oversize material from the road after processing, including transport for a free-haul distance of 10 km.”*

Item 33.07

Amend the item description to read :

“Removal of unsuitable material (including free-haul of 10 km):”

Delete the fourth paragraph and replace with: *“The tendered rates shall include full compensation for the removal of all classes of unsuitable material and shall distinguish only between stable and unstable material and layer thicknesses of less than and exceeding 200 mm. It will also include compensation for free-haul of 10 km.”*

SECTION 3400: PAVEMENT LAYERS OF GRANULAR MATERIAL**3407 MEASUREMENT AND PAYMENT**

Add the following new pay items :

Item	Unit
PS34.01 Pavement layers constructed from granular material taken from commercial sources	
(a) Gravel selected layers compacted to	
(ii) 95% of modified AASHTO density	
(1) Lower selected layer (G9) 150mm thick	cubic metre (m ³)
(2) Upper selected layer (G7) 150mm thick	cubic metre (m ³)
(c) Gravel subbase (unstabilized gravel) compacted to	
(ii) 97% of modified AASHTO density	
(1) G5 150mm thick	cubic metre (m ³)
(2) G4 150mm thick	cubic metre (m ³)
(3) G5 200mm thick	cubic metre (m ³)
(4) G5 300mm thick	cubic metre (m ³)
(5) G4 200mm thick	cubic metre (m ³)
(6) G4 300mm thick	cubic metre (m ³)

The unit of measurement shall be the cubic metre of compacted pavement layer, and the quantity shall be calculated from the authorized dimensions of the completed layer.

The tendered rates shall include full compensation for procuring the material from commercial sources, placing and compacting the material, including the cost of transporting the material to site, and the protection and maintenance of the layer and the conducting of control tests, all as specified.

SECTION 3500 : STABILIZATION**PS3502 MATERIALS****(a) Chemical stabilizing agents**

Delete sub-sub clause 3502(a)(ii); (iii); (iv); and (v) and replace with the following :

The new SABS ENV 197-1 standard specifications for cement will be applicable to this Contract (Refer to Clause PS1229 in the Project Specification).

Delete subclauses (ii) Ordinary Portland cement and (iii) Portland blast-furnace cement and replace with the following:

"Cement shall comply with the relevant requirements of EN 197. The use of strength classes greater than 32,5 shall not be permitted."

PS3503 CHEMICAL STABILIZATION**(h) Curing the stabilized work**

Add the following after the second paragraph:

The curing method for the stabilised subbase shall be as follows:

*Method 3503(h)(i) shall apply for the first 24 hour period, thereafter method 3503(h)(ii) shall apply meaning that the asphalt paving shall be undertaken **before** the 24 hour period has expired. During this curing period the stabilized layer shall have limited access to light vehicles only. All heavy vehicles are to be diverted during this period.*

Alternatively, the Contractor shall be permitted to cure the stabilized layer for seven (7) days but shall be responsible for the diversion of all traffic over this period and all costs for the related traffic accommodation measures.

PS3506 TOLERANCES

Delete item b (ii) in its entirety and replace with the following :

b(ii) the Unconfined Compressive Strengths and the Indirect Tensile Strengths required to be met on a project will be specified in the Project Brief.

PS3510 MEASUREMENT AND PAYMENT**Payment Item 35.02 Chemical stabilising agent**

Add the following note to this payment item:

The notation used for Portland cement and Portland blast-furnace cement corresponds with the notation specified in SABS ENV 197-1.

SECTION 3600 : CRUSHED STONE BASE**PS3602 MATERIALS****(a) Requirements for crushed aggregate**

Amend the second sentence as follows:

“Sampling shall be in accordance with Section 8100. The aggregate shall not contain more than 0,1% by mass of unwanted material such as wood, coal or similar organic material. Aggregate shall not contain more than 2% by mass of free mica especially muscovite, obtained by visually separating the particles, or more than 4% by volume obtained from microscope slices. Only aggregate containing mica, such as granite, gneiss, mica schist, pegmatite or sandstone or mica intrusions need to be evaluated. Soft or weathered particles must be controlled by the Durability Mill Index values specified in table 3602/1 under Durability.”

Add after the last sentence the following:

“Rocks containing easily detectable quantities (more than 1%) of olivine, serpentine and sulphide minerals, such as pyrites and marcasite, must be considered with caution, and may warrant additional evaluation to the satisfaction of the Employer’s Agent.”

(c) Grading Requirements

Add the following new subclause:

“Ethylene glycol durability index

The ethylene glycol durability index shall not exceed the value of 4.”

Table PS3602/1

Durability

Add the following:

“For Basic crystalline rocks, Arenaceous rocks, Argillaceous rocks and Diamicrites the Durability Mill Index (DMI) shall be less than 125. For all other rock types the Durability Mill Index (DMI) shall not be more than 420 subject to the % passing the 0,600mm sieve not increasing by more than 8 percentage points during the Durability Mill test.”

Add the following:

“The grading of the crushed aggregate for the crushed stone G2 base shall conform to the grading limits given in table 3602/1 for nominal 37.5mm size aggregate and the material shall conform to the target grading within the tolerances given in table 3602/4 for nominal 37.5mm size aggregate, and in reference to table PS4302/13.”

PS3604 CONSTRUCTION

Add the following subclause

(j) The construction of the crushed rock subbase

The dump rock layer shall be placed by end tipping to a thickness as instructed by the Employer’s Agent. After spreading it shall be given a 6 pass compaction using a 3 tonne vibratory roller and the rock surface then inspected for any isolated loose rock particles. The layer must then be compacted using a further 2 passes of the vibratory roller after the repositioning, by hand, of any replaced rock particles. The layer must then be blinded with 10 mm evenly graded aggregate placed by an end tipping operation and spread. The blinding material will then be subjected to sufficient passes of a vibratory roller to fill the voids in the rock layer. Additional material shall then be added until the blinding process has been completed.” The alternative of placing synthetic-fibre filter fabric as opposed to the 10mm evenly graded stone will be considered subject to motivation being supplied to the

Employer's Agent Representative for consideration. This synthetic-fibre filter fabric shall be of grade A7 or similar.

PS3607 QUALITY OF MATERIALS AND WORKMANSHIP

Delete the second paragraph and add the following :

Test results and re-measurements shall be assessed in accordance with the provisions of Section 8200 : Quality Control (Scheme 1) of the standard specifications, as amended in these project specifications.

PS3608 MEASUREMENT AND PAYMENT

Add the following to sub pay item PS36.01

<i>Item</i>	<i>Description</i>	<i>Unit</i>
PS36.01	Crushed rock subbase and blinding of layer	
	(g) Crushed dump rock subbase	tonnes (t)
	(f) 10mm evenly graded stone	tonnes (t)

The unit of measurement shall be the tonnes of crushed dump rock subbase delivered to site and tonnes of 10mm evenly graded crushed aggregate required to blind the dump rock and constructed in accordance with the method specification as specified in Section PS3604(j) above. The quantity shall be calculated from the delivery notes of the layer as specified or prescribed by the Employer's Agent.

The tendered rate shall include full compensation for procuring, furnishing and placing all materials, and for hauling the material over an unlimited free-haul distance from a commercial source.

(h)	Synthetic-fibre filter fabric	square metre (m²)
------------	--------------------------------------	-------------------------------------

The unit of measurement for sub item PS36.01(h) shall be the square metre of filter fabric supplied and installed as specified by the Employer's Agent. Type of filter fabric as specified in the schedule of quantities.

The tendered rate shall include full compensation for procuring, furnishing, cutting, overlapping, jointing, placing and protecting the filter fabric as specified as well as wastage.

SECTION 3800: BREAKING UP EXISTING PAVEMENT LAYERS

Amend the following, wherever found in this section, to read:

Freehaul of 1.0km to read Freehaul of 10km

PS3805 CONSTRUCTION

(b) Milling

(iii) Asphalt

Add the following new paragraph:

“The material originating from the milling of the existing asphalt layers shall become the property of the Employer and the transport thereof to a designated stockpile site shall be the responsibility of the Contractor. The cost for stockpiling of the milled material, inclusive of loading and haulage to a freehaul of 10.0km radius, shall be deemed to be included in the tendered rates for the milling of the asphalt layers.”

(vi) General

Add the following:

“Where milling is to be done at existing structures, care shall be exercised to avoid damage to concrete elements, expansion joints, nosing to expansion joints, manholes, catch pits etc. Damage caused to any element forming part of the permanent works shall be repaired at the Contractor’s cost.

The floor of the milled excavation shall be cleaned out of all loose material by brooming. The exposed floor of the excavation shall be lightly sprayed with water to identify cracks. The Employer’s Agent’s Representative shall be given the opportunity to inspect the milled surface for cracks and loose patches and any cracks or loose patches shall be repaired in accordance with the relevant sections of the specification.” Finally the cut should be blown using a blower or compressor such that no dust or loose stone is visible. The Employer’s Agent’s Representative shall be given the opportunity to inspect and approve the cut such that the subsequent operation can follow.

PS3807 MEASUREMENT AND PAYMENT

(b) Overhaul

Delete and replace with the following:

“Overhaul shall be paid on material milled of the existing asphalt layers and hauled in excess of 10km radius from the site of origination. Irrespective of whether the Employer intends to utilise the material for recycling or reworking or whether the material is transported to a stockpile or dump site. The contractor shall include for the freehaul of 10km in the rates tendered.”

Item	Description	Unit
PS38.02	Milling out existing bituminous material with an average milling depth:	
(a)	Not exceeding 30m	cubic meter (m ³)
(b)	Exceeding 30mm but not 60mm	cubic meter (m ³)
(c)	Exceeding 60mm but not 120mm	cubic meter (m ³)
(d)	Exceeding 120mm	cubic meter (m ³)
PS38.16 E.O 38.02	(a), (b), (c) and (d) hauling of material in excess of 10km radius	cubic metre.kilometer

Delete the third paragraph in the description of payment and replace with the following:

“The tendered rate shall also include full compensation for loading and unloading irrespective of method, transporting and stockpiling of the material, to a freehaul distance of 10km radius from site of origination.”

Amend the following pay item

PS38.15 Moving the milling machine from site to site by lowbed as agreed with the Employer's Agent or Employer's Agent's Representative for the following size machines:

- | | | |
|-------|------------------------|-------------|
| (i) | 0,0 m to 1,0 m | Number (No) |
| (ii) | greater 1,0 m to 1,5 m | Number (No) |
| (iii) | greater than 1,5 m | Number (No) |

Amend the first paragraph to read:

The unit of measurement shall be the number of times the machine is moved for more than 10km by lowbed, as approved by the Employer's Agent or Employer's Agent's Representative.

SECTION PS 4200 : ASPHALT BASE AND SURFACING

Replace this section of the specification with the following:

PS 4201 SCOPE

This section covers all work in connection with the construction of asphalt bases and surfacing. It includes the procuring and furnishing of aggregate and bituminous binder, mixing at a mixing plant, spreading and compaction of the mixture, all as specified herein.

PS 4202 REFERENCES AND STANDARD SPECIFICATIONS

Reference to the following standard specifications, guideline documents and codes of practice (Table 1) shall be deemed to be references to the latest issues of the relevant documents:-

Table 1 Reference and Standard Specifications

Reference	Title	Date of Issue
SANS 9001	Quality management systems – Requirements	Edition 5 2015
SANS 4001-BT1	Penetration grade bitumen	Edition 1.3 2016
SANS 4001-BT3	Anionic bitumen road emulsions	Edition 1 2014
SANS 4001-BT4	Cationic bitumen road emulsions	Edition 1 2014
SANS 1083	Aggregates from natural sources	Edition 2.6 2018
SANS 824	Lime for soil stabilization	Edition 2.1 2006
SANS 50197-1	Cement – Part 1:Composition, specification and conformity criteria for common cements	Edition 2 2013
SATS 3208	South African PG Binder Classification System	Edition 1 2019
Act 85 of 1993	Occupational health and safety act	As amended
Act 39 of 2004	National environmental management : Air quality act	As amended
Sabita Manual 5	Guidelines for the manufacture and construction of hot mix asphalt	October 2020
Sabita Manual 24	User guide for the design of asphalt mixes	June 2022
Sabita Manual 27	Guidelines for thin hot mix asphalt wearing courses on residential streets	May 2008
Sabita Manual 32	Best practice guideline for warm mix asphalt	September 2011
Sabita Manual 33	Design procedure for high modulus asphalt (EME)	Revised 4 th edition November 2022

TRH8/ Sabita Manual 35	Design and use of asphalt in road pavements	Revised 6 th edition February 2023
Sabita TG1	The use of modified bituminous binder in road construction	5 th Edition November 2020
TRH 21 / Sabita Manual 36	Use of reclaimed asphalt in the production of asphalt	May 2022
SAPEM	South African Pavement Engineering Manual	Second Edition October 2014

PS 4203 DEFINITIONS AND MIX NOMENCLATURE

PS 4203.01 Definitions

The following definitions and abbreviations are used throughout this section.

Table 2 Definitions

NMPS	Nominal maximum particle size
Sa	Sand skeleton mix
St	Stone skeleton mix
SMA	Stone mastic asphalt
EME	Enrobé à module élevé
UTFC	Ultra thin friction course
WMA	Warm mix asphalt
BRASO	Bitumen rubber semi-open graded asphalt
S	Standard traffic and speed conditions
H	Heavy traffic and speed conditions
V	Very heavy traffic and speed conditions
E	Extreme traffic and speed conditions
R	Permanent deformation (Rutting) foremost consideration in mix
F	Fatigue foremost consideration in mix

PS 4203.02 Mix Nomenclature (or Mix Description)

The following nomenclature shall be used for mixes used for the eThekweni Municipality.

A mix shall be defined from amongst the following mix types :-

- Sa
- St (currently not applicable for eThekweni roads unless as a special mix (e.g. SMA, EME))
- Special Mixes
 - SMA
 - EME
 - UTFC
 - BRASO
 - Proprietary Mixes

The mix type shall be further defined by the following :-

- the typical conditions under which a mix is to be used (type Sa mixes only)
 - S Standard conditions
 - H Heavy conditions
 - V Very heavy conditions
 - E Extreme conditions

The criteria for these conditions is based on the binder grade selection procedure

outlined in Sabita Manual 35 (reproduced below).

Table 3 Traffic Loading Conditions

Design Traffic (10 ⁶ E80's)	Traffic Speed (km/h)		
	< 20	20– 80	> 80
< 0.3	S	S	S
0.3– 3	H	S	S
>3-10	V	H	S
>10– 30	E	V	H
>30– 100	E	E	V
> 100	E	E	E

- the NMPS of the mix
 - o Permitted NMPS sizes are noted in Table 4.
- the critical failure consideration for the mix (optional for Type Sa and EME mixes)
 - o F fatigue
 - o R permanent deformation (rutting)
- The class of the mix (EME mixes only)
 - o Either class 1 or class 2.

The mix types shall thus be labelled as follows :-

- “Mix type”-“Condition” “NMPS” “Failure Mode” (Mix Class)
 - o Examples
 - Sa-H14F
This is a Sand Skeleton mix for use under Heavy traffic loading and speed conditions with Nominal Maximum Particle Size of 14.0mm that should lend itself to maximizing fatigue resistance.
 - EME-14R(2)
This is an EME class 2 mix with Nominal Maximum Particle Size of 14.0mm designed for resistance to permanent deformation (rutting).
 - SMA-14
This is an SMA mix with Nominal Maximum Particle Size of 14.0mm.

Note that the mixes SMA, EME, UTFC and BRASO (etc.) will actually fall into either the type Sa or St mixes. However, these mixes (like the proprietary mixes) are special mixes with very specific characteristics and associated design approaches and are thus specifically and separately named.

PS 4204 **MIX DESIGN**

Mix designs are to be conducted in accordance with the documents noted in Table 4. Further reference should be made to Sabita Manual 24 “User Guide for the Design of Asphalt Mixes” as may be required.

Cost of designs:

There shall be no separate provision under Measurement and Payment for the costs associated with the asphalt mix designs. Such costs are to be included in the tenderers construction rates for supplying and laying that particular asphalt mix. Such costs shall include producing, for each mix, and or, binder type specified, laboratory mix design followed by plant mix verification and trials confirming conformance to the particular design method and product properties specified. Any changes to individual components, or properties of a mix, even after initial acceptance has been given, shall require that a new mix design process be undertaken, with any extension of time and cost implications for re-design and trial section at the cost of the Contractor.

Table 4 Asphalt Mix Design Documents

Sand Skeleton Mixes	TRH 8/Sabita Manual 35	Design and use of asphalt in road pavements
Stone Mastic Asphalt (SMA)	TRH 8/Sabita Manual 35	Design and use of asphalt in road pavements (Appendix B)
Enrobé à Module Élevé (EME)	Sabita Manual 33	Design procedure for high modulus asphalt (EME)

Asphalt mixes shall be selected from the list of permitted mixes noted in Table 5. Mix requirements will be detailed in the project specification in terms of :-

- Mix description (as outlined in clause 4.2 Mix Nomenclature)
- The required level of design.

Table 5 eThekweni Asphalt Mixes

Mix Nomenclature	NMPS (mm)			
	7	10	14	20 ¹
Sa-S	X	X	X	
Sa-H		X	X	X
Sa-V			X	X
Sa-E			X	X
SMA		X	X	
EME			X	X
Proprietary and Other Mixes	To hold Agrément South Africa certification or subject to approval by Roads Provision. NMAS as per Manufacturer's specification.			

1. Use of 20mm NMPS mixes is not recommended.

Special asphalt mixes (e.g. UTFC, proprietary mixes, etc.) shall hold Agrément South Africa fit-for-purpose certification. Alternatively, the use of a particular mix shall be subject to the approval of the Roads Provision Department.

PS 4204.1 Materials

Materials shall conform to the requirements and recommendations outlined in Sabita Manual 35.

PS 4204.1.1 Binders and Aggregates

The specifications pertinent to specific raw materials should conform to accepted industry standards and shall be documented in the Asphalt Mix Design Report. These specifications shall be used for quality management purposes. Any deviations from standard industry practice as outlined in Sabita Manual 35 shall be documented in the Asphalt Mix Design Report and shall specifically be brought to the attention of the Roads Provision Department.

PS 4204.1.1.1 Nominal Mix Proportions of Stone and Sand Skeletal Mixes for Tender Purposes

The mix proportions of bituminous binder, combined aggregates and filler for the various mix types, as listed in Tables 5a and Table 5b below, are nominal, and shall only be used for tendering purposes. The proportions actually used shall be as determined during the mix design, trial section and assessment requirements as specified in the project specifications, Section PS4200. Any approved variation to these nominal mix proportions, and or, application rates shall be subject to an adjustment in payment, as relevant to the applicable variation rates tendered for each component as listed under Measurement and Payment below.

Table 5a: Nominal Mix Proportions of Stone Skeletal Mixes for Tender Purposes

MIX TYPE	High Modulus Base (EME)		Continuous graded base and surfacing: standard or homogenous modified bitumen			Stone Mastic Asphalt (SMA)		Continuous graded and semi-open graded surfacing: Bitumen-rubber:	
	20	14	20	14	10	14	10	20,0	14,0
Nominal maximum particle size	20	14	20	14	10	14	10	20,0	14,0
Aggregate (%)	93,0	92,0	94,0	93,5	93,0	92,5	92,0	92,0	91,5
Bitumen (%)	6,0	7,0	5,0	5,5	6,0	6,5	7,0	7,5	8,0
Active filler*1	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Cellulose fibre (%)	N/A	N/A	N/A	N/A	N/A	0,5	0,5	N/A	N/A

*Note 1: Active filler for tender purposes shall be hydrated lime

Table 5b: Nominal Mix Proportions of Sand Skeletal Mixes for Tender Purposes

MIX TYPE	Continuous graded base and surfacing: standard and homogenous modified bitumen			Gap and semi-gap mixes using standard and homogenous modified bitumen	
	20	14	10	14	10
Nominal maximum particle size	20	14	10	14	10
Aggregate (%)	94,0	93,5	93,0	92,5	92,0
Bitumen (%)	5,0	5,5	6,0	6,5	7,0
Active filler*1	1,0	1,0	1,0	1,0	1,0

*Note 1: Active filler for tender purposes shall be hydrated lime

PS 4204.1.2 Reclaimed Asphalt

The use of reclaimed asphalt (RA) is permitted subject to the limitations noted under the specific mix types. The inclusion of RA in a mix design shall be documented in the Asphalt Mix Design Report.

The incorporation of reclaimed asphalt into the mix should be guided by Sabita Manual 36 / TRH 21 "Use of reclaimed asphalt in the production of asphalt".

PS 4204.1.3 Warm Mix Asphalt Technologies/Additives

The use of Warm Mix Asphalt (WMA) is permitted (and preferred) and shall be documented in the Asphalt Mix Design Report. The use of Warm Mix Asphalt should be guided by Sabita Manual 32 "Best practice guideline for warm mix asphalt".

PS 4204.2 Mix Design

No mixes may be supplied without submission of an Asphalt Mix Design Report and acceptance thereof by the Roads Provision Department.

The mix design process shall consist of a laboratory design, a plant trial and (if required) a paved trial for every mix supplied.

PS 4204.2.1 Specific Mix Design Requirements**PS 4204.2.1.1 Sand Skeleton Mixes**

The reclaimed asphalt (RA) content of sand skeleton mixes shall be limited to 50% maximum.

The following additional requirements and guidelines should be taken into consideration for any particular level of mix design :-

PS 4204.2.1.1.1 Level IA Design

The design should also take into consideration the recommendations of Sabita Manual 27 “Guidelines for thin hot mix asphalt wearing courses on residential streets”.

Further to Sabita Manual 35 Table 23 (VMA), the VMA for the 7.1mm NMPS mix shall be 16% (target design voids 4%).

Mixes shall comply with the requirements noted in Tables 22, 23 and 24 of Sabita Manual 35. Mixes shall further comply with the requirements noted Table 6 (below).

Table 6 Empirical Performance Tests (Level 1A)

Test	Requirement	Test Method / Reference
Filler/Binder Ratio	1.3 max.	Sabita Manual 35 cl. 4.3.4 Note 4.3
Binder Film Thickness (µm)	7.5 min.	Sabita Manual 35 cl. 5.5.1(4)(a)
Modified Lottman (TSR)	0.8 min.	ASTM D 4867 M
Air Permeability (@ 7% Voids) (x 10 ⁻⁸ cm ²)	1.0 max.	TRH 8 App C
Marshall Stability, Flow and Quotient	Report	SANS 3001-AS2

PS 4204.2.1.1.2 Level IB Design

A maximum of 10% natural sand (by mass of mix aggregates) may be used in sand skeleton mix types designed to Level IB.

Although Sabita Manual 35 requires the use of a gyratory compactor for laboratory mix evaluation, the use of Marshall compaction will however be permitted. Gyratory compaction is nevertheless the preferred method of compaction. Briquettes for mix evaluation shall be compacted at the compaction effort noted in Table 7.

Table 7 Volumetric Compaction Requirements

Gyratory	Marshall
AASHTO T 312	SANS 3001 AS1
N _{design}	No. Blows
75	75+75

The empirical performance requirements for Level IB mixes shall be as indicated in Sabita Manual 35 save that the mix durability requirements noted in Table 28 of Sabita Manual 35 shall be altered to reflect a minimum Modified Lottman value of 0.8 for both Base and Wearing Course mixes.

PS 4204.2.1.1.3 Level II Design

Although Sabita Manual 35 recommends the use of a Level III design for traffic loading in excess of 30 million E80's, within an urban environment there are a number of roads falling within this traffic loading scenario but for which a Level III design is not warranted. The Level II design approach is thus acceptable for roads with this higher traffic loading. However, the laboratory compaction will be as noted in Table 8.

Table 8 Level II Laboratory Compaction Requirements

Design Traffic (E80's)	N _{design}
3 to 30 million	100
> 30 million	125

Therefore, in order to identify the requisite compaction parameters for a particular E80 design traffic loading, the Level II design will be labelled in the project specification as follows :-

- Level II(A)
Level II(A) will cater for an E80 design traffic loading of less than or equal to 30 million E80's.
- Level II(B)
Level II(B) will cater for an E80 design traffic loading of greater than 30 million E80's.

The mix durability requirements noted in Table 28 of Sabita Manual 35 shall be altered to reflect a minimum Modified Lottman value of 0.8 for both Base and Wearing Course mixes.

PS 4204.2.1.1.4 Level III Design

Level III designs (if required) will only be conducted on roads with a design traffic loading of greater than 30 million E80's in line with the recommendations of Sabita Manual 35.

The mix durability requirements noted in Table 28 of Sabita Manual 35 shall be altered to reflect a minimum Modified Lottman value of 0.8 for both Base and Wearing Course mixes.

PS 4204.2.1.2 Stone Mastic Asphalt Mixes

Stone Mastic Asphalt (SMA) mix designs are to be conducted in accordance with the guidelines set out in Sabita Manual 35 "Design and use of asphalt in road pavements – Appendix B".

SMA mixes are permitted for two NMPS:-

- 10mm
- 14mm

The mix design should ensure that the fine aggregate mortar should not induce dilation of the coarse aggregate stone skeleton after compaction on site thereby ensuring coarse aggregate interlock. Coarse aggregate for both NMPS shall be defined as all material retained on the 5mm sieve.

The use of "natural" sand and reclaimed asphalt (RA) shall not be permitted in SMA mixes.

The stability of the fine aggregate mortar will require enhancement with either cellulose fibre or through modification of the binder or both.

The SMA mix shall also conform to the requirements in Table 9.

Table 9 SMA Mix Specifications

Design Air Void Content (%)	4.0
Voids in Mineral Aggregate (VMA) (Min.)	17
Modified Lottman (TSR) (Min.)	0.7
Schellenberg Drainage Test (%) (Max.)	0.3
Air Permeability (@ 7% Voids) ($\times 10^{-8}\text{cm}^2$) (Max.)	1.0
VCAmix ¹ (%)	< VCA _{dr} ²

Note 1. VCAmix is the voids in coarse aggregate (>5mm) of the mix. compacted

Note 2. VCA_{dr} is the voids in coarse aggregate (>5mm) of the coarse aggregate. dry rodded

SMA mixes shall also conform to the permanent deformation requirements noted in Table 33 of Sabita Manual 35.

The mix design document should clearly document the process followed to meet the desired SMA characteristics.

PS 4204.2.1.3 Enrobé à Module Élevé (EME) Asphalt Mixes

EME mix design are to be conducted in accordance with the guidelines set out in Sabita Manual 33 “Interim design procedure for high modulus asphalt”.

EME mixes are permitted for two NMPS:-

- 14mm
- 20mm

The use of “natural” sand shall not be permitted in EME mixes.

The reclaimed asphalt (RA) content of EME mixes shall be limited to 20%.

The mix design document should clearly document the process followed to meet the desired EME characteristics.

PS 4204.2.1.4 Warm Mix Asphalt

Should a Warm Mix Asphalt be used in the mix, the mix design shall incorporate the use of such a technology/additive in the mix design process. Any consequential deviations from the guidelines set out in Sabita Manual 35 “Design and use of asphalt in road pavements – Appendix B”, Sabita Manual 33 “Design procedure for high modulus asphalt (EME)” or standard industry practice shall be brought to the attention of the Roads Provision Department and shall be documented in the mix design report.

The use of Warm Mix Asphalt should be guided by Sabita Manual 32 “Best practice guideline for warm mix asphalt”.

PS 4204.2.2 Asphalt Mix Design Report

Once satisfied that the laboratory design, the plant and (if required) paved trials meet the specified mix requirements, the Manufacturer shall submit an Asphalt Mix Design Report

recording the essential information relating to the design. This shall be recorded on the relevant COTO “D3” form **and shall be supplemented with a report documenting any further information required in terms of this Technical Note.**

The final mix parameters (i.e. the Job Mix Formula (JMF)) will be based on the test results for the plant trial and will be used for production quality control and acceptance purposes.

The Manufacturer shall include the following “mix characteristics” as a part of his Mix Design Report submission :-

- A unique identification number for every mix design
- The use of any Warm Mix Asphalt technology/additive. The Manufacturer shall document the name and type of technology/additive to be used together with any other technical information pertinent to its use in the asphalt mix. The Manufacturer shall further comment on any modifications to the “standard” mix design process consequential to the use of the Warm Mix Asphalt technology/additive.
- The recommended maximum mix temperature in the truck at the exit from the plant (in line with industry norms)
- The recommended minimum mix temperature in the truck on delivery (in line with industry norms)
- The minimum recommended mix temperature for compaction of the mix on site (in line with industry norms)
- Comment on any asphalt mix characteristics that should be brought to the attention of the asphalt paving/laying team on site (e.g. EME asphalt mix longitudinal joint construction)

Should substantial changes to material types and properties occur, the asphalt mix designs for affected mixes shall be reviewed and where necessary re-constituted and re-submitted for approval.

PS 4204.2.2.1 Mix Design Acceptance Process

It is not necessary for a new mix design to be compiled for every project. The Manufacturer may supply proof that an existing mix design is still current and has already been accepted by the Roads Provision Department. In the case of the submission of a new mix design, the Manufacturer shall submit his proposed mix design to the Roads Provision Department for acceptance of the mix design at least 2 weeks prior to initial supply of any particular mix.

Upon request by the Roads Provision Department, the Manufacturer shall supply samples of raw materials and any other relevant information as may be requested to facilitate acceptance of the mix design.

Once satisfied with the content of the mix design, the Senior Manager : Pavement & Geotechnical Engineering (or his nominee) will give signed acceptance for the mix.

PS 4204.2.3 Mix Design Review

Every mix design is to be reviewed at least annually. The review should include verification of the asphalt mix through testing of basic raw material properties and mix characteristics.

Should the binder, aggregate or mix characteristics of any particular mix differ significantly from the characteristics obtained in the initial mix design, then the mix shall be re-designed to meet the relevant volumetric and performance characteristics. In the event of a dispute over the significance of a particular characteristic, the Manufacturer shall undertake the appropriate performance test to prove compliance with the specification.

PS 4204.3 Asphalt Production

PS 4204.3.1 Mixing Plant

Asphalt shall be manufactured through a plant capable of meeting the full design requirements of any particular mix. The plant shall be operated and kept in a well maintained condition as directed by the Quality Management System. Records of such maintenance shall be made

available on request. The plant shall be approved by the Roads Provision Department.

Sufficient reserves of raw materials shall be held at the plant for all mixes being supplied to the eThekweni Municipality to prevent delays in construction projects. It will be incumbent on the plant manager to ascertain demand and time frames from Contractors or Municipal Departments to whom they are supplying mix.

All cold aggregates shall be stockpiled and protected in a manner that precludes the possibility of aggregate contamination from adjacent stockpiles, from the underlying ground or from weather conditions.

Binder storage tanks shall be provided and managed to ensure that there is no risk of contamination of different binder types. Binder storage tanks shall be heated and the binder circulated in such a manner that the binder is not degraded during heating. The heating and circulation of binders should conform to the recommendations of the binder supplier.

The plant and its operation shall conform to the requirements of the following legislation:-

- Occupational Health and Safety Act
- National Environmental Management : Air Quality Act

PS 4204.3.2 Quality Control

The Manufacturer shall have an active Quality Management System in place compliant with the quality processes outlined in Sabita Manual 35. The quality of mix produced shall be monitored as directed in the Manufacturer's Quality Management System. The asphalt mix constituents (i.e. binder and aggregates), and the asphalt mix produced shall be checked for compliance and consistency on a regular basis through routine process control testing. The results of such testing shall be made available for review by the Roads Provision Department at all times.

PS 4204.3.2.1 Quality Management System

The Quality Management System (QMS) should include documentation outlining the asphalt mix design process, the annual mix review process and processes pertaining to delivery of the asphalt mix.

The QMS shall also include any agreed frequency of split sampling of either raw mix constituents or asphalt mixes (prepared as agreed) with the Roads Provision Department. Such samples are to be delivered to the Roads Provision's Bitumen and Asphalt Laboratory located at the Roads Provision Asphalt Plant in uMhlathuzana Road. All samples shall be adequately and uniquely labelled so that the location of any related mix is readily traceable.

The QMS shall also document the processes to be followed whenever a deviation from specifications is identified. The Manufacturer shall provide full rectification of any work undertaken with such asphalt mix or materials.

The plant laboratory should preferably be SANAS accredited for the tests undertaken. However, should the laboratory not be SANAS accredited, the laboratory will need to be approved by the Roads Provision Department.

In line with these processes, the QMS should include as a minimum the material characterisation tests included in Table 10 for every type of mix supplied.

Table 10 Test Frequencies

Quality Control Tests		Minimum Test Frequency			
Binder	Penetration	Every batch delivered			
	Softening Point	Every batch delivered			
	SA PG Binder Classification	1 per 6 months			
Aggregate	Aggregate Coarse	Aggregate Grading	Every batch delivered		
		Flakiness Index (Max.)	1 per month		
		Aggregates BRD, ARD and Water Absorption	1 per month		
		ACV, 10%FACT	1 per month		
		Polished Stone Value (Coarse Aggregates)	1 every year per stone type and source		
		Aggregate Grading	Every batch delivered		
	Aggregate Fine	Aggregates BRD, ARD and Water Absorption	1 per month		
		Sand Equivalent (Fine Aggregates)	Every batch delivered		
		Methylene Blue Adsorption Value	1 per month		
		Asphalt Mix	Temperature Of Mix	In the truck at the exit weighbridge	Every load
				In the truck at the point of delivery	Every load

PS 4204.3.2.1.1 Test Methods

The test methods used in the design of asphalt mixes and quality management in the production of asphalt should be in line with those noted in Sabita Manual 35. However, the determination of the bulk density of asphalt mix in terms of SANS 3001-AS10 shall be modified as follows.

PS 4204.3.2.1.1.1 Asphalt Briquette/Core Bulk Density Test Method

The bulk density of compacted asphalt mixtures shall be determined in accordance with SANS 3001-AS10:2011 Edition 1 save that the measurement of the volume of the specimen as stated in clause 6.2 shall not apply.

For general measurement of volume for non-absorptive mixes (generally VIM < 6%), the method outlined in clause 6.4 of SANS 3001-AS10 shall be used.

However, for mixes suspected of being absorptive/porous, or in the event of a dispute over mix density, briquette or core density shall be determined by either the paraffin wax coating method (ASTM D 1188) or the automatic vacuum sealing method (ASTM D 6752).

The density of porous mixtures (generally VIM >15%) shall be measured in accordance with SANS 3001-AS10 with the measurement of volume as specified in clause 6.6.

PS 4204.3.2.2 Process Control

The temperature of the mix taken in the truck at the exit to the plant shall not exceed the value stated in the mix design. Furthermore, the temperature of the mix taken in the truck on delivery shall not be less than the value stated in the mix design.

Quality checks on mix production will be based on the Job Mix Formula (JMF) for the approved mix design. Tolerances on variation from the JMF are given in Table 11.

**Table 11 Job Mix Formula
Tolerances**

		Permissible Deviation from JMF (%)		
		Individual Results	Average of 3 Consecutive Results	
Aggregate Fraction-Grading	Sieve Size (mm)	28	± 5.0	± 3.0
		20	± 5.0	± 3.0
		14	± 5.0	± 3.0
		10	± 5.0	± 3.0
		7.1	± 5.0	± 3.0
		5	± 4.0	± 2.5
		2	± 4.0	± 2.5
		1	± 4.0	± 2.5
		0.6	± 4.0	± 2.5
		0.3	± 3.0	± 2.0
		0.15	± 2.0	± 1.5
0.075	± 1.0	± 1.0		
Voids in the Mix (@ design compaction)		± 1.5	± 1.0	
Binder Content	General Mixes (Sa, SMA, EME, etc.)	± 0.3	± 0.2	
	Gap Graded & Bitumen Rubber	± 0.4	± 0.3	

All process control testing undertaken by the Manufacturer shall be signed off by the responsible person identified in the QMS and shall be made available to the Roads Provision Department.

- All process control test results shall be referenced back to the unique Mix Design reference number.
- Mix extraction gradings shall be made available within 48 hours of the asphalt being manufactured.
- Binder content and void content shall be made available by 08:00am on the day following manufacture of the asphalt.

The Manufacturer shall be responsible for rectification of any work completed (or partially completed) with asphalt mix that does not meet the specification to the satisfaction of the Roads Provision Department. The processes related to the rectification of such work shall be outlined in the QMS.

PS 4204.3.2.3 Acceptance Testing

After reviewing the results of the process control testing, the Roads Provision Department may elect to conduct their own testing of the binder, aggregates or asphalt mix produced. A copy of test results will be submitted to the Manufacturer as soon as they are available.

If the acceptance tests indicate that the mix (or any part thereof) is not to specification, the cost of any re-test by the Municipality shall be borne by the Manufacturer.

PS 4204.3.2.4 On Site Mix Problems

The Manufacturer shall also make himself available on site should the workability and compaction of the mix during the paving/laying operation be problematic in order to assist in trouble-shooting the cause of such problems. If the root cause of the problem is related to the asphalt mix design, the Manufacturer shall re-evaluate his mix design to correct such issues and re-submit his mix design for acceptance.

PS 4205 CONSTRUCTION**PS 4205.01 Paver Trial**

The Employer's Agent may authorize the Contractor to supply and place in an approved portion of the roadway one or more of the mixes. In such a case approximately 25 tons of the mix shall be laid and shall be paid for at the rates in the Schedule of Quantities. After the Employer's Agent has approved a mix design, the type of mix, shape of grading curve and source of the aggregate used in that mix shall not be changed without the prior approval of the Employer's Agent.

PS 4205.02 Tack Coat

Upon approval of the surface of the underlying layer, and immediately before laying asphalt, a tack coat shall be applied by approved means at the rate of 0,3 l/m² if required by the Employer's Agent.

The Contractor shall take whatever measures are necessary to protect concrete kerbs and channels and other street furniture from overspray. Failure to comply will result in the contractor remedying the situation at his cost.

The unit of measurement shall be the square metres (m²) of tack (60% anionic stable grade emulsion) applied at the specified application rate.

The tendered rate shall include for the procuring, furnishing and application of the material as specified, including all labour, plant, equipment and all other incidentals required to carry out the operation successfully.

PS 4205.03 Delivery

The asphalt shall be transported to the site in vehicles having bins consisting of metal sides and bottoms. The insides of the bins shall be free of all foreign matter and be lightly oiled to prevent adhesion of asphalt. The opinion of the Employer's Agent or Employer's Agent's Representative regarding the amount of oiling necessary shall be final. The bins shall be covered with tarpaulins or other suitable material when loaded to protect the asphalt from inclement weather and to prevent loss of heat during transportation. The temperature of asphalt on arrival on site shall conform to relevant specification for the mix and in harmony with the Industry Standard Guidelines.

PS 4205.04 Placing

The laid widths of wearing course shall be so arranged that longitudinal joints shall coincide with future lines marking traffic lanes in the roadway. Paving shall cease when rain starts falling or when the surfaces to be paved are visibly wet

PS 4205.04(a) Paver Laid Asphalt

Asphalt mixture shall be delivered to the paver in such a manner that the paver will never be forced to stop for lack of asphalt. The mixer capacity and the operating speed of the paver are to be so co-ordinated as to ensure continuous laying and to avoid intermittent stopping of the paver.

The temperature of the mixtures shall be controlled by measuring in a random pattern in the truck immediately before emptying, and shall not be more than 10°C below the minimum temperature specified for mixing as per the mix design. The adjustment of the screed, tamping bars, feed screws, hopper feed, etc, shall be checked frequently to ensure uniform spreading of the mix. If segregation or tearing occurs, the spreading operations shall immediately be suspended until the cause is determined and corrected.

No one shall not be permitted to walk on uncompacted asphalt.

Paving shall, if possible, commence at the bottom of the grades and the lower edges of super elevated curves. Paving shall be done upgrade on grades steeper than 5%.

Spreading shall be so arranged that longitudinal joints do not coincide with joints in lower layers of asphalt base, paver laid crushed stone bases or surfacing.

Unless otherwise specified in the project specifications the paver shall be equipped to provide automatic control of levels and cross section. In the case of asphalt base construction, automatic control shall be run off guide wires, stabilizing beams and in the case of surfacing and overlays skid stabilizing beams or guide wires shall be used.

Asphalt shall be placed in restricted areas with the aid of smaller specially equipped pavers, hand tools, or other approved equipment. The space concerned shall be properly filled with asphalt, without leaving any gaps between the fresh asphalt and the existing pavement layers

PS 4205.04(b) Hand laid Asphalt

The Employer's Agent or Employer's Agent's Representative may approve the paving of asphalt by hand in where paving equipment is confined, restricted or inaccessible. In such cases the paving shall be carried out in a manner will minimize mix segregation and allow acceptable level of layer elevation control.

PS 4206 Joints and Compaction

The preparation of joints and the compaction of asphalt shall be done in accordance with methods described in the Sabita Manual 5 (March 2008, 3rd Edition relating to joints and compaction. Rolling shall commence immediately and be undertaken within the rolling temperature window for each particular mix.

Where the new surfacing is required to tie into the existing road surface the joint shall depend on the class of road.

Generally joints shall consist of one of the following types which shall be billed separately in the Schedule of Quantities:

- (a) Transverse Joint: The joint is to be formed by milling out an area 3 m wide over the full width of the existing roadway, the area to be tapered from 0 to -40 mm in depth.
- (b) Longitudinal Joint: The joint is to be formed by cutting into the existing road surface by 150 mm wide to a depth of 40 mm where the new surfacing is to be tied longitudinally into the adjacent existing pavement.
- (c) Feathered Transverse Joint: The joint shall be formed by saw cutting a 500 mm wide by 30 mm deep key into the existing surface. The new wearing course shall be tapered over to tie in at the key a distance of not less than 1,0 m.

The position of the joint shall be indicated by the Employer's Agent or Employer's Agent's Representative on site.

After cutting the joint shall be swept of all loose material and painted with a tack coat.

On completion of preparing the joint, the adjacent surface shall be inspected to ascertain that there has been no damage caused to the adjacent layer. Any identified damage shall be appropriately repaired prior to commencement of paving any adjacent asphalt layer.

Whenever the paving operation ceases due to lack of supply of mix, and the temperature of the mat has reduced to below the appropriate compaction temperature, the Contractor shall form a proper transverse construction joint as specified.

Unless otherwise provided for, joints in the final layer of the surfacing shall correspond with the intended lane markings. Joints in lower layers shall be offset by not less than 150 mm from either side of the edges of any underlying substrate joint

Cutting of the joints shall only take place immediately prior to the laying of the wearing course.

The unit of measurement shall be the metre (m) of joint cut, for each type of joint as specified above, and as instructed by the Employers Agent Representative.

The tendered rate shall include compensation for all labour, plant, and equipment to undertake the cutting/milling of the joints, loading and transport of material to spoil, and all other incidentals required to carry out the operation successfully. The Employers Agent may instruct the Contractor to cart the material to a designated stockpile site with a freehaul of 10km

PS 4207 Minimum Lengths to be placed

Where possible a minimum length of 100 m of base course or 200 m of wearing course shall be placed at any one time. The delivery shall be at a uniform rate and shall be within the capacity of the paver and compaction equipment to ensure that the paver works continuously.

PS 4208 TOLERANCES

PS 4208.01 Bituminous Base Course

The base course layer shall be tested to comply with the following requirements:

(a) Thickness

The minimum thickness for the continuously graded base coarse layer shall be three (3) times nominal maximum aggregate size.

The average thickness of completed base course layer in any section, as determined from a minimum of five test holes, shall not be less than the thickness specified. The allowable tolerance at any one test hole shall be $\pm 10\%$ of the specified thickness.

(b) Smoothness

The maximum number of surface irregularities permitted with a 3 m rolling straight edge shall be as follows:

In any 300 m	In any 75 m
4 mm and above - 40	4 mm and above - 18
7 mm and above - 4	7 mm and above - 2
19 mm and above - None	10 mm and above - None

(c) Accuracy of Levels

In any section the average of the elevations taken shall be such that the average thickness of the succeeding layer or layers above the formation shall not be less than specified/nor greater than the specified plus 20mm.

The standard deviation of the differences between actual and design levels shall not be greater than 6mm.

PS 4208.02 Wearing Course

The wearing course shall be tested to comply with the following requirements:

(a) Thickness

The minimum thickness for the continuously graded wearing coarse layer shall be three (3) times nominal maximum aggregate size.

A tolerance of 5 mm will be allowed above or below the design levels for any single reading.

(b) Smoothness

The maximum number of surface irregularities permitted with a 3 m rolling straight edge will be as follows:-

CATEGORY 'A' ROADSIn any 300 m

4 mm and above - 10
7 mm and above - 1
10 mm and above - Nil

In any 75 m

4 mm and above - 4
7 mm and above - 1
10 mm and above – Nil

CATEGORY 'B' ROADSIn any 300 m

4 mm and above - 20
7 mm and above - 2
10 mm and above - Nil

In any 75 m

4 mm and above - 9
7 mm and above - 1
10 mm and above – Nil

CATEGORY 'C' ROADSIn any 300 m

4 mm and above - 40
7 mm and above - 4
10 mm and above - Nil

In any 75 m

4 mm and above - 18
7 mm and above - 2
10 mm and above – Nil

The category classification of road is as per eThekweni Municipality's Pavement Management System classification. The information regarding each road classification can be obtained from the Pavement & Geotechnical Engineering branch of the Roads Provision Department.

(c) Riding Quality

The finished surface riding quality shall be in accordance with criteria as stipulated under section PS4216.02.04 Roughness, Table D6.

(d) Texture depths

A minimum in-situ texture depth of 1.0mm is required on the finished wearing course of Category A and Category B roads.

PS 4208.03 Rectification

The full depth of the layer shall be removed and replaced with fresh material laid and compacted to specification.

Where surface level or irregularities fail to conform to the specification, the area rectified shall be paver laid not less than one lane wide and at least 5 m long for base course and 15 m long for wearing course. The rae rectifiead shall conform in all regards with the full requirement of the specification.

Where the number of surface irregularities exceeds the specified limits the area to be rectified shall be 300 m long and not less than one lane wide.

PS 4209 MEASUREMENT AND PAYMENT**PS 4209.01 Asphalt mixes from commercial sources**

Measurement shall be tons (t) as recorded on printed weigh-bridge tickets.

The rates tendered for asphalt shall cover all materials, storage, handling, mixing, transporting, sweeping the previous surface where necessary, spreading, jointing, compacting, protection to adjacent concrete kerbing and street furniture, paving and testing other than those carried out by the Employer's Agent in accordance with the specification. Both longitudinal and transverse joints shall be included in the construction rates, unless requested or approved by the Employer's Agent or Employer's Agent's Representative.

PS 4209.01 (e) Variations

Item	Description	Unit
(i)	Bitumen	ton (t)
(ii)	Aggregate	ton (t)
(iii)	Active filler	ton (t)

The unit of measurement in respect of increases or decreases of any component of the approved mix from that specified in the nominal proportions specified for the relevant mix type, shall be the ton. No payment shall be made for inert filler added by the Contractor.

PS 4209.02 Asphalt mixes from Ethekwini Municipality Asphalt Plant (Collect and Deliver):

The unit of measurement shall be tons (t) as recorded on printed weigh-bridge tickets.

The rates tendered for asphalt shall cover transporting, sweeping the previous surface where necessary, spreading jointing, compacting, protection to adjacent concrete kerbing and street furniture, paving and testing other than those carried out by the Employer's Agent in accordance with the specification.

PS 4209.03 TESTING

Notwithstanding the provisions of Table 19 of this specification, Control Testing as specified in Table 10 on all asphalt supplied by the Contractor, shall be carried out by the Contractor. Should the asphalt be supplied from the EM Asphalt Plant, the Contractor will only be expected to carry out checking and keeping records of the temperature of the mix and of the densities of the laid asphalt. In addition to the tests specified in Table 10 the void content of the mix shall also be determined for every 200t of output or part thereof per day. The record of temperatures of the asphalt must include temperature as it arrives on site and temperatures as it is being paved (ie. In the paver's bin).

The Contractor will also be required to analyse all results before submitting to the Employer's Agent or Employer's Agent's Representative to ensure that the work undertaken is to the required specification, as it is the Contractor's responsibility to ensure that work is done to specification.

PS 4209.03(a) CORING FOR DENSITY TESTING

The Employer's Agent may instruct that cores are taken to test the density of the asphalt paved. Cores shall then be taken, using the Stratified Random Method (as per TMH5/TRH5) to locate the position of the tests, and tested with 48 hours of instruction.

The unit of measurement shall be number (No.), of the following specified core depths:

- (i) 0 – 50mm
- (ii) 0-100mm

and shall be per core taken, the rate shall include for getting a coring machine onto and off site, coring, filling in core holes with asphalt, marking of cores, testing and provision of test results.

Extra over Item (i) or (ii) will be paid for every 10mm of asphalt depth cored. The unit of measurement will be millimetre (mm).

PS 4209.03(b) NUCLEAR TESTING

The Employer's Agent may instruct that Nuclear Testing take place to test the density of the asphalt paved. Testing shall then be taken, using the Stratified Random Method (as per TMH5/TRH5) to locate the position of the tests, and tested within 48 hours of instruction.

The unit of measurement shall be number (No), and shall be per test taken, the rate including for procuring a private Materials Laboratory's testing station onto and off the site, testing and provision of test result.

The asphalt final density is required as per Colto, with the following amendments:

* $L_s=93\%$ of Maximum Theoretical Density (Table 8206/3, Note 1(a))

The Contractor shall utilize the calibrated nuclear gauge for process control during compaction operations. Notwithstanding this requirement, the acceptance testing carried out for compaction by the Employer's Agent, shall still be based on cores taken from the compacted layer or nuclear gauge testing by the Ethekwini Municipality Laboratory or private laboratory (to be approved by the Employer's Agent or Employer's Agent's Representative)

PS 4209.04 PATCHING OF EXISTING SURFACE

Prior to resurfacing existing roads, those areas of the existing asphalt pavement which require patching will be marked by the Employer's Agent.

PS 4209.04(a) Patching (Surface : Asphalt wearing course)**(i) Deep Patching (0-160mm) – Category A & B Roads**

In the areas to be deep patched the in-situ asphalt laid sides shall be cut vertically to a depth of 160mm, shall be swept of all loose material, a 60% anionic stable emulsion grade track coat applied at an application rate of 0,3 l/m² to the bottom and the sides and then patched with asphalt wearing course in two layers of 55mm, and one of 50mm thick. After compaction the surface of the patch shall be flushed with the adjacent road surface.

(ii) Deep Patching (0-100mm) – Category C Roads

In the areas to be deep patched the in-situ asphalt laid sides shall be cut vertically to a depth of 100mm, shall be swept of all loose material, a 60% anionic stable emulsion grade track coat applied at an application rate of 0,3 l/m² to the bottom and the sides and then patched with asphalt wearing course in two layers of 50 mm thick each. After compaction the surface of the patch shall be flushed with the adjacent road surface.

(iii) Shallow patching (0-50mm)

In areas to be shallow patched, the in-situ asphalt surface layer shall be removed to a depth of 50mm. The sides shall be cut vertically with the edges square. The exposed surface shall be swept of all loose material, a 60% anionic stable emulsion grade track coat applied at an application rate of 0,3 l/m² to the bottom and the sides and then patched with asphalt wearing course. After compaction the surface of the patch shall be flush with the adjacent road surface.

PS 4209.04(b) Patching (Structural G2/BSM – Various road categories)**(i) Category B**

The existing wearing course (160mm) and crusher run(150mm) layer to be cut vertically and removed to spoil, a fresh layer of crusher (G2) shall be laid and compacted to 98% Mod AASHTO to a final thickness of 150 mm (ie compacted thickness).

The surface of this newly laid crusher layer to be swept of all loose material, a 60% anionic stable emulsion grade track coat applied at an application rate of 0,3l /m² to the bottom and the sides and then patched with two 80 mm layers of asphalt wearing course. After compaction the surface of the patch shall be flushed with the adjacent road surface.

(ii) Category C

The existing wearing course (80mm) and crusher run(150mm) layer to be cut vertically and removed to spoil, a fresh layer of crusher (G2) shall be laid and compacted to 98% Mod AASHTO to a final thickness of 150 mm (ie compacted thickness).

The surface of this newly laid crusher layer to be swept of all loose material, a 60% anionic stable emulsion grade track coat applied at an application rate of 0,3l /m² to the bottom and the sides and then patched with a

80 mm layer of asphalt wearing course. After compaction the surface of the patch shall be flushed with the adjacent road surface.

(iii) Category D

The existing wearing course (50 mm) and crusher run(150 mm) layer to be cut vertically and removed to spoil, a fresh layer of crusher (G2) shall be laid and compacted to 98% Mod AASHTO to a final thickness of 150 mm (ie compacted thickness).

The surface of this newly laid crusher layer to be swept of all loose material, a 60% anionic stable emulsion grade tack coat applied at an application rate of 0,3l /m² to the bottom and the sides and then patched with a 50 mm layer of asphalt wearing course. After compaction the surface of the patch shall be flushed with the adjacent road surface.

Alternatively, the different reinstatement categories can be undertaken as follows and the material shall conform to PS10202 of the Project Specification, where specified by the Employer's Agent or Employer's Agent's Representative:

(i) Category B

The existing material to be cut vertically to a depth of 310 mm and removed to spoil, a fresh layer of in-plant foamed BSM shall be laid and compacted to 100% Mod AASHTO to a final thickness of 150mm (ie compacted thickness).

The surface of this newly laid foamed BSM layer to be swept of all loose material, a 60% anionic stable emulsion grade tack coat applied at an application rate of 0,3l /m² to the bottom and the sides and then patched with two 80 mm layers of asphalt wearing course. After compaction the surface of the patch shall be flushed with the adjacent road surface.

(ii) Category C

The existing material to be cut vertically to a depth of 230 mm and removed to spoil, a fresh layer of in-plant foamed BSM shall be laid and compacted to 98% Mod AASHTO to a final thickness of 150 mm (ie compacted thickness).

The surface of this newly laid foamed BSM layer to be swept of all loose material, a 60% anionic stable emulsion grade tack coat applied at an application rate of 0,3l /m² to the bottom and the sides and then patched with 80 mm layer of asphalt wearing

(iii) Category D

The existing material to be cut vertically to a depth of 200 mm and removed to spoil, a fresh layer of in-plant foamed BSM shall be laid and compacted to 98% Mod AASHTO to a final thickness of 150 mm (ie compacted thickness).

The surface of this newly laid foamed BSM layer to be swept of all loose material, a 60% anionic stable emulsion grade tack coat applied at an application rate of 0,3l /m² to the bottom and the sides and then patched with 50 mm layer of asphalt wearing

PS 4209.04(c) MATERIALS

The asphalt base course to be used shall comply with the requirements of the Sand Skeleton Mixes: Sa-S10.

The asphalt wearing course to be used shall comply with the requirements of the Sand Skeleton Mixes: Sa-S10.

The Graded crushed stone to be used shall comply with COLTO Section 3600 Table 3602/1. This is a G2 quality material.

PS 4209.04(d) MEASUREMENT AND PAYMENT

PS 4209.04(d)(i) Deep/Shallow Patching

Shall include saw-cutting the area to be patched, for removal of the in-situ layers to spoil, trimming the sides, compaction, application of the tack coat, supply and laying of the asphalt, loading and haulage to the spoil site of excess material. Provision has been made in the schedule of quantities for measurement and payment for deep patching and shallow patching.

The unit of measurement shall be square metres (m²)

PS 4209.04(d)(ii) Patching on the various road categories

Shall include saw-cutting the area to be patched, for removal of the in-situ layers to spoil, trimming the sides, compaction, application of the tack coat, supply and laying of the crusher run and asphalt layers, loading and haulage to the spoil site of excess material. Provision has been made in the schedule of quantities for measurement and payment for the various road categories.

Where in-plant foamed BSM has been specified for reinstatement by the Employer's Agent, the rate shall cover saw-cutting the area to be patched, the removal of in-situ layers to spoil, trimming the sides, compaction, application of the tack coat, supply and laying of the in-plant foamed BSM from Ethekewini Municipality's Asphalt Plant stockpile, laying the asphalt layers, loading and haulage to spoil site of the excess material. The rate shall exclude mixing/processing of the in-plant BSM, provision and addition of the stabilizing agents, screening and crushing which all shall be paid for under the respective items in Section PS10200. Provision has been made in the schedule of quantities for measurement and payment for the various road categories.

The unit of measurement shall be square metres (m²)

PS 4210 VARIATION IN QUANTITY OF EMULSION

The unit of measurement shall be litres (l).

PS 4211 APPLICATION OF WEEDKILLER

Where directed by the Employer's Agent, the Contractor will apply a weed killer to the road surface prior to commencing asphaltting operations. The rate of application shall be as recommended. The weed killer to be used shall be fit for purpose and as approved by the Employer's Agent.

The unit of measurement shall be metre (m) and the rate shall include for all labour, plant, equipment, transport and materials required for the application of the weed killer.

PS 4212 PATCHING or RECONSTRUCTING OF EXISTING ASPHALT SIDEWALK/DRIVEWAY ACCESS SCOOPS

Those areas of the existing asphalt sidewalk/access scoops which require patching or requiring reconstruction will be marked by the Employer's Agent or Employer's Agent's Representative.

The existing wearing course (25 mm) and crusher run(100 mm) layer to be cut vertically (saw-cutting) and removed to spoil, a fresh layer of crusher (G2) shall be laid and compacted to 98% Mod AASHTO to a final thickness of 100 mm (ie compacted thickness). Alternatively, the existing sidewalk base be replaced with the in-plant BSM base from Ethekewini Municipality's Stockpile and shall be compacted to 100% Mod AASHTO to a final thickness of 100 mm (ie compacted thickness)

The surface of this newly laid crusher/BSM layer to be swept of all loose material, a 60% anionic stable emulsion grade tack coat applied at an application rate of 0,3l /m² to the bottom and the sides and then patched with a 25 mm layer of Sa-S10 asphalt wearing course. After compaction the surface of the patch shall be flushed with the adjacent sidewalk/access surface.

PS 4212.01 MATERIALS

The asphalt wearing course to be used shall comply with the requirements of the Sand Skeleton Mixes : Sa-S10.

The Graded crushed stone to be used shall comply with COLTO Section 3600 Table 3602/1. This is a G2 quality material.

PS 4212.02 MEASUREMENT AND PAYMENT

Shall include for formation preparation, trimming the sides (saw-cutting), compaction, supply and application of weedkiller, application of the tack coat, supply and laying of the crusher run and asphalt layers, backfilling as required, loading and haulage to the tip/stockpile of excess material.

If the in-plant foamed BSM has been used, the rate shall include for formation preparation, trimming the sides (saw-cutting), compaction, supply and application of weedkiller, application of the tack coat, supply and laying of the in-plant foamed BSM from Ethekewini Municipality's Asphalt Plant stockpile and asphalt layers, backfilling

as required, loading and haulage to the tip/stockpile of excess material The rate shall exclude mixing/processing of the in-plant BSM, provision and addition of the stabilizing agents, screening and crushing which all shall be paid for under the respective items in Section PS10200.

The unit of measurement shall be square metre (m²) of sidewalk/access scoops repaired or reconstructed.

PS 4213 REMOVAL OF SPEED HUMPS

The unit of measurement shall be linear meter measured across the width of road of asphalt traffic calming devices or speed hump removed as per the municipal standard detail.

The tendered rate shall include full compensation for the breaking-out of the asphalt, removing, loading and carting to a spoil site (freehaul) or if instructed by the Employers Agent, cart to stockpile within a freehaul distance of 10 km

PS 4214 REINSTATING OF SPEED HUMPS

The unit of measurement shall be linear meter measured across the width of road of asphalt traffic calming devices or speed hump reinstated as per the municipal standard detail 43924 A/1.

The tendered rate shall include full compensation for saw cutting the keys, , breaking-out of the asphalt, removing, loading, carting to a spoil site (freehaul) or if instructed by the Employers Agent, cart to stockpile within a freehaul distance of 10 km, preparation, supply of continuously graded asphalt Sa-S10 and constructing the speed hump as per standard detail, and all incidentals. Painting the permanent road markings with the thermal plastic paint and road studs as per the standard detail, is paid for separately under section 5700.

PS 4215 REINFORCEMENT OF ASPHALT USING GEOTEXTILES

PS 4215.01

A high strength, open fibreglass grid, custom knitted in a stable construction and coated with an elastomeric polymer and a pressure sensitive adhesive backing, for use as an asphalt reinforced interlayer, as specified by the Employers Agent. The data specification is as tabulated below, or similar approved by the Employers Agent:

Mass	Nominal	g/m ²	205	405	610	ASTM D5261 ISO 9864
Tensile Strength (Ultimate)	Machine	kN/m	55	115	115	ASTM D6637 EN ISO 10319
	Across	kN/m	55	115	215	
	Elongation	%	2.5	2.5	2.5	
Tensile Resistance @ 2% strain	Machine	kN/m	46	95	95	ASTM D6637 EN ISO 10319
	Across	kN/m	46	95	180	
Secant Stiffness EA @ 1% strain	Machine	N/mm	2 200	4 600	4 600	ASTM D6637 EN ISO 10319
	Across	N/mm	2 200	4 600	8 600	
Young's Modulus E		MPa	73 000	73 000	73 000	
Melting Point	min	°C	>232	>232	>232	ASTM D276 EN ISO 3146
Damage during installation		%	< 5	< 5	< 5	Internal Test Method
Grid Size (centre to centre of strand)	mm		25 x 25	25 x 25	25 x 19	
Adhesive Backing			Pressure Sensitive			
Roll Dimensions	Roll Length	m	150	100	60	
	Roll Width	m	1.5	1.5	1.5	
	Roll Area	m ²	225	150	90	

PS 4215.02 STORAGE

The glass fibre reinforced geogrid must be stored in a dry covered condition free from dust, dirt and moisture. The geogrid is normally supplied upright on purpose built pallets and it is recommended where possible to store in an upright position.

PS 4215.03 PAVEMENT PREPARATION

Surface must be prepared as a clean, dry even surface with pavement cracks sealed. Cracks up to 6mm should be filled with a suitable crack filler. A levelling course shall be laid as per the Employer's Agent's or Employer's Agent's Representative's instruction once all cracks and patches have been completed. Before installing the glass fibre reinforced geogrid on recently laid asphalt or levelling course, ensure that the surface has properly cured and that the surface temperature is between 5°C and no greater than 60°C before installing the geogrid.

Prior to placing the geogrid, the existing pavement shall be cleaned by a mechanical device by sweeping or vacuuming and be free of oil, vegetation, sand, dirt, water, gravel and other debris.

PS 4215.04 CONSTRUCTION

1. Spray on a uniform application of bituminous tack coat, either an emulsion or hot applied. The necessary amount of tack coat is 1.0-1.2 l/m² of residual bitumen. When using a latex modified cationic emulsion, a minimum of 65 % residual bitumen content is preferable. (Total quantity of a 65 % modified emulsion to be applied is 1.7 /m².) Cutters or solvents to be avoided.

2. Emulsion - allow to break before installing the geogrid.

3. The geogrid may be laid mechanically or by hand. The geogrid should be laid free of wrinkles, using a squeegee or the reverse of a hard broom to smooth out any wrinkles. Stubborn folds are to be cut and smoothed. Overlaps should be 100-150 mm and adhered by applying additional binder (0.9 /m² residual bitumen).

4. Allow for 3-4 passes of a PTR (pneumatic tyred roller) once tack coat has cured sufficiently to prevent pick up. A steel drum roller should not be used. Avoid trafficking over the installed geogrid.
5. Paving of the asphalt overlay can proceed immediately after the installation of the geogrid. Application of additional bitumen is not necessary.

Note: If, after testing for proper adhesion as described below, further rolling may not be required.

Tests for Proper Adhesion to Geogrid Prior to Placing an AC Overlay:

1. Cut approximately 1m² of grid.
2. Place on area to be paved.
3. Activate self-adhesive glue (where applicable) by rolling with a rubber tyred roller or by walking on the samples.
4. Insert hook of spring balance under centre of geogrid piece
5. Pull upwards until grid starts to pull from the surface.
6. Record results in kg.
7. If 2kg or more, OK to pave. If 1 - 2kg, start paving with caution. Stop immediately if grid moves or ripples.
8. IF LESS THAN 1kg DO NOT PAVE DUE TO POOR ADHESION

Construction and emergency traffic may run on the geogrid after being placed. However, it must be ensured that damage is not caused to the geogrid by vehicles turning or braking etc., and that the mesh must be kept clean of mud, dust and other debris. Damaged sections shall be removed and patched, taking care to completely cover the damaged area.

PS 4215.05 MEASUREMENT AND PAYMENT

The unit of measurement shall for sub-item PS 4215.02(i) be the number (no.) of rolls of reinforcing geogrids supplied. Grade of fibre re-inforced geogrid as specified in the schedule of quantities.

The tendered rate shall include full compensation for supply, furnishing and delivery to site and protecting the reinforcing geotextile.

The unit of measurement shall for sub-item PS 4215.02 (ii) be the square metre (m²) of geogrid installed as specified by the Employer's Agent or Employer's Agent's Representative. Installation of fibre re-inforced geogrid as per area size as specified in the schedule of quantities.

The tendered rate shall include full compensation for cutting, overlapping, jointing, placing and protecting the filter fabric as specified as well as wastage.

PS 4216 ADDITIONAL PERFORMANCE AND ASSESSMENT CRITERIA

PS4216.01 SCOPE

This Section covers the specifications related to the provision of functional and, or, structural layers of a road pavement structure comprising the asphalt surfacing, and, or the base layer (where specified) in terms of the assessment criteria for approval of works. It includes performance parameters, field measurements, acceptance criteria and remedial work methodologies.

PS4216.02 ASSESSMENT CRITERIA

The performance parameters to be assessed are listed in Tables D1 and D2 for visual, instrumentally and test assessed parameters or as otherwise prescribed in the Contract Documentation. Table D1 is specific for the performance of the slow lanes only in the case of a dual carriageway, or the travelled lane in the case of a single carriageway. Table D2 is specific to the asphalt surfacing performance of the shoulders and inner lanes, where applicable, on dual carriageways.

Table D1: Performance parameters for the slow lane of dual carriageways and the travelled lane of single carriageways

Visually Assessed Parameters	Instrumentally Assessed Parameters	Test Assessed Parameters
1. Cracking	1. Deflection	1. Air Permeability
2. Bleeding	2. Rutting	2. Water Permeability
3. Ravelling	3. Roughness	3. Marvil Permeability
	4. Mean Profile Depth	

Table D2: Performance parameters for the shoulders of dual and single carriageways and inner lanes of dual carriageways

Visually Assessed Parameters	Instrumentally Assessed Parameters	Test Assessed Parameters
1. Cracking	1. Deflection	1. Air Permeability
2. Bleeding	2. Rutting	2. Water Permeability
3. Raveling	3. Roughness	3. Marvil Permeability

Cracking shall be defined as either Surface Cracking and/or Longitudinal and/or Transverse and/or Crocodile Cracking as defined in TMH9 Manual for Visual Assessment of Road Pavements.

PS4216.02.01 Visual Assessments

Visual assessment shall be carried out in accordance with the requirements of TMH9. The visually assessed parameters as well as the calculated Combined Index Value (CIV) shall meet the Acceptance Criteria listed in Table D3 below, which shall be applicable at the end of the Defects Maintenance/Liability Period. Interim visual assessments shall be as specified in the Contract Documentation.

The visual assessments of the pavement during the Defects Maintenance/Liability Period shall be undertaken by means of an assessment panel comprising the following representatives:

- Employer: 1 representative
- Contractor: 1 representative
- Employer's Agent: 1 representative

All site inspections/investigations shall be undertaken by the panel of representatives. The arrangements, responsibilities and all costs associated with providing the necessary equipment, transport and traffic accommodation measures required to undertake the visual inspection shall be to the cost of the Contractor, included in the construction rates. The presence of the Employer's representatives shall be at the discretion of the Employer. The visual assessments shall be carried out during daylight and off-peak traffic periods.

Table D3: Acceptance criteria for visually assessed types of distress

Type of Distress	Maximum allowance					
	Degree	CIV				
		Class 1	Class 2	Class 3	Class 4	Class 5
Cracking	2	0,05	0,05	0,1	0,10	0,15
Bleeding (flushing)	2	0,1	0,1	0,1	0,15	0,2
Surface raveling	1	0,05	0,05	0,1	0,1	0,15

The detailed visual-assessment (walk over) by the assessment panel will quantify each occurrence of the visually-assessed parameters by rating the degree of distress according to the TMH 9 definitions and the extent as the linear length (in metres) affected in the direction of travel. The minimum linear length to be recorded for

any single occurrence of any of the visually-assessed parameters shall be 0,5 metres. Visual assessments must be done in accordance with the specification presented in Table D3-1, below

Table D3-1: Specification for visual assessment

Item	Specification
Frequency of assessment	At the end of the Defects Maintenance/Liability Period. Interim visual assessments shall be as specified in the Contract Documentation
Position of assessment	Each lane and shoulder shall be individually assessed.
Segment lengths	500 m
Degree	As defined in TMH 9.
Extent	The actual length affected, with a minimum recorded linear length per single occurrence of 0,5 metres.

For each of the visually-assessed parameters the Combined Index Value will be calculated for every 500m segment of each lane and shoulder. The Combined Index Value (CIV) for each visually-assessed parameter will be processed as follows:

$$Combined\ Index\ Value(CIV) = \sum_{Degree=1}^5 Degree \times \frac{(Length_{Degree})}{10}$$

$$\left(1 \times \frac{Length_1}{10}\right) + \left(2 \times \frac{Length_2}{10}\right) + \left(3 \times \frac{Length_3}{10}\right) + \left(4 \times \frac{Length_4}{10}\right) + \left(5 \times \frac{Length_5}{10}\right)$$

Where Length1 = Total linear length (in metres) of degree 1 distress over the 500m segment, etc.

The processed results shall be used to produce results in the format specified in Table D3-2.

Table D3-2: Specification for output of visual assessments

Item	Specification
Unit	Combined Index Value (CIV)
Segment lengths	500m
Statistical summary	Produce Combined Index Value (CIV) for each lane and shoulder

Reporting, which shall be the responsibility of the Contractor, shall consist of the following:

- Compiling of report on findings as well as remedial measures required.

The abovementioned requirements shall be completed and delivered in triplicate to the office of the Employer within one calendar month of the inspection date.

PS4216.02.02 Deflection

Deflection measurements shall be carried out as specified in Annexure 1. Where so specified in the Contract Documentation, at the end of the Defects Maintenance/Liability Period, the structural capacity of the road pavement, as determined in terms of deflection measurements, shall conform to be acceptance criteria presented in Table D4 below. The acceptance criteria is specified in terms of the maximum deflection (Ymax), base layer index (BLI) and middle layer index (MLI) as calculated from FWD deflection measurements. Segment lengths of 500m in length shall be identified for evaluation. The 90th percentile value per segment shall be used to judge acceptance.

Table D4: Acceptance criteria for deflection

Base type	Maximum 90 th Percentile Value (Micron)	Class 1	Class 2	Class 3	Class 4	Class 5
Granular (G1)	Ymax	500	600	650	1 000	1 500
	BLI	190	240	250	420	800
	MLI	50	75	100	160	350
Asphalt	Ymax	420	510	680	NR	NR
	BLI	155	140	175	NR	NR
	MLI	30	50	100	NR	NR
Bitumen Modified	Ymax	450	500	600	650	NR
	BLI	170	190	240	250	NR
	MLI	40	50	75	100	NR
Cement Treated	Ymax	NR	NR	440	590	1 000
	BLI	NR	NR	85	110	290
	MLI	NR	NR	45	90	240

Notes:

1. Class 1 to 5 are defined in TRH26 – South African Road Classification and Access Management Manual issued by the Committee of Transport Officials Version 1.0, August 2012.
2. NR – Not Recommended

PS4216.02.03 Rutting

At the end of the Defects Maintenance/Liability Period, as determined in terms of the specified methodology, the surface deformation (rutting) as determined shall not exceed the values as specified in Table D5 below for the specific road class.

Table D5: Specification for rut depth criteria

Maximum length (%) of segment with rut depth worse than limiting value	Profilometer measurements: Limiting Rut Depth (mm)				
	Class 1	Class 2	Class 3	Class 4	Class 5
10 %	6	8	8	8	10
5 %	8	10	10	10	15
0 %	10	15	15	15	20

PS4216.02.04 Roughness

Roughness shall be measured in accordance as specified in Annexure 1. At the end of the Defects Maintenance/Liability Period, as determined in terms of the Specified Methodology, the surface roughness, shall not exceed the values as specified in Table D6 below.

Table D6: Specification for roughness criteria

Maximum length (%) of segment with roughness worse than limiting value	Roughness measurements limiting IRI (mm)									
	Class 1		Class 2		Class 3		Class 4		Class 5	
	S	AC	S	AC	S	AC	S	AC	S	AC
10 %	2,2	1,8	2,5	2,0	3,0	2,5	3,6	3,0	4,4	3,5
5 %	2,5	2,1	2,7	2,2	3,5	3,0	3,9	3,5	4,7	4,0
0 %	2,7	2,3	3,0	2,5	4,0	3,5	4,8	4,0	5,0	4,5

Notes:

1. S – Single or Double Seal Surfacing
2. AC – Asphalt Surfacing

PS4216.02.05 Mean profile depth

At the end of the Defects Maintenance/Liability Period, as determined in accordance with Annexure 1, the mean profile depth as determined shall not exceed the values as specified in Table D7 below.

Table D7: Specification for mean profile depth

Maximum length (%) of segment with mean profile depth worse than limiting value	Mean profile depth (mm) for Road Class				
	Class 1	Class 2	Class 3	Class 4	Class 5
10%	0,8	0,8	0,8	0,4	0,4
5%	0,6	0,6	0,6	0,35	0,35
0%	0,4	0,4	0,4	0,3	0,3

PS4216.02.06 Air permeability

Before issuing of the Completion Certificate, and at the end of the Defects Maintenance/Liability Period, the permeability of the asphalt layers, as determined by means of the air permeability test method described in Annexure 1 shall conform to the acceptance criteria as specified in Table D8 below.

Table D8: Criteria for air permeability tests acceptance

Year	Limiting Air Permeability ($\times 10^{-8} \text{cm}^2$)
0 and 1	1.0

PS4216.02.07 Water permeability

Before issuing of the Completion Certificate, at the end of the Defects Maintenance/Liability Period, the permeability of the asphalt layers, as determined by means of the Water Permeability test method, as prescribed in EN 12697, shall conform to the acceptance criteria as specified in Table D9 below.

Table D9: Acceptance criteria for water permeability tests

Year	Limiting Water Permeability ($\times 10^{-8} \text{cm}^2$)
0 and 1	< 4 mm/s

PS4216.02.08 Marvil Permeability

Before issuing of the Completion Certificate, and at the end of the Defects Maintenance/Liability Period, the permeability of the asphalt layers, as determined by means of the Marvil permeability test method defined in SANS 3001-BT12, shall conform to the acceptance criteria as specified in Table D10 below.

Table D10: Acceptance criteria for marvel permeability tests

Year	Limiting Marvil permeability
0 and 1	< 1 ℓ/hour

PS4216.03 MEASUREMENT AND PAYMENT

The arrangements, responsibilities and all costs associated with providing the necessary equipment, transport, supervision, traffic accommodation measures and all other costs necessary as required to undertake all tests described in Section PS4216.02 ASSESSMENT CRITERIA shall be to the cost of the Contractor, included in the tendered construction rates for the asphalt works.

PS4216.04 REMEDIAL WORK**PS4216.04.01 Determination of extent of work**

The Contractor, in liaison with the Visual Assessment Panel and Employer, shall be responsible for determining the extent to which remedial work is to be undertaken. Depending on the type of distress and severity thereof, further investigation and testing (e.g. test pits, etc.) may be necessary to be undertaken by the Contractor to, not only determine the extent of the area to be repaired, but also the depth to which repairs of the pavement structure are to be undertaken. The extent of repair work shall be agreed and confirmed with the Employer prior to commencement of any repair work. The cost of such further investigation and testing shall be borne by the Contractor.

PS4216.04.02 Evaluation at any time during the Defects Maintenance/Liability Period

The Employer shall be entitled to carry out an assessment of the Works at any time during the Defects Maintenance/Liability Period. Should any parameter/s fall into the remedial-work-required category, the Employer shall inform the Contractor who shall immediately propose a solution to rectify the problem/s and obtain the Employer's approval and rectify the problem/s in accordance with Clause PS4216.03.03. The remedial work shall commence within 28 days of being notified by the Employer.

PS4216.04.03 Execution of work

All remedial work or repairs to the pavement structure in order to satisfy the performance requirements as specified shall comply with the following requirements:

- (i) The Contractor shall, at his own cost, supply, erect and maintain the necessary temporary traffic-control signs in accordance with the requirements in Section 1500 or as amended, or any other requirements as prescribed in the Contract Documentation with respect traffic accommodation.
- (ii) The Contractor shall, also at his own cost, repair/reinstate such items as road studs, road markings, etc., should these be damaged or influenced by the required remedial work.
- (iii) The various types of remedial work contained in Table D11, depending on the degree of distress, shall be undertaken by the Contractor, at his own cost, to reinstate/rectify specified defects in the pavement structure recorded during the Defects Maintenance/Liability Period.

Table D11: Remedial work

Type of Distress	Acceptance Criteria: Clause	Minimum Remedial Measures
Cracking	PS4216.02.01	Mill out full depth of defective surfacing including pavement layers, if required, and reconstruct
Bleeding (flushing)	PS4216.02.01	Mill out full depth of defective surface and replace surfacing
Surfacing raveling	PS4216.02.01	Repair with AC or mill out full depth of defective surfacing and replace surfacing
Excessive deflection	PS4216.02.02	Mill out full depth of surfacing and pavement layers to pre-determined depth and reconstruct pavement layers and surfacing
Rutting	PS4216.02.03	Mill out full depth of defective surfacing including pavement layers if required, and reconstruct
Roughness	PS4216.02.04	Mill out to pre-defined depth and replace
Mean Profile Depth	PS4216.02.05	Mill out surfacing and replace
Air Permeability	PS4216.02.06	Fog spray surfacing with agreed emulsion or mill out surfacing and repave surfacing
Water Permeability	PS4216.02.07	Fog spray surfacing with agreed emulsion or mill out surfacing and repave surfacing
Marvil Permeability	PS4216.02.08	Fog spray surfacing with agreed emulsion or mill out surfacing and repave surfacing

SECTION 4300: SEALS: MATERIALS AND GENERAL REQUIREMENTS**PS.4302 MATERIALS**

Testing shall be conducted in accordance with the SANS 3001 Series Test Methods where these are available and shall supersede the methods on TMH1.

Add the following to the first paragraph:

“Any tests referred to in the publication Technical Guideline “Use of Modified Bituminous Binders in Road Construction, Fifth Edition, November 2020, Asphalt Academy (TG1)”, shall supercede those specified in the Colto Standard Specifications for Road and Bridge Works 1998. This document is available from the Asphalt Academy.”

(a) Bituminous binders

- (i) Conventional binder used in this contract shall be in accordance with the specifications described in SANS 4001-BT document.
 - (ii) Non-homogeneous (heterogeneous) modified binders (summer grade)
- (4) *Diluent*

Add the following sentence:

“The addition of a diluent or cutter to the blend shall not be permitted unless approved by the Employer’ Agent.”

(5) Bitumen-rubber blend

Replace “table 4302/3” in the first paragraph and “table 4302/4” in the fourth paragraph respectively with :

“table PS4302/3 and table PS4302/4”

In the fourth paragraph, add the following after the word “requirements”:

“for binder class S-R1”.

TABLE PS4302/3: BITUMEN-RUBBER COMPOSITIONAL AND BLENDING LIMITS

Property	Limits
Percentage of rubber by mass of total blend	18 – 24
Percentage of extender oil by mass of total blend	4 (max)
Percentage of diluent/cutter by mass of total blend	5 (max) (*1)
Blending / reaction temperature	170°C - 210°C
Reaction time (reaction time commences when all the rubber crumbs have been added to the blend)	0.5 – 4.0 hours (*2)

*Notes:

1. The addition of a diluent is not recommended in bitumen-rubber for use in hot-mix asphalt applications
2. The reaction time for the product is highly influenced by the composition of the base bitumen and the particle size of the rubber crumbs, and it may remain acceptable for up to 6 hours.

TABLE PS4302/4: PROPERTIES OF BITUMEN-RUBBER FOR USE IN SURFACE SEALS

Property	Unit	Test Method	Binder Class	
			S-R 1	
Compressions Recovery: 5 minutes	%	MB-11	>70	
Compression recovery: 1 hour	%	MB-11	>70	
Compression recovery: 24 hours	%	MB-11	>40	
Softening Point ¹	°C	MB-17	55 – 65	
Resilience @25°C	%	MB-10	13 – 35	
Flow @60°C	Mm	MB-12	15 – 70	
Dynamic Visc. @190°C	dPa.s	MB-13	20 – 40	

*Notes:

- The prescribed test method is based on not using stirrers although it has been reported that the use of stirrers has shown no difference in test results. For refereeing purposes no stirrers should be used.

(v) Homogeneous hot applied polymer modified binders (summer grades)

Delete the entire subsubclause including table 4302/7 and replace with the following:

“(1) Base bitumen

The base bitumen shall comply with the requirements of SANS 4001-BT. In addition, the chemical composition of the bitumen shall be such as to permit blending with the proposed polymer to form a stable product.

(2) Polymer

The type and percentage of polymer to be blended with the bitumen is not prescribed, however the Contractor shall indicate, the type of polymer to be utilized in the relevant documents to be supplied to the Employers Agent.

(3) Polymer modified blend

The polymer modified bitumen shall be blended at the factory.

The polymer modified bitumen to be used shall be either Binder Class S-E1 or S-E2 and shall comply with the requirements of table PS4302/7.

TABLE PS4302/7 PROPERTIES OF POLYMER MODIFIED BINDERS FOR HOT SEALING APPLICATIONS

Property	Unit	Test Method	Binder Class	
			S-E1	S-E2
Before Ageing				
Softening Point ¹	°C	MB-17	50-70	60-80 ¹
Dynamic Viscosity @165°C	Pa.s	MB-18	≤0.55	≤0.60
Elastic Recovery @ 15°C	%	MB-4	>50	>60
Flash Point	°C	ASTM:D92	>230	>230
Storage Stability @180°C ²	°C	MB-6	≤5	≤5
After ageing (RTFOT)				
Elastic Recovery @15°C	%	MB-4	>50	>60
Mass Change ³	%	MB-3	≤1.0	≤1.0

*Notes:

- The softening point values obtained for bitumen modified with SBS will tend to fluctuate over time and on reheating. Road surfaces could become too rigid at low overnight temperatures with resultant poor adhesion properties.

2. Certain base bitumens, when used in the production of modified binders, are prone to cause segregation of the modified binder. The Storage Stability test result should be interpreted as an indicator of the compatibility of the base bitumen and the modifier used. In cases where compliance limits are not met, proposals of site agitation procedures of the binder to prevent segregation shall be submitted to the client for consideration. In all cases whenever there is any reason to believe that the composition of the base bitumen has changed, the test shall be repeated to ensure compliance or to determine the need for measures to prevent segregation

3. Mass loss gives an indication of the presence of volatiles in the binder.

(b) Aggregates

Add the following:

The sieve sizes stated in tables 4302/8, 4302/9, 4302/10, 4302/11 and 4302/12 shall be replaced as indicated in Table PS4302/13 below:

SABS Sieve size (mm)	SANS 3310-1/2
37.5	37.5
26.5	28.0
19	20.0
13.2	14.0
9.5	10.0
6.7	7.1
4.75	5.0
3.35	2.0
2.36	2.0
1.18	1.0
0.60	0.06
0.425	0.425
0.300	0.300
0.150	0.150
0.075	0.075

(i) Aggregates for seals

Add the following at the end of the sentence:

“and durability.”

(1) Grading

Add the following:

“Only Grade 1 aggregate shall be used for the construction of seals on this project.”

(3) Shape

Add Table PS4302/13 and the following paragraph:

“Ninety five (95%) percent of the particles shall have at least three fractured faces. The Average Least Dimension (ALD) of the relevant nominal aggregate sizes shall comply with the requirements of Table PS4302/13.”

Table PS4302/13
Minimum ALD Requirements

Nominal Aggregate Size (mm)	Minimum ALD (mm)
20,0	12,0
14	8,0
10	5,5

Add the following subsubclause:

“(4) Durability

Aggregate used in seals and asphalt shall show a breakdown of less than 2%.

(ii) Aggregate for slurry seals

In the first paragraph, add the following after the first sentence:

“The Employer’s Agent may order the addition of an approved natural sand or additional cement to improve either the permeability or workability of the slurry.”

Add the following subsubclause:

“(iii) Aggregate for blinding

The aggregate used for blinding the single seal shall consist of 2,00 mm to 5.00 mm crushed aggregate or river sand. The aggregate shall be clean, hard and free from clay, silt or other deleterious matter.”

(d) Hydrophilic aggregates

(i) Precoating of aggregate for stockpiling or for immediate use:

In the second paragraph, delete “12 litre” in the second sentence, and add the following sentence:

“Precoating fluid shall be manufactured from petroleum based products. The use of tar based precoating fluids will not be permitted. For tender purposes the nominal quantity of precoating fluid for the relevant nominal aggregate sizes is specified in table PS4302/14.”

TABLE PS4302/14: NOMINAL APPLICATION RATES FOR PRECOATING FLUID

Nominal aggregate size (mm)	Nominal precoating application rate (l/m ³)
14	16
10	19
7.1	22

Add the following subclauses:

(e) Water for diluting emulsions

Water used for the dilution of emulsions on site shall be suitable potable water, and each source of water used shall be tested for compatibility with the emulsion before it is added to the bulk emulsion.

(f) Testing of polymer modified bitumen/emulsion

Testing shall be in accordance with the methods described in “Technical Guideline: The Use of Modified Bituminous Binder in Road Construction TG I (4th Edition January 2019).”

During spraying of each batch, at the Employer’s Agent Representative request, the Contractor shall draw off test samples of the modified bitumen/emulsion product and submit them to the Employer’s Agent for acceptance testing purposes. The supplier shall submit all his tests results to the Employer’s Agent for correlation purposes, failing which the Employer’s Agents’ results shall be binding in terms of acceptance or rejection of the product.

PS.4303 PLANT AND EQUIPMENT**(b) Binder distributor**

Add the following:

" Prior to the commencement of any work, a calibration certificate for the binder distributor shall be obtained in accordance with SANS 3001-BT20 : 2016 and be presented to the Employer's Agent Representative for approval.

The binder distributor shall be capable of spraying the binder at the specified application rates and to the satisfaction of the Employer's Agent Representative. The pump of the distributor shall be capable of delivering the binder at the spray bar nozzles at the correct pressure to obtain the specified application rates, irrespective of the viscosity properties of the prescribed binder. The spray bar of the distributor shall be fitted with fishplates at the outside edge of the bar to prevent over spraying onto gravel shoulders or staining of concrete elements on the edge of the surfacing of the road

The transverse distribution of the spray bar shall be field-verified by means of the "Bakkie" test as described in SANS 3001-BT24 : 2015. The maximum permissible tolerance permitted between the troughs (excluding the outer 300 mm) is dependent on the viscosity of the binder type being applied and shall be as follows:

- Emulsions, cutback and penetration grade bitumens - 5%
- Homogeneous modified bitumens - 7%
- Non-homogeneous binders (bitumen rubber)- 10%

The spray bar shall be of such design as to allow for any adjustments to be made in order to meet the above tolerances. This procedure shall be carried out each time the distributor is first established on site and once a week thereafter or when a problem with transverse distribution is suspected. The binder distributor shall thus have a set of troughs available in order to allow the execution of the test. For limited quantities of spray-work, the Employer's Agent Representative may accept the results of a recently completed distribution test that has been recorded and approved by an independent supervisor on the distributor's test log book.

The binder distributor shall be fitted with a suitable valve or other access gate for taking of samples of the binder for testing purposes."

(c) Chip spreaders

Add the following at the end of the first paragraph:

"The chip spreader shall be capable of delivering a proper and uniform transverse distribution of chips across the conveyor belts. The chip distribution shall be tested by means of canvas patches, each 1,0 m by 1,0 m and placed side by side. The mass of chips spread onto each individual canvas patch shall not deviate by more than 10% from the calculated average spread per canvas patch. The chip spreader shall be capable of spreading stone of the specified size uniformly over the widths varying between 2.4 m and 4.3 m in one pull."

Add the following to the last paragraph:

"A non-self-propelled chip spreader may only be used in the event of a breakdown of the self-propelled chip spreader during a pull, and shall be limited to the completion of that pull. No further application of binder shall be permitted until such time as the self-propelled chip spreader is repaired or replaced."

(i) Precoating plant

Add the following to this clause

Precoating of aggregate shall take place at locations approved by the Employer's Agent Representative. The area approved for the precoating is to be prepared to form a flat impermeable surface so as to prevent contamination of the natural ground, all to the satisfaction of the Employer's Agent Representative.

The precoated aggregate is to be immediately covered with a water proof covering, which will also prevent contamination by wind-blown debris, all to the satisfaction of the Employer's Agent Representative. If adequate

covering is not provided, at any time, to the satisfaction of the Employer's Agent Representative, the entire stockpile may be rejected.

PS.4304 GENERAL LIMITATIONS AND REQUIREMENTS

(b) Moisture Content

Add the following to before the last sentence of the paragraph:

“After rain or periods of prolonged high humidity, the moisture content of the surfacing to be resealed shall be tested with the “Plate Glass Test”. Should the test indicate the presence of moisture in the surfacing to be resealed, the resealing shall be delayed until such time as no moisture is recorded.”

(d) Preparation of areas to be sealed

(i) General

Add the following:

Sealing work shall not commence until the Employer’s Agent Representative has approved all other works ordered on that section of road.”

PS.4305 HEATING AND STORAGE OF BITUMINOUS BINDERS

(b) Non-homogenous (heterogeneous) modified binders (summer grade)

Replace the entire sub-clause with:

“After completion of the bitumen-rubber reaction, the handling of the binder shall comply with the requirements listed in table PS4305/4. The binder may only be stored in tanks with circulation systems.

The Employer’s Agent Representative shall, through timeous notification by the Contractor, be afforded the opportunity to attend all bitumen rubber-blending operations in order to exercise control sampling and testing of the binder from the stage just prior to the addition of the rubber to the base bitumen up to the end of the allowable spraying period. Failure to conform to this requirement will be considered reason enough by the Employer’s Agent to reject the batch of binder.”

TABLE PS4305/4

Binder Class	Short term handling		Storage		Spraying/Asphalt mixing/Application		
	Temp (°C) max	Time (hrs) max	Temp (°C) max	Max holding time (days)	Temp (°C) max	Temp (°C) min	Time (hrs) max
Binder for seal (S-R1)	170	24	150	10 ¹	210	195	Refer to time/viscosity curve ²
Binders for crack sealing (C-E1) ³	160	24	n/a	indefinite	170	150	8

*Notes:

1. If the recommended time period has been exceeded the binder should be resampled and tested to ensure that the properties of the binder have not degraded.
2. The Time/Viscosity relationship must be determined for each specific blend.
3. Due to the relatively small quantities utilized, bitumen rubber crack sealants are invariably supplied in a cold, pre-blended, form. Only the quantity required should thus be heated immediately prior to application. Rapid localized heating of the product should be avoided.

(e) Homogeneous hot-applied modified binders (summer grade)

In the second paragraph, replace table 4305/3 with "table PS4305/3":

Table PS4305/3

Temperature/Time Limits for Hot Polymer Modified Binder							
Binder Class	Short Term Handling		Storage		Spraying/Asphalt Mixing/Application		
	Max Temp (°C)	Max Time (hrs)	Max Temp (°C)	Max Time (hrs)	Max Temp (°C)	Min Temp (°C)	Max Time (hrs)
S-E1(SBS, SBR)	180	24	150	240	210	175	8
S-E1 (SBS)	180	24	150	240	185	175	12
S-E2	180	24	150	240	185	175	12

***Notes:**

1. When storing product for 48 – 240 hours it is recommended that the tank has agitation circulation.
2. If the recommended maximum holding time has been exceeded the binder should be resampled and tested to ensure compliance with the specification.
3. S-E1 and S-E2 (SBS) can be sprayed at a maximum temperature of 195°C, but at the risk of thermal degradation.

PS.4306 STOCKPILING OF AGGREGATE**(a) General**

Add the following:

" The contractor shall heed the environmental requirements of Part C3.4.2 of this volume in the preparation, operation and closure of stockpile sites. The positions for stockpiling of aggregate and the proposed operation methods shall be approved by the Employer's Agent Representative before delivery of the aggregate can commence."

After application of seal, all loose stones swept off the road surface are to be heaped on the side of the road and removed in one operation. No sweepings are to be left on site for more than 24 hours. No sweepings are to be heaped or stored on vegetated areas of the road reserve. No loose stone is to be stored in the road reserve."

PS.4307 CONSTRUCTION OF SEAL**(b) Single and double aggregate seals****(i) Application of tack coat and aggregate**

Replace the last sentence of the fourth paragraph with the following:

"The contractor shall so place the strips when constructing the seal that the joint between two adjacent aggregate applications shall be located along the centre-line and on the lane line where a lane, lane and shoulder situation occurs (climbing lanes)."

Add the following to the fourth paragraph:

Joints shall be straight and aggregate shall be broomed back in a neat straight line before the next spray. String lines shall be used to demarcate joint edges. All stone-loss and "tram-lining/roping" shall be made good by the Contractor at no additional cost."

(ii) Initial rolling of aggregate

Add the following after the second sentence:

"In the case of modified emulsions, initial rolling by means of self-propelled 5-ton flat steel wheel rollers shall only be permitted if crushing of aggregate does not occur. Pneumatic-tyred rolling shall be delayed until the emulsion has been allowed to break sufficiently to firmly secure the aggregate. Rolling shall be postponed if there is any pick-up of aggregate on the tyres of the pneumatic type roller."

(iii) Broom drag and final rolling of aggregate

Add the following after the first paragraph:

The Contractor shall provide a back-chipping team, together with a pneumatic-tyred roller, of sufficient capacity to ensure that back-chipping and rolling of aggregate shall be completed within thirty minutes after initial application of the aggregate."

Replace the third paragraph with the following:

"After completing the spreading of the aggregate, final rolling shall consist of a minimum of four passes utilizing a 15-ton to 20-ton pneumatic-tyred roller, followed by one or two passes of a 6-8 ton flat steel wheel roller, if crushing of aggregate does not occur."

(iv) Joints between binder sprays

Add the following at the end of the paragraph:

"The protective sheets shall be made of reinforced building paper."

(v) Protection of kerbs, channels etc.

Add the following:

"Where bitumen binder is to be sprayed directly adjacent to existing concrete kerbs, channels, side drains, concrete edge beams and bridge balustrades, or over bridge joints, such concrete elements shall be covered with an approved reinforced building paper.

Add the following sub-subclause:

"(vi) Trial section

When requested by the Employer's Agent, the Contractor shall demonstrate that the equipment and processes he proposes to use will enable him to construct the seal in accordance with the specified requirements through construction of a trial section. The area of trial section shall be agreed with the Employer's Agent.

If approval is granted for a specific operation i.e. application of tack coat, aggregate, fog or slurry, the Contractor may proceed with that approved operation.

Should the Contractor at any stage fail to deliver an acceptable product he shall rectify the problems at his own cost and demonstrate with a further trial section that he can carry out the operation successfully. No specific payment shall be made for conducting these trials and the cost thereof shall be deemed to be included in the tendered rates of section 4400 or 4500, whichever is applicable."

PS.4308 RATES OF APPLICATION

In the first sentence of the first paragraph, delete the following after "conventional":

"or homogeneous modified"

Add the following at the beginning of the second sentence:

"Homogeneous and"

In the second paragraph, delete 4314 and replace with:

"PS4314"

Add the following at the end of the second paragraph:

"In the case of single seals the Employer's Agent Representative may, at his discretion, permit the application of a diluted emulsion fog spray in instances where application rates are below the minimum allowable tolerances. In such instances no additional payment over and above the unit rate tendered for the accepted seal, plus or minus any variation from the nominal, will be made. In the case of sand seals the Employer's Agent Representative may accept, at his discretion, an application of binder sprayed above the allowable tolerance subject to the Contractor, at his own cost, applying and rolling any additional sand/aggregate necessary as a result of such over application."

PS.4314 TOLERANCES AND FINISH REQUIREMENTS

(c) The rate of application

Replace the first paragraph the following:

"The maximum permissible variation from the rates of application of aggregate or slurry, as ordered by the Employer's Agent, shall be plus or minus 5%.

For binders, the maximum permissible variation from that specified shall be 5% for conventional bitumen and all emulsions (measured net cold), and 5% for hot applied modified binders (measured at spray temperature). Provided he is satisfied that the seal will perform satisfactorily, the Employer's Agent Representative may, at his discretion, conditionally accept out of tolerance variations at the reduced rates of payment listed in Table PS4314/1 below. However, variations in total binder application rates in excess of those tabled shall be deemed rejected. Rejected sprays will not be considered for payment unless corrected to the satisfaction of the Employer's Agent.

At commencement of the contract, the Contractor shall furnish the Employer's Agent with a general method statement as to the corrective measures he intends to apply in the event of an excessive application of binder that has consequently been rejected by the Employer's Agent.

A lot for acceptance control purposes shall be at least 2000 litres. Lots smaller than 2000 litres shall be combined with succeeding lots until a combined lot not less than 2000 litres is obtained.

Table PS4314/1

Payment Reduction Factors For Conditionally Accepted Binder Application Rates

Conventional bitumen and emulsion. Deviation from specified spray rate net cold bitumen. (%)	Hot applied homogeneous and non-homogeneous modified bitumen. Deviation from specified rate at spray temperature. (%)	% Payment of tendered rate for seal
±5,0	±5,0	100%
±6,0	±6,0	97,5%
±7,0	±7,0	95%
±8,0	±8,0	90%
±9,0	±9,0	85%
±10,0	±10,0	80%

Add the following at the end of the last paragraph:

"The completed surfacing shall be of uniform texture without gaps or patches and shall be free from longitudinal and transverse corrugations and any loose aggregate or binder spillage.

The edges of the completed bituminous surfacing shall be true to line."

(d) Conditional acceptance

Delete the entire subclause

SECTION 4400: SINGLE SEALS

PS.4402 MATERIALS

*Replace “table 4402/1” with:
“Table PS4302/13”*

PS.4403 CONSTRUCTION

(a) Application of tack coat and aggregate

Equivalent sieve sizes shall be as noted in Table PS4302/13

(f) Pre-coating of aggregate

Replace “4302(d)” with “PS4302(d)”

(g) Bitumen-rubber seals

In Table 4403/2 for 14mm nominal aggregate size change the nominal rate of application of tack coat from “2.1” to “2.2”.

PS.4404 MEASUREMENT AND PAYMENT

*Amend item 44.05 as follows;
Replace the entire payment item with:*

Item	Unit
“PS44.05 Pre-coating of aggregate (using petroleum based pre-coating fluid):	
(a) 7mm.....	cubic metre (m ³)
(b) 10mm.....	cubic metre (m ³)
(c) 14mm.....	cubic metre (m ³)

The unit of measurement for the pre-coating of aggregate shall be the cubic metre of aggregate so treated as specified in the schedule of quantities and measured in haul vehicles or in stockpile.

The tendered rate shall include full compensation for furnishing the equipment and materials and pre-coating of aggregate, including the handling, stockpiling and protection of the stockpiles against inclement weather.”

Add the following item:

Item	Unit
“PS44.10 Moving of Seal paving team in excess of a 10km radius:	
Single Seal paving team.....	No.

The unit of measurement shall be the number (No.) of times the Machines and Equipment are moved in access of more than 10km by lowbed, as approved by Employer’s Agent Representative.

The tendered rate shall include full compensation for loading, transporting, off-loading, and all labour, supervision, and equipment for the safe moving of the seal team and plant.

SECTION 4800: TREATMENT OF AN EXISTING SURFACE EXHIBITING CERTAIN DEFECTS**PS4802 MATERIALS****(a) Bituminous binders**

Add the following to the first paragraph:

“The classification of modified binders for crack sealing shall be as shown in Table PS4801

TABLE PS 4801

Classification of Modified Binders for Crack Sealing	
Modified Binder Class (C)	Application
C-E1	Crack sealant – hot applied elastomer modified
CC-E1	Crack sealant – emulsion elastomer modified
C-R1	Crack sealant – hot applied bitumen rubber

The binder to be used on this contract for the sealing of cracks shall be C-E1 modified binder crack sealant. The minimum required properties of crack sealant are shown in Table PS4802

TABLE PS4802

Properties for modified binder crack sealants

	Unit	Test Method	C-E1	CC-E1	C-R1
Softening point (R&B)	°C	MB-17	80 (min)	70* (min)	55-65
Elastic recovery @ 15°C	%	MB-4	80 (min)	50* (min)	N/A
Flow @ 60 °C	mm	MB-12	Nil	Nil	15-70
Resilience @ 25 °C	%	MB-10	N/A	N/A	13-40
Dynamic viscosity @ 190°C	dPa.s	MB-13	N/A	N/A	20-40
Dynamic viscosity @ 170°C	dPa.s	MB-13	N/A	N/A	N/A
Dynamic viscosity @ 165°C	Pa.s	MB-18	0.65 (max)	N/A	N/A
Dynamic viscosity @ 25°C	Pa.s	MB-18	N/A	0.8(max)	N/A
Binder content (m/m)	%	MB-22	N/A	55 (min)	N/A

* Note: Value to be determined on the residue after recovery of the binder by evaporation method MB-20.

PS4803 PLANT AND EQUIPMENT**(b) Equipment for crack sealing**

Replace this entire subclause with the following:

“The contractor shall inter alia provide the following equipment for crack sealing:

(i) Blowing out cracks

A mobile compressor capable of discharging at least 3 m³/min compressed air at 650 kPa pressure. The compressed air shall be free of deleterious matter that may adversely affect the bond between the sealant and the cracks. The compressor shall be free of oil and diesel leaks.

A lance shall be used to direct the force of the air into the cracks and must be maneuverable enough to follow the path of the crack accurately.

(ii) Sealant applicator

The sealant shall be applied through an applicator manufactured specifically for this purpose. Essentially the equipment for the hot sealant shall consist of a mobile vessel capable of heating the sealant to the required application temperature by indirect heat, controlled by a thermostat to prevent overheating. A calibrated thermometer shall be fitted in an accessible position to accurately measure the sealant temperature in the tank. Only pumps which can deliver the sealant to the crack in a controlled fashion shall be used.

The sealant shall only be applied with pressure type application equipment to ensure that the cracks are filled rather than covered.

The contractor shall ensure that all equipment is kept clean so as to prevent blockages and resultant poor workmanship.

PS4804 CONSTRUCTION**(f) Sealing cracks****(ii) Preparation**

Add the following:

“The cracks shall be blown out with compressed air. All dirt, grit and other base or foreign matter shall be blown out and be removed from the cracks and road surface.”

(iii) Cracks smaller than 3mm

Add the following:

“No cracks smaller than 3 mm width shall be sealed unless so ordered by the Employer’s Agent.”

(iv) Cracks of 3mm and wider

Add the following:

“Cracks shall first be cleaned before the crack is sealed. The sealant shall be forced into the cracks by means of the specified sealant applicator. The contractor shall ensure that the sealant mixture actually penetrates the crack and does not merely cover the crack in the form of a bandage. All excess sealant on the road surface wider than 30mm on each side of the crack and 1mm thick shall be removed, and will not be paid for.”

(v) Restrictions

Add the following at the end of the second paragraph:

“This re-application forms part of the measured meter of crack completed and will not be measured separately.”

Add the following:

“Crack sealing shall not take place when the conditions are excessively windy or dusty as determined by the Employer’s Agent or Employer’s Agent’s Representative.”

PS4807 MEASUREMENT AND PAYMENT

Add the following items:

PS48.03a Slurry seal

Item	Unit
(a) Tack coat using 60% bitumen emulsion (cationic applied at 0.6 l/m ²)	litres (l)

Item	Unit
<i>(f) For texture improvement with natural or crusher sand applied by hand</i>	<i>cubic metre (m³)</i>

The unit of measurement for tack coat (PS48.03 (a)) shall be the litre of emulsion measured at spraying temperature and applied as specified.

The unit of measurement for slurry (PS48.03 (f)) shall be the cubic metre applied as specified.

The tendered rates shall include full compensation for procuring and furnishing all the materials, cleaning the roadway, for mixing and applying the slurry, demarcating all areas to be treated and for all plant, labour and incidentals necessary to complete the work as specified, Irrespective of the number of applications required to attain the required thickness.

PS48.04 Screed of asphalt or coarse slurry

Item	Unit
<i>d (i) Type 1 aggregate with 60% stable grade emulsion and cement filler</i>	<i>cubic metre (m³)</i>

Item	Unit
<i>d (ii) Type 1 aggregate with 60% stable grade emulsion, 3% latex and cement filler</i>	<i>cubic metre (m³)</i>

The unit of measurement for coarse grade slurry shall be the cubic metre of slurry applied as specified.

The tendered rate for slurry shall include full compensation for procuring and furnishing all materials, cleaning the roadway, for mixing and applying the slurry, demarcating all areas to be treated and for all plant, labour and incidentals necessary to complete the work as specified, Irrespective of the number of applications required to attain the required thickness.

“PS48.14 Cleaning, Applying of Herbicide, Supplying Sealant and Sealing cracks

Item	Unit
<i>Cleaning crack with compressed air, applying a herbicide/weed-killing, and sealing the cracks using Class CH-E1 modified binder crack sealant</i>	<i>metre (m)</i>

The unit of measurement for sealing of cracks shall be the metre of crack seal applied as specified.

The tendered rates shall include full compensation for blowing/cleaning the cracks, supply and application of herbicide and mixing, heating (where required) and applying all the materials as specified, and for all equipment, labour, supervision and incidentals for completing the work. No additional payment will be made for multiple applications of material, and payment will not distinguish between the various types, widths or lengths of cracks.

“PS48.15 Moving of Slurry Seal paving team in excess of a 10km radius:

Item	Unit
<i>Moving of Slurry Seal paving team (incl. plant and materials)</i>	<i>No.</i>

The unit of measurement shall be the number (No.) of times the Machines and Equipment are moved in access of more than 10km by lowbed, as approved by Employer's Agent Representative

The tendered rate shall include full compensation for loading, transporting, off-loading, and all labour, supervision, and equipment for the safe moving of the seal team and plant.

PS48.16 Emulsion variation to slurry seal mix design

Item	Unit
<i>Emulsion variation to slurry seal mix design</i>	<i>l</i>

The unit of measurement of emulsion in respect of variations in the specified mix designs shall be litre. Payment for variations shall be made as specified in clause 1213.

PS48.17 Supply and install 200mm wide crack sealing system to manufactures specifications

Item	Unit
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The crack sealing strips (nonwoven continuous filament polyester Paving Fabric, or similar approved) shall be laid where instructed by the Employer's Agent Representative, over the cracks where the sealant has already been applied. The tack coat shall then be applied on the strip before asphaltting the surface.

The tendered rates shall cover full compensation for procuring the material, cutting, applying the tack coat and laying the strip as per the manufactures instruction/specifications.

<i>(b)Crack sealing strip (to manufactures specifications inclusive of tack)</i>	<i>metre (m)</i>
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PS46.08 Extra over items PS48.03 and PS48.04 for work in areas inaccessible to mechanical equipment

Item	Unit
<i>E/O for work in restricted areas</i>	<i>Square metre (m²).</i>

The unit of measurement shall be the square metre (m²) of seal constructed in restricted areas which is inaccessible to mechanical equipment, as approved by Employer's Agent Representative

The tendered rate shall include full compensation for all additional costs for executing the work in areas inaccessible to mechanical equipment. Payment shall not distinguish between the various types of binders or various sizes or grades of aggregate.

RAPID DRYING SLURRY: MICROSURFACING**PS.4801: SCOPE**

Add the following:

This supplements Section 4300, Asphalt Pavements and Seals of the COLTO Standard Specifications for Road and Bridge Works for State Road Authorities (1998 Edition). In the event that any part of it is at variance with the standard specification, these special conditions shall apply.

The Rapid Drying Slurry application will be required to have the following special properties;

- i) Improved functional properties such as high skid-resistance and resistance to wear
- ii) Provide some leveling and riding-quality improvement
- iii) Overlays can be applied in a single pass in thicknesses varying from 6 to 12 mm
- iv) Ruts up to 50 mm deep can be successfully filled
- v) Be quick curing - the formulation of the product shall be such that complete curing will take place within a maximum of 4 hours, regardless of the climatic conditions during construction, to allow opening to traffic.
- vi) Minimal traffic disruption
- vii) Environmentally friendly – no heating required – no harmful emissions

PS.4802: MATERIALS

Add the following:

(d) Rapid drying emulsion

The emulsion to be used in preparing the rapid drying slurry applications shall be cationic, quick-set and modified with a polymer to comply with the requirements for an AC-E1 (overlay) and AC-E2 (rut-fill) binder as stipulated in Table 11, Technical Guideline TG1, The use of modified bituminous binders in road construction, 2019. The emulsion must be specially formulated to allow for a time of between 90 and 240 seconds when mixed with the selected aggregate, to ensure sufficient setting time of the mix during placing

(i) Chemical additive

The rapid drying system should include a chemical additive to control the breaking rate of the emulsion

(ii) Cement

Portland Cement conforming to the requirements of SANS 50197.

(iii) Aggregates

The aggregate for slurry seals shall be an approved crusher sand obtained from a parent rock having a 10 % FACT value (dry) of at least 150 or a mixture of such crusher sand and an approved clean natural sand, where the mixture does not contain more than 25 % of natural sand. The aggregate shall be clean, tough, durable, and angular in shape and shall comply with the grading requirements given in Table 1 for the slurry and the grade or type of aggregate specified.

Aggregate for the particular application shall be specified in the Contract Documentation

Table 1: Grading requirements for slurry seals

Sieve size (mm)	Percentage passing sieve, by mass				
	Fine slurry			Coarse slurry	
	Fine Grade	Medium Grade	Coarse Grade	Type 1	Type 2
14					100
10				100	85-100
7.1		100	100	85-100	70-90
5	100	82-100	70-90	70-90	60-80
2	90-100	56-95	45-70	45-70	40-60
1	65-95	37-75	28-50	25-45	25-45
0.600	42-72	22-50	19-34	15-30	15-30
0.300	23-48	15-37	12-25	10-20	10-20
0.150	10-27	7-20	7-18	6-15	6-15
0.075	1-15	4-15	2-8	4-10	4-10

The sand equivalent determined in accordance with SANS 3001 - AG5, shall be at least 35.

In addition, unless otherwise specified, for rapid setting slurries the supplier shall assess the compatibility of the binder offered with aggregates from suitable sources nearest to the site prior to tender closure.

Aggregate for Microsurfacing

The aggregate shall consist of a continuously graded crusher dust, conforming to the specifications in Table 2.

Table 2: Grading requirements for microsurfacing

Sieve size (mm)	Type II Percentage Passing	Type III Percentage Passing	Stockpile Tolerance
	Overlay or Rut fill (up to 12 mm)	Rut fill (more than 12 mm)	
10	100	100	
7.1	100	85-100	5%
5	90-100	70-90	5%
2	65-90	45-70	5%
1	45-70	28-50	5%
0.600	30-50	19-34	5%
0.300	18-30	12-25	4%
0.150	10-21	7-18	3%
0.075	5-15	5-15	2%

Table 3: Quality requirements for crusher dust

DESCRIPTION	LIMITS
Aggregates crushing value (TMHI, method BI)	Max.21
Sand equivalent value (TMH1, method B19)	Min.35
Methylene Blue values (Colas method)	5 – 12
Soundness (ASTM C88)	15% max. using Na ₂ SO ₄

(e) Composition of the Rapid Drying Slurry Mix

The suppliers of the rapid drying slurry emulsion shall perform a design on the crusher dust selected for the contract. The following tests will be performed on the rapid drying slurry mix to determine the optimum binder content:

- i) Maximum binder content - Sabita Manual 28
- ii) Minimum binder content using the Wet Track Abrasion method – ASTM
- iii) Mixing time
- iv) Setting time

The bulk relative density of the crusher dust will be determined to facilitate conversion of mass to volume proportioning of the mix.

The design will be presented to the *Employer's Agent* for approval before commencement of the work.

(i) Nominal mix composition - rapid drying slurry overlay

Table 4: Nominal mix proportions

DESCRIPTION	QUANTITY
Crusher dust	1 m ³
Portland Cement	1 – 2 % m/m of crusher dust
Rapid Drying emulsion	180 – 200 litres
Water	120 – 130 litres (approx..)

For tender purposes, an emulsion content of 180 litres/m³ crusher dust should be assumed.

(ii) Nominal mix composition - rapid drying slurry rut-filling application

Table 5: Nominal mix proportions

DESCRIPTION	QUANTITY
Crusher dust	1 m ³
Portland Cement	1 – 2 % m/m of crusher dust
Rapid drying emulsion	165 – 175 litres
Water	135 – 145 litres (approx..)

(f) Quality Control for rapid setting slurry:

The Contractor is required to take samples of the final mixed rapid setting slurry, of a minimum of one (1) sample per truck load for quality control testing to ensure that the product is in accordance to the specifications and relevant mix designs. These results must be submitted to the Employer's Agents Representative within 7 days of sampling on-site. This requirement is to be included in the Contractors tendered rates and there shall be no separate payment for compliance to this requirement.

(g) General Notes:

Although the crusher dust may conform to the grading requirements and the requirements stipulated in Table 1 of this section, the suppliers of the rapid drying emulsion must assess the compatibility between the crusher dust and the rapid drying emulsion. The compatibility is determined by the electrostatic attraction between the aggregate and the emulsion. The Methylene Blue test gives a rough indication of the electrostatic properties of the aggregate, but final compatibility will be determined by the mixing test and the setting time of the final mixture.

Ball penetration (SANS 3001-BT10), corrected for the expected road surface temperature (refer SABITA Manual 40), on the product (microsurfacing) shall reduce to less than 2,0 mm within a period of 4 weeks.

PS.4803: PLANT AND EQUIPMENT

Add the following:

Section 4203 of COLTO; Standard Specifications for Road and Bridge Works, shall apply

(d) Mixing Equipment Plant

The rapid drying slurry machine shall be specifically designed and manufactured to lay rapid drying slurry. The material shall be mixed by a self-propelled mixing machine which shall be a continuous-flow mixing unit able to accurately deliver and proportion the aggregate, rapid drying emulsion, Portland

Cement, break control additive and water to a revolving multi-blade, double shafted mixer and discharge the mixed product on a continuous flow basis. The machine shall have sufficient storage capacity for the aggregate, emulsion, cement, control additive and water and maintain an adequate supply to the mixer. The machine shall be equipped with the necessary instrumentation to accurately indicate the quantities of the component materials consumed.

(e) Spreading Equipment

(i) Spreader box

The mixture shall be continuously agitated and spread uniformly in the spreader box by means of twin-shafted paddles fixed in the spreader box. The spreading width of the box should be adjustable whilst the spreading operation is in progress. The spreader box should be sealed off with rubbers to ensure no loss of mixture on the front and sides of the box. The rear rubber seal shall act as the final strike off and shall be adjustable to ensure the required thickness of the rapid drying slurry layer is achieved. The spreader box shall have a suitable means provided to side shift the box to compensate for variations in the pavement geometry.

(ii) Rut-filling box

Ruts of 12 mm or deeper shall be independently filled with a rut-filling spreader box capable of extending to a width of 1,2 m. The box will be fitted with twin shafted paddles. The rut-fill box should also be fitted with a suitable strike-off capable of placing the wet material with a crown, and allow for return compaction when the material has cured. Similar to the spreader box above, the rut-fill box should be sealed off with rubbers to ensure no loss of mixture on the front and sides of the box.

PS.4804 CONSTRUCTION AND WEATHER LIMITATIONS

Add the following:

(h) Weather

Spreading can be undertaken when the ambient temperature is between 4 and 35 ° C. No spreading shall be undertaken during rain or when rain is imminent

(i) Moisture and surface requirements

Rapid drying slurry can be applied on surfaces that are slightly damp. The rapid drying slurry should not be applied on surfaces that are excessively smooth as slippage of the layer may occur.

(1) PLACING AND FINISHING

(a) Surface Requirements

- (i). Immediately before applying the rapid drying slurry, the surface shall be cleared of all loose material, silt spots, vegetation and other objectionable materials.
- (ii) Manholes and other service entrances shall be protected from the rapid drying slurry by a suitable method.

(b) Spreading Of Mixture

When required by local conditions, the surface shall be pre-wetted by a light spray of water ahead of the spreader box. The rate of application of the water spray shall be adjusted during the day to suit temperatures, surface texture, humidity and dryness of the pavement

The rapid drying slurry shall be of the desired consistency upon leaving the mixer. A sufficient amount of material shall be present in all parts of the spreader box at all times to ensure complete coverage of

the road surface. Overloading of the spreader box should be avoided. No lumping, balling or unmixed aggregate shall be permitted to escape from the spreader box.

No streaks, such as those caused by oversized aggregate, shall be left in the finished surface.

A damp hessian drag should be pulled over the freshly placed material to ensure a uniform textured surface.

(c) Joints

No excess build-up, uncovered areas or unsightly appearance shall be permitted on longitudinal or transverse joints. The spreader box should be of sufficient width to allow a minimal number of longitudinal joints. Half passes or odd-width passes will only be used in minimal amounts. A maximum of 75 mm shall be allowed for overlap on longitudinal joints.

(d) Mix stability

The rapid drying slurry shall possess sufficient stability to prevent premature breaking of the material in the mixing or spreader box. The mixture shall be homogeneous during and after mixing and spreading. It shall be free of excess water or emulsion and free of segregation of the emulsion and aggregate fines from the coarser aggregate.

(e) Handwork

Areas which cannot be reached with the spreader box shall be surfaced using hand squeegees to provide complete and uniform coverage. If necessary, the area to be surfaced by hand shall be slightly dampened prior to mix placement. Care shall be exercised to leave no unsightly appearance from handwork. A light hessian drag should be applied over areas where handwork has been done.

2. COMPACTION

It is not normal practice to roll rapid drying slurry overlays, as the thin layers are easily compacted by normal vehicular traffic. On the thicker, rut-filling overlays, it may be necessary to roll the application 2 – 3 passes with a 25 to 28 tonne pneumatic tyred roller. Care should be taken to avoid rolling the application before the mix has set sufficiently as this can cause polishing of the surface and lead to entrapment of the water in the mix.

PS.4807 MEASUREMENT AND PAYMENT

Add the following:

PS48.03 Slurry Seal:

Item

Unit

(g) *Microsurfacing (type indicated)*

cubic metre (m³)

The unit of measurement shall be the cubic metre applied as specified.

The tendered rates shall include full compensation for procuring and furnishing all materials, quality control testing on constituent material and final product testing (to ensure product is constructed to specification), demarcating the areas to be slurried, cleaning the road surface, mixing and applying the microsurfacing, rolling, sweeping and for all plant, labour and other incidentals necessary to complete the work as specified, irrespective of the number of applications required to attain the required thickness.

SECTION 5400 : GUARDRAILS**PS5402 MATERIALS****(a) Guardrails**

Add to Sub-clause 5402(a) the following:

All holes in guardrail sections shall be drilled prior to galvanising. The Contractor shall submit SABS test certificates certifying the galvanising complies with the specification.

End treatment will involve the dipping of the last 3 sections of guardrails into the ground as detailed on the drawings.

PS5404 REQUIREMENTS

After the first paragraph at the start of Clause 5404, add the following :

The vertical tolerance to which the completed guardrail shall comply shall be 3 mm. On straights and on curves the completed guard-rail shall not be out of line by more than 10 mm and 15 mm respectively.

PS5404 MEASUREMENT AND PAYMENT

PS54.01 Remove the words that read "Guardrails on timber posts" in item 54.01 and replace with "Guardrails on concrete posts, in accordance to standard drawing no. 38580"

Add the following item:

PS54.05 Additional guardrail posts

Item	Unit
(c) Concrete	No.

The unit of measurement for additional guardrail posts shall be the number erected over and above those erected in accordance with the normal spacing shown on the drawings.

The tendered rates shall include full compensation for supplying and installing additional posts complete as specified, excavating the necessary holes, erecting the posts, and backfilling the holes.

PS54.07 Removal of existing guardrails

At the end of the last sentence of item 54.07, add the following:

"and protecting of the existing guardrails for re-use"

PS54.09 Re-erection of guardrails with recovered materials**PS54.09.01 Item****Guardrails including concrete posts**

(a)	Unit
Single guardrail	No.
Double guardrail	No.

The unit of measurement for shall be the metre of single or double guardrail including concrete posts, re-erected with used/re-covered materials, and measured between the points where they are joined to the end units.

The tendered rates shall include full compensation for re-erecting the guardrails including concrete posts, including the loading, transporting between any two points on the site and off-loading the material, and making neat the site area where the guardrails and concrete posts were removed by backfilling with topsoil as necessary.

PS54.09.02 Item**Guardrails only**

- (c) *Single guardrail*
- (d) *Double guardrail*

Unit

- No.*
- No.*

The unit of measurement for shall be the metre of single or double guardrail, re-erected with used/re-covered materials, and measured between the points where they are joined to the end units.

The tendered rates shall include full compensation for re-erecting the guardrails, including the loading, transporting between any two points on the site and off-loading the material and making neat the site area where the guardrails and concrete posts were removed by backfilling with topsoil as necessary.

SECTION 5600 : ROAD SIGNS

Replace this section of the specification with the following:

DESCRIPTION OF WORKS

This specification covers requirements for all labour, materials, transport, plant and equipment for the manufacture, delivery and installation of traffic signs and posts as and when required by the Roads Provision Department:-

- i. Manufacture of the signs.*
- ii. Supplying all posts, nuts, bolts and washers etc. (stainless steel grade 304), and clamps for the assembly and erection of the signs.*
- iii. Transporting and installation of the posts, and signs.*
- iv. Removal and disposal of damaged posts and signs.*

All signs shall be manufactured fully in conformity with the latest Southern African Development Community Road Traffic Signs Manual (SADCRTSM), the Road Traffic Act (RTA) and SABS 1519-1990.

PS 5600 ROAD SIGNS**PS 5601 MATERIALS**

1.1. Only new material shall be used.

1.2. The backing shall be 1.4mm chromadek sheeting

1.3. Preparation and painting shall be carried out in accordance with CKS 193-1977 and the paint system shall be as follows:-

1.3.1 PVC plastical system having a 150 micron min.dry film thickness on each side of the sheet.

1.3.2 The coat on the back face of the sign sheeting shall be grey in colour G29 to SABS 1091 or similar.

1.3.3 Where sign backings are to be faced with retro-reflective background material, application shall be carried out as per the manufacturer's instructions.

1.3.4 When tested with a straight edge the flat surface of the sign shall not deviate from a true plane by more than 0.25% of the test length. The min test length shall be 1m.

1.3.5 Bolts washers and nuts shall be stainless steel grade 304 bolts manufactured to SABS 136.Nuts shall be locking 'nyloc' or equally approved.

1.3.6 Blind rivets shall be 48mm diameter and non-corrosive.

1.4. All steel sections shall be hot dip galvanised in accordance with SABS 763.

1.5. The Contractor shall ensure that the signs and supports supplied by the manufacturers are correct in all respects

PS 5602 MANUFACTURE OF SIGNS

Retro-reflective Sheeting

2.1 All sheeting used in the manufacture of signs must be approved by the South African Bureau of Standards

2.2 All Class 1 sheeting used for the manufacture of the signs shall carry an identifying mark and shall be Class 1, 7 year engineer grade retro-reflective material and shall comply with the minimum standards for Class 1 sheeting. Where Class 3 sheeting is specified, it shall comply with the minimum standards for Class 3 sheeting.

- 2.3 *All sheeting used in the manufacture of the sign must be approved by the South African Bureau of Standards in terms of performance and retro-reflective sheeting material.*

Only Class 1 and Class 3 sheeting is to be used and must comply with the minimum standards for Class 1 and Class 3 sheeting. All retro-reflective sheeting must comply with SABS 1519. The contractor shall provide the necessary SABS certificates for the various sheeting used in the manufacture of the signs.

- 2.4 *The application of all retro-reflective sheeting shall be carried out as per the manufacturers' instructions.*
- 2.5 *The entire sign, except where otherwise specified, shall be manufactured using 7 year engineer grade retro-reflective material, i.e. the background, border and symbol shall be reflective except where the symbol is black semi-matt. Silk screening with inks shall not be permitted on any signs. The signs shall be manufactured using a single piece of retro-reflective sheeting for the background and symbols as necessary.*

PS 5603 SIGN BACKING MATERIAL

- 3.1 *The backing material of all signs shall be 1,4mm thick Chromadek sheeting or otherwise specified.*
- 3.2 *All sheeting used for signs shall be new, and refurbished backings shall not be accepted.*
- 3.3 *The cut edges shall be true and smooth and free from burrs or ragged breaks.*
- 3.4 *All triangular backings for standard traffic signs are to have the corners shaped to comply with the latest edition of the SADCRTSM ie. The corners shall be rounded to the radius as specified in the manual.*
- 3.5 *The colour on the back of all signs shall be grey except for STOP signs where the colour shall be white semi-matt, in accordance with the SADCRTSM*
- 3.6 *Drilling of Signs and Fixing of Uni-struts to Signs*
- 3.6.1 *All signs shall be drilled, or fitted with uni-strut channels, as shown on the attached annexures. Regulatory and warning signs shall be drilled on the vertical centre line as shown.*
- 3.6.2 *The diameter of the holes shall be 12mm. All holes must be drilled prior to the application of retro-reflective sheeting. All holes shall be perpendicular to the principal surface and free from burrs. Holes shall not be drilled in such a manner as to distort the metal.*
- 3.6.3 *Drilling details for sign backings are attached. Dimensions are given to the centre of the drilled holes.*
- 3.7 *Samples*
- 3.7.1 *The Contractor shall deposit samples of :-*
- a) *A STOP sign (R1 - 600mm)*
- b) *A children ahead warning sign (W 308 - 900mm)*
- All samples shall be deposited at the offices of the Employers Agent, at the Roads Provision Dept. at 30 Archie Gumede Place.*
- 3.7.2 *The Employers Agent reserves the right to subject samples to such tests as may be deemed reasonable and necessary.*
- 3.7.3 *The samples of the signs will be retained for comparison with the goods supplied.*
- 3.8 *Details on Sign*
- The manufacturer will be required to affix a sticker to the back of every sign that he manufactures. The sticker must be durable and last as long as the guarantee on the signs and shall bear the name of the manufacturer and the month and year of manufacture.*

3.9 Double Sided Signs

Double sided signs will have identical details on both faces of the chromadek sheet. It will be clearly indicated in the schedule of quantities which signs are double sided.

3.10 Exclusive Secondary Message Sign

The regulatory sign and the exclusive secondary message sign shall be incorporated onto a single chromadek backing. The bottom corners of the sign backing shall be rounded to the radius as specified in the SADCRTSM.

3.11 One Way Roadway Sign

Backings for this type of sign shall have four 12mm diameter holes drilled as shown on the drilling detail. The corners of all one way roadway sign backings shall be rounded to the radius as shown in the SADCRTSM.

3.12 Specification for W407 to W410

Signs W407 to W410 shall be manufactured with a 1mm chromadek backing, white class 1 retro-retro-reflective background and red class 3 chevrons. The signs shall be rivetted onto a hot dipped galvanised frame manufactured 32mm square tube (2mm wall thickness). Mounting hooks shall be welded onto the frame and drilled prior to galvanising. Mounting hooks shall be 30 x 5mm thick flat bar.

PS 5604 TRANSPORT AND PACKAGING OF SIGNS

The contractor shall ensure that all signs are properly packaged and protected against damage during storage and transportation. Any damaged signs shall be returned to the contractor for repairs/replacement.

PS 5605 EXCAVATION AND BACKFILLING FOR ROAD SIGN SUPPORTS

Road signs shall be erected in the positions shown on the drawings or indicated by the Employers Agent. The unit of measurement shall be the number (no) of excavation measured in place according to the neat dimension of the footings or excavations as shown on the drawings or directed by the Employers Agent. In the case of timber or aluminium posts not in concrete, the plan area of the excavated hole shall be taken as 0,15 m² irrespective of the actual size of the excavated hole. All excavation shall be carried out by hand with the contractor exercising due care when working near underground services. If any service is damaged, the contractor shall bear the cost of the repair to such service. The contractor shall ensure that the work site is safe before leaving it. All holes excavated for post planting shall be backfilled at the end of the working day and all spoil shall be removed from site within 48 hours. Where excavation is required to be done in a hardened sidewalk, items for these are included in the bill of quantities. The re-instatement of sidewalks has also been included in the bill of quantities.

PS 5606 RE-INSTATEMENT SIDEWALKS

All sidewalks to be re-instated to comply with Section PS 4200, Item PS 4212 – Patching or reconstruction of existing asphalt sidewalk / driveway access scoops.

PS 5607 SUPPLY OF POSTS FOR THE INSTALLATION OF SIGNS

This specification will require the supply and installation of the types of posts specified below:-

7.1. *Wooden posts of varying diameters and lengths*

Timber posts for road sign supports shall conform to the requirements of SABS 754, shall be equal to or better than strength group B timber posts and shall be stamped with the SABS mark. The posts shall be treated in accordance with creosote or copper-chromium-arsenic (CCA) compounds which complies with SABS 753. After the posts have been treated, they shall not be sawn, drilled or shaped.

Where, however, the cutting of posts is unavoidable after having been treated, the Employers Agent may permit the required length to be cut off from the bottom of a post, provided that the exposed area is subsequently thoroughly treated with creosote or CCA compounds.

Timber posts shall not exhibit excessive cracking at the ends. Posts which, in the opinion of the Employers Agent, exhibit a degree of cracking that would render them unfit for service during a much shorter than normal life shall not be used.

7.2. *76mm diameter (2mm wall thickness) hot dipped galvanised posts of varying lengths*

Where, the cutting of posts is unavoidable after having been treated, the Employers Agent may permit the required length to be cut off from the bottom of a post, provided that the exposed area is subsequently thoroughly treated as per manufacturers specification to avoid rusting / deterioration.

PS 5608 TRANSPORT AND INSTALLATION OF POSTS

The installation of posts shall be carried out as specified below:-

8.1. *Posts shall be soilcreted into position*

8.2. *Posts shall be placed into position and the backfill earth compacted*

8.3. *Posts shall be placed in position, in the case of sleeves at the end of traffic islands, the sleeve shall then be backfilled with river-sand or the post may be secured in position with the use of polystyrene wedges.*

8.4 *The post shall be set to a depth of 600-700mm. The minimum distance between the ground and the lowest portion of the sign shall be 2100mm, and a maximum distance of 2500mm, unless otherwise specified.*

8.5 *Soilcrete shall consist of 1 part cement and 12 parts granular sand such as river sand and adequate water to cause the materials to react and set.*

Excess lengths of the posts to be cut off and appropriately treated as mentioned in this specification.

PS 5609 REMOVAL AND DISPOSAL OR RE-ERECTION OF DAMAGED POSTS AND SIGNS

9.1 *Where ordered by the Employers Agent, the contractor shall dismantle existing road signs and / or posts, store them, and re-erect them at new positions indicated. This work shall be done with as little damage as possible to the signs*

9.2 *Where ordered by the Employers Agent, the contractor shall dismantle existing road signs and / or posts, and dispose of.*

PS 5610 INSTALLATION OF SIGNS

Signs may be installed on new and existing posts or ELP's (as instructed by the Employers Agent) by various methods as outlined below:-

- 10.1. *With the use of stainless steel bridges, clips and strapping (two per sign)*
- 10.2. *With the use of uni-strut clamps (two pairs)*
- 10.3. *With the use of stainless steel self-tapping coach bolts, where the signs are being installed on wooden posts.*

Signs shall be installed at the correct heights as per the SADCRTSM.

PS 5611 SUPPLY OF VARIOUS FASTENERS

- 11.1 *All bridges, clips and strapping shall be stainless steel grade 304. Bridges shall be supplied with a washer.*
- 11.2 *Uni-strut clamps shall be galvanized and shall be supplied in pairs, in various sizes as required. Bolts (M8x45), washers (x2) and nuts used to fasten the uni-strut clamps shall be stainless steel grade 304.*
- 11.3 *Self-tapping M8 coach bolts shall be stainless steel grade 304.*

PS 5612 PROTECTION AND MAINTENANCE

The contractor shall protect the completed road signs against damage until they have been finally accepted by the employer, and he shall maintain the road signs until the completion certificate has been issued. Damage or defects caused by negligence or faulty workmanship shall be rectified by the contractor at his own cost to the satisfaction of the Employers Agent.

MEASUREMENT AND PAYMENT**PS 56.01 SUPPLY OF TRAFFIC SIGNS**

This item covers road sign boards with painted or coloured semi-matt background, symbols, lettering and borders in Class 1 retro-reflective material, where the sign board is constructed from pre-painted galvanised steel plate (1.4 mm chromadek).

The tendered rate shall include full compensation for procuring and furnishing all the materials, and for manufacturing and supplying the completed road sign board, including amongst others galvanizing (if specified), drilling, painting, retro-reflective lettering, symbols, numbers, arrows, emblems and borders, and for all other materials, equipment, labour, supervision, transport, handling, etc necessary for the manufacture, supply and delivery of the sign board to the site.

Sign type and size to be as specified individually as indicated in the bill of quantities.

The unit of measurement shall be the number of completed single sign boards supplied.

PS 56.02 SUPPLY OF POST, BRACKETS, FASTNERS

The tendered rate shall include full compensation for procuring and furnishing all the materials, and for manufacturing and supplying the posts, including amongst others supporting framework, reinforcement, cross bracing, struts, fixing brackets, angle irons, channel profiles, nuts, bolts and for all other materials necessary, equipment, labour, supervision, transport, handling, etc necessary for the manufacture, supply and delivery of the post and installation accessories to the site.

- (i) *Post type, diameter and length to be as specified individually as indicated in the bill of quantities. The unit of payment shall be the number of posts supplied.*
- (ii) *Type of fastener to be as specified individually as indicated in the bill of quantities. The unit of measurement shall be the number of that fastener type supplied.*

PS 56.03 INSTALLATION OF POSTS

The tendered rate shall include full compensation for excavating, backfilling and compacting the backfill material, for the disposal of all surplus excavated material, and for providing the backfill material materials, equipment, labour, supervision, handling, etc necessary for the installation of the post on site. The supply of the cement is to be included in the construction rate. This rate excludes the supply of the posts, which is catered for in PS56.02

The unit of measurement shall be the number of posts installed.

PS 56.04 INSTALLATION OF TRAFFIC SIGNS

The tendered rate shall include full compensation for attaching the road sign board to the road sign support structure (new or existing posts) and for all other materials, equipment, labour, supervision, handling, etc necessary for the installation of the sign on site. This rate excludes the supply of the signs, which is catered for in PS56.01

Installation to be based on the type of fastener as specified individually as indicated in the bill of quantities.

The unit of measurement shall be the number of sign boards installed of that fastener type specified.

PS 56.05 REMOVAL AND DISPOSAL OF DAMAGED SIGNS AND POSTS

- (i) **Signs:** The tendered rates shall include full compensation for carefully dismantling and disassembling the road signs, loading, transporting, off-loading and disposing all the materials as required by the Employers Agent. It shall also include compensation for restoring the site where the road signs have been dismantled.

The unit of measurement shall be the number of signs dismantled and disposed off, irrespective of size of sign and type of fasteners.

- (ii) **Posts:** The tendered rates shall include full compensation for demolishing the concrete footings (if applicable) of existing signs to at least 200 mm below the adjacent ground level, disposing of the resulting debris at approved dumping sites provided, and cutting timber or steel support structures at not less than 200 mm below the adjacent ground level and disposing thereof.

The unit of measurement shall be the number of posts dismantled and disposed off, irrespective of

length and diameter of posts.

PS 56.06 REMOVAL AND RE-ERECTION OF SIGNS AND POSTS

- (i) *Signs: The tendered rates shall include full compensation for carefully dismantling and disassembling the road signs, storing the road signs, loading, transporting the material to the new location, off-loading and re-erecting the road signs, and restoring the location where they were dismantled.as required by the Employers Agent.*

The unit of measurement shall be the number of signs dismantled and re-erected, irrespective of size of sign and type of fasteners.

- (ii) *Posts: The tendered rates shall include full compensation for demolishing the concrete footings (if applicable) of existing signs to at least 200 mm below the adjacent ground level, disposing of the resulting debris at approved dumping sites provided, and cutting timber or steel support structures at not less than 200 mm below the adjacent ground level, loading, transporting the material to the new location, off-loading and re-erecting the support posts, and restoring the location where they were dismantled.as required by the Employers Agent.*

The unit of measurement shall be the number of posts dismantled and re-erected, irrespective of length and diameter of posts.

SECTION 5700 : ROAD MARKING**PS5701 SCOPE**

Replace “South African Road Traffic Signs Manual” in the second paragraph with:

“SADC Road Traffic Signs Manual”

Replace the words “ordinary road marking paint” with “solvent borne road marking paint”.

Replace “BS 3262” with “EN 1436”.

Replace “Hot melt plastic road marking” with “thermoplastic road marking”.

PS5702 MATERIALS

Insert the following before subclause (a) Paint:

“The selection of the appropriate road marking paint and materials for permanent road markings to ensure conformance with the requirements of this specification rests with the contractor. Such paint and material shall have technical characteristics (brightness, luminance, skid resistance, durability) equal to or greater than road marking paint and materials specified in subclauses 5702(a), (b) and PS5702(c).

Where plastic road-marking material (hot-melt plastic (also known as thermoplastic) and two-component (also known as cold plastic)) is used, the contractor shall obtain an approved guarantee from the manufacturer that the paint complies with the specification. This shall be submitted to the Employer’s Agent on request.”

Replace sub-subclause PS5702(a)(i) with the following:

“(i) Road marking paint

Road marking paint shall be Type 1 as specified in SANS 731-1. Only paint, manufactured in a SANS approved and accredited facility shall be accepted. The no-pick-up time of road-marking paint shall comply with the Class 1 requirement in accordance with SANS 731-1.

The paint shall be delivered at the site in sealed containers marked in accordance with SANS 731-1.

The viscosity of the paint shall be such that it can be applied without being thinned down.”

Replace sub-subclause PS5702(a)(iii) with the following:

“(iii) Thermoplastic road marking material

Thermoplastic road marking material shall comply with the requirements of EN 1436, and EN 1423: 1998 for drop-on glass beads for road marking and anti-skid aggregates and mixtures thereof. Blending of thermoplastic road marking material and glass beads shall comply with EN 1424: 1998.

The binder shall be an elasticized synthetic resin and the material shall be reflectorized by mixing in 25% by mass Class A glass beads in accordance with EN 1424: 1998. An additional topping of glass beads shall be applied to the hot surface of the material for instant retro-reflectivity.

The white road marking material shall contain 6% by mass minimum titanium dioxide content and shall have a skid resistance of 45 S.R.T. – units or higher. SABS Method 1248: 1995 shall be used for determination of traffic wear index; indication of durability.

The following minimum lumination values are required for the completed product:

- 250 mcd/m².lux & 120 mcd/m².lux for white & yellow lines respectively, at 30 days after application.
- 200 mcd/m².lux & 100 mcd/m².lux for white & yellow lines respectively, at 6 months after application.

Determination of coefficient of retro-reflected luminance by means of portable retro-reflectometer shall be carried out using SANS 6261: 2008. Application of the permanent roadmarking will thus have to be performed within the first 6 months of the 12 month defects liability period to allow for the second measurement to fall within the contract dates. Should the application of the permanent road-marking fall outside the first half of the defects liability period for whatever reason, the settlement of the retention money will be delayed until the second measurement of luminance can be performed at the stipulated time and the required adjustment can be made to the tendered rate (if required).

Two-component cold plastic road marking material shall be used for symbols, arrows and letters (hand painted markings) unless otherwise instructed by the Employer's Agent."

Add the following sub-subitem:

"(v) Cold plastic road marking material

Cold plastic road marking material shall be used for symbols, arrows and letters (hand painted markings) and shall consist of a solvent-free reactive acrylic resin, stuffing, beads and pigment to which a hardener shall be added. Application shall be carried out using a trowel. Application by paint brush shall not be permitted.

Cold plastic road marking material shall be reflectorized by mixing in 25% by mass (or 400 g/m²) Class A glass beads in accordance with EN 1424: 1998. An additional topping of glass beads is applied to the wet surface of the material after application and will comply with EN 1423: 1997."

b) Roadstuds

Replace the second sentence with the following:

"All square roadstuds shall have a footprint of 100mm x 100mm and a height of at least 20mm. Round roadstuds shall be 100mm in diameter and not less than 20mm in height."

Add the following sub-item:

c) Retro-reflective beads

Retro-reflective glass beads shall be applied to the wet paint, thermoplastic and cold plastic.

The beads shall comply with Class A beads in accordance with EN 1424: 1998, with the following requirements or as approved by the Employer's Agent:

- | | | |
|--------------------|---|--------------------------------------|
| • colour | : | crystal clear |
| • roundness | : | > 80% |
| • size range of | : | 14 – 200 US Mesh (75 – 1400 Microns) |
| • refractive index | : | > 1.5 |
| • specific gravity | : | ± 2.5 |
| • granulometry | : | |

CUMULATIVE RETAINED MASS		
SIEVE	MINIMUM	MAXIMUM
1700	0	2
1400	0	10
1180	5	30
850	40	80
600	70	100
425	80	100
355	90	100
212	95	100
PAN	100	100

The beads shall be delivered to the site in sealed bags, marked with the name of the manufacturer, the batch number and an inspection seal of SANS, confirming that the beads form part of a lot tested by SANS and comply with the requirements of EN 1424: 1998. Alternatively, the Contractor shall at all times have a SANS certificate on the site, identifying the batches to which the inspection seals apply and certifying that they have been tested by SANS, and comply with the requirement of EN 1424: 1998.”

PS5704 MECHANICAL EQUIPMENT FOR PAINTING

Add the following sentence at the end of the first paragraph:

”The road-marking machine shall be fitted with a device to guide the operator to the centre of the line to be painted. This device shall be used at all times of operation.”

PS5705 SURFACE PREPARATION

Add the following at the end of the second paragraph:

”The onus is on the contractor to ensure that the surface on which the road markings are to be applied is sufficiently clean and dry to ensure that the quality of the road markings will not be adversely affected. The contractor is also responsible for protecting road studs from being painted over, and the subsequent cleaning thereof if such over-painting did occur.”

PS5706 SETTING OUT THE ROAD MARKINGS

Insert the following before the first paragraph:

”Where road markings are to be replaced after any construction activity, it is essential that all existing road marking be accurately surveyed and referenced before commencement of such construction activities which will obliterate the existing road markings. The position of barrier lines shall be re-assessed on site by the Employer’s Agent before the contractor commences with the road marking.”

PS5707 APPLYING THE PAINT

Insert the following before the first paragraph:

”The Contractor’s establishment on site and general obligation shall be deemed to fully include the establishment of the road-marking team, irrespective of the number of times the road-marking team is required to be on site or is required to move within the site.

Replace the sixth paragraph with the following:

”Solvent borne road marking paint shall be applied at a nominal rate of 0,42 l/m² or as directed by the Employers Agent. Thermoplastic road marking shall be applied at a nominal rate of 2,5 kg/m² to achieve a minimum thickness of 1,25mm to 1,5mm or as directed by the Employers Agent. The two-component road marking material shall be applied by hand by means of a trowel. The desired symbol or line shall be marked with a tape or a template on the road surface. Thereafter apply the required volume of material and spread uniformly over the entire area. When dry/set, remove the tape or template. A spreading rate of 4,5kg/m² is estimated to achieve a 2,0mm material thickness.

In order to ensure proper coverage on all types of surfaces the Employers Agent may order an increase in the above nominal application rates. Payment for these variations in application rates shall be made under item 57.04.

A daily log-sheet, provided by the Employer, shall be completed and signed by the Contractor and the Employer's Agent representative, recording the quantities of paint and glass beads used on that day and shall be available for inspection at all times. The completed and signed log-sheet for the period covered by a payment certificate shall be attached to the payment certificate."

Replace the last paragraph with the following:

"Solvent-based road marking as specified by the Employers Agent shall be carried out within 14 days of opening the road full width to traffic after the completion of the surfacing.

If in the in the opinion of the Employers Agent, conditions are unsafe, the centre-line shall be painted immediately after 2,0 km of continuous road has received a new asphalt layer, or 4,0 km of continuous road has received a new seal surfacing."

PS5708 APPLYING THE RETRO-REFLECTIVE BEADS

In the first paragraph, replace the nominal application rate of 0,8kg/litre with "400gm/m²".

Replace the second paragraph with the following:

"The thermoplastic road marking material and two-component road marking material shall contain insitu glass beads of minimum content of 25% in order to obtain night visibility (reflectivity). The contractor shall immediately apply additional glass beads at 400g/m² to obtain immediate reflectivity. The beads shall be sprayed onto the road marking layer by means of a pressure sprayer. Where letter, symbol, traverse line and island road marking is undertaken by hand, the glass beads may be applied by hand if approved by the Employers Agent. Prior to any hand application work, the contractor shall first request approval from the Employers Agent."

Add the following:

"Beads shall be applied in accordance with EN 1424."

PS5710 TOLERANCES

Add the following paragraphs to subclause (c) Alignment of markings:

"When an unbroken line and a broken line are painted alongside each other, the beginning and the end of the unbroken line shall coincide with the beginning of one broken line and the end of another broken line. When existing lines are repainted, the new markings shall not deviate more than 100mm in the longitudinal direction nor 10 mm in the transverse direction from the existing marking.

The alignment of the road studs shall not deviate from the true alignment by more than 10mm and shall be positioned so that the reflective faces are within 5° of a right angle to the centre line of the road."

Add the following subclause:

"e) Testing

(1) Plant

Before painting any permanent road markings, the Contractor shall satisfy himself and the Employers Agent, by painting test lines on a section of pavement other than the section required to be marked:

- (i) that the painting machine is in good working order and properly adjusted;
- (ii) that the operator is fully experienced; and
- (iii) that the machine sprays at the specified rate of paint application.

The Contractor shall bear the cost of all materials and workmanship required for the above plant tests.

In addition, the Contractor shall conduct random paint thickness tests and dip/spread tests as required by the Employers Agent."

PS5711 GENERAL

Insert the following into the last sentence of the last paragraph between "black paint" and "or chemical paint remover":

" , bituminous emulsion, slurry"

Add the following to the last paragraph:

"Where black paint is used, it shall be matt."

Add the following clause:

"The Contractor shall provide temporary traffic control facilities in accordance with Section 1500 of the COLTO's standard specifications for road and bridge works to ensure traffic safety where work is being executed.

Property and/or road signs damaged by the Contractor, his personnel, his agents or sub-contractors shall be repaired or restored to their condition prior to the damage at his own cost."

PS5712 FAULTY WORKMANSHIP OR MATERIAL

Add the following paragraphs to this item:

"The Contractor shall rectify in an acceptable manner and at his own costs; all marking that do not comply with the specified requirements.

While work is in progress, tests shall be carried out on materials and/or the quality of work to ensure compliance with the specified requirements. The sampling methods are specified in SANS 731-1. The sampling methods described in TMH5 shall be followed where applicable."

PS5713 PROTECTION

Add the following paragraph

"Traffic cones shall not be smaller than 750mm in height and shall be placed on the road not further than 48m apart. Cones shall not be removed before the paint on the road has hardened to such an extent that it will not be damaged by traffic and the adhesive of the road studs has hardened to such an extent that the studs will not turn or become loose. All marks on the road caused by traffic driving over wet paint shall be removed by the Contractor at his own cost."

PS5714 MEASUREMENT AND PAYMENT

Amend the heading for payitem 57.03 as follows:

Item

Unit

"PS57.03 Thermo-plastic road-marking paint

metre (m)"

Amend the unit of measurement of items 57.03(a), 57.03(b), 57.03(c) from kilometre (km) to metre (m):

Add the following after the third paragraph:

"Full payment of the tendered rate will be applicable upon completion of the application of the road-marking paint. However, should the coefficient of retro-reflected luminance fall below the required

minimum levels as specified in paragraph PS5702 above, payment will be reduced on the following sliding scale :

White:

- Below 250 mcd/m2.lux at 30 days : minus 10 % of the tendered rate
- Below 200 down to 180 mcd/m2.lux at 6 months : minus 10% of the reduced rate
- Below 180 down to 160 mcd/m2.lux at 6 months : minus 20% of the reduced rate
- Below 160 down to 140 mcd/m2.lux at 6 months : minus 30% of the reduced rate

Yellow:

- Below 120 down at 30 days: minus 20 % of the tendered rate
- Below 100 down to 80 mcd/m2.lux at 6 months: minus 20% of the reduced rate

The reduction in the tendered rate applicable for failing to meet the specified minimum luminance level at the 30 days and 6 months measurement dates shall be applied accumulatively in the certificate immediately following the date of measurement.”

Amend payitem PS57.05 as follows:

“Item	Unit
PS57.05 Roadstuds (installation and maintenance)	number (No)”
(a) Heavy duty aluminium road stud (K-lite SKU-304 or similar and approved by Employers Agent)	No
(b) Glass dome road stud (Holophane type or similar and approved by Employers Agent)	No

Add the following after the first sentence of the second paragraph:

“No additional payment will be made should temporary or permanent road studs be replaced if lost or broken during the construction period or during the Defects Notification Period.”

Item	Unit
PS57.06 Setting out and pre-marking the lines (excluding traffic island markings, lettering and symbols)	kilometre(km)

Add the following:

“Referencing of existing barrier lines and other road marking lines prior to milling and other operations, shall be included in the tendered rate for setting out and pre-marking.”

Item	Unit
PS57.08 Removal of existing, temporary or permanent road Markings by:	square metre (m ²)

Add the following subclause:

“(c) Water Jetting	square metre (m ²)
--------------------	--------------------------------

Add the following payitems:

"Item	Unit
PS57.10 Cold plastic road marking material	
(a) White lettering and symbols	square metre (m ²)
(b) Yellow lettering and symbols	square metre (m ²)
(c) Transverse lines, painted island and arrestor bed markings (any colour)	square metre (m ²)

The unit of measurement for applying the roadmarking material for the lettering, symbols, transverse lines, islands and arrestor bed markings shall be the square metre, and the quantity to be paid for shall be the actual surface area of the lettering, symbols, transverse lines, islands and arrestor bed markings, completed in accordance with the instructions of the Employers Agent.

The tendered rate per square metre for applying the road marking material shall include full compensation for procuring and furnishing all material, including the retro-reflective beads and all necessary equipment, and for applying, protecting and maintenance as specified, including the setting out of lettering, symbols, transverse lines, islands and arrestor bed markings.

SECTION 5800: LANDSCAPING AND PLANTING PLANTS

Amend the following, wherever found in this section, to read:

Freehaul of 1.0km to read Freehaul of 10km

5809 MEASUREMENT AND PAYMENT

Revise the following pay items:

PS Item 58.04 Grassing**Unit**

- (a) *Planting of grass cuttings*
 (i) *Kikuyu*

square metre (m²)

The unit of measurement for planting grass cuttings shall be the square metre of established grass with an acceptable grass cover.

The tendered rate shall include full compensation for furnishing and planting the cuttings, watering, weeding, and replanting if necessary, and all other incidentals which may be necessary for establishing an acceptable cover and for maintaining the grass, except mowing.

- (c) *Hydroseeding*
 (iii) *Hydroseeding including the seed mixture for areas < 10,000m²*
 (iii) *Hydroseeding including the seed mixture for areas > 10,000m²*

square metre (m²)

square metre (m²)

The unit of measurement for hydroseeding shall be the square metre of grass established by hydroseeding, which has an acceptable cover.

The tendered rate shall include full compensation for procuring, furnishing and transporting the seed mixture, adding any anti-erosion compound if required, applying the mixture, watering, weeding, re-hydroseeding bare patches, and for any other work, except mowing, which may be necessary for establishing an acceptable cover and maintaining the grass

SECTION 7400: PATENTED EARTH RETAINING SYSTEMS

PS7402 MATERIALS

Add the following to this section:

In addition to the specifications and requirements of the supplier of the Loffelstein or Terrace Blok precast concrete blocks or similar approved units, the blocks shall adhere to the following. The blocks shall comply with the minimum specifications as stated in the table below and in the SANS 508:2020, and shall also be erected in accordance with the design drawings.

21 day crushing strength of blocks:

- | | |
|--|---------------------------------------|
| •Under full platen contact: | Avg 13MPa with a minimum of 11MPa |
| •Under simulated in-situ point loading: | 8 MPa (minimum) |
| •Coefficient of friction for interlocking sliding: | 0,54 (Value at 95%) |
| •Block dimensional variations: | Approx 3mm (length, width and height) |
| •Block mass variation: | Not less than 95% of specified mas. |

Tests and associated results, as conducted by an approved authority / laboratory, shall be made available to the Employer or his Agent for approval, e.g.:

- 21 day crushing strength (As specified above)
- Determination of the coefficient of friction for interlocking and sliding between blocks
- Representative pullout resistance (Block and geogrid connection test / Determination of pullout resistance of various block types)

PS7405 MEASUREMENT AND PAYMENT

PS74.01 Patented Earth Retaining Systems

Delete the second paragraph starting with "The tendered rate shall" and replace with the following

The tendered rate shall include full compensation for procuring, furnishing, transporting, handling and placing all materials and precast concrete blocks, including average 200mm thick compacted earth filling behind the blocks and filling blocks with garden soil lightly tamped as the work proceeds, installing geofabric, weep-holes and geo-pipes as indicated in the drawings for the different wall types as indicated in the bill of quantities, and any additional costs required for placing the blocks in position complete as specified.

Add the following Specification:

SECTION PS9000: ULTRA-THIN FRICTION COURSE (UTFC)

PS9001 SCOPE

This section covers the specifications and work related to the construction of an Ultra Thin Friction Course (UTFC) surfacing in terms of performance criteria and includes, inter alia, field measurements, acceptance criteria, remedial work and payment items related to the UTFC. Reference shall also be made to Form E1: Quality Assurance - UTFC, which shall be construed to form part of these specifications.

PS9002 GENERAL

This specification supplements Section PS4200: Asphalt Base and Surfacing. In the event that any part of this specification is at variance with Section PS4200, these specifications shall apply.

The ultra-thin frictional course (UTFC) surfacing shall be Agrément certified as “Fit-for- Purpose” and will be required to provide the following functional performance properties:

- (a) Improved functional properties such as skid-resistance and water drainage
- (b) A levelling action and ride-quality improvement similar to those of a thin asphalt
- (c) Reduced traffic noise
- (d) No chip-loss or loose stone
- (e) A hard-wearing riding surface
- (f) Quick curing, able to be opened to traffic almost immediately
- (g) Environmentally-friendly work, with no tack being carried off the section
- (h) Improved exclusion of water from the substrate
- (i) Improved adhesion to the lower layer

The Contractor shall comply with the following additional requirements listed below, and as contained in Part C3.6 of this document. The contractor shall be required to submit Form E1, and E2 listed below, to the Employers Agent for approval within ten (10) days of the commencement of the Project Order.

1. Quality Assurance: UTFC - refer to Form E1
2. Design Constraints for the proposed UTFC Products - refer to Form E2.

PS9003 WARRANTY REQUIREMENTS

With the exception of de-bonding between the UTFC and the substrate, the contractor shall not be held liable for any failures of the UTFC that might occur as a result of failure within the underlying layers. The contractor shall also not be held liable for any damage to the UTFC surfacing resulting from “outside” sources, including, but not limited to:

- (a) Traffic accidents
- (b) Spillage of fuel, oils, hazardous materials, etc.
- (c) Materials falling off vehicles
- (d) Travelling of construction/tracked plant (other than his own) after completion of the Works.

PS9004 MATERIALS

Unless contrary to the requirements of a certified proprietary product, the constituents shall comply with the following requirements:

a) Tack coat

The tack coat shall be as stated by the tenderer (Form E1: Quality Assurance: UTFC) which shall include the proposed application rate, as well as the type and proposed percentage modifier (if any).

The tack coat shall be applied in a continuous spray and application by hand spray shall not be permitted. Where a self-priming paver is not used, the tack coat shall have such properties as to not be picked up by construction (or other) traffic during the paving operation.

b) Bituminous binder

(i) The type of binder utilised in the mix shall conform to the requirements specified in Form E1: Quality Assurance: UTFC. Where a homogeneous modified binder is to be used in the production of the surfacing mix, the binder shall comply with the requirements of "Technical Guideline: The use of Modified Bituminous Binders in Road Construction (TG 1-2019): Asphalt Academy", type A-E2 or A-P2. Should the contractor wish to use a binder with properties different from those specified in TG1, further details regarding the composition, test methods and acceptance criteria shall be included in the tender under Form E1: Quality Assurance: UTFC.

(ii) The type and percentage of anti-stripping agent (if applicable) shall be as stated in Form E1: Quality Assurance: UTFC.

c) Aggregates

(i) The coarse aggregates shall consist of crushed, single-sized low-absorptive stone, conforming to the quality requirements in Table PS9004/1.

TABLE PS9004/1: QUALITY REQUIREMENTS FOR COARSE AGGREGATES

Description	Test Method	Limits
Aggregate Crushing Value	TMH 1 : Method B1	Max. 21
Polished Stone Value	SABS Method 848	Min. 50
Flakiness Index	TMH 1 Method B3	Max. 20
Absorption (water)	TMH 1 Methods B14 and B15	Max. 1.0% (coarse) Max. 1.5% (fine)

(ii) The several aggregate fractions for the mixture shall be sized, graded and combined in such proportions that the resulting composite blend meets the required performance criteria.

PS9005 COMPOSITION OF MIX

The composition of the UTFC mix shall be as proposed by the tenderer in Form E1: Quality Assurance: UTFC.

No adjustment of compensation shall be made should the actual mix proportions used in the works vary from that nominated by the contractor on Form E1: Quality Assurance: UTFC.

The contractor shall submit to the Employers Agent his design for the surfacing mix within thirty (30) days of the commencement of a Project Order. The target binder content, filler content and aggregate grading shall be subject to the tolerances given in the Standard COLTO Specifications and in Clause PS9010 hereof. All production and application shall be carried out in terms of the details included under Form E1: Quality Assurance: UTFC.

PS9006 PLANT AND EQUIPMENT

The following shall apply in addition to the requirements of section 4204 COLTO Standard Specifications for Road and Bridge Works for State Road Authorities (1998 edition):

a) Mixing plant

The UTFC surfacing mix shall be produced by an approved type of asphalt plant suitable for producing the mix as per the details included under Form E1: Quality Assurance: UTFC.

b) Paving equipment

The paver shall have a variable width, heated, screed plate.

PS9007 CONSTRUCTION AND WEATHER LIMITATIONS

Paving works shall only be undertaken when the air temperature is at least 8°C and rising and the road surface temperature is at least 10°C and rising. No paving shall be undertaken during rain or immediately after a rainy spell.

PS9008 PLACING AND FINISHING

a) Surface requirements

Immediately before paving, the surface shall be cleaned and swept clear of all loose or deleterious material. Surface defects shall be repaired prior to paving (including crack sealing as required and/or as instructed by the Employers Agent).

The contractor shall demonstrate, as part of the paving trials, the methods to be used for the construction of joints, etc. Handwork with UTFC surfacing shall not be permitted within trafficked lanes or shoulders.

b) Mixture requirements

The mixture temperature will be measured in the truck, just before being dumped into the paver hopper.

c) Tack coat requirements

(i) The application rate for the tack coat shall be nominated by the contractor for a specific area, taking account of:

- the results of sand-patch tests.
 - the traffic counts for that area.
 - the percentage of heavy vehicles.
 - the dryness of the existing surfacing.
- (ii) No adjustment in compensation shall apply should the actual tack coat application be higher or lower than that nominated by the contractor.
- d) At the approaches to exposed bridge joints the contractor shall mill out the existing asphalt base or surfacing on the abutment side to a depth of 15mm and for a distance of 5m. The UTFC surfacing shall be placed to form a smooth transition towards the bridge joint.

PS9009 **COMPACTION**

a) Rollers

Reference is made to sub-sub-clause 4204(d)(i) of the COLTO Standard Specifications.

Add the following: “a solution of suitable soluble oil shall be used as the lubricating agent on the steel drums.”

PS9010 **CONSTRUCTION TOLERANCES AND FINISH REQUIREMENTS**

a) Working mix

The permitted deviation of the working mix from the accepted target mix proportions shall be within the limits specified in Form E1: Quality Assurance: UTFC but shall in no instance exceed the values listed in Table PS9010/1.

b) Tack coat

The application of the tack coat shall be at the rates specified in Form E1: Quality Assurance: UTFC, but shall have a tolerance not exceeding $\pm 0,1 \text{ l/m}^2$ (nett cold bitumen)

TABLE PS9010/1: DEVIATIONS PERMITTED

Aggregate sieve size (mm)	Permissible deviation from target grading (%)
9,5mm	$\pm 4,0$
6,7mm	$\pm 4,0$
4,75mm	$\pm 3,0$
2,36mm	$\pm 3,0$
1,18mm	$\pm 3,0$
0,600mm	$\pm 3,0$
0,300mm	$\pm 3,0$
0,150mm	$\pm 3,0$
0,075mm	$\pm 1,5$

c) Asphalt binder content

The binder content in the working mix shall have a tolerance of $\pm 0,3\%$

d) Thickness

The mixture shall be laid at a nominal compacted thickness of 18mm, with a tolerance of ± 2 mm. Increased thicknesses may come about as a result of filling ruts of less than 10mm depth (at the same time as paving the nominal 18mm surfacing layer). The Contractor shall make provision in their tendered m² rate for any additional quantities of surfacing required as a result of filling such ruts.

PS9011 QUALITY OF MATERIALS AND WORKMANSHIP

The Contractor shall be required to submit his detailed Quality Assurance Plan to the Employers Agent for approval within ten (10) days of the commencement of the Project Order. Once it has been approved, the contractor shall not deviate from it without prior written agreement with the Employers Agent.

The onus rests with the contractor to produce work pertaining to the UTFc which conforms in quality to the Quality Assurance Plan, to the specifications and requirements herein, and to other relevant specifications and standards defined in the submitted plan (e.g. in Form E1: Quality Assurance: UTFc).

The Employers Agent shall, however, conduct such tests as he may deem applicable and shall retain all rights related to bad workmanship and to unacceptable materials. This shall also be applicable to the accepted UTFc surfacing (or design) and related specifications.

PS9012 FUNCTIONAL PERFORMANCE ASSESSMENTS

The monitoring of the functional performance of the UTFc surfacing shall be by the visual assessment of functional performance parameters immediately after completion (prior to the issue of the Completion Certificate), and then by the visual and instrumental assessments of the relevant parameters at the end of the defects liability period. If so instructed by the Employer or the Employers Agent, instrumental assessment of relevant parameters may also be carried out immediately after completion.

The functional performance parameters to be assessed are listed in Table PS9012/1 for both visually - as well as instrumentally - assessed parameters.

TABLE PS9012/1: FUNCTIONAL PERFORMANCE PARAMETERS FOR UTFc SURFACING

Visually-assessed parameters	Instrumentally-assessed parameters
1. Deformation (shoving)	1. Roughness (riding quality)
2. Surface failure (de-bonding)	2. Surface macro-texture
3. Surface cracking	
4. Surface ravelling (aggregate loss)	
5. Bleeding	

The functional performance assessments undertaken during the defects liability period shall, as far as practicably possible, coincide with the Employer's regular road-assessment programme within that year. The roughness and surface macro-texture surveys will be commissioned, and the costs thereof will be borne, by the Employer.

PS9013 VISUALLY-ASSESSED PROPERTIES

a) Definition

The detailed description and definition for the visually-assessed parameters shall be as specified in TMH9 (1992): "Pavement Management Systems: Standard Visual Assessment Manual for Flexible Pavements", issued by the Committee of Land Transport Officials (COLTO).

b) Assessment methodology

The visual assessments of the pavement surfacing during shall be undertaken by means of a Visual-Assessment Panel comprising the following representatives:

- Employer - 1 representative
- Contractor - 1 representative
- Appointed Employers Agent or suitably qualified external assessor - 1 representative

All site investigations or inspections shall be undertaken by the panel of representatives. The arrangements, responsibilities and costs for such inspections shall vest with the contractor, but he shall not be responsible for the travel, accommodation and personnel costs of the Employer and Employers Agent during the panel inspections. The presence of the Employer's representatives and the Employers Agent in the panel inspection shall be at the discretion of the Employer. The visual assessments shall be carried out during daylight hours in off-peak periods.

c) Assessment specification

The visual-assessment panel will quantify each occurrence of the visually-assessed parameters by rating the degree of distress according to the TMH 9 definitions and the extent as the linear length (in metres) affected in the direction of travel. The minimum linear length to be recorded for any single occurrence of any of the visually-assessed parameters shall be 0,5 metres. Visual assessments must be done in accordance with the specification presented in Table PS9013/1.

TABLE PS9013/1: SPECIFICATION FOR VISUAL ASSESSMENT

Item	Specification
Frequency of Assessment	Immediately after completion, and at the end of the defects liability period, coinciding with the Employer's regular road-assessment programme, where applicable.
Position of assessment	Each lane and shoulder shall be individually assessed.
Segment lengths	1 km
Degree	As defined in TMH 9.
Extent	The actual length affected, with a minimum recorded linear length per single occurrence of 0,5 metres.

PS9014 INSTRUMENTALLY- ASSESSED PROPERTIES

a) Roughness

(i) Definition

Road roughness is defined as the deviations of a road pavement from a true planar surface, which deviations affect vehicle dynamics, riding quality and the dynamic loads exerted on the pavement.

(ii) Equipment and accuracy

The roughness data should be derived from the longitudinal profile characteristics obtained from the measurement by a non-contact laser sensor-based profilometer in each wheel path. The profilometer should comply with the ASTM E950-94 standard with:

- a vertical measurement resolution of less than or equal to 0,1mm, and
- a longitudinal sampling interval of less than or equal to 100mm.

(iii) Validation and operation

Validation and operation of the profilometer must be carried out in accordance with the manufacturers and the Employer's requirements, and it must have successfully completed the validation trials of the Employer not more than six months before the measurements are taken in accordance with these specifications.

(iv) Measurement specification

The specification for the measurement of roughness is given in Table PS9014/1.

TABLE PS9014/1: SPECIFICATION FOR MEASUREMENT OF ROUGHNESS

Item	Specification
Frequency of measurement	Immediately after completion, and at the end of the defects liability period, coinciding with the Employer's regular road-assessment programme, where applicable.
Position of measurement	In both wheel paths of all trafficked lanes.
Testing interval	The longitudinal profile measurements shall be at intervals of 100mm or less.

(v) Data processing and reports

Roughness data must be processed so as to produce results in the format specified in Table PS9014/2.

TABLE PS9014/2: SPECIFICATION FOR OUTPUT OF ROUGHNESS RESULTS

Item	Specification
Processing unit	The longitudinal profile data in each wheel path shall be processed according to ASTM E1170-92 and World Bank Technical Paper 46 to produce the International Roughness Index (IRI) (m/km) for every 100m of each wheel path.
Output unit	The average 100m IRI for a lane is calculated by averaging the 100m IRI left & right wheel path values.
Segment lengths	1 km
Statistical summary	Produce cumulative distribution graph of the 100m IRI average values for a lane for each 1km segment.

(vi) Acceptance criteria

Using the cumulative distribution graph, the processed roughness results must meet the acceptance criteria presented in Table PS9014/3 for the applicable year of the survey.

TABLE PS9014/3: ACCEPTANCE CRITERIA FOR ROUGHNESS

Time ¹ (Years)	Limit Value (Average 100m IRI) ²	Maximum (%) of 1 km Segment With Roughness Worse Than Limit Value
1	1.40	20%
	1.60	5%
	2.00	0%

Notes:

1. Time in years after the issuing of the Completion Certificate

2. Average 100m IRI =
$$\frac{100 \text{ m IRI}_{\text{Left Wheel Path}} + 100 \text{ m IRI}_{\text{Right Wheel Path}}}{2}$$

b) Surface macro-texture

(i) Definition

Macro-texture is the deviation of a pavement surface from a true planar surface with the characteristic dimensions along the surface of 0,5 – 50mm.

(ii) Equipment and accuracy

The macro-texture shall be measured using a non-contact laser spot sensor capable of meeting the requirements contained within ISO 13473-1 for measuring mean profile depth (mpd).

(iii) Validation and operation

Validation and operation of the non-contact laser spot sensor must be carried out in accordance with the manufacturer's requirements, and it must have successfully completed the validation trials of the Employer not more than six months before the measurements are taken in accordance with these specifications.

(iv) Measurement specification

Macro-texture measurements must be taken in accordance with the specification presented in Table

PS9014/4.

TABLE PS9014/4: SPECIFICATION FOR MEASUREMENT OF SURFACE MACROTEXTURE

Item	Specification
Frequency of measurement	Immediately after completion, and at the end of the defects liability period, coinciding with the Employer's regular road-assessment programme, where applicable.
Position of measurement	Outer wheel path of all trafficked lanes.
Testing intervals	Record data over 10m intervals.

(v) Data Processing and Reports

Surface macro-texture data must be processed so as to produce results in the format specified in Table PS9014/5.

TABLE PS9014/5: SPECIFICATION FOR OUTPUT OF SURFACE MACRO-TEXTURE

Item	Specification
Unit	Mean Profile Depth (ISO 13473-1) calculated for each 10 metres.
Segment lengths	1 km
Statistical summary	Produce cumulative distribution graph for each segment

(vi) Acceptance criteria

Using the cumulative distribution graph for each segment, the measured surface macro-texture must meet the acceptance criteria presented in Table PS9014/6.

TABLE PS9014/6: ACCEPTANCE CRITERIA FOR SURFACE MACRO-TEXTURE

Time ¹ (Years)	Limit value (Mean profile depth (mm)) ²	Maximum (%) of 1 km segment with surface macro-texture value worse than limit value
1	1.3	20%
	1.2	5%
	1.1	0%

Notes:

1. Time in years after the issuing of the Completion Certificate.
2. Mean Profile Depth value over 10 metres.

PS9015 EVALUATION FOR ACCEPTANCE BY EMPLOYERS AGENT

The following procedures shall be followed by the Employers Agent to determine the acceptance of the UTFC surfacing or to determine whether remedial work is required on it. These procedures shall be followed as appropriate after each of the assessments.

a) Assessment on completion of the works

An assessment shall be done on completion of the Works and the contractor shall repair all defects before a Completion Certificate will be issued. The first 50% of the Retention Money shall then be released.

b) Assessment one year after issuing of the Completion Certificate, i.e. at the end of the Defects Liability Period

Should all parameters meet the full Acceptance Criteria, the Employers Agent shall issue a report to the Employer and notify the contractor accordingly.

The balance of the Retention Money shall then be released.

Should the full Acceptance Criteria not be met, the Employers Agent shall advise the contractor of such defects as may be evident and may, in consultation with the Employer, either:

(i) Instruct the contractor to undertake immediate remedial work.

(ii) Grant a concession to allow the remedial work to be held in abeyance until further notices are issued by the Employers Agent.

(iii) Notwithstanding the concessions that may be granted under (ii) above, the contractor may elect to attend to and defects immediately.

c) Assessment at any time during the Defects Liability Period

The Employer or the Employers Agent shall be entitled to carry out an assessment of the work at any time during the Defects Liability Period. Should any parameter/s fall into the remedial-work-required category, the Employer or his agent shall inform the contractor who shall immediately propose a solution to rectify the problem/s and obtain the Employer's or his agent's approval and rectify the problem/s in accordance with Clauses PS9016, PS9017 and PS9018.

PS9016 PROCEDURES TO BE ADOPTED IN THE EVENT OF FAILURE

Where distress has occurred in excess of the permissible or maximum specified limits relating to the performance of the pavement surfacing, the contractor shall, at his own cost and in terms of the Contract, rectify all segments in which such defect/s occur which exceed the permissible or maximum criteria listed in Tables PS9013/3, PS9014/3 and PS9014/6 hereof.

The Employers Agent's approval shall be obtained prior to the contractor's carrying out any remedial work. Notwithstanding the approval by the Employers Agent of the remedial work, the contractor shall remain fully liable for the performance of his proposed remedial action/s measured in terms of the specified performance parameters.

In the event of the contractor's failing to undertake the required steps to rectify/reinstate any defects to conform with the specified requirements, the Employer reserves the right to withhold payment of any monies which are payable to the contractor or which may become payable to him under the Contract.

PS9017 NOTIFICATION OF REMEDIAL WORK

The Employer or his agent shall notify the contractor in writing of any remedial work or repairs required to the surfacing in terms of this section of the specifications. Such notification shall take place at any time during the Defects Liability Period. A programme of work must be submitted for approval to the Employer or his agent within fourteen (14) days of the date of such notification.

The contractor shall commence with the remedial work within ten (10) days from the date on which the site is handed to him by an order in writing from the Employers Agent.

PS9018 REMEDIAL WORK

All remedial work or repairs to the surfacing shall comply with the following requirements:

- (a) The contractor shall, at his own cost, supply, erect and maintain the necessary temporary traffic-control signs in accordance with the requirements in Section 1500 of the Project Specifications, the drawings, and the South African Road Traffic Signs Manual, Volume 2, Chapter 13, Roadworks Signing, November 1997. Any future amendments to the aforementioned manual shall also be complied with.
- (b) The contractor shall, also at his own cost, repair/reinstate such items as road studs, road marking, etc., should these be damaged or influenced by the required remedial work.
- (c) The various types of remedial work contained in Table PS9018/1, depending on the degree of distress, shall be undertaken by the contractor, at his own cost, to reinstate/rectify specified defects in the pavement surfacing during the Defects Liability Period.

Final acceptance shall only be given upon completion of all remedial works to the satisfaction of the Employer and the Employers Agent.

TABLE PS9018/1: REMEDIAL WORK FOR UTFC SURFACING

Type of Distress	Acceptance Criteria	Minimum Remedial Measures
Deformation (shoving) of asphalt	Requirements in Table PS9013/3 not met	Mill out full depth of defective surfacing and repave surfacing
Surface Failure	Requirements in Table PS9013/3 not met	Mill out full depth of defective surfacing and repave surfacing
Surface Cracking	Requirements in Table PS9013/3 not met	Crack seal or mill out full depth of defective surfacing and repave surfacing
Surface Ravelling	Requirements in Table PS9013/3 not met	Repair with UTFC surfacing or mill out full depth of defective surfacing and repave surfacing
Bleeding	Requirements in Table PS9013/3 not met	Mill out full depth of defective surfacing and repave surfacing
Roughness	Requirements in Table PS9014/3 not met	Mill out full depth of defective surfacing and repave surfacing
Surface Macrotexture	Requirements in Table PS9014/6 not met	Mill out full depth of defective surfacing and repave surfacing

PS9019 MEASUREMENT AND PAYMENT

Item	Unit
PS90.01 Ultra thin asphalt surfacing (10 mm aggregate) course using a nominal thickness of 20mm	square metre (m ²)

The unit of measurement shall be the square metre of ultra thin asphalt surfacing constructed within the specified dimensions.

The tendered rate shall include full compensation for procuring, furnishing, heating, mixing, placing (including application of tack coat) and compacting all materials, as well as for process-control testing, and for protecting and maintaining the work, all as specified.

Item	Unit
PS90.02 Trial section	square metre (m ²)

The unit of measurement shall be the square meter of trial section constructed as ordered.

The tendered rate shall include full compensation for the trial section of UTFC as specified, including the application of the tack coat.

SECTION PS10100: SPECIFICATION FOR COLD IN SITU RECYCLING WORK**CONTENTS**

PS10101	SCOPE
PS10102	MATERIALS
PS10103	STABILISATION MIX DESIGN
PS10104	PLANT AND EQUIPMENT
PS10105	SETTING OUT AND CONTROL OF THE WORK
PS10106	CONSTRUCTION
PS10107	TRIAL SECTIONS
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PS10109	CONSTRUCTION TOLERANCES
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PS10101. SCOPE

“Cold in situ recycling” is a construction process that uses large special-purpose machines to recover and reuse material from the upper portion of existing pavements, without pre-heating the road surface. This process is referred to as “in situ recycling” or “recycling” in these specifications.

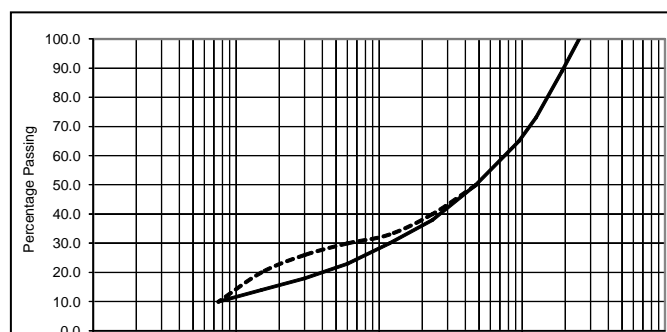
The work to be undertaken by in situ recycling will be described in the Scope of Works of the Project Order, including details of:

- The extent of the recycling work in terms of length and width to be recycled;
- Traffic accommodation during construction;
- The depth to which the materials in the existing pavement are to be recycled;
- The different materials that will be encountered in the recycling horizon;
- The degree of pulverisation required for breaking down previously bound materials;
- Pre-treatment requirements, including the import of any fresh material;
- Stabilisation or other treatment of the recycled material;
- Requirements for finishing the new recycled layer including opening to traffic; and
- Surfacing or construction of additional layers on top of the new recycled layer.

PS10102. MATERIALS**2.1) In situ pavement material**

The results of all relevant investigations, surveys and tests carried out on the existing pavement will be included in the Design report and shall be made available on request. As a minimum, these will include test pit profiles, results of laboratory tests carried out on material sampled from the various layers as well as any stabilisation mix designs, the thickness and integrity of any previously bound material (e.g. asphalt or cement stabilised layers) and in situ subgrade conditions (indicated by the results of DCP surveys).

The recycling process shall break down (pulverise) and blend together all material encountered in the recycling horizon (previously bound and unbound materials), to produce a homogeneous mixture with a grading curve that is relatively continuous, similar to the “ideal” curve shown below:



In addition, the grading curve shall fall within the envelope relevant to the type of stabilisation specified in the latest edition of the following publications:

- Cementitious stabilisation: TRH 13 and TRH14
- Bituminous stabilisation: TG2

Where this cannot be achieved, sufficient material (specified in sub-clause 2.2) shall be imported and spread on the existing road surface prior to recycling in order to achieve the required grading.

2.2) Imported material

The Project Document will include details of the materials to be imported for blending with the recycled material (e.g. G2 crushed stone from commercial sources).

2.3) The unscreened or crushed and screened reclaimed asphalt material

For this contract shall meet the requirements specified in TG2 Table 4.7 Recommended Grading for BSM Emulsion or Foam.

Should the results of foamed bitumen mix designs indicate that blending of the crushed stone material with crusher dust is desirable to achieve an optimal product, the crusher dust used for blending shall meet the grading requirements for 'Fine Slurry – Fine Grade' specified under Section 4300, 4302 (b) (ii) Aggregates for Slurry Seals– Table 4302/11, Materials for slurry, as amended in Section PS4300, Table PS4302/13."

2.4) Stabilising Agents

2.4.1 Cementitious stabilising agents

(a) Cement shall comply with the relevant requirements of SANS 50197-1:2013 for a CEM II. The use of strength classes greater than 32.5 shall not be permitted.

(b) Road lime shall comply with the requirements of SANS 824.

(c) Other cementitious stabilising agent or blend of stabilising agents, as specified in the Project Document.

2.4.2 Bituminous stabilising agents

(a) The bitumen emulsion to be used will be specified in the project Document and shall comply with the appropriate specification for a stable-grade bitumen emulsion (60% net bitumen) for: SANS 309 (SANS 4001 BT3: 2014) for anionic emulsion; or SANS 548 (SANS 4001 BT4: 2014) for cationic emulsion.

(b) Foamed bitumen shall be produced by injecting a small amount of water (between 2% and 4% by mass of bitumen) into an 70/100 road-grade bitumen complying with the SABS 307 (SANS 4001 BT1: 2012) specification. The minimum foaming characteristics (in terms of expansion ratio and half-life) shall be consistent with those stipulated in the latest version of TG2.

2.5) Water for construction

Water shall not contain any deleterious materials in harmful concentrations. Only approved sources of water shall be used.

PS10103. STABILISATION MIX DESIGNS

The Project Order will include the details of all relevant stabilisation mix designs undertaken prior to the award of the Project.

Within 7 days of the Contractor taking possession of the site, the "Advance Testing Programme" shall commence. This testing programme shall be carried out on samples of materials extracted from the full depth of the recycling horizon, taken from the outer wheel path at 1km intervals, alternating between the left and right side of the road. These samples shall be tested to determine the grading and plasticity of the material and the results used to identify sections of Material Uniformity in the existing pavement (the minimum length of such a section shall be 500m).

For each Material Uniform Section thus identified, two separate bulk samples shall be extracted from the recycling horizon and used in the stabilisation mix design procedures. The location at which such samples are taken shall be selected by dividing the length of the uniform section by three and sampling from the outer wheel path in opposite lanes at one-third intervals. Stabilisation mix designs shall be undertaken by an approved laboratory to determine:

- details for blending the recycled material with imported material (where necessary);
- application rates for stabilising agent(s); and
- target strengths achieved from such application rates.

Stabilisation mix designs shall be carried out in accordance with the latest edition of the following publications:

- Cementitious stabilisation: TRH 13 and TRH14
- Bituminous stabilisation: TG2

Recycling work may only commence once the relevant mix designs have been approved for the initial 1km section. Thereafter, it will be incumbent on the Contractor to ensure that the laboratory work proceeds at a sufficiently fast pace to provide the relevant mix design requirements and obtain the necessary approval ahead of the recycling work. Should the situation arise where there is no approved mix design due to any delay, recycling work shall cease until such time as the approved mix design information becomes available and the Contractor shall have no recourse for costs incurred as a consequence of such a delay.

PS10104. PLANT AND EQUIPMENT

NOTE. These specifications are focused on the use of purpose-built wheel-mounted recyclers. Where the contractor intends using any other type of machine to recycle (e.g. a modified track-mounted milling machine) he shall submit a full motivation for using such a machine, including a detailed work plan describing the recycling / mixing process and subsequent compaction / levelling processes that will produce a layer that meets the specified end product requirements.

4.1) Recyclers

In situ recycling shall be carried out using a special-purpose recycler to break down and recover material from the prescribed horizon in the upper layers of the existing pavement, blended together with any imported material, stabilising agent(s), water and any other specified additives. The machine employed shall be capable of achieving the required grading and consistency of mix in a single pass. As a minimum, the recycler shall meet the following requirements:

- It shall be factory-built by a proprietary manufacturer having a demonstrable track record and manufacturing history in producing such equipment;
- If older than 10 years, the machine shall be certified by the manufacturer or manufacturer's authorised agent to confirm operational fitness-for-purpose dated not more than 3 months earlier than the date on which it commences work on the project;
- A level-control system to maintain the cut depth within a tolerance of ± 10 millimetres of the required depth during continuous operation;
- The milling / mixing drum (the "cutter") shall have a minimum cut width of 2 metres with a facility to change the speed of rotation. The machine shall be capable of recycling to the maximum depth specified in the Project Document in a single pass;
- The cutter shall rotate within an enclosed chamber (the mixing chamber) into which water and any liquid stabilising agents are injected under pressure at the specified application rate relative to the mass of material in the mixing chamber.
- The cutter shall be mounted on a swing arm that is separate from the housing of the mixing chamber, thereby allowing the volume of the mixing chamber to increase as the depth of cut increases.
- A liquid application system dedicated to adding water to the material in the mixing chamber;
- Where a bitumen stabilising agent is to be applied, a second separate liquid application system shall be fitted to the mixing chamber. Such system shall be appropriate for the addition of either bitumen emulsion or foamed bitumen;
- All liquid application systems shall be controlled by a micro-processor / flow meter combination that accurately regulates pump delivery (flow rate) with the speed of advance.
- All liquid application systems shall include a dedicated spraybar that spans the full width of the mixing chamber. Each spraybar shall be equipped with multiple injection nozzles mounted equidistant along the length of the bar at a maximum interval of 200mm with the ability to close off selected nozzles, thereby allowing the width of application to be preset;

- Where two liquid application systems are used, the water application spraybar shall be mounted below the other spraybar (relative to the direction of rotation of the cutter) such that the recycled material encounters the water spray before the stabilising agent; and
- The recycler shall have sufficient power to recover and mix the existing pavement material together with all additives to produce a homogeneously mixed material whilst pushing (or pulling) bulk supply tanker(s).

Additional requirements when stabilising with foamed bitumen:

The liquid application system mounted on the recycler shall have the following additional features:

- Each injection nozzle on the spraybar shall be fitted with an expansion chamber (the so-called "Mobil system") for foaming the bitumen;
- Functioning gauges on the bitumen supply line for monitoring temperature and pressure;
- The ability to demonstrate that all expansion chambers are free of blockages in both the water and bitumen feed lines;
- A means of producing a representative sample of foamed bitumen at any stage during normal operations (i.e. a "test nozzle"); and
- The micro-processor shall continuously monitor the actual bitumen consumption whilst working and provide a running total that allows immediate reconciliation with theoretical (calculated) consumption.

Before any recycling work commences, the contractor shall submit a specification sheet (obtained from the manufacturer) stating the capacity, pressure and temperature limits for each liquid application system that will be used to treat the recycled material.

The recycler that the contractor intends deploying shall be subject to the Employer's Agent's or Employer's Agent's Representative's approval and he shall be entitled to reject a machine which, in his opinion, may not be capable of producing a consistent product when recycling to the specified depth(s).

4.2) Plant for processing the treated material - Compaction

The treated material exiting from the rear of the recycler shall be processed using suitable compaction equipment and graders to achieve a layer that meets the specified requirements. Sufficient plant and equipment shall be deployed to enable the treated material to be processed and finished off within the time limitations specified in Clause 6.1 below.

4.2.1) Primary compaction.

Initial compaction shall be undertaken immediately behind the recycler using a vibrating single-drum padfoot roller selected in accordance with the following guidelines.

Guideline for selection of primary roller				
Minimum static mass of roller (tons)	Final layer thickness			
	< 150mm	150 – 200mm	200 – 300mm	300-350mm
	12	15	20	25

The drum of the primary roller shall be capable of vibrating with minimum amplitude of 1.8mm at a frequency in the range of 30 – 35Hz.

The roller must be equipped with an integrated compactometer device (Hamm HCN-GPS Navigator system, or similar) to indicate and record the level of density that is achieved with each successive recording pass of the roller. The minimum interval of recording such measurements shall be 2 metres. These records shall be used by the Contractor for Process Control to indicate that the maximum density has been achieved.

4.2.2) Secondary compaction

After the grader has pre-shaped the material, a smooth drum vibrating roller with a static mass not less than 10 tons and not more than 12 tons shall be used to compact the upper portion of the layer after the grader has pre-shaped the material.

4.2.3) Final rolling

A pneumatic-tyred roller (PTR) with a minimum static mass of +18 tons and mounted on at least seven (7) tyres shall be used to finish off the new layer.

4.3) Bulk tankers

Only tankers with a capacity exceeding ten thousand (10 000) litres shall be deployed to supply the recycler with water and liquid stabilising agents. Tankers containing a bitumen stabilising agent shall be fitted with two recessed pin-type tow hitches, one in front and one at the rear, thereby allowing the tanker to be pushed from behind by the recycler, and to push a water tanker in front. No leaking tanker will be permitted on the site.

Where a bituminous stabilising agent is added, each tanker shall be equipped with:

- A functioning thermometer reflecting the temperature of the contents in the bottom half of the tank; and
- A rear feed valve (minimum internal diameter of 75mm when fully opened) that is capable of draining the contents of the tank.

PS10105. SETTING OUT AND CONTROL OF THE WORK

Unless otherwise stated in the Scope of Works of the Project Order, the Contractor shall establish his own reference and level beacons for the setting-out and control of the works. The existing horizontal alignment shall be retained and only minor modifications made to the vertical alignment, as described below.

The Contractor shall establish a series of level control poles placed at a constant offset on either side of the road at a minimum interval of 20m. At each 20m location, the Contractor shall record the existing road surface levels at the centre-line and at the outer limits of each lane and prepare a series of graphs (for sections not less than 2.0km in length) with the recorded levels plotted at an exaggerated scale against the km distance. Final levels for the new stabilised layer shall be selected in accordance with a “best-fit” principle, taking into account the following:

- the required camber or superelevation details at each location;
- the minimum requirements governing changes in grade (longitudinal grade line);
- the thickness of the existing base layer; and
- minimising the amount of pre-work required (pre-treatment and/or importing new material) before recycling can commence.

At least two weeks before recycling work is scheduled to commence on any specific section, the Contractor shall select the best-fit design levels and submit these proposals to the Employer’s Agent’s Representative (both as a schedule of longitudinal grade, cross-fall and final surface levels, as well as a drawing with the design lines superimposed on the existing levels) for approval or amendment.

The Employer’s Agent’s Representative will take control measurements to determine the accuracy and adequacy of the reference beacons / control poles, and may instruct the Contractor to correct any faulty work and to take and provide such additional measurements and details as may be deemed necessary. Survey work will not be measured and paid for separately and compensation for any work involved in staking, setting out, taking levels, determining the final surface elevations and transferring these design levels on to the level control poles (including the cost of all labour materials and reinstatement if required for any reason) will be deemed to be included in the rates for the various items of work included in this contract. No payment will be made for any inconvenience or delay caused by compliance with these requirements.

PS10106. CONSTRUCTION**6.1) General limitations and requirements**

No recycling work shall be undertaken during misty or wet conditions, nor shall any work commence if there is a risk that it may not be complete before such conditions set in. Similarly, work shall not be undertaken if the ambient air temperature is below 5°C for emulsions and between 10-15°C for foam. No further work, other than finishing and compaction, will be permitted if the air temperature falls below 10°C during operations.

Spreading of powdered stabilising agent(s) and active filler(s) (lime and cement) on the road ahead of the recycler shall not be permitted when windy conditions adversely affect the operation.

The limitations shown in the following table shall be strictly enforced.

Temperature and time limitations for different stabilising agents				
Limitation	Stabilising agent			
	Cement	Lime	Bitumen emulsion	Foamed bitumen
Minimum material temperature (°C)	5	5	10	15
Maximum time for completion (hours)	4	8	12	10

6.2) Requirements before recycling commences

On a daily basis, before the start of recycling work (or, alternatively, at the end of the day's work), on instruction by the Employer's Agent the recycler shall be used to pulverise a short section of the road ($\pm 10\text{m}$) that will be recycled when work begins. Such pulverising shall be carried out with the cutter set to the specified recycling depth and the machine moving forward at the normal operating advance speed ($\pm 8\text{m/min}$) with no water or stabilising agent applied. A bulk sample ($>100\text{kg}$) of such pulverised material shall be taken from an area where the machine was advancing at the normal operating advance speed and retained for laboratory testing. No payment will be made separately for this and would be deemed to be included in the various items of recycling.

6.2.1) Production Plan

Prior to the start of work every day, the contractor shall prepare a Production Plan detailing his proposals for the forthcoming day's work. As a minimum, this plan shall include a sketch showing:

- the overall layout of the length and width of road intended to be recycled during the day, broken into the number of parallel cuts required to achieve the specified width of treatment;
- the location of and overlap width at each longitudinal joint between adjacent cuts, together with the location of the inner and outer wheel paths of each lane affected by recycling;
- the sequence and length of each cut to be recycled before starting on the adjacent or following cut; and
- an estimate of the time required for recycling each cut and for finishing off the work.

Note. The minimum width of overlap between adjacent cuts shall be 100mm.

6.2.2) Preparing the Surface

Before any recycling work commences, the surface of the existing road shall be prepared by:

- cleaning all vegetation, garbage and other foreign matter from the full road width, including any adjacent lanes or shoulders that are not to be recycled;
- removing any standing water;
- pre-milling to remove high-spots and/or pre-pulverising (where ordered); and
- providing an accurate guideline to assist the operator to accurately steer the recycler.

In addition, the contractor shall record the location of all road marking features (e.g. extent of barrier lines) that will be obliterated by recycling.

6.2.3) Surface shape and level requirements

Where the grade line and cross-sectional shape of the existing road are acceptable (i.e. not excessively distorted), it shall be the contractor's responsibility to conduct his operations in such a manner as to ensure that the surface levels of the completed recycled layer are consistent with those that existed prior to recycling. Where surface defects are to be corrected and/or modifications made to the grade line, instructions will be issued detailing the new surface level requirements. These may be achieved prior to recycling by either pre-milling to remove in-situ material, by pre-pulverising, pre-shaping and pre-compacting the pulverised material, or by importing material and accurately spreading on the existing road surface, as described below.

6.2.4) Pre-milling

Where instructed, pre-milling shall be undertaken using a milling machine (not a recycler) to:

- Remove material from the road. Isolated high spots shall be removed and/or minor modifications made to crest vertical curves by accurate milling. The material resulting from such milling operations shall be loaded onto trucks and disposed of as directed.
- Break down (pulverise) thin layers of asphalt. Badly cracked asphalt layers (full-depth crocodile cracks at intervals $< 100\text{mm}$), and/or sections where thin asphalt overlays are delaminating, shall be pre-milled immediately in advance of the recycling operation. To ensure that the milling operation achieves the required degree of pulverisation, the depth of milling shall be constantly monitored and adjusted so that the bottom of the milling drum remains within the lower half of the cracked / delaminating asphalt layer. Where an acceptable degree of pulverisation cannot be achieved, the machine shall be operated in reverse (i.e. down-cutting) with the same controls applied to the depth of milling. If such reverse milling fails to produce an acceptable degree of pulverisation, the offending asphalt layer shall be milled off and removed.

The pulverised asphalt material generated from such pre-milling shall remain on the road, behind the milling machine, where it shall be spread across the width of recycling and rolled with a smooth-drum roller.

6.2.5) Pre-pulverising existing pavement material

Pre-pulverising shall only be undertaken on instruction from the Employer's Agent's Representative for the purpose of:

- breaking down excessively hard material;
- loosening the material across the road width so that it can be cross-mixed by grader;
- exposing the loosened (fluffed-up) material to the atmosphere to promote drying; or
- loosening the material in the existing pavement so that it can be loaded and removed from site.

The depth of pre-pulverising shall be carefully controlled throughout the operation to ensure that the cut horizon always remains at least 25mm above the bottom of the subsequent recycling / stabilisation horizon.

Unless the objective of pre-pulverising is to dry for the material, a water tanker shall be coupled to the recycler and sufficient water added to allow the material to be compacted to a minimum density of 95% of the mod AASHTO density. Except where the material is to be cross-mixed, it shall be compacted immediately behind the recycler before using a grader to pre-shape the material in accordance with final level requirements. Where cross-mixing is ordered, the material shall be bladed by grader across the specified width to achieve a uniform blend of material before being compacted and shaped.

6.2.6) Addition of imported material

Where instructed to import material for blending and/or as make-up material for the purpose of shape correction, the prescribed material shall be imported and spread on the existing road surface prior to recycling. The method of placing and spreading the imported material shall be such as to achieve the required surface levels and will require the use of a paver, motor grader or other such plant. All imported material shall be pre-compacted to a minimum of 95% of the mod AASHTO density.

Nowhere shall the thickness of imported material exceed the recycling depth.

6.3) THE RECYCLING PROCESS

6.3.1) Before starting

Prior to starting recycling, the production planned for the day shall be approved by the Employer's Agent Representative and the following checks carried out:

- All relevant temperatures shall be measured and recorded, including:
 - air temperature;
 - the material in the recycling horizon; and
 - the contents of all bulk supply tankers (including water).
- All plant and equipment is on site and the operators of the different machines are adequately trained and briefed on their particular tasks.
- The recycler has been prepared and set up for the first cut. Such preparations shall include:
 - checking that the mixing chamber is free of any material build-up that may affect the functioning of the application nozzles on all relevant spraybars;
 - the cutting tools have sufficient remaining life to complete the first cut without stopping;
 - all relevant liquid application systems are functioning, free of blockages and the in-line filters are clean. Where a bitumen stabilising agent is applied, a relevant check-sheet (similar to the example forms included in the Appendices of the latest version of TG2) shall be diligently followed, signed off and submitted to the Employer's Agent's Representative;
 - the on-board computer has been correctly set up and the input data verified;
 - the spraybar is set up with the correct nozzles selected to achieve the required 2width of application;
- Bulk supply tanker(s) are coupled correctly to the recycler, all feed pipes are properly connected, bled of air and free of leaks. Where a bitumen stabilising agent is applied, the feed pipe shall only be connected immediately before work is about to start. Where the stabilising agent is foamed bitumen, the outlet plumbing on the tanker shall be checked and any "cold plug" of bitumen removed before attaching the feed pipe.
- Where cement or lime is spread by hand on the road surface ahead of the recycler, the "spot marks" for bag spacing shall be checked at random intervals and recorded.
- A clear guideline is in place for the recycler to follow and is correctly aligned relative to the road geometry.
- The integrated compactometer system on the primary roller properly functioning and has been set up to record the correct relevant data.

6.3.2) Recycling

The recycler shall be set up and operated to ensure that:

- The speed of advance is regulated (below the maximum allowable of 10m/min) to achieve;
 - adequate pulverisation of all bound materials in the existing pavement to produce a material that meets the grading requirements;
 - operating pressures and flow rates in all liquid application systems that remain within the limits prescribed by the manufacturer of the machine.
- The depth of recycling coincides with the line and level specified for the bottom horizon of the new stabilised layer. The bottom of cut horizon shall be checked at least once every 100m of cut using a suitable T-bar to dip from a stringline pulled between the relevant final level reference marks on the level control poles.
- The planned width of overlap along all longitudinal joints is maintained and the line of cut does not deviate laterally by more than 50mm from that required (measured from the operator's guideline that shall be positioned for each and every cut).
- The process is continuous with a minimum number of stops. Transverse joints that occur every time the recycler stops are properly treated to achieve continuity of stabilisation and moisture across the resulting joint.
- The application rate of liquid stabilising agent(s) and water is uniformly continuous across the required width of treatment, including all longitudinal joints. The temperature across the width of material exiting the mixing chamber shall be checked at least once every 100m using a digital thermometer with a laser beam target held no more than 100mm above the material. Where the temperature varies consistently by more than 3°C along a particular longitudinal strip \pm 200mm wide, the recycler shall be stopped and the relevant application nozzles on all spraybars that coincide with the offending strip shall be checked for blockages.
- The moisture content of the treated material is continuously monitored and the application of water adjusted to achieve a uniform moisture content of not less than 60% and not more than 80% of the optimum moisture content.
- The mixed material exiting from the behind the recycler is struck off by the rear door of the mixing chamber with sufficient pressure applied to obtain a uniform surface that is free of valley lines, empty pockets and particle segregation.

The advance speed of the recycler and the speed of rotation of the recycling drum shall be set to obtain the required grading and sufficient mixing of all components (recycled material and additives) so that a homogeneous material is produced.

IMPORTANT NOTE. Recyclers are configured such that their rear wheels run on top of the treated material towards the outer extremities of the cut. To prevent introducing a density differential across the width of cut, primary compaction shall be completed prior to any grader work commencing. If the treated material is pre-shaped by grader prior to being compacted, the work shall be summarily rejected.

6.4) Primary compaction

A single-drum vibrating roller (described in sub-clause 4.2.1) shall be deployed to compact the recycled material immediately behind the recycler. This roller shall travel forwards and backwards at a constant speed (maximum 3km/hr (50m/min)), remaining within the confines of the recycled cut. Recycled material covering the outer extremities of cut shall be moved at regular intervals (\pm 5m) to expose the cut line, thereby allowing the operator to remain within the cut width.

The vibration mode shall be set on "high" amplitude and shall not be adjusted for the duration of the primary compaction exercise. Successive lengths of recycled / treated material shall be compacted (each approximately 50m in length).

Rolling shall continue on each section until the integrated compactometer device indicates that no further density is being achieved over at least 80% of the length of the section (i.e. maximum achievable density has been reached). Should the device indicate a consistent loss of density at any point during primary compaction (as indicated over two successive recording passes), rolling on that section shall be terminated and the roller moved forward to start compacting the next section.

After each day's production, the contractor shall provide the Employer's Agent with an electronic copy of the data file from the compactometer device containing detailed compaction records for the day's work. As a minimum, this file will include the number of passes made on each section of every cut made by the recycler, as well as the following data for each 2m interval along the length of each cut:

- the compactometer reading;

- the amplitude of vibration; and
- the advance speed of the roller.

These records will constitute the contractor's Process Control for primary compaction.

Notes.

i. A "roller pass" shall be defined as a single unidirectional pass made by the roller. Where the roller travels forwards and backwards over the same point, it would have made "2 passes".

ii. A "recording pass" is a roller pass where the compactometer readings are stored (recorded) and used for comparison purposes. Recording passes are always in one direction of travel only. Recordings shall be made commencing with the first pass and every alternative subsequent pass that is made (i.e. 1, 3, 5, 7, etc.)

iii. The minimum number of primary roller passes shown in the following table.

Layer thickness (mm)	Number of passes	
	Minimum	Maximum
Up to 175	5	9
175 – 250	7	11
Over 250	9	15

Additional roller passes (to the maximum shown in the above table) shall not be paid separately and would be deemed to be included in the tendered rates.

iv. The contractor must ensure at the time of compaction, the moisture content of the mixed material falls within the prescribed range of not less than 60% and not more than 80% of the optimum moisture content (OMC).

v. Where the moisture content is below 60% of OMC, additional passes will be required to achieve the maximum density for which no additional payment shall be made. Where the moisture content is above 80% of OMC, the contractor runs the risk of creating instability (heaving) in the layer that may result in the layer being rejected.

vi. Where the number of passes required by the primary roller exceeds 5, a second identical roller may be required to ensure that the primary compaction process follows at the same rate as the recycling operation. Where two rollers are used, only one needs to be fitted with an integrated compactometer device provided they work in tandem. The roller with the integrated compactometer device shall then be positioned to follow the one without a device (travelling towards the recycler) and the number of passes recorded will be multiplied by two (2). No additional payment shall be made for this plant

6.5) Grader work and secondary compaction

After completing the primary compaction on all adjacent cuts that make up the width of pavement that is recycled in one shift, the surface shall be pre-shaped before final compaction is applied. Pre-shaping shall address the lateral shift of material resulting from the surface inclination (cross-fall) and shall be undertaken in the following sequence:

- i. the full width of primary compacted material shall be treated with a generous application of water sprayed from a tanker;**
- ii. the grader shall then cut the uppermost portion of recycled material from the centre-line extremity towards the outer shoulder, cutting to a depth that coincides with the lower part of the step located at each longitudinal construction joint (overlap between adjacent cuts), often identifiable with padfoot imprints (normally $\pm 50\text{mm}$ for standard 2% camber). The cut material is windrowed to the outermost edge of cut and a light application of water sprayed on the full width of the exposed surface. To prevent the lamination phenomenon (biscuiting), no roller will be allowed onto the exposed cut surface.**
- iii. The grader shall then blade the windrowed material to the opposite side of the recycled width, cutting the strip underlying the location of the original windrow to the same depth as the first cut, and placing the material in windrow along the innermost edge of cut. A light application of water is then sprayed over the full width of the exposed surface. As with the previous cut, no roller will be permitted onto this exposed surface.**
- iv. After spraying the exposed surface with water, the grader shall then spread the windrow across the full recycled width as a layer of uniform thickness approximating final surface levels.**

Secondary compaction shall then be applied using the smooth-drum vibrating roller operating in low amplitude vibration mode. A minimum of three (3) unidirectional passes shall be applied to the entire area. The outer

cut extremities shall be exposed as a guide for the roller operator to ensure that the compaction effort is directed only on to the recycled material (thereby preventing any "bridging across" from the unrecycled pavement).

Once compacted, final surface levels will be cut with the grader and finished off by blading (skimming) the working windrow across the surface, first from the outer edge towards the centre-line and then back towards the outer shoulder where it shall either be spread across the shoulder and compacted or picked up and removed. After cutting final levels the smooth-drum roller shall make a final compacting pass over the entire area before the finishing work commences.

6.6 Finishing off the layer

When the grader work and secondary compaction is complete, the surface will be sprayed with an appropriate amount of water and a pneumatic tyred roller (PTR) applied. The PTR shall make sufficient passes required to generate a "mild" slush and close up voids in the surface together with any other grader-induced defects and achieve a tightly-knit surface finish.

Where the recycled material is treated with a bitumen stabilising agent and the intention is to open the finished layer to early trafficking, a dilute emulsion (15% residual bitumen) may be substituted for water in the slushing process on the Employer's Agent's Representative's request. Such slushing shall be undertaken in short sections ($\pm 20\text{m}$) over the full width of the recycled layer. A water tanker fitted with an appropriate spraying system (or binder distributor) shall be used to spray a uniform amount of dilute emulsion on the surface before applying the PTR. Additional dilute emulsion may be applied where the first application failed to generate sufficient slush under the wheels of the PTR. Personnel equipped with squeegees shall be deployed to move the slush over areas showing signs of roughness and/or segregation. Squeegees shall be used to remove any surplus slush to the side of the road.

Once slushing is complete, the entire area shall receive a fog spray application using the same dilute emulsion (applied at a nominal rate of 0.75 litres/m^2) and left to dry back before opening the road to traffic. This item shall be measured and paid separately as and when requested by the Employer's Agent.

Note.

Dilute emulsion for slushing and fog spraying shall only be applied using an appropriate water tanker or binder distributor.

PS10107. TRIAL SECTIONS

Before the contractor commences with any recycling work, he shall demonstrate by means of constructing a trial section that the processes he proposes to use will enable him to construct a new layer in accordance with the specified requirements.

Prior to carrying out the trial section, the contractor shall assemble all items of plant and equipment that he proposes to use for the recycling operation. Only those machines he intends using for production work shall be used to construct the trial section and under no circumstances shall he be permitted to use any substitutes. The first section of pavement to be recycled shall be regarded as a trial section with the objective of:

- demonstrating that the equipment and processes he proposes to employ are capable of constructing the recycled layer in accordance with the specified requirements;
- determining the effect on the grading of the recycled material by varying the forward speed of the recycling machine and the rate of rotation of the milling drum; and
- determining the amount of rolling necessary to achieve the compaction requirements.

The trial section shall be at least 200m in length and shall cover the full lane-width or half-road width in accordance with the geometry of the road and the accepted work plan.

To allow the Employer's Agent's Representative sufficient time to assess all aspects of quality of the completed trial section and contingent on the results being satisfactory, the contractor shall programme to start production recycling work no sooner than one week after constructing the trial section.

Should the contractor make any alterations in the methods, processes, equipment or materials used, or if he is unable to comply consistently with the specifications due to variations in the in-situ material, or for any other reason, he may be required to undertake further trial sections before continuing with the permanent work.

Provision is made for payment for the first approved trial section, measured separately in square metres for the area actually constructed as a trial section. Such payment will be made as an extra-over to the various payment items for recycling work together with all additives that will be measured and paid as normal production work. Any further trial sections ordered by the Employer's Agent or Employer's Agent's

Representative shall likewise be paid provided they are approved. Trial sections that fail to obtain approval shall be deemed to be the contractor's expense.

PS10108. PROTECTION AND MAINTENANCE

New layers construction from recycled material stabilised with cement require different protection and maintenance measures from those stabilised with bitumen.

8.1 Curing

8.1.1 Cementitious stabilisation

(a) *Where the recycled layer forms the subbase in the new pavement structure*

The provisions of Clause 3503 (h) (ii) shall apply:

"The stabilised layer shall be covered with the material required for the next layer while the stabilised layer is still in a wet or damp condition. The material forming the protective layer shall be watered at such intervals as may be required to keep the stabilised layer continuously wet or damp and, in dry weather, this shall be done at least once every 24 hours."

(b) *Where the recycled layer forms the base of the new pavement structure*

The provisions of Clause 3503 (h) (iv) shall be modified to read:

"The prime coat shall be utilised as a curing membrane and will be applied no later than 24 hours after completing the recycled layer, all in accordance with Section 4100."

8.1.2 Bituminous stabilisation

No special curing treatment is required for layers of bitumen stabilised material.

8.2 Trafficking the completed layer

8.2.1 Cementitious stabilisation

Under no circumstance shall traffic be allowed to travel on layers of cement stabilised material.

8.2.2 Bituminous stabilisation

(a) *Where bitumen emulsion is applied as the stabilising agent*

Traffic shall not be allowed to travel on the completed layer for a period of 24 hours. The moisture content of the layer shall then be checked and, provided it is below 80% of OMC, the new layer may be opened to traffic.

(b) *Where foamed bitumen is applied as the stabilising agent*

Traffic shall be allowed to traffic the completed layer as soon as the surface has dried back to a damp condition. As soon as the surface of the layer has dried (normally within 24 hours under favourable weather condition), the section shall be closed to traffic to allow a fog spray of dilute emulsion (15% residual bitumen) to be applied at a nominal application rate of 0.75 litres/m². The section shall be reopened to traffic after two hours or as soon as the emulsion has broken.

Where the surface was slushed with a dilute emulsion and a fog spray applied as part of the finishing process (as described in Clause 6.6 above), the section shall remain closed to traffic for a minimum of two hours after completion or until the emulsion at the surface has broken.

Until the surfacing is applied, the contractor shall maintain the surface integrity of the new layer by deploying staff on a daily basis to visually monitor all sections under traffic and take immediate action as soon as signs of ravelling are detected. Such action shall include the local application of dilute emulsion (applied by hand using a large paint brush) or the application of a further fog spray.

8.3 Application of surfacing

To prevent environmental degradation and abrasion damage (where the completed work is open to traffic), new base layers shall be surfaced as soon as the moisture content in the upper 100mm horizon has reduced to below 50% of OMC.

The maximum time delay between completing a new base layer and applying the surfacing shall be 14 days (with due allowance made for inclement weather).

PS10109. CONSTRUCTION TOLERANCES

The provisions of Clause 3405 shall apply to all layers constructed by in situ recycling.

9.1 Stabilising agents

The average rate of application of stabilising agents (cementitious and bituminous) as measured from consumption records shall be within 5% of the specified application rate.

9.2 Bitumen stabilised bases subjected to early trafficking.

The contractor shall be responsible for the maintaining the surface integrity of new bitumen stabilised base layers that are opened to traffic before the surfacing has been applied. Where damage occurs as a consequence of the surfacing not being applied within the time limits specified in Clause 8.3 above, the Employer's Agent or Employer's Agent's Representative shall have the right to summarily reject the affected layer and the contractor will have no recourse for the costs he incurs in removing the layer and replacing it with fresh bitumen stabilised material.

PS10110. QUALITY OF MATERIALS AND WORKMANSHIP**10.1 Process control**

The contractor shall establish a comprehensive process control system for the recycling work.

10.1.1 Daily reports

The following daily reports shall be submitted:

- The production plan (refer Clause 6.2.1).
- The completed pre-start check list (where the material was stabilised with bitumen).
- A "Daily Production Record" that includes:
 - weather conditions and temperature measurements (refer Clause 6.3.1)
 - details of the recycling work completed during the day with the following information for each cut that was made:
 - start and end chainages;
 - depth of cut (including a schedule of dip measurements);
 - width of application of stabilising agent(s);
 - nozzle settings (closures) for each spraybar;
 - computer data input; and
 - cement / lime spreading check measurements (where relevant).

Where the material is treated with a bitumen stabilising agent, the following shall be included:

- bitumen emulsion or Pen-grade bitumen consumption; and
- average temperature and pressure measured at the spraybar; and
- all other details shown in the sample report included in the Appendices of the latest edition of TG2.
- relevant comments / information concerning the recycling operation. These shall include but shall not be limited to:
 - standing time and the reason(s);
 - sections where in situ pavement conditions changed together with a description of the change (e.g. thick asphalt between km 1+200 and km 1+230 in Cut #2);
 - details of any non-routine tests that were undertaken;
 - any changes in the weather during the day (e.g. strong wind from 13:00); and
 - relevant instructions received and from whom.
- the location where the daily sample of pulverised material was taken.

10.1.2 Bitumen consumption

Where the recycling process includes bitumen stabilisation, the contractor shall base his consumption claim on that indicated the recycler's computer. To verify his claim, the contractor shall provide the Employer's Agent's Representative with a weekly reconciled schedule showing any stock records together with all consumption and deliveries for that specific week. All deliveries shall be supported by original (or certified copies of) official weighbridge certificates that are used by the contractor as the basis of payment to the supplier.

Where there is a discrepancy between the actual and theoretical consumption for stabilisation, the contractor shall immediately check the calibration of the flow meter on the recycler. To do so, he shall provide a full tanker load of bitumen stabilising agent with a loading ticket from an assized weighbridge. The entire contents

of the tanker shall then be used to recycle a continuous section of cut (after resetting the computer). The consumption reflected by the computer on the recycler shall be compared with the mass shown on the weighbridge ticket and, if necessary, the computer shall be re-calibrated. A second tank-load of bitumen stabilising agent with a loading ticket shall then be used to confirm the accuracy of the recalibration exercise.

Note. Dipstick readings shall not be used as a basis of payment for bitumen stabilising agents.

10.1.3 Density of the recycled layer

Compaction data from the integrated compactometer device fitted to the primary roller (refer Clause 4.2.1) shall be submitted daily in an electronic format. Where the contractor elects to provide the Employer's Agent with printed summary sheets, the electronic data shall also be supplied.

10.1.4 Grading of the recycled material

Samples of pulverised material shall be taken on a daily basis (refer to the first paragraph in Clause 6.2) and tested to determine the grading curve. Where the curve consistently fails to meet the requirements specified in the Project Document, the Employer's Agent may issue an order for suitable blend material to be imported.

10.1.5(a) Process Control Testing

The Contractor must carry out the necessary process control testing required to prove to the Employer's Agent that the layer has been constructed to specification. These results must be made available to the Employer's Agent who will decide if any further Acceptance testing is required. No additional payment will be made for Process Control Testing and it will be deemed to be included in the tendered rates.

10.15(b) Acceptance control

Routine inspection and tests shall be carried out by the Employer's Agent or Employer's Agent's Representative to determine the following aspects of quality of the completed work:

10.2.1 Strength of the stabilised material

At least one sample shall be taken for every 1000m² of stabilised material and subjected to strength tests according to the type of stabilising agent applied.

(a) Cementitiously stabilised materials

Standard TMH1 tests shall be undertaken to determine the UCS of the material. The results will be used to indicate whether the material meets the "C" classification stipulated in the Project Document.

(b) Bituminous stabilised materials

Samples shall be taken to the laboratory and, within 12 hours, 100mm diameter specimens shall be manufactured in accordance with the guidelines of the latest publication of TG2 and the relevant ITS values determined. The results will be used to indicate whether the material meets the "BSM" classification stipulated in the Project Document.

10.2.2 Density of the completed layer

Unless otherwise stated in the Project Document, the reference density for recycled materials shall be the modified AASHTO density. (ARD or BRD shall only be considered where the material in the existing pavement is relatively uniform.)

Target densities are shown in the following table:

Predominant material type	Target density (% of modified AASHTO density)	
	Cementitious	Bituminous
Natural gravel	97	100
Graded crushed stone	98	102
Crushed and Screened Reclaimed Asphalt		102
Unscreened Reclaimed Asphalt		100

At least one density test shall be undertaken per 200m² of completed layer using a nuclear gauge. At each and every density test location, sufficient material shall be sampled from the full layer thickness to determine the moisture / density relationship and the in situ moisture content. The results shall be used to determine the density achieved at that specific location.

Where a density test result falls below the target, the Employer’s Agent or Employer’s Agent’s Representative will first check the data produced by the integrated compaction system to determine whether or not sufficient compaction effort was applied and confirm that the maximum density was achieved. If so, then the moisture content of the material will first be checked (from the oven-dried sample taken for the moisture correction value used by the nuclear gauge).

Should this value fall below 50% of the OMC (determined for the same sample), then the test will be deemed a “failure” and the affected portion of the layer reworked at the correct moisture level (or, in the case of cement stabilisation, rejected).

If the moisture content is above 50%, then the Employer’s Agent’s Representative will inspect the location of the low density result and take whatever measurements are deemed necessary to determine the cause of such low density. Such measurements may include:

- repeating the mod AASHTO density test to confirm the MDD target;
- driving a DCP probe through the underlying pavement structure to determine the support conditions; and/or
- taking additional samples and conducting further laboratory tests (e.g. gradings of different horizons to determine the influence of any segregation that may have occurred whilst blading the treated material with a grader).

10.2.3 Layer thickness

The thickness of the completed layer will measured from sample holes excavated at each density test location.

PS10111. MEASUREMENT AND PAYMENT

Note. The quantities reflected in the Schedule, and especially those relating to the import of new material, stabilising agents and the recycling / stabilising work, must be regarded as “provisional” since they can only be finalised once the stabilisation mix designs have been completed.

Item	Unit
PS10111.1 Preparations for pavement rehabilitation (Lane.km)	Lane kilometre

The unit of measurement shall be the lane kilometre (ie 3.5m wide by 1km in length) of road subjected to rehabilitation.

The tendered rate shall include full compensation for undertaking all the work required in preparation for rehabilitation, including all survey and survey-related work (e.g. setting out, establishing the level control poles and fixing the design levels), removal of standing water, grass and weeds from the road (including the shoulders) and for preparing the pavement surface.

PS10111.2 Pre-pulverising material in the existing pavement using a milling machine

- (i) Milling to break down asphalt layers in excess of 40 but not more than 60mm.....square metre (m²)**
- (ii) Milling to break down asphalt layers in excess of 61 but not more than 100mm.....square metre (m²)**
- (iii) Milling to break down asphalt layers in excess of 101 but not more than 160mm.....square metre (m²)**
- (iv) Milling to break down asphalt layers in excess of 160mm.....square metre (m²)**

The unit of measurement shall be the square metre of existing road surface that is pre-pulverised in situ, as instructed by the Employer’s Agent or Employer’s Agent’s Representative, regardless of the hardness or type of material encountered in the existing pavement. The quantity shall be calculated from measurements of the actual width pre-pulverised and shall not be increased to include any allowance for overlaps between adjacent cuts, nor for the number of cuts required to cover the width of pre-pulverising.

The tendered rate shall include full compensation for setting out the works, for pre-pulverising all types of material in the existing pavement structure, for controlling the depth of pre-pulverising, for the addition of water whilst pre-pulverising, for mixing, placing, cutting levels and compacting the material to a nominal density of 95% of the modified AASHTO density.

PS10111.3 New material imported for modification of existing pavement layers:

- | | | |
|------------|---|------------------|
| (a) | Crushed stone (G2) from commercial sources | tonne (t) |
| (b) | Crusher dust from commercial sources | tonne (t) |

The unit of measurement shall be the tonne of new material imported on to the road, as instructed by the Employer's Agent. The quantity shall be taken from delivery notes, unless instructed by the Employer's Agent that the quantity be determined from cross-sections.

The tendered rate shall include full compensation for procuring the material, from commercial sources, for loading and transporting to site, for dumping, spreading, mixing by grader with water (if required), cutting levels and compacting the material to a nominal density of 95% of the modified AASHTO density.

The rate tendered for material obtained from commercial sources shall include for all transport costs, regardless of the distance the material is hauled.

Note. No additional payment shall be made for working in restricted widths of 1.0m on the shoulders and the tendered rates shall make provision for working in such restricted widths.

PS10111.4 New pavement layer constructed by in situ recycling:

(a) Layers (all materials), compacted to the 102% Mod AASHTO density, stabilised:

(i)	100mm to 150mm.....	cubic meter (m³)
(ii)	151mm to 200mm.....	cubic meter (m³)
(iii)	201mm to 250mm.....	cubic meter (m³)
(iv)	251mm to 300mm.....	cubic meter (m³)

(b) Layers (all materials), compacted to 100% Mod AASHTO density, stabilised:

(i)	100mm to 150mm.....	cubic meter (m³)
(ii)	151mm to 200mm.....	cubic meter (m³)
(iii)	201mm to 250mm.....	cubic meter (m³)
(iv)	251mm to 300mm.....	cubic meter (m³)

(c) Layers (all materials), compacted to 98% Mod AASHTO density, stabilised:

(i)	100mm to 150mm.....	cubic meter (m³)
(ii)	151mm to 200mm.....	cubic meter (m³)
(iii)	201mm to 250mm.....	cubic meter (m³)
(iv)	251mm to 300mm.....	cubic meter (m³)

The unit of measurement shall be the cubic metre of completed stabilised layer. The quantity shall be calculated in accordance with the authorised dimensions of the layer. The quantity shall not be increased to include any allowance for overlaps between adjacent cuts, nor for the number of cuts required to cover the width of the road.

The rates tendered shall include full compensation for setting out the works and for all plant, labour, materials and other incidentals required for recovering and breaking down the material to the prescribed depth, regardless of whether the recovered material consists entirely of in situ pavement material, a blend of in situ material and pre-treated material and/or new imported material and regardless of the hardness or type of in situ material; for mixing the recovered material with stabilising agents, active filler (excluding the provision of the stabilising agents and active filler which shall be measured and paid for separately) and water (including the provision of water); for placing, spreading and compaction; for cutting levels, final compaction and finishing off the layer. The rates shall also include for protection and maintenance of the new layer (excluding the application of the fog spray) and for conducting all quality control inspections, measurements and tests.

PS10111.5 Stabilising agents:

- (a) **Cementitious stabilising agents (and active fillers)**
- (i) **Ordinary Portland Cement, Cem II 32.5** ton (t)
- (ii) **Slaked Road lime** ton (t)
- (b) **Bituminous stabilising agents**
- (i) **Bitumen emulsion (type specified)**..... ton (t)
- (ii) **Foamed bitumen from 70/100 Pen-grade bitumen** ton (t)

The unit of measurement shall be the ton of stabilising agent/dispersing agent actually consumed in the recycling / stabilising process. Measurement shall be based on assized weighbridge tickets issued for each and every tanker load of bitumen consumed in the recycling process. The measured quantity shall not exceed the calculated theoretical quantity by more than 5%. The measurement for bitumen stabilising agents shall provide for double treatment over a nominal 100mm overlap width along longitudinal joints.

The tendered rates for cementitious stabilising agents shall include full compensation for procuring and providing the stabilising agent or active filler on site, for all handling and temporary storage requirements, for setting out and spotting bags/pockets in a grid matrix along the line of cut, for opening, emptying and spreading the contents of the bags/pockets accurately within the confines of the relevant cells, for collecting and disposing of all empty bags/pockets, for all wastage and for adhering to all safety measures whilst handling the bags/pockets.

The tendered rate for bituminous stabilising agents/active fillers shall include full compensation for procuring and transporting the material to site, for transfer into storage tanks, storage, heating and transfer into tankers for coupling to the recycling train, for all transport on site, for issuing the required assized weighbridge ticket showing the mass of bitumen contained in the tanker, for any re-heating required, for all wastage and for strict adherence to all safety measures required when handling warm or hot bitumen. For foamed bitumen, the rate shall include for foaming the bitumen on the recycler, including the water and any other additive that may be required to achieve the minimum foaming characteristics and for injecting the foamed bitumen in to the recycled material. The rate shall exclude for slushing with a dilute bitumen emulsion, which will be paid separately if requested/the need arises

The tendered rate shall include full compensation for gathering the surplus material by windrowing or pushing it into heaps, for loading and transporting to a designated spoil site (freehaul), for offloading and either spreading the material or placing in neat stockpiles.

PS10111.6 Trial Sections where orderedcubic metre (m³)

The unit of measurement shall be the cubic meter of recycled pavement treated as a Trial Section, as ordered by the Employer's Agent or Employer's Agent's Representative. Where the Trial Section is successful, this item shall be measured and paid in addition to the various related work items. Where a Trial Section fails to achieve the specified result for any reason whatsoever, no payment shall be affected under this item, nor shall any payment be made under the various related items for the failed work.

The tendered rate shall include full compensation for all additional costs incurred as a consequence of designating the section of work a Trial Section, including all costs relating to low productivity.

PS10111.7 / 48.01 Application of a fog spray of diluted bitumen emulsion:

- (a) 65% Cationic spray grade emulsion litre (l)
- (b) 32.5% Cationic spray grade emulsion litre (l)
- (c) 16% Cationic spray grade emulsion litre (l)

The unit of measurement shall be the litres of emulsion sprayed measured at spraying temperature.

The tendered rate shall include full compensation for procuring and providing all plant, labour and materials required for applying the fog spray as specified, including all preparation work required to dilute the emulsion and sweep the road surface before applying the fog spray.

Add the following Specification:

SECTION PS10200: SPECIFICATION FOR PROCESSING RECLAIMED ASPHALT FOR SUBBASE OR BASE OFF SITE IN A STATIC COLD RECYCLING MIXING PLANT AND PLACED BY A PAVER, PROCESSED BY A GRADER OR BY HAND IN RESTRICTED AREAS

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PS10201 SCOPE

“Cold recycling using a Static Cold Recycling Plant” is a construction process that uses large special-purpose pug mill type machine together with stabilizing and dispersing agents to recycle reclaimed asphalt or granular material for reuse in existing pavements, without pre-heating the material. This process is referred to as “Static Plant recycling” in these specifications

- The road base or subbase for Pavements in this contract shall be constructed from crushed and screened or unscreened reclaimed asphalt material, stabilized with foamed bitumen in a central-type mixer and paver laid, laid/processed using a grader or laid by hand in restricted areas, all as specified by the Employers Agent. The new base shall be opened to traffic immediately after completion.

PS10202 MATERIALS

(2.1) The Crushed and Screened or Unscreened Reclaimed Asphalt Material

For this contract shall meet the requirements specified in TG2 (2020) Table 4.7 Recommended Grading for BSM foam and BSM emulsion.

Should the results of foamed bitumen mix designs indicate that blending of the crushed stone material with crusher dust is desirable to achieve an optimal product, the crusher dust used for blending shall meet the grading requirements for 'Fine Slurry – Fine Grade' specified under Section 4300, 4302 (b) (ii) Aggregates for Slurry Seals– Table 4302/11, Materials for slurry seal, as amended in Section PS4300, Table PS4302/13."

(2.2) Stabilising Agents

(2.2.1) Cementitious stabilizing/dispersing agents

- Cement shall comply with the relevant requirements of SANS 50197-1:2013 for a CEM II. The use of strength classes greater than 32.5 shall not be permitted.
- Road lime shall comply with the requirements of SABS 824.

(2.2.2) Bituminous stabilising agents

- The bitumen emulsion to be used will be specified in the project Document and shall comply with the appropriate specification for a stable-grade bitumen emulsion (60% net bitumen) for: SANS 309 (SANS 4001 BT3: 2014) for anionic emulsion; or SANS 548 (SANS 4001 BT4: 2014) for cationic emulsion.

(b) Foamed bitumen shall be produced by injecting a small amount of water (between 2% and 4% by mass of bitumen) into an 70/100 road-grade bitumen complying with the SANS 4001-BT1:2012 specification. The minimum foaming characteristics (in terms of expansion ratio and half-life) shall be consistent with those stipulated in the latest version of TG2.

(2.2.3) Water for construction

Water shall not contain any deleterious materials in harmful concentrations. Only approved sources of water shall be used.

PS10203. STABILISATION MIX DESIGNS

The Project Order will include the details of all relevant stabilisation mix designs undertaken prior to the award of the Project.

Within 7 days of the Contractor taking possession of the site, the "Advance Testing Programme" shall commence.

(3.1) Mix Design Procedures

The Employer's Agent will determine the optimal application rates for foamed bitumen and any active filler using specialised laboratory equipment to produce foamed bitumen to mix with representative samples of the material to be stabilised.

200 kg of representative samples of each of the crushed stone and crusher dust materials that the contractor intends using for bitumen stabilized road base shall be delivered to the Employer's Agent's Representative at least six weeks before foamed bitumen stabilizing work is scheduled to commence. Should the Contractor elect to use more than one aggregate source, the procedures described below shall be repeated for each source, allowing a six week period for each to enable the Employer's Agent's Representative to undertake the necessary testing programme.

The Employer's Agent's Representative shall undertake the necessary tests in the site laboratory to determine the need for blending crushed stone with crusher dust and the relevant proportions should blending be required. Any blending requirement shall be prescribed in terms of percentage (by volume) of each component. The application rate of foamed bitumen will be determined from mix design procedures conducted on the specified blend of crushed stone and crusher dust and may vary between a minimum of 2.5% and maximum of 3.5% (by mass). In addition, tests will be carried out to determine the need for adding an active filler to the mix. A nominal application rate of 1% (by mass) of either hydrated lime or cement is usually added as a dispersing agent for the foamed bitumen.

Following these tests, the Employer's Agent's Representative will issue the Contractor with a memo specifying:

- the temperature range at which the bitumen is to be supplied for foaming;
- the amount of water to be injected into the bitumen for foaming;
- any requirements for blending the crushed stone material with crusher dust, together with applicable proportions (by volume);
- the application rate (to one decimal place, by mass) for foamed bitumen;
- the type and application rate (to one decimal place, by mass) of any active filler to be added to the aggregate prior to mixing with foamed bitumen; and
- the minimum strength values that will be applicable for quality control of the mixed product."

(3.2) Determining the Application Rates for Foamed Bitumen and Active Filler

Five (5) drums, each containing twenty (20) litres of representative samples of the bitumen that the contractor intends using on this contract, shall be delivered to the Employer's Agent's Representative at least six weeks before foamed bitumen stabilizing work is scheduled to commence. These samples shall be used to determine:

- the optimal foaming characteristics of the bitumen,

- the optimal application rate of foamed bitumen for stabilizing the material to be used in the construction of the new road base, and
- whether or not an active filler is required in the mix.

The laboratory procedures for determining optimal application rates and the need for an active filler shall be referred to as "mix design procedures".

(3.3) Foaming Characteristics of the Bitumen

The Employer's Agent or Employer's Agent's Representative will determine the optimal foaming characteristics using specialised laboratory equipment to inject water into hot bitumen and measuring two key characteristics of the resulting foam at various bitumen temperatures and amounts of added water. The two key characteristics are:

- the expansion ratio. This is a measure of the viscosity of the foam and is calculated as the ratio of the maximum volume of foam relative to the original volume of bitumen, and right
- the half-life. This is a measure of the stability of the foam and is the time taken (in seconds) for the foam to collapse to half the maximum volume achieved.

The laboratory procedure determines the temperature of the bitumen and amount of water addition (expressed as a percentage of the mass of bitumen) required to achieve a maximum of both expansion ratio and half-life.

An expansion ratio in excess of 10 with a corresponding half-life of more than 10 seconds are typical foaming characteristics for the bitumen specified on this contract under the following conditions:

Road-grade Bitumen (Penetration)	Bitumen Temperature (°C)	Water Addition (% of Bitumen Mass)
70/100	160 – 190	1 – 3

Stabilisation mix designs shall be carried out in accordance with the latest edition of the following publications:

- Cementitious stabilisation: TRH 13 and TRH14
- Bituminous stabilisation: TG2

Recycling work may only commence once the relevant mix designs have been approved for the initial 1km section. Thereafter, it will be incumbent on the Contractor to ensure that the laboratory work proceeds at a sufficiently fast pace to provide the relevant mix design requirements and obtain the necessary approval ahead of the recycling work. Should the situation arise where there is no approved mix design due to any delay, recycling work shall cease until such time as the approved mix design information becomes available and the Contractor shall have no recourse for costs incurred as a consequence of such a delay.

PS10204. PLANT AND EQUIPMENT

PROCESSING, LAYING AND COMPACTING SCREENED OR UNSCREENED RECLAIMED ASPHALT SUBBASE AND BASE

NOTE. These specifications are focused on the use of a Static Plant Recycler of site – KMA or similar. Where the contractor intends using any other type of machine to recycle reclaimed asphalt he shall submit a full motivation for using such a machine, including a detailed work plan describing the foaming, mixing process and subsequent compaction processes that will produce a layer that meets the specified end product requirements.

(4.1) Mixing Plant/Static Plant Recycler – KMA or similar

The mixing plant shall be purpose-built and supplied by a reputable manufacturer who can prove a successful history of foamed bitumen application with such a system in an environment similar to the region KwaZulu Natal. The foamed bitumen application system shall consist of a series of individual expansion chambers in which regulated amounts of water are mixed with hot bitumen. Modified hot-mix asphalt plants and "open" foaming systems that create foam by spraying a fine jet of water onto a hot bitumen stream in the open air (i.e. not in an enclosed chamber) shall not be used on this contract.

The material to be stabilized shall be fed continuously to the mixing unit. Where blends of crushed stone aggregate and crusher dust are specified, each component shall be fed through individual separate bins (cold-feed bins) and the required blend shall be achieved by adjusting the gate opening on each bin. Sensors shall be installed at each gate opening to monitor the flow of material and shall cause the plant to stop working in the event of no material flow.

The mass of material being transported on the main feed conveyor shall be determined by means of a load-cell that shall be linked to a central micro-processor control unit. This unit shall regulate the addition of foamed bitumen, active filler and water. In addition, the micro-processor shall record the throughput of material and related consumption of active filler, bitumen and water.

The application of active filler shall be achieved by adding dry powder onto the main feed conveyor prior to the material entering the pugmill mixer. Water and foamed bitumen shall only be applied in the mixer. Water shall first be added to the material at the inlet of the mixer, followed by the foamed bitumen. Each application system (active filler, water and foamed bitumen) shall be regulated by the central micro-processor control unit.

The foamed bitumen application system shall include the following features:

- electrical heating to raise the temperature of the entire bitumen flow path to at least 150°C before introducing bitumen into the system;
- a flow meter to measure and regulate the flow of hot bitumen;
- a series of separate expansion chambers spaced equidistant on a spraybar spanning the width of the pugmill mixer;
- a positive automatic control system to maintain a bitumen feed-pressure in excess of three (3) bars; and
- an easily accessible "test nozzle" that will instantly deliver a representative sample of the foam being injected into the mixer.

For safety reasons, systems that circulate hot bitumen from a tank, through the plant and back to the tank by means of a return pipe, shall not be employed unless the entire bitumen flow circuit is electrically heated. Such heating shall be applied continuously to the return pipe to safeguard against blockages forming whilst the plant is working.

The mixing plant that the contractor intends employing shall be subject to the Employer's Agent's or Employer's Agent's Representative's approval and he shall be entitled to reject a process which, in his opinion, may not consistently produce a mix with the required proportions or properties.

(4.2) (a) Paver

The base or subbase material shall be laid by a self-propelled track-mounted paver fitted with a single-unit screed that can pave a minimum width of 5m, equipped with "high compaction" features capable of uniformly compacting the full thickness of the paved layer to the minimum density of 98% of MDD (AASHTO T180). The equipment used shall be of adequate rated capacity, in good working order, and subject to the approval of the Employer's Agent or Employer's Agent's Representative. Obsolete or worn out equipment will not be permitted on the Site.

Only one longitudinal construction joint coinciding with the centre-line shall be permitted in the new base or subbase layer on this contract.

(4.2) (b) Hand laid

The base or subbase material shall be hand laid by labour intensive personnel to a depth of up to 150mm and levelled using hand rakes to suitable finished road level. The process shall include loading the BSM from the production plant and transporting to site, and spread to 150mm depth with proper level controls such as surveyor pegs must be in place to ensure proper thickness control, processing and compacting the layer to 98% MOD AASHTO as specified. The equipment used shall be in good working order and subject to the approval of the Employer's Agent. Obsolete or worn out equipment will not be permitted on the site.

Only one longitudinal construction joint coinciding with the centre-line shall be permitted in the new base or subbase layer on this contract.

(4.2) (c) Grader finished

The base or subbase material shall be laid by end-tipping and levelled using a Grader to a depth of up to 150mm, to suitable finished road level as directed by the Employers Agent. The process shall include loading the BSM from the production plant and transporting to site, and spread to 150mm depth with proper level controls such as surveyor pegs must be in place to ensure proper thickness control, processing and compacting the layer to 98% or 100% MOD AASHTO as specified. The equipment used shall be in good working order and subject to the approval of the Employer's Agent. Obsolete or worn out equipment will not be permitted on the site.

Only one longitudinal construction joint coinciding with the centre-line shall be permitted in the new base or subbase layer on this contract.

(4.3) Compaction

Compaction of the material shall be carried out using both vibrating smooth-drum rollers (minimum static mass of 12 tons and minimum drum width of 2.0 m) and pneumatic-tyred rollers (minimum 9-tyres and operating mass of 20 tons). The rolling pattern shall be so designed as to retain the shape of the layer and shall be as determined during the Trial Section. The size/mass of the rollers may be reduced in areas which are restrictive, however the compaction requirements as stated above are to be achieved.

(4.3.1) Placing and Compaction

The mixed material shall be loaded into trucks used for transporting the material in such a manner that segregation will not take place while the material is being loaded, nor whilst in transit to the point of offloading. Care shall be taken to prevent excessive loss of moisture between the time when the materials are loaded into trucks for transport and when they are finally compacted on the road. Where necessary, trucks shall be provided with protective covers to limit the loss of moisture.

The sub-base layer shall be swept clean of all debris and loose material over the full area. The surface shall be thoroughly moistened prior to laying the base and kept moist until covered by the new base. The contractor shall arrange his operations so that trucks transporting material to the site travel for the least distance possible on the prepared surface of the subbase. No turning of trucks shall be permitted on the prepared subbase and only wide-radius turns may be made whilst the truck is lining up. Any damage caused to the surface of the subbase layer shall immediately be rectified by:

- removing all loose subbase material by hand;
- moistening the surface so exposed;
- backfilling any gouges with foamed bitumen stabilised material; and
- compacting the backfill material to reinstate the original surface levels.

The new bitumen stabilized road base shall be constructed in half widths with only one longitudinal joint at the centre-line. To prevent a vertical step remaining along the centre-line overnight, the Contractor shall arrange his daily programme such that both half-widths are completed in a single shift. This means that whatever length of base is constructed on one half-width during the first part of the shift must be matched by constructing the same length on the other half-width before the end of work.

The longitudinal joint along the centre-line shall be kept continuously moist until the opposite half-width is laid and processed. At the end of each day's work, and when operations are delayed or stopped for more than one (1) hour, a lateral joint shall be formed by trimming back into the previously material until the full layer thickness of thoroughly compacted material is achieved. Such joints shall not be vertical, nor flatter than 1:2 (vertical : horizontal). All loose material shall be removed and the joint thus formed shall be moistened prior to works recommencing.

Once the layer has been compacted, the surface shall be gently slushed out by a pneumatic-tyred roller working in conjunction with a water tanker to obtain a tightly-knit surface finish. The finished surface of the foamed bitumen stabilised base course shall be of a uniform consistency. Any surface defect, including areas of coarse segregated aggregate, shall be removed by excavating the full layer depth. The sides of the holes so formed shall be trimmed, as described above for construction joints, before backfilling with fresh foamed bitumen stabilised material, compacted to the required density and finished off to the required elevation.

Sufficient time shall be allowed at the end of the shift to allow the surface to dry back to a moist state before opening the full road width to traffic. Curing, the new foamed bitumen stabilised road base shall commence the following morning and continue until the fog spray (or surfacing) is applied. It shall be kept continuously

moist for seven days by an effective application system that will not damage the surface of the layer. If requested by the Employer's Agent or Employer's Agent's Representative a fog spray of dilute bitumen emulsion to protect the surface from the abrasive forces of traffic shall be applied and paid for separately.

PS10205 SETTING OUT AND CONTROL OF THE WORK

Must be read in conjunction with clause PS10105

PS10206 CONSTRUCTION

(6.1) General limitations and requirements

No recycling/mixing work shall be undertaken during misty or wet conditions, nor shall any work commence if there is a risk that it may not be complete before such conditions set in. Similarly, work shall not be undertaken if the ambient air temperature is below 5°C for emulsions and between 10-15°C for foam. No further work, other than finishing and compaction, will be permitted if the air temperature falls below 10°C during operations.

The limitations shown in the following table shall be strictly enforced.

Temperature and time limitations for different stabilising agents			
Limitation	Stabilising agent		
	Cement	Bitumen emulsion	Foamed bitumen
Minimum material temperature (°C)	10	10	15
Maximum time for completion (hours)	4(from first bag been opened)	12	10

(6.2) Requirements before mixing/recycling commences

On a daily basis, before the start of recycling/mixing work (or, alternatively, at the end of the day's work), a bulk sample (>100kg) of screened/unscreened material shall be taken from an area that is going to be processed for laboratory testing

(6.3) Treating the Material with Foamed Bitumen and Active Filler

Mixing shall be done at locations off the road by means of a mobile mixing plant. Mixing the materials in-situ on the road will not be allowed and no alternative methods, including those that employ recycling-type machines for in-situ mixing, will be considered.

(6.4) Stockpile Areas

The crushed stone material, any crusher dust required for blending and, where required, the treated product shall be stockpiled separately adjacent to the mixing plant. To prevent contamination, the entire area on which material is to be stockpiled shall be prepared by creating a hard surface. The decision as to how such a surface is created is entirely the responsibility of the Contractor, as is the area of hard surface required for each material type. The cost of constructing such hard surfaces shall be included in the rates for bitumen stabilization.

The Contractor shall be solely responsible for ensuring that any material placed in stockpile does not become contaminated with that from the underlying floor. Any contamination of the material in stockpile will be sufficient reason for the Employer's Agent or Employer's Agent's Representative to reject the entire stockpile and the Contractor shall remove all material deemed to be contaminated at his own cost and such material shall not be used in the permanent work.

(6.5) Mixing Plant

The mixing plant shall be purpose-built and supplied by a reputable manufacturer who can prove a successful history of foamed bitumen application with such a system in an environment similar to the region KwaZulu-Natal. The foamed bitumen application system shall consist of a series of individual expansion chambers in which regulated amounts of water are mixed with hot bitumen. Modified hot-mix asphalt plants and "open" foaming systems that create foam by spraying a fine jet of water onto a hot bitumen stream in the open air (i.e. not in an enclosed chamber) shall not be used on this contract.

The material to be stabilized shall be fed continuously to the mixing unit. Where blends of crushed stone aggregate and crusher dust are specified, each component shall be fed through individual separate bins (cold-

feed bins) and the required blend shall be achieved by adjusting the gate opening on each bin. Sensors shall be installed at each gate opening to monitor the flow of material and shall cause the plant to stop working in the event of no material flow.

The mass of material being transported on the main feed conveyor shall be determined by means of a load-cell that shall be linked to a central micro-processor control unit. This unit shall regulate the addition of foamed bitumen, active filler and water. In addition, the micro-processor shall record the throughput of material and related consumption of active filler, bitumen and water.

The application of active filler shall be achieved by adding dry powder onto the main feed conveyor prior to the material entering the pugmill mixer. Water and foamed bitumen shall only be applied in the mixer. Water shall first be added to the material at the inlet of the mixer, followed by the foamed bitumen. Each application system (active filler, water and foamed bitumen) shall be regulated by the central micro-processor control unit.

The foamed bitumen application system shall include the following features:

- electrical heating to raise the temperature of the entire bitumen flow path to at least 150°C before introducing bitumen into the system;
- a flow meter to measure and regulate the flow of hot bitumen;
- a series of separate expansion chambers spaced equidistant on a spraybar spanning the width of the pugmill mixer;
- a positive automatic control system to maintain a bitumen feed-pressure in excess of three (3) bars; and
- an easily accessible "test nozzle" that will instantly deliver a representative sample of the foam being injected into the mixer.

For safety reasons, systems that circulate hot bitumen from a tank, through the plant and back to the tank by means of a return pipe, shall not be employed unless the entire bitumen flow circuit is electrically heated. Such heating shall be applied continuously to the return pipe to safeguard against blockages forming whilst the plant is working.

The mixing plant that the contractor intends employing shall be subject to the Employer's Agent's or Employer's Agent's Representative approval and he shall be entitled to reject a process which, in his opinion, may not consistently produce a mix with the required proportions or properties.

(6.6) Mixing

The mixing plant shall be operated to produce on a continuous basis. Small batches shall be avoided. Sufficient loading capacity shall be provided to maintain an adequate supply of material in the cold-feed bins and bulk tankers with a minimum capacity of 20 000 litres shall be used to supply hot bitumen and water. Where active filler is not supplied from a bulk silo, sufficient labour shall be employed to maintain a continuous supply from bags into a feeding hopper.

Before mixing commences, the amount of water to be added to the hot bitumen in the expansion chambers shall be entered into the micro-processor's "settings" mode, as well as the application rates for active filler, foamed bitumen and water. The gate openings on each cold-feed bin shall be set to deliver the required proportion of material into the resulting blend.

The temperature of the bitumen in the bulk tanker shall not be less than that required for foaming, as determined by the Employer's Agent or Employer's Agent's Representative from initial laboratory tests. If the bitumen temperature drops by more than 5°C below that required whilst bitumen is being drawn from the tanker, foaming characteristics shall be estimated using the test nozzle (as described below). The expansion ratio and half-life thus estimated will be used by the Employer's Agent as an indication of whether an acceptable quality of mix can be achieved. Should the Employer's Agent or Employer's Agent's Representative decide that the temperature is too low, then the Contractor shall immediately stop mixing and either heat the bitumen in that tanker or utilise another tanker with bitumen at the required temperature.

The amount of water added in the mixer shall be sufficient to achieve the optimum mixing moisture content (approximately 80% of the Optimum Moisture Content (OMC) of the blended material.) This setting may be changed periodically whilst mixing in response to varying moisture conditions of the input materials.

The foaming characteristics of each and every tanker-load of bitumen shall be checked using the test nozzle on the mixing plant. Within five minutes of starting to mix with a new tanker load of bitumen, a sample of foamed bitumen shall be discharged from the test nozzle into a clean steel container (bucket) with a capacity

of 20 litres. The test nozzle shall be opened for approximately five seconds and all foamed bitumen caught in the bucket. The half-life shall be estimated in seconds from the time taken for the foam to collapse to approximately half the volume initially achieved. The expansion ratio achieved shall be estimated from measurements of the maximum height achieved and the height of bitumen after the foam has totally collapsed. These estimates shall be recorded for each bulk-tanker load along with the bitumen temperature, bitumen pressure and percentage water addition, as well as bitumen-type and details of the supply tanker (where relevant).

No mixing shall be undertaken if the temperature of any of the aggregate materials that will be used in the mix is less than 15°C. The temperature of the material shall be measured not less than 150 mm below the surface of the aggregate stockpile. In addition, no mixing shall be undertaken when the ambient air temperature falls below 10°C.

The mixed product may be transported to site and laid immediately or placed in stockpile for later use.

(6.7)Control of Application Rates

The Contractor shall establish a control system on site for checking the consumption of active filler and bitumen against the tonnage of material mixed.

This system will be used for:

- checking the application rate of both active filler and foamed bitumen, and
- determining the amount of active filler and bitumen actually consumed.

The Contractor shall present his proposals for such a control system to the Employer's Agent or Employer's Agent's Representative for approval and no foamed bitumen stabilising work shall commence until an acceptable control system has been finalised.

(6.8)Stockpiling the Treated Material

Where the treated material is placed in stockpile, care shall be taken to ensure that the following minimum requirements are met:

- the area on which the material is stockpiled shall be prepared, similar to those on which the aggregate ingredients for the mix are stockpiled (refer sub-sub-clause (ii) above) and the Contractor's attention is drawn to the consequences of allowing the treated material to become contaminated;
- the maximum height of stockpiled material shall be 4 m;
- moisture loss from the material in stockpile shall be prevented, either by covering the entire stockpile with an impervious sheet, or by spraying the surface of the stockpile with water every two hours between sunrise and sunset;
- no vehicles, front-end loaders or other equipment shall be permitted to drive on stockpiled material. Stockpiled material shall be maintained in as loose a state as is practical;
- samples shall be extracted from the stockpiled material seven (7) days after being placed in stockpile and, thereafter, every seven (7) days whilst the material remains in stockpile. Such samples shall be tested for moisture content and indirect tensile strength. Samples shall be taken from each 500 mm horizon below the surface of the stockpile to a maximum depth of 2 m;
- no material shall remain in stockpile for more than thirty (30) days unless the contractor can show by means of laboratory tests that keeping the material in stockpile for longer periods is not detrimental to the performance expectations of the final base course; and
- loading material from stockpile shall be undertaken by front-end loaders running on a thin layer of sacrificial mix on the stockpile floor. Loading shall be done in such a manner that the material is extracted from the base of a vertical face, thereby promoting mixing as the face collapses. All due care and diligence will be required by the contractor regarding the safety of plant and personnel during loading operations and to ensure that the stockpile is "made safe" at the end of work each day.
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(6.9) Transporting the Mix, Placing, Compaction and Finishing

(a) Thickness Limitations

The compacted thickness of the foamed recycled reclaimed asphalt layer shall not exceed 200 mm. Where a greater thickness is required (up to a maximum thickness of 300 mm), the material shall be treated in two layers of equal thickness.

(b) Compaction Requirements

The Compaction requirements will be dependent on the supporting layer underneath. The following requirements will apply:

- (a) Asphalt or stabilized supporting layer – 102% to 100% Mod AASHTO.
- (b) Crushed Stone or well compacted natural gravel support – 100% to 98% Mod AASHTO.
- (c) Insitu natural gravel support – 98% Mod AASHTO.

The project Specific compaction requirements will be stated in the Project Order.

No single test shall be lower than the Project Specific compaction minus 2%, i.e. Project Specific compaction = 100%, therefore, no test may be less than 98% Mod AASHTO.

The minimum number of tests per lot shall be 5.

(c) Finishing off the layer

After compaction is complete, the surface will be sprayed with an appropriate amount of water and a pneumatic tyred roller (PTR) applied. The PTR shall make sufficient passes required to generate a "mild" slush and close up voids in the surface together with any other grader-induced defects and achieve a tightly-knit surface finish.

Where the recycled material is treated with a bitumen stabilising agent and the intention is to open the finished layer to early trafficking, a dilute emulsion (15% residual bitumen) may be substituted for water in the slushing process on the Employer's Agent's or Employer's Agent's Representative's request. Such slushing shall be undertaken in short sections ($\pm 20m$) over the full width of the recycled layer. A water tanker fitted with an appropriate spraying system (or binder distributor) shall be used to spray a uniform amount of dilute emulsion on the surface before applying the PTR. Additional dilute emulsion may be applied where the first application failed to generate sufficient slush under the wheels of the PTR. Personnel equipped with squeegees shall be deployed to move the slush over areas showing signs of roughness and/or segregation. Squeegees shall be used to remove any surplus slush to the side of the road.

Once slushing is complete, the entire area shall receive a fog spray application using the same dilute emulsion (applied at a nominal rate of 0.75 litres/m²) and left to dry back before opening the road to traffic. This item shall be measured and paid separately as and when requested.

Note.

Dilute emulsion for slushing and fog spraying shall only be applied using an appropriate water tanker or binder distributor.

(d) Curing of Bitumen Stabilized Work

The surface of the new foamed bitumen stabilised road base shall be kept continuously moist for seven days by an effective application system that will not damage the surface of the layer. If requested by the Employer's Agent or Employer's Agent's Representative a fog spray of dilute bitumen emulsion to protect the surface from the abrasive forces of traffic shall be applied and paid for separately.

(6.10) Construction Limitations

Each section of bitumen stabilised base shall be completed the same day that it is laid.

The new bitumen stabilised base shall be constructed in half widths with only one longitudinal joint at the centre-line. To prevent a vertical step remaining along the centre-line overnight, the Contractor shall arrange

his daily programme such that both half-widths are completed in a single shift. This means that whatever length of base is constructed on one half-width during the first part of the shift must be matched by constructing the same length on the other half-width before the end of work.

The full road width shall be opened to traffic at the end of each day's work and traffic shall be allowed to run on the completed layer during the curing period. Traffic speed shall be controlled to a maximum of 40 kph by the installation of suitable temporary traffic-calming measures approved by the Employer's Agent or Employer's Agent's Representative.

If, for any reason, the Contractor is unable to complete both half-widths and match up before the end of work, he shall, at his own cost, protect the travelling public by installing the necessary signage and delineators along the entire length of road where the base is incomplete. In such instances, the surface of the incomplete section, including the step along the centre-line shall be kept wet (day and night) by frequent watering until the adjacent half-width is laid and finished off. Failure to keep the completed half-width wet shall result in the material being rejected and the Contractor will have to remove it from site at his own cost.

PS10207 CONSTRUCTION OF TRIAL SECTIONS

Before the Contractor commences with the construction of the foamed bitumen stabilised base, he shall demonstrate by constructing a trial section that the equipment and procedure he proposes to use will result in him constructing the layers in accordance with the specifications. The trial section shall be at least 2,000 m² in area and shall be constructed in its proper position in the pavement. Only when such a trial section has been satisfactorily constructed and accepted will the Contractor be permitted to proceed with the foamed bitumen stabilised layer in the permanent work.

In the event of the trial section being unsuccessful, the Contractor shall remove the trial section should the Employer's Agent so require. The trial section shall be paid for separately only when it complies with all the requirements of the specifications and has been approved by the Employer's Agent or Employer's Agent's Representative. After approval has been obtained, the mixing process and equipment shall remain unaltered unless otherwise approved by the Employer's Agent or Employer's Agent's Representative.

PS10208 PROTECTION AND CURING

The provisions of Sub-clause 8.1 of Section PS10108 shall apply.

No additional payment shall be made for curing with water, as described above. The application of a dilute bitumen emulsion fog spray on the completed base shall be measured and paid separately.

PS10209 TRAFFIC

The full road width shall be opened to traffic at the end of each day's work and traffic shall be allowed to run on the completed layer during the curing period. Traffic speed shall be controlled to a maximum of 40 kmph by the installation of suitable temporary traffic-calming measures approved by the Employer's Agent or Employer's Agent's Representative. No additional payment shall be made for this item.

PS10210 TOLERANCES

(10.1) Amount of Stabilizer

(i) Foamed Bitumen and Active Filler for Bitumen Stabilisation

The rate of application of foamed bitumen and active filler shall be determined from the consumption of each material relative to the quantity of product mixed and used for the construction of the new road base. The approved method of measurement (refer sub-sub-clause PS10206 (6.7)) shall be used for determining the amount of foamed bitumen and active filler that was actually consumed.

The tolerances that shall be applied are:

- Active filler. The actual application rate of active filler shall be within 0.25% of the specified application rate; and

- Foamed bitumen. The actual application rate of foamed bitumen shall be $\pm 0.25\%$ of that specified. (e.g. if an application rate of 3.5% is specified, mixes that contain between 3.25% and 3.75% shall be accepted.)”

(10.2) Uniformity of Mix

Bitumen Stabilised Material

The uniformity of mixing with foamed bitumen and active filler shall be assessed from samples taken from trucks delivering the mixed product to the site. At least one bulk sample (200 kg) shall be taken for every 2000 m² of finished road base and retained in sealed bags for transport to the laboratory.

In the laboratory, the moisture content of the material shall first be determined. The moisture content of the bulk sample shall then be adjusted to the optimum moisture content. This material shall then be used to manufacture 150 mm diameter briquettes, cured and tested for ITS values. These results shall be assessed against the relevant mix design specified for that particular material. The quality shall be acceptable if the strengths achieved are more than 75% of the ITS achieved in the mix design. No statistical judgement plan shall be applied to these test

PS10211 QUALITY OF MATERAILS AND WORKMANSHIP

Must be read in conjunction with clause PS10110 and PS10206

PS10212 MEASUREMENT AND PAYMENT

PS10212.01 Preparations for pavement rehabilitation

Will be paid under PS10111.01

PS10212.02 Processing/Mixing of Reclaimed Asphalt in a Static Plant Recycler – KMA or similar

Processing/Mixing bitumen stabilised reclaimed asphalt in a static plant recycler – KMA or similar and stockpile onsite.....cubic metre (m³)

"The unit of measurement shall be the cubic meter of material processed/mixed in a Static Plant recycler – KMA or similar, to be used in construction, measured in place after compaction.

"The tendered rates shall include full compensation for processing/mixing the bitumen recycled reclaimed asphalt material in a mobile mixing plant – KMA 200 or similar, addition of bitumen and other stabilizing agents, for **stockpiling**, protecting until used, and for conducting control tests, all as specified.

Rate shall **exclude** crushing, screening to the correct grading, **hauling**, adding the specified amount of crusher dust, and the specified amount of foam/emulsified bitumen and cement/lime stabilizing agent.

10212.03 Processing/Mixing of Reclaimed Asphalt in a Static Plant Recycler – KMA or similar, and paver laid.

(a) For material, paver laid and compacted to 102% (average) of Mod AASHTO density, to compacted layer thickness:

- (i) 100 mm, up to and including 150 mm..... cubic metre (m³)
- (ii) Exceeding 150 mm and not 200 mm..... cubic metre (m³)
- (iii) Exceeding 200 mm and not 300 mm..... cubic metre (m³)

(b) For material, laid and compacted to 100% (average) of Mod AASHTO density, to compacted layer thickness:

Paver Laid:

- (i) 100 mm, up to and including 150 mm..... cubic metre (m³)
- (ii) Exceeding 150 mm and not 200 mm..... cubic metre (m³)

(iii) Exceeding 200 mm and not 300 mm..... cubic metre (m³)

Grader Finished:

(i) 100 mm up to and including 150 mm..... cubic metre (m³)

(c) For material, laid and compacted to 98% (average) of Mod AASHTO density, to compacted layer thickness:

Paver Laid:

(i) 100 mm up to and including 150 mm..... cubic metre (m³)

(ii) Exceeding 150 mm and not 200 mm..... cubic metre (m³)

(iii) Exceeding 200 mm and not 300 mm..... cubic metre (m³)

Hand Laid:

(i) 100 mm up to and including 150 mm..... cubic metre (m³)

Grader Finished:

(j) 100 mm up to and including 150 mm..... cubic metre (m³)

"The unit of measurement shall be the cubic meter of material processed/mixed in a Static Plant recycler – KMA or similar and used in construction, measured in place after compaction.

"The tendered rates shall include full compensation for processing/mixing the bitumen recycled reclaimed asphalt material in a mobile mixing plant – KMA 200 or similar, addition of bitumen and other stabilizing agents, hauling within a freehaul distance of 10km radius from the processing plant to the site, for any wastage, for placing by paver/hand/grader, rolling, slushing and finishing, for protection and maintenance of the completed layer and for conducting control tests, all as specified.

Rate shall **exclude** crushing, screening to the correct grading, adding specified amount of crusher dust, and the specified amount of foam/emulsified bitumen and cement/lime stabilizing agent.

(d) Extra over item (a), (b) or (c) for crushing of the reclaimed asphalt..... cubic metre (m³)

"The unit of measurement shall be the cubic meter of material crushed and finally used in construction, measured in place after compaction. No allowance will be made for waste material screened out and discarded.

The tendered rate shall include for full compensation for labour, plant, fuel, handling, processing, stockpiling if necessary, and for conducting control tests, all as specified.

(e) Extra over item (a), (b) or (c) for screening of the reclaimed asphalt/crushed reclaimed asphalt cubic metre (m³)

"The unit of measurement shall be the cubic meter of material screened and finally used in construction, measured in place after compaction. No allowance will be made for waste material screened out and discarded.

The tendered rate shall include for full compensation for labour, plant, fuel, handling, processing, stockpiling if necessary, and for conducting control tests, all as specified.

(f) Extra over item (a), (b) or (c) for mechanically modifying of the reclaimed asphalt/crushed/screened reclaimed asphalt by adding a specified amount of crusher dust as and when ordered by the Employer's Agent tonne (t)

The unit of measurement shall be the tonne of material blended with the crushed stone aggregate in the mixing plant and shall include full compensation for all necessary work/plant to blend the crusher dust with the screened asphalt. The quantity of crusher dust that is added shall be measured in accordance with the proportion of the total volume that comprises crusher dust, as dictated by the settings on the feed gates of the

mixing plant. This proportion shall be applied to the relevant measurement under Item a) or b) and paid under this item as an extra over.

(For example. Where the mix design calls for 10% crusher dust: 90% graded crushed stone blend, the gates on the mixing plant will be set to deliver such proportions by volume. Assuming that the quantity of this mix measured under item a/ or b) is 1,000 m³, and then the quantity to be measured and paid as an extra over under this item will be 100 m³, which will then be multiplied by the Relative Density of this material to give tonne's.

The tendered rate shall include full compensation for procuring and furnishing the crusher dust material (including quarrying, crushing and screening to the correct grading) for all haulage from the supply source to the mixing plant, for any wastage and for adding the crusher dust to the reclaimed asphalt/crushed/screened material, and for conducting control tests, all as specified, all as specified

**(g) Extra Over Item (a), (b) or (c) for overhaul on material in excess of 10km radius
(ordinary overhaul) cubic metre.kilometre (m³.km)**

The unit of measurement shall be the cubic meter of material, measured in place after compaction, of overhaul material hauled in excess of 10.0km, multiplied by the overhaul distance in kilometers,

The tendered rate shall include full compensation for hauling material in excess of the free haul distance.

PS10212.04 Trial Sections..... cubic metre (m³)

Foamed bitumen stabilised graded crushed stone base trial section (all thicknesses) constructed in accordance with the provisions of the Project Specifications. cubic metres (m³), as and when ordered by the Employer's Agent or Employer's Agent's Representative.

The unit of measurement shall be the cubic meter of completed trial section approved by the Employer's Agent or Employer's Agent's Representative.

The tendered rate shall include full compensation for constructing the trial section complete as specified."

**10212.05 Stabilising or dispersing agents
Will be paid under PS10111.6**

**10212.06 Application of fog spray of diluted emulsion as and when requested by the
Employer's Agent or Employer's Agent's Representative.
Will be paid under PS1011.7/48.01**

Add the following Specification:

SECTION PS10300: SPECIFICATION FOR ESTABLISHMENT OF CONSTRUCTION PLANT

PS10301 SCOPE

This section covers establishment at the commencement of work and de-establishment on completion of the work, of all the construction plant and teams (human resources) that is necessary for the construction or deconstruction of any road layers to the required specification. The layers and operations which may need construction plant may include but not limited to the following:

- *Paving of asphalt layers or application of surfacing seals*
- *Milling out of existing road layers*
- *Construction of layerworks using in-plant BSM*
- *Construction of layerworks using in-situ BSM*
- *Construction of granular layers.*
- *Construction due to subgrade improvements i.e. undercut*
- *Construction of ancillaries*

The use of all hand-operated constructional equipment, or in other words construction equipment which does not require a driver, shall be included in the respective rates of the items for which this equipment is used. i.e. Wacker, Jack-hammer, etc.

The establishment and de-establishment of any equipment shall be agreed with Employer's Agent or Employer's Agent's Representative in writing before doing so. The Contractor may not remove construction plant from the site without the written consent of the Employer's Agent. Should the Contractor remove any plant from the site without the permission of the Employer's Agent, the contractor shall be liable to a fine of R2000 per item of construction plant and may be required to re-establish the construction plant at the cost of the Contractor.

The construction plant covered under this section is the plant that is normally included in the fixed obligations of Section 1300, Contractor's Establishment on site and General Obligations of the COLTO Specifications.

Note: Storage of construction plant on the roadway outside of the permitted working hours is strictly prohibited, unless approved in writing by the Employer's Agent. The Contractor shall factor into his establishment rates the necessary movement of plant in terms of storage so as not to constitute a safety hazard to the public and travelling motorists. The Employer's Agent may, at his discretion, suspend all works for the non-compliance to this requirement.

PS10302 MEASUREMENT AND PAYMENT

PS10302.01

The unit of measurement shall be the number of establishments and de-establishments of all the construction plant required to complete an operation to specification. Establishment and de-establishment shall form a combined quantity of one.

The tendered rate shall include full compensation for establishing and de-establishing, loading and transporting all the necessary plant and equipment that the contractor deems necessary in order to complete an operation to the required specification.

The responsibility shall rest with the Tenderer to identify such plant and price accordingly as plant will not be paid for individually but for the successful completion of an operation to specification. i.e. if the operation requires the construction of an in-situ BSM layer, then the plant required to complete the operation would be:

- *The recycler*
- *The water tanker*
- *The bitumen tanker*
- *The grader*
- *The pad-foot roller*
- *The smooth-drum roller*

The above is only an example which should not be taken as binding or the actual requirement. The cost of carrying out the actual work by the plant shall be included in the construction rates, as stated in the COLTO specifications.

Establishment of:

- | | | |
|------|--|-------------|
| (a) | Plant necessary for paving asphalt layers | number (No) |
| (b) | Plant necessary for milling operations | number (No) |
| (c) | Plant necessary for constructing in-plant BSM layers by
(Excl. KMA plant covered by sub-item(h)) | |
| (i) | Paver | number (No) |
| (ii) | Grader | number (No) |
| (d) | Plant necessary for constructing in-situ BSM layers | number (No) |
| (e) | Plant necessary for constructing granular layers | number (No) |
| (f) | Plant necessary for completing subgrade improvements (undercuts) | number (No) |
| (g) | Plant necessary for carrying out the required ancillary works | |

Note: payment for this item shall be effected per sub-contractor undertaking the works as agreed and approved by the Employers Agent.

- | | | |
|------|--|-------------|
| (i) | Pre-treatment (plant for excavation and compaction) | number (No) |
| | This includes activities to be undertaken prior to the main rehabilitation works such as patching, construction of sub-soil drains or stormwater drains etc. that requires the establishment of plant for excavation and compaction activities. The Contractor is to programme the works such that the plant may have a continuous flow of work and only de-establish once all pre-treatment works are complete. | |
| (ii) | Post-treatment (plant for excavation and compaction) | number (No) |
| | This includes activities to be undertaken upon completion of the main rehabilitation works such as construction of speed-humps, sidewalks and kerbing or kerbing-channelling combination etc. that requires the establishment of plant for excavation and compaction activities. The Contractor is to programme the works such that the plant may have a continuous flow of work and only de-establish once all post-treatment works are complete. | |
| (h) | Static Plant Recycler – KMA or similar | number (No) |
| (i) | Crusher | number (No) |
| (j) | Screen (26.5/19mm max particle stone size), as specified by the
Employer's Agent | number (No) |
| (k) | Plant necessary for single seal construction | number (No) |
| (l) | Plant necessary for slurry seal construction (including microsurfacing) | number (No) |

The tendered rate for subitem PS10302.01(h), the establishment of Static Plant Recycler (KMA or similar) shall cover full compensation for preparing the platform where the Plant and the stockpiling area will be kept, setting up the KMA plant, establishing and de-establishing, loading and transporting all the necessary plant and equipment that the contractor deems necessary in order to complete an operation to the required specification

Add the following Specification:

SECTION PS10400: SMALL CONTRACTOR DEVELOPMENT

PS10401 SCOPE

This section covers construction aspects relating to the processes by which the construction industry develops contractors. This includes training, coaching, guidance or mentoring which may be required by the local ward based emerging sub-contractors.

Definitions

(i) Training:

Training refers to the process of teaching a learner – usually in a classroom or simulated work environment situation. Training usually takes place with one teacher/trainer and several learners. Principles and theory are taught. Demonstrations are given. Assignments are then set to ensure that the learner is able to apply what has been taught. Training is done by a specialist in the subject, who is also qualified to train.

Example: use of a dumpy level

Training would involve the theory of how a dumpy level works and how to calculate levels. A demonstration of how to set up and read a level could be given.

(ii) Coaching:

Coaching refers to hands-on training and is mostly on a one-on-one basis of tangible and measurable skills. It is typically on-site training, or learning-on-the-job. Coaching is training by the process of “watch-do-correct-practice”. The coach does the task while the learner watches and asks questions. Then the learner does the same task while the coach watches. The learner is corrected until the coach feels that he has gained competence in the function. The learner is then left to practice the task or skill, which the coach oversees. Coaching is imparting a skill – usually manual or physical. A coach is usually a person doing the same type of work on a higher or more competent level, or has a mastery of the skill/task. While training gives the theory or shows/explains the principles, coaching helps the learner become competent and master a skill. A coach is often in the direct reporting line, i.e. someone in authority. Coaching could be part of the management function and would make the job run more smoothly.

Example: Use of a dumpy level

Coaching would involve taking the learner onto site, setting up a dumpy level, reading levels. Then the coach would get the learner to do the job, while the coach checked setting up and reading. Once the learner understands and can do the tasks, the coach checks periodically to ensure the learner is still doing the job properly. The desired outcomes of coaching are for the learner to “fit-the-mould”, or do things the same standard as the coach.

(iii) Guidance:

Guidance is anticipating where one might go wrong, or where one is doing a task in a complicated, inefficient or ineffective way, and giving advice as to how to achieve a better result. Guidance is mostly given by a person in the direct reporting line, but can be given by anyone. Guidance is not imparting skills, but suggesting ways to improve performance.

Example: Use of a dumpy level

A person who knows how to use a dumpy level would be given guidance as to where he would next set up the level to limit the number of set-ups. Guidance could be an extension of coaching.

(iv) Mentoring:

Mentoring is developing a person on a long-term career path. It is mostly about imparting skills that are often intangible and non-measurable. A mentor is seldom anyone in the direct reporting line – although he could be a person several levels higher in that reporting line. Mentoring is more about developing a relationship and taking a personal interest in an individual. A mentor looks out for that individual and gives him advice that cannot be found in a book or in the normal course of business. The sort of issues a mentor discusses with the protégé is company politics, how to pick up work before others get wind of it, how to position ones company to get a better competitive advantage, how to tender such that the tender is lowest, but the profit is as good or better than the next person, how to determine and assess risk. Mentoring helps the protégé think strategically, sharpen entrepreneurial skills and grow – both personally and in terms of the company. A mentor helps the protégé to develop

insight and shrewdness. It is more about business skills to survive long-term than the technical, tactical or day-to-day activities of doing business. The desired outcome for mentoring is for the protégé to develop his own style, i.e. to shape his own “mould”.

(v) **Supervision**

Supervision is instruction regarding the work to be performed, and ensuring it is carried out to specification and to the satisfaction of the supervisor. It is not instruction on how the work is to be performed, but rather on what work has to be performed, and usually has specific time frames.

PS10402 GENERAL RESPONSIBILITIES FOR DEVELOPMENT

The Contractor may request or the Employer’s Agent may determine, where applicable, the need for developmental assistance for the sub-contractors, where such sub-contractors experience and competencies are limited and require training, coaching, guidance and mentorship, to ensure successful completion of the allocated project/s.

The Contractor shall appoint a dedicated Senior Foreman or Clerk of Works (internally or externally sourced) or Site Technician (hereafter referred as Service Provider) whose sole responsibility shall be to assist with the execution of its responsibilities towards the training, coaching, guidance, mentoring, development and/or support of the local ward based sub-contractors.

The qualifications and experience of the Service Provider shall be relevant and of a suitable level to enable them to supervise the level of the sub-contractors. The minimum requirements thereof being:

- i. Minimum ten (10) years’ experience in the type of works being undertaken,
- ii. Relevant trade-test certification (where applicable).

The Service Provider shall evaluate whether the local sub-contractor(s) would require assistance in form of training, coaching, guidance and/or mentoring and subsequently develop and establish a Support Development Programme, which shall be approved by the Employers Agent prior to implementation.

a) General Obligations of Service Provider

The Service Provider shall comply with the following minimum obligations:

- (i) Assist the local sub-contractors in instituting a quality assurance system;
- (ii) Provide adequate training, coaching, guidance, mentoring or any other identified and approved assistance;
- (iii) Provide support and any other identified and approved assistance to ensure that the Contractors meet their obligations and commitments with respect to their subcontracts, and
- (iv) Assist the local sub-contractors planning of construction activities (programming), and required production rates in order to achieve a positive cashflow
- (v) Assist the local sub-contractors with all health and safety and environmental requirements in relation to the project specifications, and the relevant acts or guidelines
- (vi) Assist the local sub-contractors with the procurement of plant, materials and human resources, where applicable.

b) Quality of Work and Performance of Sub-contractors

The Contractor shall closely monitor and supervise all sub-contractors and where requested and approved by the Employer’s Agent, shall appoint a Service Provider to train, coach, guide, mentor and assist sub-contractors in all aspects of management, execution and completion of its subcontract. This shall typically include assistance with planning of the works, sourcing and ordering of materials, labour relations, monthly measurements and invoicing procedures. The extent and level of such training, coaching, guidance, mentoring, and assistance to be provided shall be commensurate with the level of subcontract applicable and shall be directed at enabling the sub-contractor to achieve the successful execution and completion of its subcontract.

The Contractor shall give reasonable warning to the sub-contractors when any contravention of the terms and conditions of the subcontract has occurred or appears likely to occur. The Contractor shall, whenever feasible, give the sub-contractors reasonable opportunity to make good any such contravention, or to avoid such contravention, and shall render all reasonable assistance to the sub-contractors in this regard.

c) Dispute Avoidance and Resolution Procedures for sub-contractors

When any disputes arise as provided for in the subcontract, the Contractor shall explain fully to the sub-contractor that such actions are provided for in the subcontract. If such action is contemplated it shall be discussed with the Employer before any action is taken.

If the sub-contractor, in the opinion of the Employer, fails to comply with any of the criteria listed below, the Employer shall issue a written warning to the Contractor, stating all the areas of non-compliance. The criteria are as follows:

- (i) Acceptable standard of work as set out in the specifications;
- (ii) Progress in accordance with the time constraints in the construction programme;
- (iii) Punctual and full payment of the workforce and suppliers;
- (iv) Site safety; and
- (v) Accommodation of traffic.

The sub-contractor shall have 21 days from the date of receipt of the letter of warning by the Contractor to address and rectify the issues raised by the Employer, except for sub-clauses (iv) and (v) above, for which the reaction time shall be in accordance with the relevant specifications for those aspects of the Works, but which shall not be longer than 24 hours. Failure by the sub-contractor to comply with a deadline, will be sufficient grounds for the Contractor to apply a penalty or terminate the subcontract provided that the Employer is satisfied that the Contractor has made every effort to correct the performance of the sub-contractors.

The sub-contractor shall have the right to dispute any ruling given or deemed to have been given by the Contractor or Employer. Provided that, unless the sub-contractor shall, within 21 days after his receipt of a ruling or after a ruling shall have been deemed to have been given, give written notice (hereinafter referred to as a **Dispute Notice**) to the Contractor, referring to the relevant clause(s) in the subcontract agreement, disputing the validity or correctness of the whole or a specified part of the ruling, he shall have no further right to dispute that ruling or the part thereof not disputed in the said notice.

PS10403 TRAINING, COACHING, GUIDANCE, MENTORING OR ASSISTANCE

(a) Purpose of the Support Development Programme(s)

Skills development forms an integral part of the Employer's Transformation and Community Development Policies and hence, it is important to the Employer that Targeted Enterprises (local ward based sub-contractors) be equipped with skills that can be used to gain meaningful future employment and secure subcontracting opportunities.

It is, therefore, a requirement of this Contract that adequate Training, Coaching, Guidance, Mentoring and assistance be provided, to ensure skills development within the Construction Industry.

(b) Skills Audit and Gap Analysis

Prior to establishing the Support Development Programme(s), the Contractor shall conduct a Skills Audit and Analysis of the Subcontractors to determine their levels of skills sets in undertaking the works allocated to them. The outcome of the Skills Audit and Analysis shall be used to compile the Support Development Programme(s).

The Contractor shall be paid separately in the Bill of Quantities for compliance to this required specification.

(c) Developing the Support Development Programme(s)

The Employer shall be involved in the decision making and quality control pertaining to the development and implementation of the Support Development Programme(s) facilitated through this Contract.

The Support Development Programme shall address two elements, namely:

- (i) The skills gap identified during the skills audit and analysis as referred to in PS10403 (b), and,
- (ii) The general obligations of the Service Provider as referred to in PS10402 (a).

The complete Support Development Programme shall be approved by the Employer before any training commence, and shall include the following, but not limited to:

- (i) specify the development needs of each sub-contractor contracting entity – the systems the entity lacks,
- (ii) specify the development needs of the individuals comprising the entity – the skills the individuals within the entity lacks,
- (iii) the level to which that activity will be developed within the period of the contract
- (iv) whether training, coaching, guidance and/or mentoring is to be given in each activity, and
- (v) the person/s responsible for each activity.

The Contractor shall be paid separately in the Bill of Quantities for compliance to this required specification.

An example of what the Support Development Programme(s) could entail includes the following, but not limited to:

- (i) Understanding and interpreting drawings
 - Understanding the cross referencing to drawings from the contract documents and the bill of quantities,
 - Understanding the layout of the drawings,
 - Understanding the plan view, elevations and cross sections, and
 - How to interpret, accurately layout and construct the details
- (ii) Setting out construction works
This skill requires an understanding of the function and use of instruments such as the dumpy level, the theodolite, and procedures such as stringing a line.
- (iii) Technical know-how of activities.
- (iv) Task organization
This activity involves the correct supervision of labour and organisation of tasks to ensure that labour is utilised most effectively. This includes the following:
 - Allocation of the appropriate number of people for the task,
 - Availability on site of the correct type and amount of material and equipment at the point of use, and
 - Planning tasks ahead so that labour does not stand ideal.
- (v) Task prioritization
Task prioritization must cover an understanding of critical paths, including identifying which tasks can be postponed and which are urgent. It includes planning and monitoring so that time targets are achieved. It must also cover gaining an understanding of the penalties applicable to late completion of tasks.
- (vi) Works schedule
This is the ability to produce daily work plans and will assist with task organization. Daily work plans need to be developed into monthly work plans and vice versa. These plans assist in material ordering, plant scheduling, labour allocation, timeous completion of the work, and keeping track of profit/losses.
- (vii) Quality Control
Quality control requires knowledge of specifications and tolerances and ensuring that the work adheres to these, as well as understanding the requirements of the client.
- (viii) Measuring work done for payment certificates
This is the ability to measure actual work done and to translate these measurements into a payment certificate. Knowledge must be gained on how to calculate escalation, how to claim for VO's and how to handle other claims.
- (ix) Handling site instructions and VO's
This is the ability to distinguish between site instructions and variation orders and how to respond to such instructions.
- (x) Materials planning
 - Determining the quantity of materials required for each task and planning ordering,
 - Determine appropriate lead times to ensure that everything required to do a job is on hand, and
 - Quantity take-offs for pricing a bill at higher levels of development.
- (xi) Receiving, storing and handling materials
Receiving includes checking materials delivered against the delivery note and the order placed.

- Storage involves knowing what quantities and type of materials to store, planning accessibility, and safety of materials from inter alia theft and weather. Handling of materials needs to be carried out to ensure no wastage or damage.
- (xii) Machine analysis
This is the analysis of the use of equipment. It includes calculating fuel and hourly costs. This will enhance an understanding of the effective use of equipment, how to reduce costs and provide a background for pricing of equipment for tenders.
 - (xiii) Maintenance schedule
This covers the importance of maintenance of equipment and how to schedule this so that there is minimal disruption in day-to-day work.
 - (xiv) Construction programme/work plan
Knowledge of how to develop a construction programme/work plan, monitor and assess the production, and corrects the programme where necessary.
 - (xv) Understanding tests
Understanding what tests are required, reading and interpreting results relating to specifications and quality, and how to make the corrections required.
 - (xvi) Cash Flow
The concept of cash flow, as well as the development of cash flow projections and monitoring of the cash flow are vital aspects of running a business. Included under this topic is knowing how long it takes from placing an order for material until payment is due, and time lags between ordering the materials and using materials and receiving payment for work done. The concept of sufficient working capital also needs to be imparted.
 - (xvii) Risk Assessment
This involves learning how to assess the financial risks associated with the job in terms of his performance and profitability and the management of these risks. This becomes increasingly important as the sub-contractor company grows.
 - (xviii) Insurance
This includes an understanding of why insurance is required, how to obtain insurance, the benefits and costs, insurance providers and what can be claimed from different types of insurance. The different types of insurance to be included are Short Term insurance, Public Liability and Contractors All Risk insurance.
 - (xix) Sureties
This involves understanding what sureties are, why and when they are needed, how they can be obtained, what they cost and how they can be redeemed.
 - (xx) Procurement of plant and equipment
The difference between purchasing, leasing, hire purchase and hiring plant needs to be understood. Also included is gaining knowledge of all aspects of these options as well as the benefits and implications for the business for each option.
 - (xxi) Employee Records
This involves knowing and applying with legislation for conditions of employment. Employment contracts must be in place for all labour employed and a formal system of keeping employee records must be established. Employee records must be in line with legislation including recording of employee details and copies of identification documents, termination of service procedures, and certificates of service.
 - (xxii) Record Keeping
This activity involves developing knowledge of what records need to be kept and how best to keep them.
 - (xxiii) Good housekeeping
Good housekeeping is about developing a work approach of keeping the site tidy, cleaning and putting away tools, and working in an orderly way. Developing good housekeeping assists a company in working efficiently and improving profit margins.

(d) Portfolio of Evidence

The Service Provider is to develop and maintain a portfolio of evidence for each sub-contractor. The Portfolio of Evidence is a collection of proof of the training, coaching, guidance and mentoring inputs provided to these entities. It is a living document which records the development progress of and will need to be updated

continually throughout the duration of the project.

The Portfolio of Evidence should include the following documentation:

- a) Training courses completed by each sub-contractor,
- b) Hours of guiding, coaching and mentoring received for each activity listed in the development plan,
- c) Monthly progress reports on the development provided (inputs) versus the actual progress made (output) by the local sub-contractors, and
- d) List of competencies.

Whenever required, the Contractor via the Service Provider shall provide copies of such portfolio of evidence records to the Employer.

The Service Provider shall be paid separately in the Bill of Quantities for compliance to this required specification.

(e) Learning Material

Learning material may be required for the support development programme(s). Each Trainees shall receive a copy of the learning material to learn the contents and to use it as reference source for future works. Learning material shall include all technical specifications or best practice guidelines, manuals, literature papers, acts or policies etc as deemed necessary. The cost of procuring and furnishing such materials to the trainees shall be included in the rate for the provision of training facilities as specified below. The Contractor shall be required to submit tax invoices or receipts of purchase of such learning materials.

(f) Training Facilities

Where necessary, in such cases where on-site training is not practical, the Contractor shall be responsible for providing everything necessary to offer the various training workshops including:

- (i) a suitable venue with sufficient furniture, lighting and power,
- (ii) all necessary stationery consumables and study material,
- (iii) transport for attendees.

The Service Provider shall be paid separately in the Bill of Quantities for compliance to this required specification.

PS10404 MEASUREMENT AND PAYMENT

ITEM

UNIT

PS10404.01 Provision of key personnel

- (a) Senior Foreman or Clerk of Works or Site Technician..... Person-Month

The tendered monthly rate for the provision of the required key personnel (Service Provider) shall cover all costs related to establishing a dedicated Senior Foreman or Clerk of Works or Site Technician for the duration of the project as necessary, insurances, profit, overheads and any other day to day costs. Transport for this service and accommodation and subsistence, where applicable, shall be included in this rate. It must be noted that the key personnel provided is specific and dedicated to this Project Order and such resource shall not be permitted to be shared with other Project Orders/Contracts.

The unit of measurement shall be the person-months.

ITEM	UNIT
PS10404.02 Training, coaching, guidance, and mentoring	
(a) Conducting a skills audit and gap analysis.....	Provisional (Prov) sum
(b) Preparing Support development programme(s).....	Provisional (Prov) sum
(c) Implementing Support development programme(s).....	Provisional (Prov) sum
(d) Portfolio of evidence.....	Provisional (Prov) sum
(e) Training facilities.....	Provisional (Prov) sum
(f) Remuneration for workers undergoing training.....	Provisional (Prov) sum
(g) Handling costs and profit in respect of payment associated with sub-item PS10404.02(a) to PS10404.02(f).....	Percentage (%)

Measurement and payment shall be in accordance with the provisions of subclause 6.6 of the General Conditions of Contract for Construction Works, 2015.

Payment under subitem PS10404.02 (a) shall be full compensation for the Service Provider conducting the skills audit and gap analysis for the Contractor (Pool A) or each sub-contractor, where applicable, in respect of the works allocated to them.

Payment under subitem PS10404.02 (b) shall be full compensation for the Service Provider in preparing the Support Development Programme(s) for the Contractor (Pool A) or each sub-contractor, where applicable.

Payment under subitem PS10404.02 (c) shall be full compensation for the Service Provider for costs arising from implementing the Support Development Programme(s) which shall include elements of training, coaching, guidance and mentoring, where necessary, of the Contractor (Pool A) or each sub-contractor, where applicable.

Payment under subitem PS10404.02 (d) shall be full compensation for the Service Provider for preparing and maintaining a portfolio of evidence for the Contractor (Pool A) or each sub-contractor, where applicable, in terms of any training, coaching, guidance and mentoring activities conducted.

Payment under subitem PS10404.02 (e) shall be full compensation for the Service Provider for the provision of the training venue, for all necessary lighting, power, furniture, stationery, consumables and study material and for transportation of the trainees to and from the training venue.

Payment under subitem PS10404.02 (f) shall be the daily wage in normal work hours of the individual workers whilst they are away from their normal duties and at training.

The tendered percentage for subitem PS10404.02 (g) is a percentage of the amounts actually spent under subitems PS10404.02 (a) to PS10404.02 (f), which shall include full compensation for handling costs, overhead charges and profit of the Contractor in appointing the Service Provider.

C1000 DAYWORKS

This part of the Particular Specifications deals with the provision for daywork in the Schedule of Quantities. Rates for daywork shall be entered in the Schedule of Quantities in accordance with the following specifications.

D1. SCOPE

According to Clause 6.5 of the General Conditions of Contract 2015, certain work may be carried out using rates tendered in the daywork schedule. A schedule of personnel, plant and equipment which may be necessary to perform work on a daywork basis is included in the Schedule of Quantities. The quantities used in the Schedule of Quantities are for tender evaluation purposes only and the use or not of these items shall not constitute a variation in terms of Clause 6.3 of the General Conditions of Contract 2015.

No work will be paid for as daywork without the written instruction or approval of the Employer's Agent Representative.

D2. TYPE OF WORK

The Employer's Agent Representative may order daywork in certain cases where it is necessary to vary or to extend the works due to new or unforeseen circumstances to such an extent that the tendered rates for specific items of work are no longer applicable, or where no suitable combination of tendered rates can be used to pay for such work.

As a general rule, applicable rates for additional work items will be agreed between the Contractor and the Employer's Agent Representative. Daywork will only be used in exceptional circumstances.

D3. MATERIALS

Materials for use in works carried out under daywork shall be purchased by the Contractor who shall also arrange for delivery to site, and shall be responsible for any other requirements associated with specific materials. A Provisional Sum has been allowed in the Schedule of Quantities for daywork materials. The Contractor shall enter a tendered percentage in the Schedule of Quantities to cover his handling costs and profit, as per other provisional and prime cost sums in this Contract.

Materials shall be paid for using the method described in C2.1, 'Pricing Instructions'. No contract price adjustment will be applicable to materials.

The Contractor shall submit proof of ownership for any materials used in daywork with his daywork claim to the Employer's Agent Representative. Further, if specific materials are required for daywork, quotations will be called for as per Clause 6.5.2 of the General Conditions of Contract 2015.

D4. CONSTRUCTION PLANT HIRE

Where daywork is ordered, the tendered rates for plant hire in Section D of the Schedule of Quantities shall be used in calculating the payment due for any plant required to execute the daywork. If no rate is included in the Schedule of Quantities for a particular piece of equipment, and where no other rate or combination of rates would provide suitable compensation, then the daywork method of payment described in Clause 6.5.1 of the General Conditions of Contract 2015 will be used.

The tendered rates for each item of constructional plant shall include for all operating costs associated with the said item of plant. Such costs are deemed to include fuel, re-fuelling costs, lubrication and routine servicing / maintenance, breakdowns and spares, all overhead costs, site management costs and administration costs. The tendered rates shall also include the plant operator and the general supervision of the plant while it is engaged in the daywork.

D5. SALARIES AND WAGES OF WORKMEN

The salaries and wages of workmen executing daywork shall be paid for using the tendered rates in the Schedule of Quantities. The tendered rates shall include for all costs associated with the employment of personnel, including salaries, wages, allowances, workmen's compensation, medical aid and pension contributions, government levies and taxes, training costs and any costs associated with living on the site. The tendered rates shall also include for the transportation of the workmen to the site of the daywork.

All overhead costs, administration costs, site management costs and the Contractor's profit are deemed to be covered by the daywork rates and no additions or mark ups will be made to the tendered rates.

The tendered rates shall also include any hand tools normally associated with the workmen's job description e.g. picks, shovels, hammers, saws, spirit levels, etc. The tendered rate for labourers shall also include for the casual supervision by a gang boss or foreman. Only when specifically called for by the Employer's Agent Representative, will payment be made for the use of a gang boss or foreman supervising on a continuous basis.

D6. MEASUREMENT AND PAYMENT

The following principles shall also apply to the measurement and payment of daywork.

The unit of measurement for plant shall be the number of vibroclock hours worked and each item of plant shall be fitted with a vibroclock, the cost of which shall be included in the rates. Excessive non-productive time when the engine is idling will not be paid for. Where there is ambiguity between the flywheel horsepower and mass of the machine, the flywheel horsepower shall govern the measurement category. Where width and mass are specified, mass shall govern the measurement category.

The Contractor's attention is drawn to the requirements of Clauses 6.5.3 and 6.5.4 of the General Conditions of Contract 2015 with regard to the submission of daywork claims.

C3.4: PARTICULAR SPECIFICATIONS


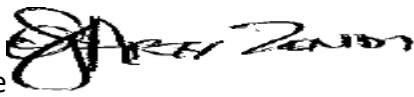
In addition to the Standardized and Project Specifications the following Particular Specifications / Policies shall apply to this contract:

C3.4.1 Part AH - OSHA 1993 Safety Specification
(26 Pages)

C3.4.2 Standard Environmental Management Plan for Civil Engineering Construction Works
(24 Pages)

HEKWINI MUNICIPALITY



Document Title	HSS 232.02.24 Site Specific Health and Safety Specification
Client	eThekweni Municipality Road Provision
Project Name	Rehabilitation of various roads located in the Western Region of eThekweni Municipality, as and when required for a period of 36 months
Contract Number	1R-28004
Revision	00
Date	06/02/2024
Compiled by:	Name: Siziwe Chiliza  signature
Approved BY:	Name: Arty Zondi  signature

ACCEPTANCE OF CONDITIONS OF THESE SPECIFICATIONS

- *The Principal Contractor must provide a certified copy of his Public Liability Insurance when signing this document.*

I, _____ the Contractor, do hereby declare that my company _____ acknowledge having read and understood the conditions contained in this legal document and furthermore we agree and accept to abide by the conditions and requirements of the act.

SIGNATURE CONTRACTOR: _____ DATE _____

SIGNATURE WITNESS _____ PRINT NAME: _____

AGENT ACTING ON BEHALF OF THE CLIENT:

NAME: _____ DATE _____

SIGNATURE: _____

SIGNATURE WITNESS _____ PRINT NAME: _____

**AGREEMENT WITH MANDATARY IN TERMS OF SECTION
37(1) AND (2) OF OHS ACT 85 OF 1993**

DEFINITION OF MANDATARY

- Includes an agent, a contractor, or a subcontractor for work, but without derogating from his status in his own right as an employer or a user.

DEFINITION OF AGENT

- means any person who acts as a representative for a client in the managing the overall construction Work.

SECTION 37(1)

(1) Whenever an employee does or omits to do any act which it would be an offence in terms of this Act for the employer of such employee or a user to do or omit to do, then, unless it is proved that-

(a) In doing or omitting to do that act the employee was acting without the connivance or permission of the employer or any such user.

(a) it was not under any condition or in any circumstance within the scope of the authority of the employee to do or omit to do an act, whether lawful or unlawful, of the character of the act or omission charged; and all reasonable steps were taken by the employer or any such user to prevent any act or omission of the kind in question, the employer or any such user himself shall be presumed to have done or omitted to do that act, and shall be liable to be convicted and sentenced in respect hereof; and the fact that he issued instructions forbidding any act or omission of the kind in question shall not, in itself, be accepted as sufficient proof that he took all reasonable steps to prevent the act or omission.

SECTION 37(2)

The provisions of subsection (1) shall mutatae mutandis apply in the case of a mandatory of any employer or user, except if the parties have agreed in writing to the arrangements and procedures between them to ensure compliance by the mandatory with the provisions of this Act.

ACCEPTANCE BY MANDATORY

In terms of the provisions of Section 37(2) of the Occupational Health and Safety Act, Act 85 of 1993, and Construction Regulation 5(1) (c),

I, _____ (Appointed 16(2) person)

Acting For

And on behalf of _____

_____ (Company / Close

Corporation/Enterprise/ Owner/User) undertake to ensure that the requirements and provisions of the Act and Regulations are complied with.

Print Name: _____.(Agent, Principal Contractor or Contractor)

Signature: _____ at _____.

Designation: _____ Date: _____.

Mandatory- COIDA / Federated Employers Mutual

No.: _____.

Mandatory- Professional Indemnity Insurance no: _____.

CLIENT

Print Name: _____.(Appointed 16(1)

Person/Client/Agent of Client or Principal Contractor)

Signature: _____ at _____.

Designation: _____ Date: _____.

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EXECUTIVE SUMMARY

eThekwini Metropolitan Municipality is a metropolitan municipality created in 2000 that includes the city of Durban, South Africa and surrounding towns. eThekwini is one of the 11 districts of KwaZulu-Natal province of South Africa that has to also operate within the South African legislative parameters of the Occupational Health and Safety Act 85 of 1993. With the promulgation of the revised Construction Regulations, Regulation Gazette 10113, Government Notice 84, dated 7 February 2014, eThekwini Municipality seeks to fulfil its duties as espoused in regulation 5.

Each year fatalities, serious injuries and poor attitudes of Contractors mar the reputation of the Construction Industry therefore eThekwini Municipality has a responsibility to limit its risk by ensuring a zero tolerance and better practice approach to Contractors and those affiliated to this project. Thus, a high premium is placed on the health and safety (H&S) of eThekwini Municipality stakeholders, which includes its employees, professional service providers, public and its physical assets.

The responsibilities that eThekwini Municipality and relevant stakeholders have toward its employees are captured in, but not limited to this document. The responsibilities stem from both moral, civil and a variety of legal obligations. The Principal Contractor is to take due cognisance of the above statement.

eThekwini Municipality, as the Client has appointed an H&S Agent which has developed this project specific Health & Safety Specification (PSHSS) for the project in order to provide the Principal Contractor appointed to perform construction work for the project with the entire relevant requirement pertaining to H&S.

INTRODUCTION

In terms of Construction Regulation 5(1) (a) of the Occupational Health and Safety Act, 1993 (Act 85 of 1993), the Client and/or its Agent on its behalf, shall be responsible to prepare Health & Safety Specifications for any intended construction project and provide any Principal Contractor who is making a bid or appointed to perform construction work for the Client and/or its Agent on its behalf with the same.

Every effort has been made to ensure that this specification document is accurate and adequate in all respects. Should it however, contain any errors or omissions they may not be considered as grounds for claims under the contract for additional reimbursement or extension of time, or relieve the Principal Contractor from his responsibilities and accountability in respect of the project to which this specification document pertains. Any such inaccuracies, inconsistencies and/or inadequacies must immediately be brought to the attention of the Agent and/or Client.

PROJECT DESCRIPTION

The roads subjected to the rehabilitation works are located within the eThekweni Municipal boundary, specifically in the Western Region

The works are classified as follows:

“Surfacing Works” - Projects which include the construction of new pavement layers which are all asphalt layers, or layers which may be described as bituminous surfacings such as slurries, single seals, microsurfacing etc shall be classified under “Surfacing Works”.

“Recycling Works” - Projects which include construction of BSM (Bitumen Stabilised Material) layers shall be classified under “Recycling Works”. This category shall include both in-situ recycling and in-plant recycling. This category shall also include cement or lime stabilization of pavement layers, and the construction of asphalt layers.

“Granular Works” - Projects which include the construction of new granular pavement layers above the formation level (i.e. Base and/or Subbase) shall be classified under “Granular Works”. These works shall include construction of layers using both virgin materials and reuse of existing granular materials. This category shall also include the construction of BSM layers and asphalt layers.

“Subgrade Improvement Works” - Projects which include improvements/re-construction of the subgrade layers below the formation level of the pavement shall be classified under “Subgrade Improvement Works”. This shall only be applicable to projects where greater than 25% of the length of the road requires subgrade improvements. These works shall also involve reconstruction of the layers above formation and the construction of all types of layers shall be covered by this category of rehabilitation.

“Ancillary Works” - Projects where the scope of works is not rehabilitation of pavement layers shall be classified under “Ancillary Works”. Examples of the projects this category is intended to cover include raising/lowering of services, construction/re-construction of sidewalks, laying of kerbs or kerb & channel or asphalt haunching, repairs or reconstruction of sidewalks and laying of sub-soil drains.

1. DEFINITIONS

For the purpose of this Construction Health and Safety Specification, all definitions in the Occupational Health and Safety Act and Regulations, the abbreviations and the definitions given hereunder shall apply; where definitions may overlap, the most onerous requirement shall apply:

Acronym or Definition	Meaning
Agent	Refer to the Agent appointed by the Client to act on its behalf, and who is appointed in writing
CHSS	Refers to this document as the Construction Health and Safety Specification
Client	Refers to eThekweni Municipality
COIDA	Means Compensation for Occupational Injuries and Diseases Act 130 of 1993
Construction Site	Means the premises and grounds where construction work is being performed
Principal Contractor	Means an employer appointed by the Client to perform construction works
CR	Refers to the Construction Regulations of 2014
DSTI	Refer to a documented daily safe task instruction compiled and issued by a contractor and trained to all relevant employees
Agent	Refer to the Agent appointed by the Client to act on its behalf, and who is appointed in writing
CHSS	Refers to this document as the Construction Health and Safety Specification
Client	Refers to eThekweni Municipality
COIDA	Means Compensation for Occupational Injuries and Diseases Act 130 of 1993
Construction Site	Means the premises and grounds where construction work is being performed
Principal Contractor	Means an employer appointed by the Client to perform construction works
CR	Refers to the Construction Regulations of 2014
H&S	Refers to Health and Safety

Medical Certificate of Fitness	Means a valid medical certificate of fitness issued by an occupational medicine practitioner, such medical testing shall be relevant to the risks of the construction work on the construction site and shall conform to the Occupational Health and Safety Act and Regulations and to the requirement of this Health and Safety Specification
--------------------------------	--

Acronym or Definition	Meaning
Method Statement	Refer to a document detailing the key activities to be performed in order to reduce as reasonably as practicable the hazards identified in the Risk Assessment
OHSA	Refer to the Occupational Health and Safety Act
Regulations	Refer to the Regulations stipulated in the OHSA
S	Refer to a section in the OHSA
SACPCMP	Means the South African Council for the Project and Construction Management Professions
Sub-Contractor	Means an employer appointed by a contractor of the Principal Contractor
BoQ	Bill of Quantities
CC	Compensation Commissioner
CR	Construction Regulations
DMR	Driven Machinery Regulations
DoL	Department of Labour
FEMA	Federated Employers Mutual Association
GAR	General Administration Regulations
GSR	General Safety Regulations
HCSR	Hazardous Chemical Substances Regulations
HIRA	Hazard Identification Risk Assessment
H&S	Health and Safety
MSDS	Material Safety Data Sheet
OH	Occupational Health
OHSS	Occupational Health and Safety Specification
PSHSS	Project Specific Health and Safety Specification
PC	Principal Contractor
PPE	Personal Protective Equipment

SANS	South African National Standards (Authority)
SMME	Small Medium and Micro Enterprises
SWP	Safe Work Procedure

2. KEY REFERENCES

- Occupational Health and Safety Act, Act 85 of 1993 and Regulations (as amended)
- Compensation for Injury and Occupational Diseases Act No.130 of 1993 (as amended)
- General Conditions of Contract of Construction Works 2010 (GCC 2010)
- SANS 10085, SANS 50355, SANS50361
- SANS Code 1921-6 – HIV / AIDS Awareness
- SANS Code 1200 GB – Standard Specification for Civil Engineering
- SANS Code 0400 – Building Regulations South Africa

3. INTRODUCTION TO THIS HEALTH AND SAFETY SPECIFICATION.

This Construction Health and Safety Specification is published in terms of the Occupational Health and Safety Act of 1993 (OHS Act), Construction Regulations 2014, Regulation 5(1) (b). The CHSS does not replace the Construction Regulations, 2014, but is a supplementary specification as required in terms of the Regulations. The Principal Contractor is at all times required to and will remain responsible to fully address all requirements and standards of the Occupational Health and Safety Act, Regulations and the Construction Regulations. Inclusive of the Health and Safety Plan and implementation thereof.

The Client has appointed an Agent who will (inter alia) be responsible for the approval of all Principal Contractors H&S Plans, for the auditing and monitoring of the Principal Contractor implementation thereof and for maintaining the document control associated with the CHSS.

4. LIMITATIONS OF LIABILITY

The Client or its Agent shall not be responsible for any acts or omissions of any contractor which may directly or indirectly result from the application of the CHSS or any project specific version thereof.

All contractors must ensure that articles, work, equipment, machinery, plant and work practices are, at all times compliant to the legal requirements as these apply.

The Client or its Agent shall limit its responsibility to the application of the Construction Regulations Clients Requirements only.

The Principal Contractor shall enter into a Mandatory Agreement with the Client, as defined in Section 37(2) of the Occupational Health and Safety ACT.

The Principal Contractor shall ensure that each contractor appointed by the Principal Contractor and each sub-contractor appointed by a contractor also into a Mandatory Agreement with the Principal Contractor, as defined in Section 37(2) of the Occupational Health and Safety ACT. These agreements shall be included in the Principal Contractor's H&S File on site and be valid for the duration of the contractors' work on the construction site.

5. PURPOSE OF THE CONSTRUCTION H&S SPECIFICATION

The eThekwini Municipality is obligated to implement measures to ensure the health and safety of all people and properties affected under its custodianship or contractual commitments and is further obligated to monitor that these measures are structured and applied according to the requirements of these Health and Safety Specifications. (All references to the singular shall also be regarded as references to the plural)

The PSHSS is a performance specification to ensure that the eThekwini Municipality and any other bodies that enter into formal agreements with the eThekwini Municipality viz. Agents, Professional Service, Principal Contractors, and Contractors achieve an acceptable level of OHS performance.

No advice, approval of any document required by the PSHSS such as Hazard Identification and Risk Assessments, or any other form of communication from the Client shall be construed as acceptance by the Client of any obligation that absolves the Principal Contractor from achieving the required level of performance and compliance with legal requirements.

Furthermore, there is no acceptance of liability by the Client, which may result from the Principal Contractor failing to comply with the PSHSS, i.e., the Principal Contractor remains responsible for achieving the required performance levels.

A Mandatory Agreement in terms of section 37.2 of the OHSA will be signed between parties prior to any Works commencing

The PSHSS highlights the aspects to be implemented over and above the minimum requirements of current legislation. Requirements may be changed should new Risks or issues are identified that could not have been foreseen during the design phase of the project, or during the Construction Phase. Any new legislation or standards (legislated or determined by eThekwini Municipality) that are promulgated or accepted during the contract will automatically be applied.

The purpose of this specification document is to provide the relevant Principal Contractor (and his /her contractor) with any information other than the standard conditions pertaining to construction sites which might affect the health and safety of persons at work and the health and safety of persons in connection with the use of plant and machinery; and to protect persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work during the carrying out of construction work for the eThekwini Municipality. The Principal Contractor (and his /her contractor) is to be briefed on the significant health and safety aspects of the project and to be provided with information and requirements on inter alia:

- a) Safety considerations affecting the site of the project and its environment.
- b) Health and safety aspects of the associated structures and equipment.

- c) Submissions on health and safety matters required from the Principal Contractor (and his /her contractor); and
- d) The Principal Contractor's (and his /her contractor) health & safety plan.

To serve to ensure that the Principal Contractor (and his /her contractor) is fully aware of what is expected from him/her with regard to the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) and the Regulations made there-under including the applicable safety standards, and in particular in terms of Section 8 of the Act.

To inform the Principal Contractor that the Occupational Health and Safety Act, 1993 (Act 85 of 1993) in its entirety shall apply to the contract to which this specification document applies. The Construction Regulations promulgated on **7 February 2014** and incorporated into the above Act by Government Notice GNR.84 OF 2014, published in **Government Gazette 37305** shall apply to any person involved in construction work pertaining to this project, as will the Act.

The purpose of the CHSS is for the specification to be used as the standard on which Principal Contractors H&S Planning and safe work execution must be based

This CHSS will be applicable to all construction work and shall be implemented for the complete project until project close out.

This CHSS defines the client's standard by which all occupational health and safety risks shall be controlled at the construction site.

All employers working on the construction site shall conform to the standard in the CHSS. All the duties of a Principal Contractor in this CHSS equally apply, in full, to contractors of such Principal Contractor and sub-contractors of such contractors...

6. IMPLEMENTATION OF THE CONSTRUCTION H&S SPECIFICATION

The Project specific H&S Specification (PSHSS) forms an integral part of the Contract, and the PC is required to make it an integral part of their Contracts with the Contractors and Suppliers.

This Specification must be read in conjunction with the OHSA, Regulations (as amended) and any other standards relating to work being done, and to ensure compliance thereto. The information relative to the scope of the Project, the works etc. are detailed in the tender and are to be considered when developing the H&S Plan and associated documentation.

The OHSA Section 37.2 Mandatory Agreement must be fully completed by the PC, supplied by the Client. These documents shall be deemed to form part of the returnable Contract Documents.

Non-conformances will be issued, and penalties or work stoppages will be issued where appropriate. Communication between the H&S Agent and the PC will be through the

Engineer (or Clients responsible person) as determined at the commencement of the project.

This CHSS forms an integral part of the Contract, and Principal Contractors H&S Planning and safe work execution must be based.

The Principal Contractor shall ensure that the H&S Plan contain sufficient evidence of:

- Adequate provision for the cost of safety measures

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- The Principal Contractor access to and intention to appoint persons with the necessary competencies to carry out the construction work safely.
- The Principal Contractors access to the necessary resources to carry out the construction work safely and without risk to the health of the workers.
- The Principal Contractor's planning of construction activities within the special requirement emanating from personnel deployment, time constraints and language barriers.

The Principal Contractor shall allow in their cost provision for complying with the requirements of this CHSS; resources for the following H&S controls shall be in place.

7. Design Risk Management

Based on the recent design changes, as well as change in the scope of works, the PC will be required to ensure a resubmission of an amended H&S Plan for approval. Further to this, the PC must ensure that similar information must be provided as it applies to the works to all their Contractors, within five (5) working days following notification thereof.

The PC must ensure that they have the latest designs on file i.e., Drawings, Loadings, Specifications. The PC must further ensure that a competent temporary works designer is appointed to inspect and approve the temporary works.

Design – in relation to any structure, includes drawings, calculations, design detail and specifications'

Temporary works must be properly designed and signed off by a competent person who has sufficient experience in the design of the type of temporary work in question to be able to assess the design. The competent person/(s) appointed must either be a registered professional engineer or technologist. The appropriate competent person is to be appointed to manage and monitor such works to the satisfaction of the engineer and the H&S Agent. Records and registers are to be kept properly completed and kept in the H&S file. If temporary works are to be erected by a Contractor, this must be notified to the Engineer / H&S Agent.

As per the Government Gazette, 2 June 2017, no. 40883, guidelines, Regulation 12 (1) is a three functions competent person(s) appointment. The temporary works designer could be one person or different persons to design, inspect and or approve [read with

Regulation 6 (g); (h) and (i). Temporary works designer(s) must be mandated by the Contractor to perform any or all of the three functions. A risk bases methodology should be applied in respect of competencies for temporary works.

Failure to do so will be considered a serious offence

8 Safety Cost in the Bill of Quantities

Number	Item	What is required	Pre Requisite	Legal Reference	
1	Safety Administration on the Site	Full time Safety Officer	Competent and Registered with SACPCMP Diploma in Safety Management Safety Manager	In terms of section 18(1)(c) of the Act, (no.43 of 2000), as published on 31 May 2013 in the Government Gazette, No.36525, Board Notice 114 of 20`3 for commencement 1 August 2013	
2		Safety File	Comprehensive Safety File addressing all the requirement in the Baseline Risk Assessment and the Client Health and Safety Specification		Construction Regulation 7 (b) Documentation required in terms of the Act and applicable regulations
3		Medicals	All employees on the site including local labour		Regulation 7 (g) and (8) A contractor must ensure that all his or her employees have a valid medical certificate of fitness specific to the construction work to being performed and issued by an occupational health practitioner in the form of Annexure 3

Number	Item	What is required	Pre Requisite	Legal Reference
4		Personal Protective Equipment	<ul style="list-style-type: none"> • Fall Arrest Equipment • Overalls • Boots • Eye Protection • Hearing protection • Hand protection • Dust masks • Site Safety Signage (specific and applicable) 	<p>Construction Regulations 7 (c)(i) General Safety Regulations 2 (3) (a) – (g)</p> <p>Note: PPE is not limited and will increase as the Risk increase. Extra must be allowed for any new risks not identified in the initial stage of the project</p>
5	Training	Specialized training for the Project	<ul style="list-style-type: none"> • First Aiders • Flag Persons • Health and Safety Representatives • Emergency Team/ Warden/ Fire • Working at Height/ Use of fall protection equipment • Rescue from Falling from Height • Scaffold Team / Supervisor/Inspector/Erector team/team leader • Induction for visitors / employees • Mandatary training / Risk register / Risk Assessments / P.PE 	<p>Training programs for contractors employees</p> <p>Competent Person means a person who-</p> <p>(a) Has in respect of the work or task to be performed the necessary required knowledge, training and experience and where applicable, qualifications specific to that work or task: Provided that where appropriate qualifications and training are registered in terms of the provisions of the National Qualifications Framework Act, 2000(Act No.67 of 2000) those qualification and that training must be regarded as the required qualifications and training.</p>

Number	Item	What is required	Pre Requisite	Legal Reference
6	Site Establishment	Welfare facility on site	<ul style="list-style-type: none"> • Sheltered Eating Facility • • Changing Facility for both sexes • • Ablution facility male/female: Ratio 1:15 • Toilets for male/female: Ratio 1:30 • Drinking water • Fully fenced 	Construction Regulation 30 – provide at or within reasonable access to every construction site.
7	Traffic	Traffic Safety Officer	Competent in Traffic Safety Minimum SAMTRAC Comply with SANS 1921-2:2004 Construction and Management Requirements for Works Contracts, Part 2 Accommodation of Traffic on Public Roads occupied by the Contractor Develop Traffic Management Plan according to South African Road Traffic Signs Manual – Volume 2: Roadwork’s Signing	South African Road Federation Register online http://www.sarf.org.za tshidi@sarf.org.za 011 394 7934

Number	Item	What is required	Pre Requisite	Legal Reference
8		Accommodation of traffic for on and off ramp	<ul style="list-style-type: none"> • Safety signs and directions • Traffic cones • Delineators / danger plates • Traffic warning lights/ night (amber) • New jersey barriers plastic (moveable) • Concrete barriers and temporary guardrails • Stop / Go signals / two-way radio's • Flag persons • Barricades • Speed controls • Traffic Management Plan • By-pass or detour • Public Safety • Warning devices • Lay out of detour 	Traffic accommodation design in Compliance with Legislation

9	Public Safety	Pedestrian movement	<ul style="list-style-type: none"> • Temporary boarding of walkways • Overhead protection under bridges to withstand falling objects • Safety signage and information boards • Concrete barrier with fixed guardrail along the entire length 	Public Safety Catch platform CR 4(h)
10	Outsourced Service Providers	Temporary Design	<ul style="list-style-type: none"> • Formwork / scaffolding • Geo Tech Report • Stabilizing of steep slope and bank 	Appointment and services of temporary designer CR13 2 (b) (ii)

Number	Item	What is required	Pre Requisite	Legal Reference
11		Security	<input type="checkbox"/> Fencing of the site <input type="checkbox"/> Night and Day staff/ control <input type="checkbox"/> Entrance / gate control	Contract with Security Company
12	Public Interface	Public space	<input type="checkbox"/> Demarcation <input type="checkbox"/> Working in the road <input type="checkbox"/> Confined space in manholes <input type="checkbox"/> Surface drainage/inlet /kerbs	Traffic Management Plan approved by eThekweni Transport Authority and Metro Police
13	Utilities	Relocation of services	<input type="checkbox"/> Fiber Optic Cables <input type="checkbox"/> Electricity supply <input type="checkbox"/> Water supply	Locality plans of all underground services to be obtained from Authorities prior to commencement CR 14 4(e)

14	Construction	Alignment and two new ramps.	<input type="checkbox"/> Realign road <input type="checkbox"/> Relocate services	Temporary entrance to be constructed for access to factory
15		Superstructure	<input type="checkbox"/> Retaining of the excavated bank <input type="checkbox"/> bions	Specialized Contractor to be appointed (Research for suitable service provider) Environmental Impact Assessment to be obtained

9. SCOPE OF THE PROJECT

The works will broadly include but not limited to:

“Surfacing Works” - Projects which include the construction of new pavement layers which are all asphalt layers, or layers which may be described as bituminous surfacings such as slurries, single seals, microsurfacing etc shall be classified under “Surfacing Works”.

“Recycling Works” - Projects which include construction of BSM (Bitumen Stabilised Material) layers shall be classified under “Recycling Works”. This category shall include both in-situ recycling and in-plant recycling. This category shall also include cement or lime stabilization of pavement layers, and the construction of asphalt layers.

“Granular Works” - Projects which include the construction of new granular pavement layers above the formation level (i.e. Base and/or Subbase) shall be classified under “Granular Works”. These works shall include construction of layers using both virgin materials and reuse of existing granular materials. This category shall also include the construction of BSM layers and asphalt layers.

“Subgrade Improvement Works” - Projects which include improvements/re-construction of the subgrade layers below the formation level of the pavement shall be classified under “Subgrade Improvement Works”. This shall only be applicable to projects where greater than 25% of the length of the road requires subgrade improvements. These works shall also involve reconstruction of the layers above formation and the construction of all types of layers shall be covered by this category of rehabilitation.

“Ancillary Works” - Projects where the scope of works is not rehabilitation of pavement layers shall be classified under “Ancillary Works”. Examples of the projects this category is intended to cover include raising/lowering of services, construction/re-construction of sidewalks, laying of kerbs or kerb & channel or asphalt haunching, repairs or reconstruction of sidewalks and laying of sub-soil drains.

This CHSS covers the client's requirements for addressing, mitigating, and controlling Occupational Health and safety related risks, problems, incidents and injuries during the construction work.

The scope addresses legal compliance, hazard identification and risk assessment and the promotion of a health and safety culture amongst those working on the project.

The CHSS contains clauses that are generally applicable to construction and imposes controls associated with activities that impact on human health and safety

The Principal Contractor is required to comply with the provisions of the OHSA, all applicable Regulations and this CHSS.

The client Agent will monitor the Principal Contractor's compliance with the requirements of the OHSA and the approved H&S Plan.

10. COMPENSATION FOR OCCUPATIONAL INJURIES AND DISEASES ACT

The Principal Contractor, each contractor and each sub-contractor shall submit proof of Good Standing with COIDA Commissioner, or a Mutual Association licensed in terms of Section 30 of COIDA, prior to starting any work on site.

A copy of the Letter of Good Standing with COIDA Commissioner must be included in the H&S Plan of each contractor working on the site and must remain updated for the duration of the construction work.

11. APPLICATION FOR CONSTRUCTION WORK PERMIT

The Principal Contractor shall assist the Client in compiling the evidence required by the Department of Labor for the issuing of the Construction Work Permit.

The Principal Contractor shall ensure that the H&S Plan presented for approvals includes:

- Evidence that the Principal Contractor made adequate provision for the cost of H&S measures
- Evidence that the Principal Contractor has the necessary competencies and resources to carry out the construction work safely.
- A copy of the Letter of appointment of the Construction Manager into CR 8(1) + proof of his qualification, competence, and registration where applicable.
- Proof of the registration of the Principal Contractors safety officer with the SACPCMP.

The Principal Contractor shall display the work permit number at the main site entrance. This display must be conspicuous to the satisfaction of the Department of Labour. The permit must be noticeable.

The construction works can only commence once the construction work permit is issued by the Department of Labour.

12. CONSTRUCTION MANAGER

The Principal Contractor shall appoint a full-time competent person as the construction manager with the duty of managing all construction on the site.

The construction manager must be exclusively dedicated to the construction site

Proof of competency of the construction manager shall be incorporated in the H&S Plan; and as a minimum this shall include:

- Proof of professional training
- Proof of experience in the construction scope of work defined in the CHSS.
- Proof of experience in H&S management for as defined in the scope
- Proof of training in the OHSA, CR and evidence that a training provider certifies the construction manager to be familiar with the OHSA and with the applicable regulations made under the Act.

The construction manager shall be responsible to ensure that the following duties are executed and shall actively communicate with the Client-Agent in order to:

- Confirm and provide compliance and
- Discuss any compliance constraints which may be experienced.

The construction manager may be assisted by the safety officer and, where such an arrangement is planned, the H&S Plan of the Principal Contractor shall clearly define the respective duties of the construction manager and of the safety officer.

The construction manager shall be appointed in writing and reference to compliance of the Client specification must be stipulated in the appointment letter.

The construction manager shall present the site-specific health and safety plan, based on this health and safety specification to the client agent and shall discuss and amend the H&S Plan until finally approved by the client agent.

The construction manager shall ensure that the H&S Plan is reviewed and updated as work progresses.

The construction manager shall open and keep the site health and safety file to ensure that at all times this file is on site and available to an inspector, the client, the clients agent or contractor.

The construction manager shall provide contractors and sub-contractors with this CHSS.

The construction manager shall only approve the H&S Plan by a contractor and a sub-contractor if there is sufficient evidence that the contractor:

- Has made sufficient provision for health and safety measures during the construction process.

- Has the necessary competencies to perform the construction work safely
- Has made the necessary resources available to perform the construction work safely.

The construction manager shall ensure that all contractors appointed by the Principal Contractor have a compliant H&S Plan, prior to appointing the contractor and prior to allowing the contractor to start working on the site.

The Construction Manager shall ensure that contractors have evidence of both registration and good standing in terms of COIDA and shall not permit any contractor to start work on the site unless a valid Certificate of Good Standing is on site.

Additional to the requirements of the Construction Regulations, the Principal Contractors construction manager shall ensure that all sub-contractors appointed by any of the contractors of the Principal Contractor comply with the construction regulations and, in particular the construction manager shall:

- Assess and finally approve H&S Plans of all these sub-contractors; without such approval these contractors are not permitted onsite.
- Ensure that employees of these contractors are also inducted in the H&S induction program
- Audit these contractors monthly
- Stop unsafe work or work not in accordance with the approved H&S Plan.

The construction manager together with the safety officer shall ensure that daily inspections of the health and safety compliance of all contractors and sub-contractors on site are performed and documented in the Principal Contractor H&S File.

The construction manager together with the safety officer shall ensure that monthly site audits and document verification is conducted of all contractors and all sub-contractors on site.

The construction manager shall stop all construction work which is not in accordance with the CHSS or with the principal contractor's health and safety plan or which poses a threat to the health and safety of persons.

The construction manager shall ensure that, where changes are brought about to the design and construction on the site, sufficient health and safety information and appropriate resources are made available to any contractor to which the changes apply.

The construction manager shall hand over a consolidated health and safety file to the Client Agent upon completion of the construction work.

The construction manager shall ensure that a comprehensive and updated list of all the contractors on the site that is both those directly accountable to the principal contractor and those accountable to other contractors is kept in the H&S File. The list must refer also to the work

The construction manager shall ensure that a comprehensive and updated list of all the contractors on the site that is both directly accountable to the Principal Contractor and those accountable to other contractors is kept in the H&S File. The list must refer also to the work performed by the

contractors, the date of the approved H&S Plan, the expiry date of the COIDA Letter of Good Standing, the last monthly audit date and the agreement between the parties.

The construction manager shall ensure that no employee accesses the worksite unless that employee is in possession of a valid medical certificate of fitness specific to the construction work to be performed and filed on site in the H&S File.

The construction manager shall ensure that site rules and regular communication processes are in place in order to obtain co-operation between all contractors on site.

The construction manager shall ensure that all persons on site have undergone the relevant site health and safety induction of the principal contractor

An up-to-date register of all employees on indicating the date of H&S induction, the expiry date of medical certificates of fitness and the employee's job title

The construction manager shall ensure that all fall risk work is performed in accordance with the fall protection plan and that at all times an updated fall protection plan is filed in the H&S file on site. Where fall recovery procedures are defined, the construction manager shall be responsible for ensuring that the necessary emergency engineering and administrative risk controls are in place, on stand-by and adequately controlled to ensure immediate assistance at all times when work is performed which poses a suspension risk. Where environmental conditions prevent safe work, the construction manager shall ensure timeous work stoppage.

The construction manager shall ensure that all work on site is performed under supervision of a competent person appointed by the principal contractor.

The construction manager shall ensure that all incidents are investigated and that the final reports thereof is assessed and approved in writing by the construction manager

The construction manager shall ensure that all Finding-and Audit Reports are assessed that corrective action is planned and executed and confirmed in writing.

13. CONSTRUCTION SAFETY OFFICER

The PC will employ a competent full time H&S Officer for the duration of the contract. The H&S Officer's CV is to be submitted for approval by the H&S Agent or the Client. The PC is to ensure adequate resources are provided in order to undertake all responsibilities (i.e., mobile phone, computer and internet access, vehicle etc.)

Qualifications shall include at least Grade 12, SAMTRAC/NEBOSH/Diploma in H&S qualifications or similar together with additional appropriate short courses (i.e., Fall Protection Developer, Risk Assessor, Basic Fire Fighting and First Aider Level 1) with exposure to Civil and Building Construction that is appropriate given the level of project complexity and registration with SACPCMP. Any in-depth knowledge of legislative requirements and the application thereof is required. The site supervisor may not act as the H&S Officer.

The H&S Officer/s will be responsible for all H&S on the project.

- Site staff and supervision, Contractors are to follow systems, instructions etc. always given by the H&S Officer.

- No new workers or Contractors may commence work without approval or following the H&S Plan as submitted, and
- No inductions of Contractor staff until the H&S documentation is approved by the H&S Officer.
- The H&S Officer/s may not be removed or replaced without the approval of the H&S Agent.

A monthly report of all H&S activities and incidents is required by the end of the first week of each month, or at a date agreed by the H&S Agent/ Client and the H&S Officer. An example of the monthly report is attached as **Annexure B**.

The H&S Officer will be responsible for collating the H&S documentation at the close out of the project in electronic format. A list of the typical aspects that should be provided is available as **Annexure A** to this document. The PC is to ensure that all Contractors documentation follows the same requirements as closed out H&S documentation must be completed and be available with the close out of the main contract.

Failure to do so will be considered a serious offence and penalties applied.

14. OVERALL SUPERVISION and RESPONSIBILITY for OH&S

- * The Client and/or its Agent on its behalf to ensure that the Principal Contractor, appointed in terms of Construction Regulation 7(1)(c), implements, and maintains the agreed and approved H&S Plan. Failure on the part of the Client or Agent to comply with this requirement will not relieve the Principal Contractor from any one or more of his/her duties under the Act and Regulations.
- * The Chief Executive Officer of the Principal Contractor in terms of Section 16 (1) of the Act to ensure that the Employer (as defined in the Act) complies with the Act. The pro forma Legal Compliance Audit may be used for this purpose by the Principal Contractor or his/her appointed contractor.
- *All OH&S Act (85 /1993), Section 16 (2) appointee/s as detailed in his/her/their respective appointment forms to regularly, in writing, report to their principals on matters of health and safety per routine and ad hoc inspections and on any deviations as soon as observed, regardless of whether the observation was made during any routine or ad hoc inspection and to ensure that the reports are made available to the principal Contractor to become part of site records (Health & Safety File).
- *The Construction Supervisor and Assistant Construction Supervisor/s appointed in terms of Construction Regulation 8 (5) to regularly, in writing, report to their principals on matters of health and safety per routine and ad hoc inspections and on any deviations as soon as observed, regardless of whether the observation was made during any routine or ad hoc inspection and to ensure that

the reports are made available to the principal Contractor to become part of site records (Health & Safety File).

* All Health and Safety Representatives (SHE-Reps) shall act and report as per Section 18 of the Act.

15. FURTHER (Specific) SUPERVISION RESPONSIBILITIES for OH&S

Several appointments or designations of responsible and /or competent people in specific areas of construction work are required by the Act and Regulations. The following competent appointments, where applicable, in terms of the Construction Regulations are required to ensure compliance to the Act, Regulations and Safety Standards.

16. REQUIRED APPOINTMENTS as per the CONSTRUCTION REGULATIONS: -

Item	Regulation	Appointment	Responsible Person
1.	5(1)(c)	Principal contractor for each phase or project	Client
2.	7.(3)(b)	Contractor	Principal Contractor
3.	7(1) c	Contractor	Contractor
4.	8(1)	Construction supervisor	Contractor
5.	8(2)	Construction supervisor sub-ordinates	Contractor
6.	8(5)	Construction Safety Officer	Contractor
7.	9(1)	Person to carry out risk assessment	Contractor
8.	7(4)	Trainer/Instructor	Contractor
9.	10(1)(a)	Fall protection planner	Contractor
10.	12(2)	Formwork & support work supervisor	Contractor
11.	10(e) + (f)	Formwork & support work examiner	Contractor
12.	13(1)(a)	Excavation supervisor	Contractor
13.	13(2)(b)(ii)(b)	Professional engineer or technologist	Contractor
18.	16(2)	Scaffold supervisor	Contractor
19.	17(1)	Suspended platform supervisor	Contractor
20.	117(2)(c)	Compliance plan developer	Contractor
21.	17(8)(c)	Suspended platform expert	Contractor
26.	19(2)(b)	Power tool expert	Contractor
27.	19.2 (g) (i)	Power tool controller	Contractor
29.	23(1)(d)(i)	Construction vehicle and mobile plant operator	Contractor

30.	21(1)(j)	Construction vehicle and mobile plant inspector	Contractor
31.	24(d)	Temporary electrical installations inspector	Contractor
32.	22 (e)	Temporary electrical installations controller	Contractor
33.	28 (a)	Stacking and storage supervisor	Contractor
34.	29 (h)	Fire equipment inspector	Contractor

17. COMMUNICATION & LIAISON

OH&S Liaison between the Employer, the Principal Contractor, the other Contractors, the Designer and other concerned parties shall be through the H&S Committee as per the procedures determined by the H&S Committee.

In addition to the above, communication may be directly to the Client or his appointed Agent, verbally or in writing, as and when the need arises.

18. APPOINTMENT of COMPETENT SITE PERSONELL

The CEO (OHSA S16.1) of the PC will take overall responsibility of the appointment of competent site staff for the duration of the project. Should the CEO not be personally involved in the project, the H&S responsibilities are to be delegated to the Contracts Manager (OHSA S.16.2). Knowledge and training in H&S is required, and certificates indicating H&S training as well as experience to be included in CV's

All other legal appointments are to be made with relevance to the type of work required and kept current with the project programme. The Construction team is to ensure the appointed full time H&S Officer is kept up to date with all planned activities, to ensure all H&S requirements are met.

All method statements are to be generated by senior site personnel, and the appropriate risk assessments developed therefrom in conjunction with the H&S Officer. The Occupational Health and Safety Plan shall include the following but is not limited to the following key appointments.

19. INDUCTION of EMPLOYEES and VISITORS, GENERAL H&S TRAINING.

A simple, formal induction programme is to be submitted as an addendum for approval with the H&S Plan. Inductions must be carried out for all workers and visitors (including Client, Designers) to the site.

Pre task instruction is required to ensure workers are familiar with the risks and H&S measures of the work or tasks to be done. Such instruction is to be done at least daily. A record of inductions and pre-task instructions is to be kept in the H&S file.

Any person found on site without proof of induction will be removed from the site until proof is supplied and a penalty issued per non-compliance

20. FIRST AIDERS and FIRST AID EQUIPMENT

First Aiders shall be always available and accessible on site and be able to work as a team when responding to any emergency on the project.

Contractors are expected to ensure compliance and provide/ manage their own First Aiders and equipment. The number of First Aiders will be determined by the complexity and exposed risks of the project, not numbers of workers.

Appropriately stocked first aid kits are to be available at all times and to assure continual availability and access on site.

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21. PERSONAL PROTECTIVE EQUIPMENT (PPE) and CLOTHING

The PC is to provide a procedure as an addendum to indicate how PPE is managed within the Company.

The wearing of the identified SANS approved PPE is non-negotiable. The PC shall ensure that all workers (including Contractors) are issued with and shall wear:

- Hard hats
- Protective footwear
- Overalls that ensure worker visibility
- Eye protection
- Hearing protection
- Respiratory protection (minimum of FF2 and or respirators), and
- Any other necessary PPE identified from MSD's and /or risk assessments

Adequate quantities of PPE shall be available. This shall include necessary PPE for visitors. The procedure for managing PPE is to be a formal procedure submitted with the H&S Plan for approval.

Any person (including the Client, Designers etc.) found on site without the necessary PPE will be removed from the site until the PPE is supplied and worn.

Failure to comply will result in penalties being applied.

22. OCCUPATIONAL HEALTH and SAFETY SIGNAGE

On-site H&S signage is required. Signage shall be posted up at fixed or temporary working areas, or other potential risk areas / operations. These signs shall be in accordance with the requirements of General Safety Regulations or SANS requirements as amended. Signage is to be noted on the site drawings indicating where fixed / temporary signage is required.

23. TEMPORARY SIGNAGE is to include (but not limited to) the following:

- "Report to site office" / "Warning: Construction Site – Keep out" or similar
- "Site office" (if relevant)
- "Hard hat area" or other PPE requirements noted
- First Aid Box positions (including vehicles); and
- Fire extinguishers

Signs shall be posted at areas of work on site indicating that a construction site is being entered and that persons should take note of the H&S requirements

24. TEMPORARY WORKS (Scaffolding, support work, formwork)

Temporary works must be properly designed and signed off by a competent person who has sufficient experience in the design of the type of temporary work in question to be able to assess the design. The competent person/(s) are to be appointed must either be a registered professional engineer or technologist. The appropriate competent person/(s) are to be appointed to manage and monitor such works to the satisfaction of the Engineer and H&S Agent. Records and registers are to be properly completed and kept in the H&S file. If temporary works are to be erected by a Contractor, this must be notified to the Designer/ H&S Agent.

25. WORKING from a FALL RISK POSITION

A Fall Protection Plan (FPP) is to be available and supplied as an addendum to the H&S Plan. The FPP must be appropriate for the project. Method statements, appropriate risk assessments, safe work procedures and training are to be available prior to the work commencing.

Should part of the work be contracted out, a competent Contractor is to be appointed and submit documentation according to the project requirements. The PC is to note if such work is to be contracted to specialist in the H&S Plan. The Plan is to be developed by and work managed by a competent person for the duration of the project. The following aspects must be included:

- The public are to be protected at all times by the way of hoarding, barricading, or fencing.
- Notices are to be posted
- Prevention of falling tools or equipment.

All workers are to be in possession of valid certificates of fitness that extend for the duration of the works. Note the requirements in the section relating to medical surveillance and the relevant SANS codes as applied to the works and the project.

Registers and all relevant documentation are to be placed on the H&S file.

Work will be stopped, and penalties applied to any work at a fall risk position that is not compliant

26. ENVIRONMENTAL MANAGEMENT

A Project Environmental Management Plan (EMP) shall be developed which must be adhered to. The objective of the EMP is to manage the impacts of construction identified during the course of the Environmental Impact Assessment (EIA) process, as well as during the course of construction. This is document and will be continuously updated in order to reflect current site conditions and address any issues identified during the course of construction. The EMP therefore serves as an

action plan for the implementation of mitigation measures proposed for the construction of low-income houses.

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27. HEAT STRESS

Working in very hot conditions can cause illness when heat stress overcome the body's temperatures regulatory system resulting in heat strokes, heat exhaustion, dehydration, heat syncope, heat cramps and heat rash.

Considering the elevated temperatures experienced in the KwaZulu Natal region and the arid and drought like conditions, it is imperative that the PC develop a Heat Stress Management Plan in order to reduce the risk associated with heat stress.

28. PRINCIPAL CONTRACTOR'S HEALTH AND SAFETY PLAN

The Principal Contractor shall submit a suitable, sufficiently documented, and coherent specific health and safety plan and start-up H&S file for this construction project, in accordance with the legal requirement prior to work starting.H&S file

This H&S plan and file must be presented to and approved by the Agent prior to the site being handed over to the Principal Contractor prior to the Principal Contractor being allowed on site. No work may start by any Principal or other Contractor unless the relevant health and safety plan is approved.

The H&S plan shall be presented as part of the start-up H&S file; all evidence of controls which are documented in the H&S plan must be placed in the H&S file

The H&S file and plan must follow the exact index as defined in Annexure A and Annexure B respectively of this document.

Chapters not relevant in the table of contents must be stipulating not applicable to the scope of works, but the numbering must be continuous and identical to the Annexures.

Additional controls or chapters may be added at the end.

Besides the legal requirements, the site-specific health and safety plan for approval shall include:

A cover page indicating:

- The contract references
- The name and address of the Contractor and the name of the CEO
- The name and signature of the designated person in terms of Section 16(2) • The name and signature of the Construction manager
- A space for the Client Agent to sign for final approval.

An index for the H&S plan

The Principal Contractor's Occupational Health and Safety Policy signed by the CEO.

A detailed site-specific overview of the scope and activities of the project; this overview must include all work controlled by the Principal Contractor whether directly or through the services of a contractor or sub-contractors.

An overview of the machinery and plant used in the project this overview must include all machinery and plant directly or indirectly through the services of a contractor or sub-contractor controlled by the Principal Contractor.

Proof of the competency in Occupational Health and Safety of the Principal Contractor.

An overview of the site-specific budgeted resources for Occupational Health and Safety.

A site-specific baseline hazard identification and risk assessment as performed by the appointed risk assessor

- Risk Assessment of all activities identified in the scope of work shall form an integral part of the Health and Safety Plan
- The baseline risk assessment will include all work which is planned to be done by all contractors and sub-contractors.
- All risk assessments shall be conducted in terms of an acceptable and documented methodology, prior to commencement of work and in accordance with the provisions of the CR.
- The risk assessment must be based on the scope of work and the machinery and plant as defined above.

Controls for identified hazards must be formulated in method statements or operating procedures for the activities of the project; the method statement must be based on the scope of work and the risk assessment.

A detailed outline of the site-specific emergency and accident arrangements on site. Particular attention must be made to fall risk and confined space work emergency management.

An outline of the PPE to be used and the management of such PPE on site.

A list of inspection registers which will be kept on site

Medical certificates of all employees planned to start work

The Principal Contractor's action to ensure that all appointed contractors and subcontractors fully comply with the Regulations and with the CHSS, including but not limited to:

- The approval methodology for H&S plans of contractors and sub-contractors,
- An inclusion of signed agreements in terms of Section 37(2) between the Principal Contractor and every contractor & sub-contractor appointed at the start of construction.

The site-specific Health and Safety induction document used to ensure that all employees and all visitors on site are conversant with the risks on site and the content of the Health and Safety plan and what role they are expected to play in ensuring Health and Safety on the construction site.

29. HAZARD IDENTIFICATION AND RISK ASSESSMENT

The Principal Contractor shall appoint competent person(s) to perform a site-specific baseline risk assessment and thereafter, ongoing issue-based hazard identification and risk assessments. There may be more than one risk assessor appointed if this is required.

The competent risk assessor(s) shall form part of the team working on the site

The risk assessment must be based on the scope of work, the site-specific materials required, and the site-specific machinery, equipment and structures applied during the construction.

Risk Assessments of all sites specific risk activities identified in the scope of work, including those performed by contractors and sub-contractors, shall form an integral part of the H&S Plan and all risks controls (including those executed by contractors and sub-contractors) shall be documented.

The baseline assessment will be included in the H&S Plan

Additional risk assessments shall be conducted when:

- A new machine is introduced on the site
- A system for work is changed or operations altered
- After an accident or near miss has occurred
- New knowledge comes to light and information is received which may influence the level of risk to employees onsite.

Issue based risk assessment, risk monitoring and risk review shall be done at the hand of pre task risk assessment communicated to all employees; a system of daily safe task instructions may be used. The risk assessment must include:

- A daily documented listing of hazardous events
- A daily documented listing of H&S risk controls
- Proof of communication of the above to all employees, the Client requires that the Principal Contractor shall ensure that all employees on site are conversant with the content of all relevant risk assessments, the appropriate measures to either eliminate or reduce the identified risk. The Principal Contractor shall outline to employees what role they are expected to play in the risk assessment and control measure process.

Continuous risk assessment

In order to maintain a safe and risk-free environment continuous risk assessment (e.g., Daily Safety Task Instructions (DSTIs) must be undertaken on a daily basis for all activities undertaken

The Principal Contractor shall include a method for risk review ensuring that all the risks on site are adequately managed

All risk assessments must document all H&S controls which any contractor plans to put in place.

30. HEALTH AND SAFETY FILE

The Principal Contractor shall provide and maintain an H&S File, containing all relevant documents as prescribed in the OHSA and applicable Regulations and all forms or records referred to in the H&S Plan.

The start-up H&S File shall be presented together with the H&S Plan for approval prior to work starting.

The H&S File shall be kept on the construction site and available for inspection by the Client Agent or the Department of Labor Inspectors

The content of the H&S File shall follow a specific order as per Annexure B of this document and be in line with the H&S Plan

Sections not relevant in the table of contents in **Annexure B** must stipulate not applicable, but numbering must be continuous and remain identical to **Annexure B**

Additional controls or chapters may be added at the end pending the risk exposure

The H&S File shall include an index as per **Annexure B**

The H&S File becomes the property of the Client after completion of the project. The Principal Contractor is also required to scan the file in an electronic format and hand over the electronic format.

31. NON-CONFORMANCES

Should at any time, the works, or part of the works, be stopped due to unsafe acts or noncompliance with the Client PSHSS or PC's H&S Plan; neither the PC nor any other Contractor shall have a claim for extension of time or any other compensation.

The following constitute examples of the types of non-conformances that will attract penalties.

Minor	Medium	Severe
Non-use of PPE supplied	Toilets not supplied or regularly serviced, lack of drinking water	Contractors working without Health and Safety Plan approval
Non completion of registers for equipment on site	Contractors not audited	Workers transported in contravention of the OHS Plan or legal requirements
Lack of H&S signage at work areas	Working without training or the appropriate, approved H&S method statements	Invalid letter of good standing
Tools and equipment identified in poor condition during inspections	Legal non-conformances identified during the previous audit and not addressed within the agreed time frame	A serious breach of legal requirements
	No monthly OHS report at site meeting to report on	
	No certificate of fitness for the workers as required	
	Working without approved method statements	

32. Failure to Comply with Provisions

Failure or refusal of the part of the PC or their Contractors to take the necessary steps to ensure the safety of workers and the public in accordance with these specifications or as required by statutory authorities or ordered by the Engineer, shall be sufficient cause for the Engineer to apply penalties as follows:

- A penalty as shown in the Table above shall be implemented for each and every occurrence of non-compliance with any of the PSHSS.
- In addition, a time related penalty over and above the fixed penalty may be deducted for non-compliance to rectify any non-conformance within the allowable time after the site instruction to this effect has been given by the PA. The site instruction shall state the agreed time, which shall be the time in hours for reinstatement of the defects. Should the Contractor fail to adhere to this instruction, the time related penalty shall be applied from the time the instruction was given.

33. HEALTH AND SAFETY REPRESENTATIVES AND COMMITTEE

Health and Safety Representatives

- The Principal Contractor shall ensure that Health and Safety Representatives are appointed in writing and exercise their functions as defined in OHSA.
- The Principal Contractor shall elect and appoint a health and safety representative regardless of the number of employees on the site.
- The H&S representative shall at all times be on site and report to the Health and Safety Officer and Construction Manager.

Health and Safety Committee

- The Principal Contractor shall ensure that the H&S committee meets on a monthly basis
- The Principal Contractor's management and each contractor shall be represented at the H&S committee meeting; contractors with more than 20 employees shall have an H&S representative at each committee meeting and each contractor shall have a management member attending each H&S committee meeting.

34. CLOSE- OUT CONSOLIDATED HEALTH AND SAFETY FILE

The Principal Contractor shall compile a consolidated H&S file and hand over to the Agent at the end of the project handover this shall be applicable to all contractors and sub-contractors as well.

The Principal Contractor shall therefore submit a consolidated close out file inclusive of all contractor information

The consolidated H&S File shall be in hard copy and in CD format The consolidated file shall include:

- A copy of the approved H&S Plan of the Principal Contractor
- Project H&S management plans, H&S Plan, Fall Protection Plan, Emergency Plan, Storm Water Management, Traffic Management
- Project baseline risk assessment
- Designer inspections/assessments and confirmation of conformance
- Monthly risk and Incident reports
- Incident registers & IOD investigation record
- COIDA Claim incidents and supporting medical treatment record
- The completed final register required in the Staffing on Site chapter of this CHSS
- Monthly H&S performance report
- Monthly H&S audit reports from the Agent and the enjoining corrective action reports
- Endorsed minutes of H&S committee meetings • Employee list as required in this CHSS
- Records of exit medical records.

A reference record of all drawings, designs and materials used

A reference record of H&S statutory certificates required by the owner; this reference record shall indicate the designated person at the Principal Contractor, who is responsible for the document and the client-designate to whom the document has been handed.

The comprehensive list of all the contractors on site accountable to the Principal Contractor

An index of all inspections and reference to the inspection registers on site

A list of responsible persons appointed in statutory positions for the duration of the project

A list of all occupational injuries and diseases including the name of the injured, the reference number of the Annexure 1 document and the reference number of the COIDA notification of the injury (if any)

All documents relating to any reportable injury disease during the construction work, as defined in Section 24 and 25, of the Occupational Health and Safety Act, Act 85 of 1993.

35. INDUCTION AND HEALTH AND SAFETY AWARENESS

Each employee working on site shall be inducted in Health and Safety and the operating rules on site.

The Principal Contractor shall develop project specific induction training programme in Health and Safety for the site, to ensure that all employees are conversant with:

- The risk of the Construction project
- The controls documented in the H&S Plan
- The role of employees in ensuring health and safety on the construction site
- The emergency arrangements on site
- The general health and safety rules applicable to the site, considering the works is being performed with great exposure to any member of the public.

The Principal Contractor shall ensure that all employees have gone through the induction training before commencing duties on site.

The contents of the induction programme and method of ensuring that all employees are inducted will be documented in the H&S Plan and the Principal Contractor is advised that a generic induction or a human resource induction shall not be sufficient for the Client to accept the H&S planning for the construction work.

When working on the site, each employee of any contractor and sub-contractor accessing the site including management shall complete the Principal Contractors induction; the principal contractor shall ensure that none of his or his contractor's employees accesses the site unless having being inducted by the Principal Contractor.

Each visitor shall be inducted in the risk and risk controls which the visitor may be exposed to the visitor's induction and method to ensure compliance shall be documented in the H&S Plan.

The Principal Contractor shall ensure that each of the Project team and their employees are inducted in the applicable H&S controls on the site.

The induction must include exposure to snakes while working in a greenfield site, adequate control mitigation must be implemented by the Principal Contractor. Control measures must be pro-active such as animal and plant search and rescue, active monitoring of animal movement on site. Wearing of appropriate personal protective equipment and sourcing the services of the snake catcher if required.

36. HEALTH AND SAFETY TRAINING

Competency of employees and ongoing training in H&S matters shall be documented by including a training and competency matrix in the H&S Plan.

The matrix in the H&S Plan shall be a training needs matrix and shall indicate competency requirements safe working processes:

- Each applicable safe work instruction must be included in the H&S Plan
- The method of training and ensuring competence must be included in the H&S Plan

The Principal Contractor shall ensure that specific pre-task health and safety instructions are given to all employees.

The methods for ensuring that training in safe work instructions and that pre-task instructions occur shall be described in the H&S Plan.

37. INSPECTION, MONITORING AND REPORTING

The Principal Contractor shall carry out regular safety planned task observations on high-risk activities and planned H&S inspections on the site and shall take steps to rectify any unsafe acts or condition.

The appointed Construction Manager and the Safety Officer shall perform regular inspections and document these in the H&S File.

The relevant inspection templates and the frequency of inspections shall be included in the H&S Plan.

The H&S Plan shall contain a list of all the inspection registers which shall be on site and templates of such must be available in the H&S File:

- The templates must correlate with the machinery and equipment listed on the site
- Construction Health and Safety Specification Page 42
- The inspector responsible for the inspection and maintenance of the register must be appointed in writing. Proof of training and competency in the performance of the inspections must be documented.

38. INCIDENTS, ACCIDENTS, NEAR MISSES, AND EMERGENCIES

All near misses, incidents and accidents must be recorded, investigated, and managed in accordance with the statutory provisions.

Each H&S incident, near miss and accident must be recorded in a register kept in the H&S File.

Every accident shall be reported to the Agent that is as soon as the Construction Manager or the supervisor or the Principal Contractor becomes aware of it.

- Such reporting must occur via direct contact (person to person or via telephone) and via email
- Incident investigation process must be followed by competent role players and a preliminary investigation report must be submitted to the Agent and Owner within 24 hours for review and comment
- Final investigation must be finalised by the Principal Contractor and submitted to the Agent within 5 working days unless requested otherwise.

A record of all incident investigations shall be kept in the health and safety file and all records shall be made available to the Client without, this includes records relating to Section 24 of the OHSA.

Where a fatality or permanent disabling injury or any incident referred to in Section 24 occurs on the Construction site, the Principal Contractor must ensure that the Provincial Director is provided with a report contemplated in Section 24 of the Act, in accordance with Regulations 8 and 9 of the General Administrative Regulations, 2013 and that the report includes the measures that the Principal Contractor intends to implement to ensure a safe construction site as far as reasonably practicable.

The Principal Contractor shall ensure that contractors and sub-contractors apply the same measure and shall require that this process is documented in these contractors H&S Plan. The Principal Contractor's H&S Plan shall include a specific procedure in this regard, which shall include all documents and instructions in respect of any incident referred to in Section 24 shall immediately and unconditionally be forwarded to the Client Agent.

The contractor shall organize and document detailed emergency and accident arrangements on site and outline these in detail in the H&S Plan. These arrangements shall be specific for the site H&S risks.

The emergency arrangements shall be displayed on site and shall include:

- A comprehensive emergency and evacuation plan
- An emergency flow chart
- An updated list of emergency numbers

A site emergency and evacuation plan shall be included in the H&S Plan.

39. FIRST AID MANAGEMENT

The Principal Contractor shall ensure that adequately trained first aiders are on site at all times when construction employees are on site: this is even applying if less than 10 employees are on site.

The Principal Contractor, any contractor or sub-contractor shall ensure that it appoints a trained first aider on site regardless the number of labour on site

First aiders shall be identified and shall have immediate access to a comprehensively stocked first aid box

Such first aid box shall be stocked to include all first aid equipment as per the minimum requirements listed under General Safety Regulations 3, and any additional items identified in the risk assessment.

Where shift work is performed, each shift shall comply with the above first aid requirements All the above controls shall be documented in the H&S Plan.

40. AUDITS AND INSPECTIONS

The Client Agent shall conduct regular health and safety inspections and audits to ensure legal compliance and compliance with the Principal Contractors H&S Plan

Records and findings and audits shall be kept in the Principal Contractors H&S File together with a record of any non-conformance report, investigation, and corrective & preventative action

The Principal Contractor shall document corrective action planning and forward this to the Client within 72 hours of receiving the finding

The Principal Contractor's H&S Plan shall document the corrective and preventative action procedure applicable to the project, including the planned method to ensure that non-conformities are managed immediately

The Client Agent shall stop allow any work which does not conform to the H&S Plan which is contradictory to statutory requirements, or which poses a threat to the health and safety of persons.

The Principal Contractor shall conduct and document monthly health and safety audits of all contractors and sub-contractors to ensure compliance with the OSHA, its Regulations and the Principal Contractor H&S Plan and of these contractors H&S Plan.

Records of Principal Contractor's audits of all contractors and sub-contractors on site shall be kept in in the Principal Contractors H&S File together with a record of any non-conformance report, investigation and corrective & preventative action by sub-contractors and shall be made available to the Agent during monthly H&S audits.

41. HOT WORK, FIRE RISKS, FIRE EXTINGUISHERS AND FIRE FIGHTING EQUIPMENT

No open fires are allowed on the site

No smoking is allowed on site, except in designated smoke areas, identified by the Principal Contractor. The H&S Plan shall include the Principal Contractor's arrangements for managing smoking on site.

All flammable products must be stored in an adequate storage facility; this process shall be documented in a method statement in the H&S Plan

The Principal Contractor shall provide suitable fire extinguishers which shall be serviced regularly in accordance with the manufacture's recommendations.

Safety signage shall be prominently displayed in all areas where fire extinguishers are located. The Principal Contractor shall arrange for training of the relevant personnel, in the use of fire extinguishers.

The fire extinguisher inspection registers and the letter of appointment of the competent inspector shall be included in the H&S Plan.

No hot work is permitted on site unless appropriate screens, fire prevention, fire extinguishing and documented safe work permit system are all in place to prevent risk of veld fires and other related fires on the site.

The Principal Contractor shall include a hot work method statement in the H&S Plan for approval. Each person that performs hot work shall be trained in the use of a fire extinguisher and this training shall be documented in the H&S File.

42. LIVE ENERGY WORK AND ELECTRICAL RETICULATIONS AND MACHINERY.

The Principal Contractor shall appoint a competent electrician who shall ensure zero potential of all electrical reticulations worked on and who shall ensure that dedicated power sources are safely installed for the use during construction. A registered competent electrician shall also be responsible to ensure safe and compliant electrical installations

The Principal Contractor shall appoint a competent person to identify and inspect all exposed underground cables, overhead cables, or any other electrical installations to ensure that these are not a hazard to any person.

The competent person shall certify and inspect all temporary electrical installations and machinery the frequency shall be determined in the H&S PLAN

The letters of appointment, proof of competency and registers applicable to these inspections shall be included in the H&S Plan

All electrical cables shall be assumed "alive" and where applicable, the Principal Contractor shall take adequate steps to ensure that all persons are prevented from accessing any electrical installations.

All existing electrical services must be always assumed live.

No live energy work shall be performed. Contractors will ensure that all energy is brought to zero potential that residual energy is purged that energy sources care switched off and locked out by all employees working in the danger zone and are tagged, prior to any work being performed on the energy source or reticulation

The Contractor shall include a zero Potential Lock out Tag Out method statement and safe instruction(s) in the H&S Plan.

The Principal Contractor shall ensure that all electrical testing equipment to be used on site has a valid calibration and that the calibration sticker is affixed to the equipment, clearly indicating the calibration date and the next due date.

Any unsafe condition shall be reported immediately to the Client and the Principal Contractor shall take immediate steps to prevent employees or members of the public from gaining access to the dangerous installation and the area surrounding it.

The Principal Contractor shall appoint a competent person to inspect all portable electrical tools including the leads. The letter of appointment and template of this inspection register shall be included in the H&S Plan

The Principal Contractor shall include a method statement for the safe use of portable electrical tools including the management of the hazards of extension leads

Where temporary installations are installed a C.O.C for these installations shall be included in the H&S File.

Where applicable the contractor shall include any electrical dangerous work procedure in the H&S Plan

43. PERSONAL PROTECTIVE EQUIPMENT AND CLOTHING

The Principal Contractor shall ensure that every employee is issued with, and wears SABS-approved P.P.E. consisting of all PPE identified in the risk assessment

All the contractors' employees shall wear full length overalls and shall wear identification with respect to the employer.

All employees performing construction work shall wear steel-capped safety boots and a hard hat

Hard hats used by employees working with a fall risk shall have adequate chin-strap

Employees working in the vicinity of mobile plant and construction vehicles shall wear a reflective vest; reflective stripes on overall do not meet the required visibility shall not suffice

The use of respiratory protective equipment shall be defined in the site risk assessment and validated at the hand of hygiene measurements of airborne pollutants for the specific risk

The H&S Plan shall contain an outline of the PPE to be used and the management of such PPE on site including the issuing of PPE, overnight storage, and all disposal of PPE.

Failure to use protective equipment as per the risk assessment shall require disciplinary intervention and this process shall be documented in the induction

Disposal of PPE must conform to the Environmental Regulations.

44. OCCUPATIONAL HEALTH AND SAFETY SIGNAGE

The Principal Contractor shall erect and maintain quality safety signage. The signage shall include but is not limited to:

- The construction work permit number displayed at the entrance
- Access restrictions
- A sign indicating that all visitors must report to the site office and must be accompanied by the Principal Contractor when accessing the site
- The name and telephone number of the responsible person(s)
- Emergency telephone number(s)
- PPE to be worn at the site
- When falling objects may occur, relevant barricading and warning signs must be erected
- Excavations, heights structures, temporary structures and all risk areas must be indicated as per the specific methods defined in the H&S Plan.

45. CONTRACTORS AND SUB-CONTRACTORS

Contractors and sub-contractors must be given a copy of the H&S specification and any additional specification issued by the Client and shall comply with these specifications integrally. All employers working on the site shall conform to the standard in the CHSS. All the duties of the Principal Contractor in this CHSS equally apply, in full, to contractors of such Principal Contractor and to subcontractors of such contractors.

The Principal Contractor shall ensure that all contractors and sub-contractors under his control, plan the construction work in an H&S Plan, approved by the Principal Contractor, such H&S Plan and H&S File shall be in accordance with Annexure A and B respectively prescribed in this document.

Whenever a contractor or sub-contractor's H&S Plan is approved, the Principal Contractor shall communicate with the Agent for acknowledgement of the approval done by the Principal Contractor.

Principal Contractors shall ensure that all sub-contractors comply with their H&S Plans based on all applicable H&S specification, the requirements of the OHS and all relevant legislation.

Regular planned task observations, planned H&S inspections and monthly audits of all contractors and sub-contractors must be recorded and filed in the Principal Contractor's H&S File, for the inspection by the Client Agent

The Principal Contractor shall ensure that the comprehensive and updated list of all the contractors and sub-contractors on site includes:

- A reference to the agreements between the parties, including all contractors Section 37(2) agreements with the Principal Contractor
- The type of work being done
- The date of the approval of the H&S Plan
- The date of expiry of the COIDA certificate of good standing

- The date of the last monthly audit
- The Principal Contractor H&S Plan must include the Principal Contractor's procedures / controls.

46. FALL PROTECTION AND FALL RISK WORK

The construction work includes fall risk work

The Principal Contractor shall submit the name and curriculum vitae of the competent person who has been appointed to prepare the fall protection plan together with the signed letter of appointment in the H&S Plan.

The fall protection plan shall strictly comply with the requirements of the OHSA, and the planning shall be commensurate with the fall risk work.

The fall protection plan shall include all fall risk work which is planned to be performed by contractors or sub-contractors

The Principal Contractor and any sub-contractor shall ensure that:

- All risk work is planned and forms part of the safe task instructions; note that:
 1. Work from a ladder or where ladders are used as access tool are potential exposures of employees to falling, off or into and such work is considered 'heights work'
 2. There is no minimum or maximum height defining fall risk
 3. Fall risk work done on an ad hoc basis of which or which form part of abnormal or emergency processes shall be risk assessed and employees shall be instructed in the safe work process prior to work commencing.
 - Only trained and competent persons with a valid certificate of fitness are permitted to perform fall risk work.
 - All medical certificates for fall risk work are issued by a registered occupational practitioner and are included in the H&S File.
 - Where the use of harnesses is indicated in the fall protection plan, the H&S Plan shall include the following:

The need for the use of fall prevention – or fall arrest harness

The safe application, attachment, and maintenance process for harnesses

The type of harness and the type of hook to be used

The specific attachments point applicable to the fall risk work; any safety attachment shall be risk assessed by a competent person appointed in writing who shall also inspect and finally approve the attachment

The method of storing the harness when not in use

The method and register for the safety inspection and harness.

A fall recovery method statement.

- A method statement shall be included to control the safe placement of sheeting on the roof structure during construction; the number of sheets per pack, the method of strapping packs for lifting and for the placement on site and the attachment of packs to the roof structure in such a manner that inclement weather risk is mitigated.

47. LADDERS

- Ladders shall be compliant to statutory requirements
- Ladders shall only be used for the purpose for which they are designed for.
- Ladders shall be inspected regularly, and the record of the inspection shall be kept in the H&S File
- A-Frame ladders shall have a patent spreader bar system
- Ladders shall extend at least 900mm above any level or opening accessed with a ladder.
- No vertical ladders shall be accessed by any person unless firmly attached at the bottom or top or held in place by a fixed installation or buddy.

48. TEMPORARY WORK

Temporary works designer:

The Principal Contractor shall submit the proof of competency and appointment letter of the competent person(s) appointed as temporary works designer in the H&S Plan.

The temporary works designer shall be competent to design, inspect and approve the erected temporary works on site before use.

The Principal Contractor, the Construction Manager and temporary works designer shall ensure that:

- The temporary works drawing, or any other relevant document includes construction sequences and method statements.
- The temporary works designer has been issued with the latest revision of any relevant structural design drawing.
- The temporary works design and drawing is used only for the intended purpose and for a specific portion of a construction site.
- The temporary works drawings are approved by the temporary works designer before the erection of any temporary works
- The temporary works design and drawing are used solely for this intended purpose.

Temporary works supervisor:

The Principal Contractor shall submit the proof of competency and appointment letter of the competent person(s) appointed as temporary works supervisor in the H&S Plan.

The temporary works supervisor shall supervise all temporary works operations and shall ensure that all equipment used in temporary works structure are carefully examined and checked for suitability before being used.

The Principal Contractor shall define risk controls in the H&S Plan which ensure:

- That a team of competent persons adequately erect, support brace and maintain all temporary works structures, the H&S Plan shall contain the evidence that all persons required to erect, move or dismantle temporary works structures are provided with adequate training and instruction to perform these operations safely.
- That all temporary works structures are capable of supporting all anticipated vertical and lateral loads that may be applied to them and that no loads are imposed onto the structure that the structure is not designed to withstand, this includes the requirement that the foundation conditions are suitable to withstand the loads caused by the temporary works structure and any imposed load in accordance with the temporary works design.
- That all temporary works structures are done with close reference to the structural design drawings.
- That where any uncertainty exists, the services of a structural designer are available, and that consultation and advice is acquired prior to risk work performed.
- That all erected temporary work structures are inspected and approved by the temporary works designer before use.
- That all temporary work structures are inspected by the temporary works supervisor immediately before, during and after the placement of concrete, after inclement weather or any other imposed load and at least on a daily basis until the temporary works structure has been removed, the inspector must be appointed in writing and proof of competency must be included in the H&S Plan. The register documenting the results of the inspection must be placed in the H&S File
- That no person cast concrete or place a load on a temporary work structure until authorization in writing has been given by the designer
- That after casting concrete the temporary structure is left in place until the concrete has acquired sufficient strength to safely support its own weight and any imposed load and is not removed until authorization in writing has been given by the temporary works supervisor.
- That any non-conformity identified during work with temporary works structures is prevented and corrected
- Safe use of solvents or oils or any other similar substances are used in temporary works operations (see also hazardous chemical substances)
- That access to temporary work structure is solely by means of secured ladders or staircases for all work to be carried out above the foundation bearing level and fall prevention structures must be erected preventing persons from falling off the temporary work structure during erection and dismantling, during the casting of concrete, during inspection and during any work performed on the top of the structure after casting. Where no fall prevention can be secured, a fall arrest system shall be included in the design and shall be always complied with.

49. EXCAVATION AND PILING WORK

- The letter of appointment and proof of competency of the competent excavation supervisors and inspectors shall be placed in the H&S Plan.
- A template of the inspection registers must be placed in the start-up H&S File
- The Principal Contractor shall take cognisance of the geotechnical study pertaining to the conditions of the construction site and must plan all excavation work in accordance with the recommendations of the professional engineer.
- The Principal Contractor must ensure that every excavation, including all bracing and shoring, is inspected daily, prior to the commencement of each shift and that no person enters the excavation or works in a risk zone until the excavation is assessed and declared safe.
- All excavations must be left open for the minimum of time required and those that are left open on the site must be protected by a barrier or a fence of at least one meter in height as close to the excavation as is practicable. The protective barrier or fence must adequately prevent persons from falling into the excavation and barrier taping is not sufficient for this purpose
- Excavation shoring and bracing, if required shall be designed by a designer appointed in writing who shall inspect and approve the installed shoring and bracing
- Where persons work, inspect or test excavations, warning signs must be in place next to an excavation
- The risk controls for ensuring excavation safety, including working inside and around excavations must be documented in the H&S Plan.

Piling Works

The Principal Contractor shall ensure where piling is required that the works undertaken by a specialist contractor.

A works risk assessment and safe works procedure must be approved by Principal Contractor evidence of such approval must be shared with the Agent before works commences.

50. SCAFFOLDING

The Principal Contractor shall submit the appointment letter and proof of competency of the competent persons appointed as:

- Scaffold designer
- Scaffold erectors
- Competent person to inspect, maintain, move or dismantle scaffolds • Competent persons to supervise all scaffolding operations.

The H&S Plan must include the signed letters of appointment and the proof of competency.

The Principal Contractor shall ensure that all scaffolding complies with the requirements of the OHSA and Regulations and with the requirements of Temporary Works in the CHSS.

Scaffold erectors and inspectors must be formally trained, and certified competent such training must conform to the requirements of SANS 10085

Scaffolds must be clearly tagged with safe access signage; scaffolds must be inspected daily prior to use and weekly by the scaffold inspector. All scaffolds on site must be individually identified and display a safe / not safe sign.

Inspections by the scaffold inspector must be documented on the scaffold tag and in a register; a template of the tag and of the register shall be included in the H&S Plan

All scaffolds must be accessed with a ladder only. Ladders must be inside the scaffolds and hatches must be close ladder – openings in decks

All scaffold decks must be fully covered and barricaded so as to prevent persons working there from falling off.

Scaffold erectors must attach a fall prevention harness at all times; the double lanyards must be fitted with scaffold hooks only

The H&S Plan shall include the safe work instructions applicable to all employees working on scaffolds and the method of ensuring competency

Standard scaffolding designs, approved by a competent designer of the Principal Contractor may be included in the H&S Plan and all such scaffolds must conform to this standard.

51. PUBLIC HEALTH AND SAFETY

The site shall always be secured to prevent the unauthorized access of persons to construction risk areas and processes taking in consideration the -----proposed alignment

Appropriate health and safety signage shall be posted and access control to site must be exercised via a single access point.

All members entering the site must indicate in what capacity they are visiting the site.

The access point must be designed and constructed to allow for temporary parking, entry of construction vehicles, entry of personnel transport vehicles and entry of individual workers and other persons.

The principal Contractor shall ensure that each person visiting the site shall be inducted to the site and such abridged induction shall outline the hazards from on-site activities and the precautions to be observed to avoid or minimize those risks

Visitors must only enter when accompanied by a responsible person designated by the Principal Contractor.

52. NIGHT WEEK – END WORK AND FATIGUE

No night or weekend work shall be performed unless authorized by the Principal Agent or Lead Engineers

Where weekend work is planned the Principal Contractor shall ensure that its construction supervisor is on site, this applies even if only contractors or sub-contractors are working on the site

Where weekend work is planned each contractor or sub-contractor shall ensure that its construction supervisor is on site, this applies even if the Principal Contractor's manager or supervisor is on the site.

The site risk assessment shall include a fatigue risk assessment. Abnormal working hours shall be included in the risk assessment. A fatigue management procedure shall be defined in the H&S Plan

53. FACILITIES FOR EMPLOYEES

The Principal Contractor shall document the construction site's method to ensure the statutory application of employee's rights in terms of employee facilities as defined in the OHSA, the General Safety Regulations and the Construction Regulations including:

- The provision of facilities for safekeeping and changing.
- The method of ensuring that employees require changing on site can do so in privacy
- The provision of an eating area
- Construction Health and Safety Specification Page 55
- The provision and maintenance of sufficient toilets on site
- Drinking water
- Contractor's toilets must be:
 - Fixed so as to avoid being blown over by strong winds
 - Signs posted "Male" and "Female" use
 - Sanitised daily, an inspection and sanitising record must be kept in the H&S File
 - Inspected daily and where bucket collections are in place, emptied at least twice a week and one of these occasions must be on Fridays.

54. CRANES AND LIFTING OPERATIONS

The following shall be applied to any crane used on the site, including truck mounted cranes on delivery vehicles:

Each shall have (in the cab or operating are) the following legal documents on site at all times:

- The latest and up-to-date load certificate of the crane
- A record of the 6 monthly inspection of the crane by a registered inspector • The crane operator(s) current crane licence

- The crane operator(s) medical certificate of fitness, issued by an occupational medical practitioner
- The inspection registers or certification of 3 monthly inspections of all lifting equipment used with the crane.

Where applicable, the H&S Plan shall include the method statement for each erection, maintenance, inspection and dismantling of the crane.

The H&S Plan shall include the method statement for safe use of the crane, including the method of communication, the protection of fall zones and the method of determining whether the weather permits safe crane work.

Any fixed crane's load test certificate shall be included in the H&S File

All lifting equipment and gear used on site shall be identified, SWL-indicated, and listed in the register contained in the H&S File

A template inspection register of the lifting gear shall be included in the H&S Plan

The H&S Plan shall include a specific method statement listing the planned lifts and the planned methods of attachment and rigging

Where man-lift equipment is used, the Principal Contractor shall ensure compliance with Driven Machinery Regulation 18 and that competent persons are appointed in writing to ensure:

- That all scissors' lifts, cherry pickers, forklift with man- cage or any other lifting machine used to lift personnel are used only by a trained and competent operator in possession of a competency certificate issued by an accredited provider who holds a valid accreditation issued by an authorised body, in terms of the SAQA Act, and is approved by the Chief Inspector in terms of the Driven Machinery Regulation 18
- That all lifting machines are load tested and inspected as required in the Driven Machinery Regulation 18 and that the records thereof are either with the machine or in the Principal Contractor's H&S File.

The Principal Contractor shall ensure that deliveries using cranes comply with the above requirements and that all legal documents are kept in the cab of the delivery truck whilst on the Client's site.

Complex lifting or heavy lifts may require a documented lifting plan.

55. STORAGE AND USE OF FLAMMABLE LIQUIDS

No flammable substances must be stored on site unless these are stored in a flammable store or cabinet approved by the Municipal Chief Fire Officer, no other materials shall be stored in the flammable store or cabinet

Where required the H&S Plan shall include a method statement detailing the safe use, storage, decanting and spill controls for all flammable liquids used and stored on site.

56. HAZARDOUS CHEMICAL SUBSTANCE

With respect to hazardous chemical substances used, the contractor shall ensure that:

- All MSDS are included in the H&S File

- A HCS risk assessment is included in the H&S Plan
- The safe use, storage, emergency procedures and safe disposal of hazardous substances are addressed in a method statement(s) included in the H&S Plan.
- Proof of competency and signed letters of appointment of the person responsible for chemical handling is included in the H&S File.

Any hazardous chemical substance intended to be applied on site during the project (i.e. after approval of the H&S Plan) shall be subject to an issue-based risk assessment and method statement which must be presented to the Client Agent prior to the substance being introduced on site.

57. BATCHING AND CONCRETE WORKS

If batching occurs on site:

- The Principal Contractor must appoint a competent bulk mixing plant supervisor in writing
- A bulk mixing plant operator must be appointed, and no other person(s) may operate the plant.
- The Principal Contractor must ensure that the machinery and plant comply with the legal requirements and is suitable for the application on the construction site
- The bulk mixing plants installation, maintenance, and repair record document on site at all times
- The bulk mixing plant procedure is included in the H&S Plan and the relevant documents to be used are placed in the start-up H&S File.

58. EXPLOSIVE FASTENING DEVICE

The principal Contractor shall submit proof of competency and the appointment letter of the person in charge of explosives actuating fastening devices and of the person in charge of the issuing and collection of cartridges and nails. This shall be placed in the H&S Plan.

The H&S Plan shall include the method statement for the safe use of explosives actuating fastening devices including the type of PPE, barricading and warning notice which the Contractor intends to use and the method of accounting for cartridges and nails.

The H&S Plan shall include proof of training and competency of all operators using explosive actuating fastening devices.

A template inspection register of explosive actuating fastening device shall be included in the H&S Plan.

A template record for the issuing and collection of cartridges and nails shall be included in the H&S Plan.

For the purpose of acquisition / transport of the cartridges the Principal Contractor is required to hold a permit in terms of the Explosive's Act. This permit for the transportation of Blank cartridges used in Power-Actuated Tools shall be placed in the H&S Plan:

- Application for registration, licenses and permits must be submitted by the Chief Inspectors Office in Pretoria.
- The Principal Contractor is required to be in possession of a continuous transport license but is not required in terms of the Explosives Act to hold a permit for the use of the blank cartridges.
- Once the cartridges are delivered to the appointed responsible person is then required to ensure that the Regulations governing the safe use of explosive powered tools in terms of the Construction Regulation 21 of the Occupational Health and Safety Act, Act 85 of 1993 are complied with.

59. HOUSEKEEPING AND WASTE MANAGEMENT, STACKING, STORAGE AND DROP ZONE

The Principal Contractor shall appoint a person responsible for general housekeeping and stacking and storage of materials and equipment on the entire site.

A method statement of the safe management of the drop zone shall be included in the H&S Plan.

A method statement for the safe lowering of materials shall be included in the H&S Plan

All devices of building materials shall be controlled by the appointed person and no haphazard storage shall occur among other specific storage plans shall be in place for.

- The safe storage of bulk imported materials and containers and the management of this area
- The safe storage of bricks, blocks and kerbs, no pallets shall be stocked on top of each other.
- The safe placement of reinforcing steel and roofing-ceiling and cladding materials
- The safe placement of scaffolding and temporary work materials

The Principal Contractor shall appoint a person responsible for site –wide control and removal of scrap, waste and debris.

No hazardous waste, combustible materials and containers shall accumulate on the construction site.

The Principal Contractor shall document a waste management method statement in the H&S Plan. Such method statement shall include all liquid, gaseous or solid waste produced during the construction process

Waste management must comply with Environmental legislation

All waste skips removed from the site must be recorded and proof of final deposit at a registered waste site (waste disposal certificate) must be on record in the H&S File.

Waste bins for domestic waste must

- Be placed in all eating areas

- Have a functional lid, which prevents windblown dust and entry by monkeys
- Be emptied daily.

60. CONFINED SPACE

All confined space work to be performed in accordance with the approved safe work procedure and risk assessment in addition to confined space work measures provision must also be made for safe access into / from confined spaces as well as access inside confined spaces e.g., pipes on steep slopes

The Principal Contractor to ensure all confined space entry and works performed in such be in compliance with legislative requirements defined in General Safety Regulations that form part of the OHS Act.

61. CLIENT OH&S RISK ASSESSMENT

The Client has identified the construction risk associated with the proposed construction projects and defined this corresponding H&S specification which defines the standard of H&S controls. It's therefore important to be advised that over and above the standard H&S controls identified in this specification the contractor must ensure all applicable legislated requirements must be implemented and adhered to.

62. OCCUPATIONAL HEALTH.

The H&S Plan shall include:

- The Occupational Hygiene surveys which are planned because of the baseline risk assessment if required
- All medical certificates of fitness for all employees working on the site.
- All placements of medical surveillance records of employees who are or required to be under medical surveillance, the record may be the latest periodical medical examination report.

The standard for the Occupational medical testing is defined hereunder:

- Medical certificates of fitness issued by a registered occupational medicine practitioner are defined valid.
- The H&S Plan shall include the name and proof of registration of the Occupational medicine practitioner appointed by the Principal Contractor to perform the medical examinations
- The Principal Contractor and every contractor shall ensure that a Person – Job – Specification is issued for each job title deployed on the construction site
- Where employees have current medical certificate of fitness at the start of construction, those shall be assessed for compliance by the Agent for approval...

63. ACCESS, TRAFFIC MANAGEMENT AND CAMP SITE

All employees of all contractors working at the construction site shall access the site in vehicles which have seats firmly secured and adequate for the number of employees to be transported this

means personnel may be transported in the load body of a LDV or a truck and that all construction personnel must be brought to site in a bus, taxi or inside the cab of a vehicle.

No employee shall be transported together with goods or tools.

Each vehicle shall always have a serviced portable fire extinguisher

The Principal Contractor shall ensure that all employees and visitors are aware and comply with the sites safe speed restriction defined by the Principal Contractor at the hand of the risk assessment.

All activities planned to occur in the campsite shall be risk assessed and planned, this includes risk controls for the parking of staff and visitors vehicles parking of mobile plant and machinery dedicated storage areas, planned and compliant stacking practices, traffic controls, including the safe separation of pedestrians (employee) transport from risk areas...

When working in or near the road where change of traffic of flow or warning of motorist is needed in SADC Road Traffic Signs Manual Volume 2 Part 13 must be used, to warn oncoming traffic with the appropriate display of signage. The contractor shall submit a Traffic Management Plan and Pedestrian Control Plan indicating relevant measures for all construction work areas. Such Plan must be approved before any road works may commence. Specific emphasis to be placed on vehicle as well as pedestrian traffic signage.

Prior to commencement of road works the contractor shall have all the required road traffic warning signage available as stipulated in his approved Traffic Management Plan. Such measures shall also include warning signage, reflectors, and signals at night. Where needed water filled yellow Jersey Barriers / steel barriers or concrete shall be used. Where required flag person(s) to be trained and appointed. The implementation of the Traffic Management Plan must be monitored continuously, and daily inspections need to be carried out by a competent appointed person.

64. IONIZING RADIATION

Where ionizing radiation (isotopes or electrically produced x rays) is deployed on site the Principal Contractor shall ensure that the necessary appointments of competent persons and all Department of Health- defined inspections, measurements, tests, and records thereof are on site and filed in the H&S File

Only authorised personnel appointed in writing shall work with ionizing radiation.

A method statement shall be included in the H&S Plan, detailing radiographic testing notifications, permit application and approvals considering the risk associated with works.

65. STAFFING ON SITE

The Principal Contractor shall compile a list of all employees on site indicating:

- Name and ID number

- Designation (job title)
- Date of OHS Induction on site
- Date of expiry of medicals

The employee list shall be included in the start-up H&S File and maintained thereafter.

The H&S Plan shall include a method statement on communication on site this shall address:

- Language and any transition methods
- Communication methods within and between teams (radio controls and permits)
- Emergency communication methods
- Regular planned meeting and communication sessions planned by the Principal Contractor.

ANNEXURE A BASELINE RISK ASSESSMENT

REFER TO THE CLIENT'S BASELINE RISK ASSESSMENT (see attachment)

ANNEXURE B CONTENTS AND NUMBERING OF THE H&S PLAN

1. Index of the H&S Plan
2. Letter of Good Standing with COIDA
3. Principal Contractor's Health and Safety Policy
4. Scope and activities, machinery, plant, equipment, hazardous articles, and selected contractors to be used and hazardous materials and articles used in the project.
5. Project specific baseline hazard identification and risk assessment and risk register
6. Health and Safety Resources and Budget
7. Organisational chart indicating:
 - List of employees
 - List of competent people appointed
 - Signed letters of appointed competent persons
 - Evidence of competency and OHS competency
 - Medical certificates of fitness of all employees' medical surveillance reports of all health risks exposed employees.
8. Construction Manager, duty, responsibility, communication

9. Safety Officer, duty, responsibility, communication

10. Principal Contractor H&S management processes – this must include in the specification

- Management of the issue-based risk assessment, risk review and risk monitoring
- H&S Induction, training, and H&S competency management (including OHS and applicable safe work instruction templates)
- General record keeping management
- Contractor and sub-contractor management
- Construction Health and Safety Specification Page 63
- Site communication management
- Fall protection plan and method statements for height work
- First aid accident and incident and emergency management
- Safety signage management
- Access and on-site traffic and public H&S management
- Excavation management
- Temporary work management
- Scaffolding management
- Electrical management
- Delivery, off- loading, stacking, storage and housekeeping management
- Hazardous chemical substance management
- Construction plant and machinery
- Hired plant and machinery
- Lifting and rigging management
- Concrete works and batching
- Explosive actuating devices
- Occupational hygiene, Occupational Health and fitness for work management
- Employee facilities management
- Internal audit management
- Dust control management
- Waste management
- Radiation control
- Equipment installation
- Confined space entry

ANNEXURE C. CONTENTS AND NUMBERING OF THE H&S FILE

1. Index of the H&S File
2. Work Permit
3. H&S Plan and other applicable management plans
4. Risk assessments, Registers and DSTI Records
5. Risk monitoring and Review records

6. Start up and Organisation charting
 - Updated Project and OHS Organogram

- Signed letters of the appointed competent persons and evidence of competency (Registrations, qualifications and other proof of competency)
 - Employee list
 - Contractor list
 - Medical certificates of fitness
7. Training and competency Matrix and training records
 - H&S Induction records (including HIRA Training)
 - Training and competency records for method statements, operating procedures and safe work instruction
 - Visitor induction records
 8. Monthly statistics
 9. Incident register & investigation reports & COIDA Accident and incident management
 10. H&S inspection and Maintenance Registers
 11. PPE issue Register
 12. Internal audits
 13. Letters of approval of contractors and sub-contractors H&S Plans
 14. Letters of appointments of Contractors and sub-contractors
 15. Signed Section 37(2) agreements
 - Agreement between Client and Principal Contractor
 - Agreement between the Principal Contractor and each contractor or sub-contractor
 16. Audits by Client
 17. Corrective / preventative action plans for Client audits
 18. Occupational hygiene records and reference
 19. Material Safety Data Sheets
 20. Updated COIDA Letter of Good Standing of Principal Contractor
 21. Updated Notification and proof of delivery (if applicable)
 22. Waste manifest
 23. D.O.L AUDITS
 24. H&S management system of principal contractor (if referred in the H&S Plan)

ANNEXURE D CLOSE - OUT REPORT FORMAT REQUIREMENT

The H&S files of the Principal Contractors and all Contractors require closure and handover to the Client at the completion of the project. The following list is an example of what should be included but is not exhaustive.

The OHS Agent or the Client may require further information at the time of completion and the Principal Contractor is to ensure that all instructions are met. Documentation would include all records from the start of the project. Daily or monthly plant inspection records are not required unless they are related to an accident.

All records to be in electronic format and submitted to the OHS Agent for approval in adequately formatted list and folders. Layout should be logical and in the same order as in the site files.

Health and Safety Close-Out file requirements include:

1. Client H&S Specification
2. Principal Contractors OHS Plan
3. Organogram
4. Legal Appointments
5. Notification to Dept. of Labour of Construction work
6. Letter of Good Standing for the Project
7. Full files for all Contractors as well as close-out reports
 - List of Contractors
 - Letters of Approval of Contractors
 - Mandatory Agreement
 - Letters of Good Standing
 - Appointments
8. Incident Records
9. Non-Conformance records
10. Agents Audits
11. Method Statements
12. Risk Assessments
13. Safe Work Procedures
14. Medical Surveillance Certificates

ANNEXURE E: CONTRACTORS MONTHLY HEALTH AND SAFETY REPORT REQUIREMENTS

To be submitted by the end of the first week of each month

Contract Number	Project Name	Contract Details
1. General activities for the month Detail each work activity		
2. Number of workers Permanent, local contractors		
3. Training done Type, number of people		
4. Incidents / Accidents List number, detail attach reports		
5. Non-Conformances Closed out or active		
6. Contractors Approval status, lists		
7. Audits completed Internal / External		
8. Critical issues		
9. General		

H& Officer ----- Signature----- Date----- H&S

Agent ----- Signature----- Date-----

ANNEXURE F : DEFECT AND LIABILITY PERIOD

The H&S Files are to be kept “live” for the defect liability period by the Principal Contractor, including those of their Contractors. Any work required during the defect and liability period will require an assessment of the H&S File by the OH&S Agent prior to any work commencing.

ANNEXURE G: PERMIT REQUIREMENT

To be completed by the Client

Annexure 1 Const. Reg. 3 (2)

ANNEXURE 1

APPLICATION FOR A PERMIT TO DO CONSTRUCTION WORK

[In terms of Regulation 3(2) of Construction Regulations, 2014]

This application must be submitted with the following documents:

1. Health and Safety Specification.
2. Health and Safety Plan.
3. Baseline Risk Assessment.

1. Name, postal address and telephone numbers of the client:

2. Details of the Agent:

a. Title, Surname and Initials:

b. Identity number / Passport number:

c. Registration number with SACPCMP:

d. Office Tel. number and/or Mobile number:

e. Postal address:

3. Name, postal address and telephone numbers of the appointed principal contractor:

4. Name, postal address and telephone numbers of designer of the project:

5. Name, postal address and telephone numbers of the following persons:

a. Construction Manager:

b. Construction Health and Safety Manager:

c. Construction Health and Safety Officer:

6. Exact physical address of the construction and the site office:

ETHEKWINI MUNICIPALITY
Occupational Health & Safety Unit

BASELINE RISK ASSESSMENT


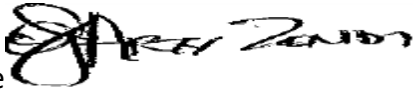
Document Title	BRA 232.02.24 Site Specific Health and Safety Specification
Client	eThekwini Municipality Road Provision
Project Name	Rehabilitation of various roads located in the Western Region of eThekwini Municipality as and when required for a period of 36 months
Contract Number	1R-28004
Date	06/02/2024
Compiled by:	Name: Siziwe Chiliza  signature
Approved BY:	Name: Arty Zondi  signature

TABLE OF CONTENTS (refer to Baseline Risk Assessment attached)

Site Establishment

Access to the site

Traffic accommodation

Material delivery to the site

Excavation Earth

works

Driving / operating of construction vehicles and mobile plant

Workplace environment

Public safety

Safety / Security / Emergency Preparedness

Community Management

Sub Contractor Management

Construction activities

Risk Profile

TIT LE

This contract is intended to cover the rehabilitation of the eThekweni Municipality's road network.

The roads subjected to the rehabilitation works are located within the eThekweni Municipal boundary, specifically in the Western Region.

EXECUTIVE SUMMARY

The Occupational Health and Safety Act of 1993, and Its relevant regulations require employers to conduct a Baseline Risk Assessment prior to the work being performed.

This assessment and observations were made at the above site under the conditions which prevailed on the date of the assessment. Detailed conclusions are given in the relevant sections of this report.

SCOPE OF WORK

“Surfacing Works” - Projects which include the construction of new pavement layers which are all asphalt layers, or layers which may be described as bituminous surfacing such as slurries, single seals, microsurfacing etc. shall be classified under “Surfacing Works”.

“Recycling Works” - Projects which include construction of BSM (Bitumen Stabilized Material) layers shall be classified under “Recycling Works”. This category shall include both in-situ recycling and in-plant recycling. This category shall also include cement or lime stabilization of pavement layers, and the construction of asphalt layers.

“Granular Works” - Projects which include the construction of new granular pavement layers above the formation level (i.e., Base and/or Subbase) shall be classified under “Granular Works”. These works shall include construction of layers using both virgin

materials and reuse of existing granular materials. This category shall also include the construction of BSM layers and asphalt layers.

“Subgrade Improvement Works” - Projects which include improvements/re-construction of the subgrade layers below the formation level of the pavement shall be classified under “Subgrade Improvement Works”. This shall only be applicable to projects where greater than 25% of the length of the road requires subgrade improvements. These works shall also involve reconstruction of the layers above formation and the construction of all types of layers shall be covered by this category of rehabilitation.

“Ancillary Works” - Projects where the scope of works is not rehabilitation of pavement layers shall be classified under “Ancillary Works”. Examples of the projects this category is intended to cover include raising/lowering of services, construction/re-construction of sidewalks, laying of kerbs or kerb & channel or asphalt haunching, repairs or reconstruction of sidewalks and laying of sub-soil drains.

The construction works will consist of large bulk earthworks, extension of culverts, pavement layer works, formal drainage, and sidewalks.

The Project consists of the following elements buy not limited to:

BASELINE RISK ASSESSMENT

- 1. INTRODUCTION:** In accordance with the Occupational Health and Safety Act, (Act 85 of 1993) the Legislator places specific requirements on an Employer. One of these is prescribed in Section 8(i) of the Act where it requires the Employer to ascertain the risks and dangers which may occur within the workplace or section of the workplace and then goes on to establish working procedures or practices.
- 2. PURPOSE:** This is conducted to create a benchmark of the potential risks that apply to the whole project or business operation.
- 3. SCOPE:** This assessment could be approached on a site, regional or national level concerning any facet of the business operation or process or activity.

4. ABBREVIATIONS, ACRONYMS AND DEFINITIONS

ABBREVIATION, ACRONYM OR DEFINITION	MEANING
Risk	Uncertain future events that can influence the achievement of the company's objective. Chance of loss
Exposure	Is a condition or practice which involves the employee being subjected to the Hazard or Danger while being normally unprotected
Likelihood or Probability	(inevitable to almost impossible) the Frequency of the exposure (constant to rarely) being one of the parameters
Consequence or Severity	This could be either having a financial, injury and or illness outcome

Risk Ranking	There are three stages namely: IDETIFYING the RISK: - in terms of the hazard, threats EVALUATING: - the hazard, threats and or exposures identified to establish the potential magnitude of the RISK involved VALUE JUDGEMENT or APPRAISING: - the acceptability and potential impact as well as the magnitude of the hazards, exposure and evaluating the outcome on the business, operations and or the health and safety of people and processes
Risk Rating	Equals = Severity + Frequency + Exposure
Baseline Risk Assessment	This is conducted to create a benchmark of the potential risks that apply to the whole project or business operation.
Issue based	This is normally focused at operational activities, processes, systems and functions and focuses on identifying the risks within a certain task, process or activity
Continuous Risk Assessment	The processes, systems and activities monitored on an ongoing basis
Hazard	A chemical, physical, social, or political condition that has the potential of causing damage or any kind of harm to people, property the environment or business continuity.
OHS Act	Occupational Health and Safety Act, Act 85 of 1993
Task based Risk Assessment	The appointed Contractor develops a Risk Assessment based on the Clients Baseline and project specific activities
Severity / Consequence	The degree of harm, the potential severity of the injuries or ill health and or the number of people potentially affected
Exposure	Chance that a person or persons will be harmed during the exposure period
Frequency	A measure of the rate of occurrence of an event expressed as the number of occurrences in a given time.

ABREVIATION, ACRONYMN OR DEFINITION	MEANING
Frequency	A measure of the rate of occurrence of an event expressed as the number of occurrences in a given time.
Intolerable Risk	Risk is intolerable and cannot be justified on any grounds
Significant Risk	Risk in which benefit outweighs cost
Moderate Risk	Risk is if cost of reduction would exceed improvement
Tolerable Risk	A Risk that has been reduced to a level that can be endured by the organization having regard to its legal obligations and its own Safety and Health Policy
Residual Risk	The risk that remains after taking into account the effect of the existing controls that have been applied

5. REFERENCE DOCUMENT

<p>Occupational Health and Safety Act, Act 85 of 1993</p> <p>Environmental Act</p> <p>Construction Regulations 2014</p> <p>(Geotech Report -</p>	
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5. RISK ASSESSMENT METHODOLOGY

All Risk identified during Risk Identification has to be assessed for significance in terms of probability of the Risk event to occur and the impact of the event.

Ranking of the Risk can be based on a simple scale ranging from:

- Very likely to almost certainly
- Actual numerical probabilities can be used
- Risk that are ranking High receives highest priority

The approach and process:

1. Identify the risk / hazards associated with the work activities
2. Assess the risk in terms of severity, likelihood of occurring and controllability
3. Evaluate the risks / hazards
4. Determine the level of control
5. Implement controls
6. Monitor the effectiveness of controls

7. RISK ESTIMATION AND EVALUATION

RISK CLASSIFICATION USING A RISK SCORE TECHNIQUE

Exposure (E) How frequently does the hazardous event occur		Risk classification
Continuously		10
Frequently (daily)		6
Occasionally (weekly)		3
Unusually (monthly)		2
Rarely (few a year)		1

Probability (P) The probability of a loss when the hazardous event does occur		Risk classification
Frequent (happens often)		10
Probable (quite possible)		6
Occasional (unusual, but possible)		3
Remotely possible (has happened somewhere)		1
Improbable (practically impossible)		0.5

Severity (S) Consequences of the hazardous event		Risk classification
Catastrophic many fatalities; or interruption of longer than 2 weeks; or asset or environmental damage (or both) exceeding R100m		100
Disaster (few fatalities; or interruption between one and 2 weeks; or asset or environmental damage (or both) exceeding R10m)		40
Very serious (one fatality; or interruption of 6 days; or asset or environmental damage (or both) exceeding R100,000		7
Important (temporary disability; or interruption between 6 and 24 hours; or damage exceeding R10,000		3
Noticeable (first aid needed; or interruption of less than 6 hours; damage exceeding R1000)		1

Risk classification (Risk score = E x P x S)		
Risk score	Risk classification	
Over 400-----5	Very high risk – discontinue operation or activity	
200 to 400 ----- 4	High risk – immediate correction needed	
70 to 200----- 3	Substantial risk – correction needed	
20 to 70----- 2	Possible risk – attention needed Under	
20 ----- 1	Risk accepted	

5	
4	
3	
2	
1	

ETHEKWINI MUNICIPALITY
Occupational Health & Safety Unit



Rehabilitation of various roads located in the Western region of eThekweni Municipality as and when required for the period of 36 months 1R-28004

BASELINE RISK ASSESSMENT WORKSHEET: IDENTIFYING EXISTING & POTENTIAL RISKS

WORK PROCESS CATEGORY: SITE ESTABLISHMENT

RISK REF	ACTIVITY	POTENTIAL HAZARD	RISK	RISK EVALUATION			RISK SCORE ExpPXS	RISK LEVEL	RISK RANK	CONTROL MEASURE
				E	P	S				
1	Erecting / Placement of temporary offices	Incorrect off loading/ handling Crane truck overturning while off loading	Injury to people, damage to material and property	6	6	7	252	High	4	Competent person with specific knowledge and experience designated to supervise offloading and placement of temporary offices
2	Ablutions for male / females	Inadequate Welfare Facilities Inadequate or insufficient Toilet Facilities	Inadequate or insufficient Ablution Facilities may result in employees using areas not designated for the use thereof Unhygienic condition	6	6	3	108	Substantial Risk	3	CR 28 1 per30 NBR prescribe chemical toilets for construction site. Sufficient showers and changing facilities for both male and female

3	Sheltered eating facilities	Unsafe positioning of ablution and sheltered eating areas	Unsafe positioning of ablutions and sheltered	6	6	7	252	High	4	Refuse bins with lids provided. Facilities clean and hygienic
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			eating areas may result in vehicles veering of the road and into the facilities and resulting in critical injuries							
4	Maintenance workshop Secure / safe storage of materials / plant and equipment	Incorrect stacking of parts and spares could cause tripping hazards	Slips, trips and falls	6	6	3	108	Substantial Risk	3	Adequately ventilated ignition free Emergency shower / eye wash provided
5	Clearing of the site area	Snakes Common venomous snakes in KZN i.e. Black Mamba, Puff Adder, Boom Slang, Green Mamba	The presence of snakes may result in snake bites causing fatalities	6	6	7	252	High	4	The Contract Manager must ensure that a snake standard or procedure is developed and implemented. The Construction Manager must embark on a snake/venomous animal's awareness training programme
6	Site clearing using Earthmoving equipment/ machinery	Protected vegetation	Damage to protected vegetation could result in damage to the ecosystem	6	6	3	108	Substantial Risk	3	The Contract Manager must ensure that protected vegetation is clearly demarcated and the Environmental Plan is adhered to

7	The storage /usage of flammable liquid/gasses and combustible materials	The incorrect storage of flammable liquids/gasses and combustible materials	The incorrect storage could lead to Environmental spillages	6	6	3	54	Substantial Risk	3	The Construction Manager must ensure that they adhere to the Client H&S Specification with regards to
										combustible substances.
8	Vehicle leaving / entering the site	Traffic disruption, injury to people	Damage to property	6	6	3	108	Substantial Risk	3	Competent operators/ drivers, use of flag person
9	Unsafe stacking and storage practices	Collapse of stored materials	Collapse of stored materials may result in injury of personnel	6	6	3	108	Substantial Risk	3	The Construction Manager must ensure that they adhere to stacking and storage principles as contained in the General Safety Regulations
10	Installation of Temporary Electrical Installations	Exposed Electrical Cables/ Wires	Contact with exposed electrical cables may result in electrocution	6	6	7	252	High	4	CoC, appointments, registers, competent person
11	Housekeeping	Slips, trips and falls	Tripping and falling on superfluous materials can cause cuts on hands, injury to feet	6	6	3	108	Substantial Risk	3	The Construction Manager must ensure that waste is removed periodically and work areas kept clean at all times
11	Security fencing	Access to unauthorized persons	Injury to persons	6	6	3	108	Substantial Risk	3	Construction manager to put system of control in place . No unauthorized entry signs to be posted and access controlled

12	<p>Essential emergency equipment</p> <ul style="list-style-type: none"> • Fire fighting equipment • First Aid Boxes • Drinking water 	Not having the essential services on hand	Health / loss of property through fire	6	6	3	108	Substantial Risk	3	Construction manager to ensure these requirements are on site from the day site is established
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BASELINE RISK ASSESSMENT WORKSHEET: IDENTIFYING EXISTING & POTENTIAL RISKS

WORK PROCESS CATEGORY: **ACCESS TO THE SITE**

RISK REF	ACTIVITY	POTENTIAL HAZARD	RISK	RISK EVALUATION			RISK SCORE ExPxS	RISK LEVEL	RISK RANK	CONTROL MEASURE
				E	P	S				
13	Accessing the site using construction vehicles	Transportation of staff to and from the site	Construction vehicles could crash into other vehicles / buildings resulting in damage to equipment or employees being injured	6	6	7	252	High	4	The Contract Manager must develop a Driving Policy which incorporates the use of cell phones whilst driving and adherence to speed limits. The Contract Manager must ensure all construction vehicles and staff comply to CR23
14		Pot holes/Speed humps	Construction trucks could crash into other vehicles resulting in damage to equipment	6	6	3	108	Substantial Risk	3	The Construction Manager must ensure that waste is removed periodically and work areas kept clean at all times
15	Accessing uneven topography or surfaces	Machinery overturning	Employees slipping and falling. Machinery / tools rolling down embankment out of control	6	6	7	252	High Risk	4	Contract Manager must compile a site specific risk assessment for the various site locations and develop a safe

										work procedure from these
16	Delivering of equipment to the site	Pedestrian /children using public road	Vehicles/trucks could crash into pedestrians walking along the roadside resulting in critical injuries or fatalities	6	6	7	252	High Risk	4	Contract Manager to ensure the truck is deemed roadworthy. Ensure the Environmental Management Plan is adhered to and the vehicle is equipped with a spill control kit.
17		Oil or petrol spill	Oil and petrol spill could cause ground contamination	6	6	1	36	Possible Risk	2	Contract Manager to ensure the truck is deemed roadworthy. Ensure the Environmental Management Plan is adhered to and the vehicle is equipped with a spill control kit.
18	Site Induction	Injuries due to persons not familiar to the site	Property damage Sustainable injuries	3	6	3	108	Substantial Risk	3	

		Roads blocked off due to community protest	Construction trucks and vehicles could crash into barricades resulting in damage to equipment or severe injuries	6	6	7	252	High Risk	4	The Contract Manager must ensure that close communication is kept with the local authorities and the appointed Community Liaison Officer to ensure that all personnel accessing the site
										are timeously alerted.

BASELINE RISK ASSESSMENT WORKSHEET: IDENTIFYING EXISTING & POTENTIAL RISKS

WORK PROCESS CATEGORY: **TRAFFIC ACCOMODATION**

RISK REF	ACTIVITY	POTENTIAL HAZARD	RISK	RISK EVALUATION			RISK SCORE ExPxS	RISK LEVEL	RISK RANK	CONTROL MEASURE
				E	P	S				
19	Setting up of temporary road works signage	Placing of incorrect signage at locations	Misinformation may cause drivers to become unable to discern what to do resulting in accidents and irate members of the public	6	6	3	108	Substantial Risk	3	The Contract Manager must ensure that a suitable site specific Traffic Management Plan is developed and implemented and a competent Traffic Safety Officer is appointed for the duration of the contract. All temporary road traffic signage must comply with the SARTSM
20		Handling and placement of signage without wearing the correct PPE	Handling of signage without gloves, reflective vests	3	3	1	9	Risk Accepted	1	The Contract Manager must ensure that a task specific risk
				and safety boots may result in injuries						

21	Public vehicular and pedestrian traffic travelling on the public road during construction work	Workers injured by passing traffic	Collision of public vehicles and workers	10	6	7	420	Very High	5	The Contract Manager must ensure that a competent Traffic Safety Officer is appointed and a site specific Traffic Management Plan is implemented
22		Limited or no advanced warning area may result in accidents	Collision of public vehicles and workers	6	6	7	252	High	4	The Traffic Safety Officer must ensure that temporary road works signage is laid out as per the SARTSM and approved Traffic Management Plan

BASELINE RISK ASSESSMENT WORKSHEET: IDENTIFYING EXISTING & POTENTIAL RISKS

WORK PROCESS CATEGORY: **MATERIALS DELIVERY TO THE SITE**

RISK REF	ACTIVITY	POTENTIAL HAZARD	RISK	RISK EVALUATION			RISK SCORE ExPxS	RISK LEVEL	RISK RANK	CONTROL MEASURE
				E	P	S				
23	Transporting of material to and from the site	Defective tipper trucks, excavators and front end loaders	The use of defective plant /equipment may result in accidents	6	6	3	108	Substantial Risk	3	The Contract Manager must verify that all Tipper trucks utilized on site has a recent service inspection register in place and is signed off by the relevant Technical Manager
24		incompetent Operators	The use of incompetent operators may result in accidents	6	6	7	252	High	4	The Contract Manager must verify that the Operators are deemed competent to operate the Tippers and are medically fit
25		Reversing into public vehicles or property	Reversing into vehicles and property resulting in damages	6	6	3	108	Substantial Risk	3	The Contract Manager must ensure that each driver is accompanied by a competent banks man and designated safe areas for offloading demarcated

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26		Uneven ground, soft soil,	Damage to plant and equipment as well as crushing injuries or fatalities	6	6	7	252	High	4	The Contract Manager must ensure that each driver is accompanied by a competent banks man when working in high risk areas
27		Steep Gradients	Damage to plant and equipment as well as crushing injuries or fatalities	6	6	7	252	High	4	The Contract Manager must assess steep gradients on foot before plant is moved onto the site to determine if the area is safe before work commences
28	Loading / offloading the truck	Incorrect slings being used	Property damage and serious injury or fatality	6	6	7	252	High	4	Rigging to be done by a trained and competent rigger and the task to be supervised by the supervisor

29	Aggregate / sand and other materials delivered	Uneven ground, soft soil,	Damage to plant and equipment	6	6	3	108	Substantial Risk	3	The Contract Manager must assess steep gradients on foot before plant is moved onto the site to determine if the area is safe
30	Manual handling Ergonomics	Incorrect posture	Back strain Skeletal damage	3	6	3	54	Possible Risk	2	Employees to be trained in the correct lifting technique
31	Mechanical handling	Employee being struck	Serious injury	3	6	3	198	Substantial Risk	3	Constant supervision
32	Lifting / lowering operation	Employee being struck by the load	Serious injury Fatality	10	6	7	420	Very High	5	Rigging to be done by a trained and competent rigger and the task to be supervised by the supervisor

BASELINE RISK ASSESSMENT WORKSHEET: IDENTIFYING EXISTING & POTENTIAL RISKS

WORK PROCESS CATEGORY: **EXCAVATION**

RISK REF	ACTIVITY	POTENTIAL HAZARD	RISK	RISK EVALUATION			RISK SCORE ExPxS	RISK LEVEL	RISK RANK	CONTROL MEASURE
				E	P	S				
33	Ground / soil condition	Soft or unknown type	Cave in / collapse	6	6	7	252	High Risk	4	Request a Geo Tech Report
34	Trenching	Spoil too close to the edge of the excavation	Spoil falling into trench, collapse of trench, injury / fatality	10	6	7	420	Very High	5	Spoil to be kept at equal distance as the actual dept of the trench
35	Shoring	Inadequate shoring	Sides collapsing	10	6	7	420	Very High	5	Daily inspection by excavation supervisor
36	Water in excavation	Sides of excavation not stable	Collapse of excavation resulting in injury / drowning/ fatality	10	6	7	420	Very High	5	Method statement of drainage of excavation Drainage procedure Daily inspections
				10	6	7	420	Very	5	The Construction Manager must

37	Excavation	Open Excavations Falling into	Open excavations could result in employees, or members of the public falling into it Fatality					High		appoint a competent Excavation Supervisor at the work front. Excavations must be checked daily. The Construction Manager must ensure that open excavations (if necessary) are barricaded with a barrier or fence-like structure of at least 1m. (Requirements of CR13 must be met)
38	Manual Excavation	Open Excavation >1.5m	Excavations > 1.5m caving in may result in multiple fatalities	6	6	7	252	High	4	Excavations guarded / barricaded/ lighted after dark in public areas. Soil dumped at least 1m away from the edge of excavation. On sloping ground soil dumped on lower side of excavation. The Construction Manager must ensure that excavations are shored/braced or vertical walls sloped to 45 degrees and the excavation
39		Unauthorized entry	Unauthorized access to site may result in critical injury to people	6	6	7	252	High	4	The Construction Manager must ensure that excavations should be preferably not open beyond

											what can be closed daily
40		The use of Hand tools (picks, spades)	An employee using a pick could strike the employee in front/rear resulting in injury	3	6	3	54	Possible Risk	2	The Construction Manager must ensure that employees are instructed in the contents of the site specific risk assessment	
41		Working in natural elements, sun, rain, glare & wind	Prolonged exposure to extreme high temperatures may result in heat stroke	3	6	3	54	Possible Risk	2	The Construction Manager must ensure that all employees have undergone medical examinations by an Occupational Health Practitioner and the requirements of the Environmental Regulations for Workplaces are adhered to.	
42		Poor Ergonomics	Poor Ergonomics may result in muscular skeletal injuries	3	6	3	54	Possible Risk	2	The Construction Manager must ensure that a SWP is developed implemented and that all employees are instructed in the content of the site specific risk assessment	

43		Snake bite	The presence of snakes may result in snake bites causing fatalities	6	6	7	252	High	4	The Construction Manager must ensure that a snake standard or procedure is developed and implemented on site.
										The Construction Manager must embark on a snake awareness training
44	Mechanical Excavation	The use of Defective Plant	The use of defective plant may result in accidents	6	6	3	108	Substantial Risk	3	The Construction Manager must verify that all plant utilized on site has a recent service inspection register in place and signed off by the relevant technical manager
45		untrained operator	The use of an untrained operator may result in accidents	6	6	7	252	High	4	The Construction Manager must verify that the Operator is deemed competent to operate that specific plant and is medically fit The Safety Officer must take cognizance of the requirements of the Driven Machinery Regulations 2015

46		Public / Contractor interface	Public accessing the work area could result in injuries	6	6	3	108	Substantial Risk	3	The Construction Supervisor must ensure all work are adequately barricaded / cordoned off to prevent member of the public from entering
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BASELINE RISK ASSESSMENT WORKSHEET: IDENTIFYING EXISTING & POTENTIAL RISKS

WORK PROCESS CATEGORY: **EARTHWORKS**

RISK REF	ACTIVITY	POTENTIAL HAZARD	RISK	RISK EVALUATION			RISK SCORE ExPxS	RISK LEVEL	RISK RANK	CONTROL MEASURE
				E	P	S				
47	Layer works	Traffic accidents on site when transporting materials. Reversing of trucks and mobile plant Dust inhalation	Damage to property Respiratory failure	6	6	3	108	Substantial Risk	3	Speed limit to be adhered to Enforced reverse alarms to be fitted Application of dust masks
48	Backfilling	Suitable access and egress in and out of excavations deeper than 1 meter not provided. Collapse of excavation during backfilling operations	Injury to persons Injury to persons Fatality	6	6	7	252	High	4	Competent excavation supervisor to ensure that access is provided, employees informed of requirements Only authorized persons to be in work area, area must be barricaded, hand backfilling mandatory

BASELINE RISK ASSESSMENT WORKSHEET: IDENTIFYING EXISTING & POTENTIAL RISKS

WORK PROCESS CATEGORY: **DRIVING / OPERATING OF CONSTRUCTION VEHICLES AND MOBILE PLANT**

RISK REF	ACTIVITY	POTENTIAL HAZARD	RISK	RISK EVALUATION			RISK SCORE ExPxS	RISK LEVEL	RISK RANK	CONTROL MEASURE
				E	P	S				
49	Trenching machine	Unauthorised opr incompetent person operating the machine	Injury to persons, damage to property	6	6	7	252	High	4	Only competent operator to be appointed
50	Excavator	Unauthorised opr incompetent person operating the machine	Injury to persons, damage to property	6	6	7	252	High	4	Only competent operator to be appointed
51	Bomag roller	Unauthorised opr incompetent person operating the machine	Injury to persons, damage to property	6	6	7	252	High	4	Only competent operator to be appointed
52	Plate compactor	Operator working with plate compactor not trained, running over workers feet	Foot injury and bruises	6	6	7	252	High	4	Only competent operator to be appointed
53	Front end loader	Unauthorised opr incompetent person operating the machine	Injury to persons, damage to property	6	6	7	252	High	4	Only competent operator to be appointed
54	Concrete breaker (Jack hammer)	Noise	Noise Induced hearing Loss	6	6	3	108	Substantial Risk	3	Employee to make use of SABS approved hearing protection ,supervisor to ensure that the correct P.P.E is used

BASELINE RISK ASSESSMENT WORKSHEET: IDENTIFYING EXISTING & POTENTIAL RISKS

WORK PROCESS CATEGORY: **WORKPLACE ENVIRONMENT , HEALTH AND HYGIENE**

RISK REF	ACTIVITY	POTENTIAL HAZARD	RISK	RISK EVALUATION			RISK SCORE ExPxS	RISK LEVEL	RISK RANK	CONTROL MEASURE
				E	P	S				
55	Exposure to noise	Noise	Noise Induced hearing Loss	6	6	3	108	Substantial Risk	3	Employee to make use of SABS approved hearing protection ,supervisor to ensure that the correct P.P.E is used. Task to be supervised by a competent supervisor
56	Exposure to vibration	Vibration	White finger	6	6	3	108	Substantial Risk	3	Supervisor to rotate employees and allow for frequent breaks
57	Protection against dehydration and heat exhaustion	Dehydration/collapse	Health consequences to workers	6	6	3	108	Substantial Risk	3	Measures in place to prevent heat exhaustion in heat stress problem areas
58	Wet / cold condition	Affecting ability to work safely	Injury to workers	6	6	3	108	Substantial Risk	3	Provide rain wear / wellingtons where necessary Provide protection against the cold

59	Hazardous chemical substances	Contact with skin/ eyes Inhalation or indigestion	Skin irritation, burns or infections Could cause loss in eyesight	6	6	3	108	Substa ntial Risk	3	All substances identified and list available. MSD's Substances stored safely
60	Manual handling	Back strain / injury	Injury	6	6	3	108	Substa ntial Risk	3	Corect lifting technique
61	Dust	Inhalation	Respiratory failure	6	6	3	108	Substa ntial Risk	3	Application of dust masks

BASELINE RISK ASSESSMENT WORKSHEET: IDENTIFYING EXISTING & POTENTIAL RISKS

WORK PROCESS CATEGORY: **PUBLIC SAFETY**

RISK REF	ACTIVITY	POTENTIAL HAZARD	RISK	RISK EVALUATION			RISK SCORE ExPxS	RISK LEVEL	RISK RANK	CONTROL MEASURE
				E	P	S				
62	Neighboring business and public exposed to the nature of the construction activities	Emission of HCS, dust and noise	Health risk impact	6	6	3	108	Substantial Risk	3	Communication with neighboring business is critical. Health risk must be communicated to all employees Dust , noise generated out of the construction work must be managed
63	Unauthorised person/s entering the work zone	Unknown to the immediate surroundings	Serious injury Fatality	10	6	7	420	Very High	5	Security to control Contracts manager to ensure no unauthorized person/s to enter the work zone

BASELINE RISK ASSESSMENT WORKSHEET: IDENTIFYING EXISTING & POTENTIAL RISKS

WORK PROCESS CATEGORY: **PUBLIC SAFETY, SECURITY MEASURES AND EMERGENCY PREPARENESS**

RISK REF	ACTIVITY	POTENTIAL HAZARD	RISK	RISK EVALUATION			RISK SCORE ExPxS	RISK LEVEL	RISK RANK	CONTROL MEASURE
				E	P	S				
64	Notices and signs	Appropriate signage not displayed	Person /s not aware of the danger Injury / serious injury	6	6	7	252	High	4	Contract Manager to ensure all danger areas are properly demarcated at all times
65	Emergency Preparedness	No Emergency Plan in place	Person/s unprepared to respond to the emergency at hand	6	6	3	108	Substantial Risk	3	Emergency contact numbers displayed with designated person
66	Emergency Drill & Evacuation	No training No implementation Planning done	Person/s unprepared to respond to the emergency at hand	6	6	3	108	Substantial Risk	3	Adequate number of employees trained in the use of fire equipment
67	Development and implementation of an Emergency Management Plan	Failure to have a basic site specific Emergency Management Plan	Failure to have a basic, site specific Emergency Management Plan may result in injury and damage to property	6	6	3	108	Substantial Risk	3	The Construction Manager must ensure that a site specific Emergency Management Plan is developed for implementation

68		Workers not trained in the Emergency Plan	Workers not trained in the Emergency Plan may result in their inability to respond to Emergencies	6	6	3	108	Substantial Risk	3	The Construction Manager must ensure that those workers are adequately trained and regularly trained to respond to
										Emergencies.
69		Insufficient or no Emergency equipment or personnel	Insufficient or no Emergency equipment or personnel on site may result in Emergencies being critical	6	6	7	252	High	4	The Construction Manager must ensure that a suitable number of employees are appointed to the Emergency Team and that First Aid boxes, First Aiders, Fire Team members and any other equipment as identified during the risk assessment process is on site.

BASELINE RISK ASSESSMENT WORKSHEET: IDENTIFYING EXISTING & POTENTIAL RISKS

WORK PROCESS CATEGORY: **COMMUNITY MANAGEMENT**

RISK REF	ACTIVITY	POTENTIAL HAZARD	RISK	RISK EVALUATION			RISK SCORE ExPxS	RISK LEVEL	RISK RANK	CONTROL MEASURE
				E	P	S				
70	Poor liaison with the CLO	Failure to adequately monitor and manage the multi faced social issues	Failure to manage social issues could result in violent protests and injury to employees	6	6	3	108	Substantial Risk	3	The Construction Manager must ensure that a Community Liaison Officer (CLO) and project steering Committee is appointed to manage social issues
71		Roads blocked off due to community protest	Construction trucks and vehicles could crash into barricades resulting in damage to equipment or severe injuries	6	6	7	252	High	4	The Contract Manager must ensure that close communication is kept with the local authorities and the appointed Community Liaison Officer to ensure that all personnel accessing the site are timeously alerted.

BASELINE RISK ASSESSMENT WORKSHEET: IDENTIFYING EXISTING & POTENTIAL RISKS

WORK PROCESS CATEGORY: **SUB – CONTRACTOR MANAGEMENT**

RISK REF	ACTIVITY	POTENTIAL HAZARD	RISK	RISK EVALUATION			RISK SCORE ExPxS	RISK LEVEL	RISK RANK	CONTROL MEASURE
				E	P	S				
72	No proper management control	Failure to adequately assess Sub Contractors S.H.E Management System before work commences and at regular intervals	Failure to manage Sub Contractors may result in injury and noncompliance to Legislation	6	6	3	108	Substantial Risk	3	The Safety Officer must ensure that the appointed Sub Contractors S.H.E system is audited monthly and on site activities supervised or
										monitored
73	Inadequate supervision	Inadequate Supervision may result in a high level of employee unsafe behaviour		6	6	3	108	Substantial Risk	3	The Construction Manager must ensure that Sub Contractors have adequate competent Supervision on site at all times

74	Utilizing incompetent SubContractors	Utilizing incompetent Sub Contractors may result in accidents		6	6	7	252	High	4	The Construction Manager must be reasonably satisfied that the Sub Contractors intended to be appointed have the necessary competencies and resources to carry out the work safely
75	Utilizing incompetent SubContractors	Utilizing incompetent Sub Contractors may result in damage to the Environment		6	6	7	252	High	4	The Construction Manager must be reasonably satisfied that the Sub Contractors intended to be appointed have the necessary competencies and resources to carry out the work safely

BASELINE RISK ASSESSMENT WORKSHEET: IDENTIFYING EXISTING & POTENTIAL RISKS

WORK PROCESS CATEGORY: **CONSTRUCTION ACTIVITIES**

RISK REF	ACTIVITY	POTENTIAL HAZARD	RISK	RISK EVALUATION			RISK SCORE ExPxS	RISK LEVEL	RISK RANK	CONTROL MEASURE
				E	P	S				
76	Brickwork	Repetitive strain injuries	Poor ergonomics may result in muscular skeletal injuries	6	6	3	108	Substantial Risk	3	The Construction Manager must ensure that a SWP is developed implemented and that all employees are instructed in the content of this SWP.
77	Mixing mortar	Repetitive strain injuries	Loading / unloading material	3	6	3	54	Possible Risk	2	The Construction Manager must ensure that a SWP is developed implemented about safe lifting and loading procedures.
81		Working from height	Working from height may result in falls and critical injuries	6	6	7	252	High	4	The Construction Manager must ensure that all personnel working from height are deemed medically fit by an Occupational Health Practitioner and a Fall Protection Plan developed and implemented

82		Operating of TLB or Excavator in close proximity to workers and	Critical injuries caused by TLB/	6	6	7	252	High	4	The Construction Manager must
		public vehicles	Excavator striking workers or TLB rolling over					Risk		ensure that the TLB/ Excavator Operator utilize a banks man
83		Using TLB for lifting pipes or other material	Critical injuries caused by the TLB or Excavator striking workers or rolling over	6	6	7	252	High Risk	4	The Construction Manager must ensure that the TLB/ Excavator has been modified or designed to be used as lifting equipment and the load test certificates provided.
84		Incorrect use of defective hand tools	The incorrect and or defective hand tools could result in non-disabling/ first aid case i.e. the hand or eyes	6	6	3	108	Substantial Risk	3	The Construction Supervisors must ensure that all hand tools are inspected monthly and recorded in an applicable register with all defective hand tools removed from the site

85		Incorrect use of defective electrical tools	The incorrect and or defective hand tools could result in non-disabling/ first aid case i.e. the hand or eyes	6	6	3	108	Substantial Risk	3	The Construction Supervisors must ensure that all portable electrical tools are inspected monthly and recorded in an applicable register with all defective equipment
										removed from the site
86	Construction of drains	Poor Ergonomics	Poor Ergonomics may result in muscular skeletal injuries	3	6	3	54	Possible Risk	2	The Construction Manager must ensure that workers are trained in the risk of ergonomically injuries and methods to mitigate the risks

BASELINE RISK ASSESSMENT WORKSHEET: IDENTIFYING EXISTING & POTENTIAL RISKS

WORK PROCESS CATEGORY: **CONSTRUCTION ACTIVITIES**

RISK REF	ACTIVITY	POTENTIAL HAZARD	RISK	RISK EVALUATION			RISK SCORE ExPxS	RISK LEVEL	RISK RANK	CONTROL MEASURE
				E	P	S				
87	Pouring Ready Mix concrete	Concrete truck tipping over	Concrete truck tipping over could result in serious injury to the operator and workers close by	6	6	7	252	High	4	The Construction Manager must ensure that safe access to the pouring platform is created before the truck arrives on the site
88	Steel fixing	Handling Reinforced steel	Steel fixers handling steel could result in cuts or puncture wounds	2	6	3	54	Possible Risk	2	The Construction Manager must ensure that only trained employees carry out the steel fixing duties and that all exposed rebar are capped with
										rebar caps
90	Electrical installation	Power supply not completely isolated	Electrocution	10	6	7	420	Very High	5	Only qualified electricians to do the installation

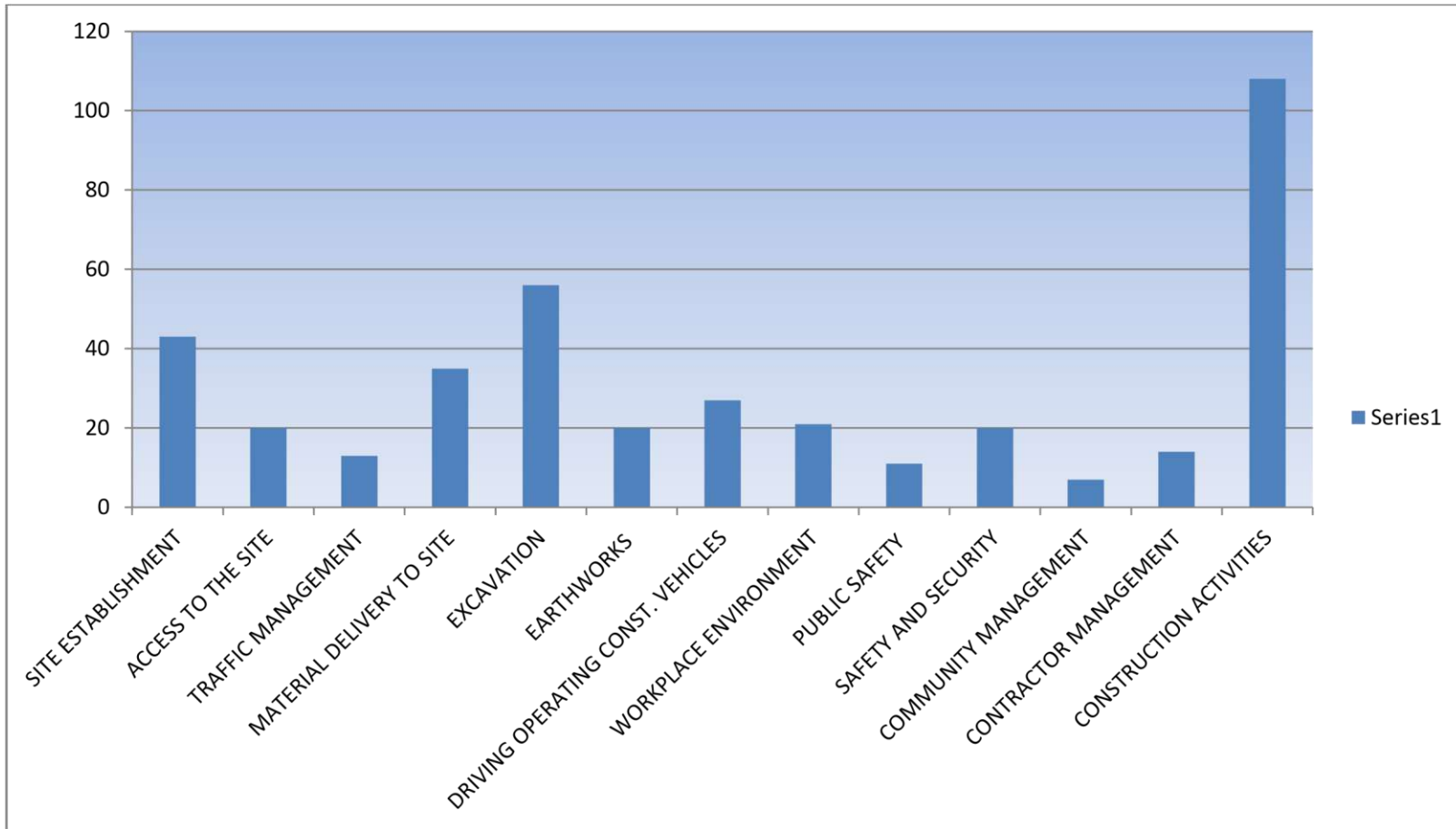
BASELINE RISK ASSESSMENT WORKSHEET: IDENTIFYING EXISTING & POTENTIAL RISKS

WORK PROCESS CATEGORY: **CONSTRUCTION ACTIVITIES**

RISK REF	ACTIVITY	POTENTIAL HAZARD	RISK	RISK EVALUATION			RISK SCORE ExpXS	RISK LEVEL	RISK RANK	CONTROL MEASURE
				E	P	S				
91	Paved walkways	Accidents / Incidents	Person /s struck by vehicles	6	6	7	252	High	4	Proper traffic management plan to be in place Traffic safety officer to be appointed on a full time basis
92	Relocation of water Sewer Electrical cables	Disruption of essential services	Community effected	6	6	3	108	Substantial Risk	3	Notification of supply service being disrupted to be communicated well in advance
93	Extension of existing culverts	Work zone not demarcated	Persons/s struck by vehicle	6	6	7	252	High	4	Traffic Management Plan to be fully implemented
94	Kerb Inlet	Work zone not demarcated	Persons/s struck by vehicle	6	6	7	252	High	4	Traffic Management Plan to be fully implemented
95	Cut off drain	Work zone not demarcated	Persons/s struck by vehicle	6	6	7	252	High	4	Traffic Management Plan to be fully implemented
96	Inlet and out let structure	Work zone not demarcated	Persons/s struck by vehicle	6	6	7	252	High	4	Traffic Management Plan to be fully implemented
97	Road milling	Unsafe machine	Fatality Property damage environment	6	6	7 on a pre	252	high		Cutter to be inspected before use

						used checklist				the user and findings to be noted
98	Tipper truck	Tipper truck turning over	fatality							Tipper truck driver to ensure that he is on a level surface before loading
										implemented

RISK PROFILE



C3.5: CONTRACT AND STANDARD DRAWINGS

C3.5.1 CONTRACT DRAWINGS / DETAILS

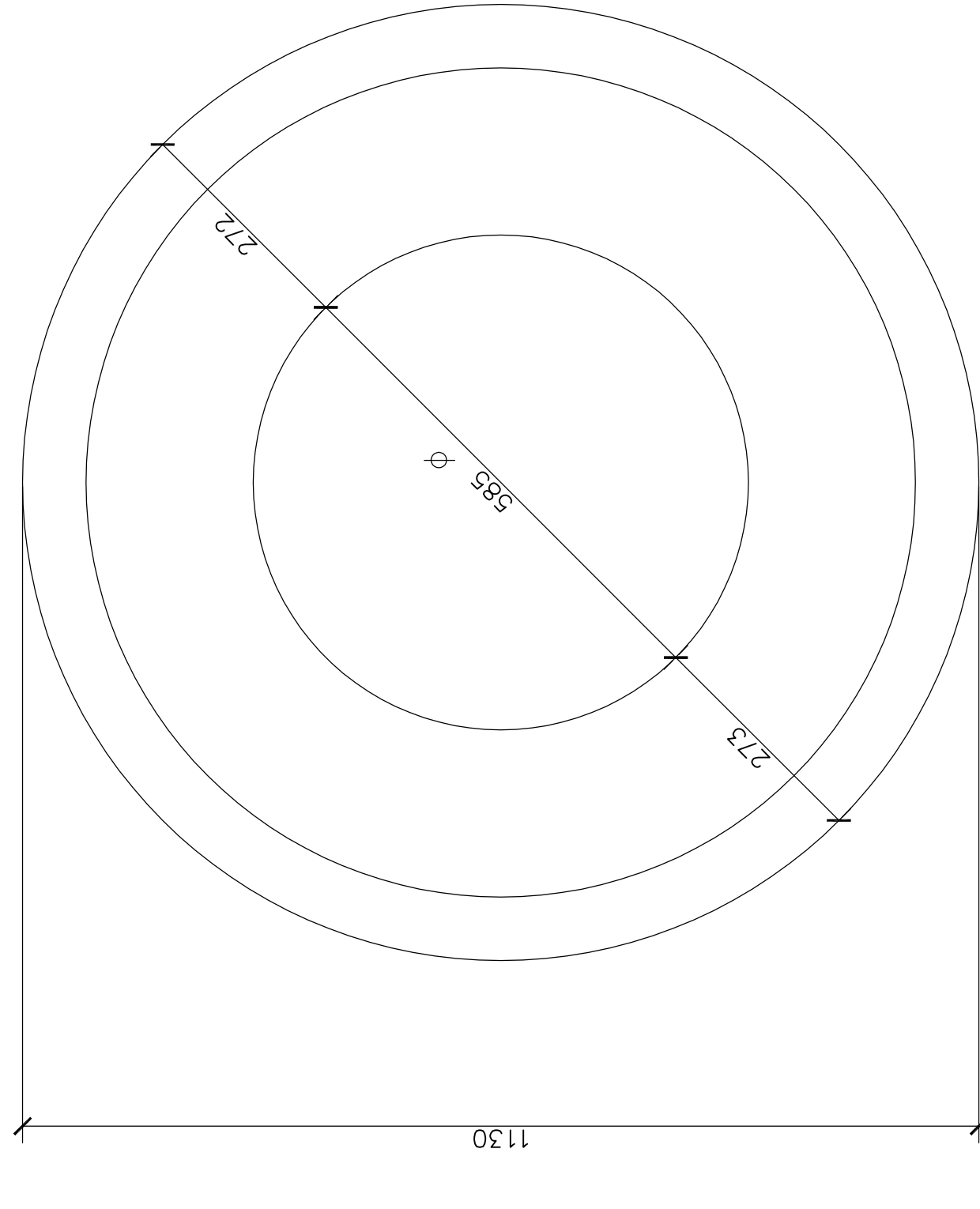
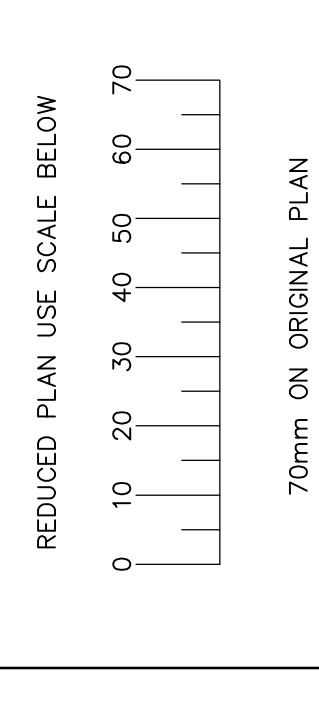
To be specified in the Project Order.

C3.5.2 STANDARD DRAWINGS

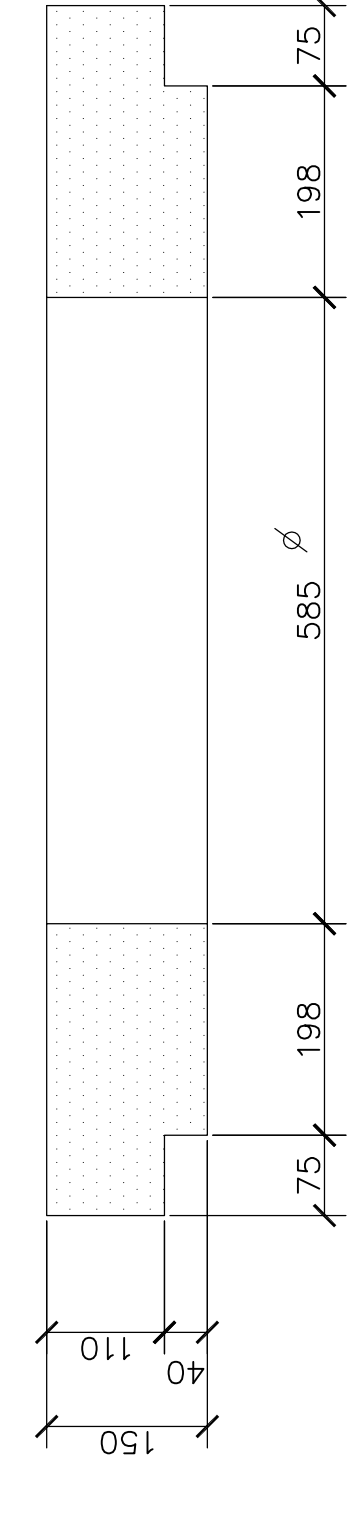
The Standard Drawings to which these Standard Engineering Specifications refer are listed below.

Dwg No	Description	Date of Issue	
38570	Ring Manholes	February	1990
38571	Brick Manhole Details	February	1990
38572	Stormwater Inlet Details	February	1990
38573	Stormwater Inlet Special Details	February	1990
38574	Sewer Manholes: Ramp, Backdrop and Channelling Details	February	1990
38575	Sub-Soil Drain, Pipe Bedding and Pipe Protection Details	February	1990
38576	Headwall Details	February	1990
38577	Kerbing Details	February	1990
38578	Concrete Median Barriers	February	1990
38579	Vehicular and Pedestrian Scoops	February	1990
38580	Concrete Bollard and Steel Guard Rail	February	1990
38581	Retaining Wall, PC Steps, Staircase, Cable Ducts and Headwalls	February	1990
38582	Precast Concrete Fencing and Aluminium Gates	February	1990
38583	Wire Mesh Fence and Gate Details	February	1990
38584	Standard Hydrant Thrust Blocks and Trenches	February	1990
38585	Water Connections, Pipework and Fittings	February	1990
38586	DP & TC Manholes - Rectangular	February	1990
38587	DP & TC Manholes - "L" Shaped	February	1990
38588	DP & TC Manholes - "T" Shaped	February	1990
38589	DP & TC Cable Ducts and Junction Box Details	February	1990
43120	Typical Details of Grid Inlets	February	1990
40137E	Typical Notice Board for Engineering Unit (Contract Boards)	March	2003
	Typical Notice Board for Engineering Unit (Public awareness – notice to residents boards)		

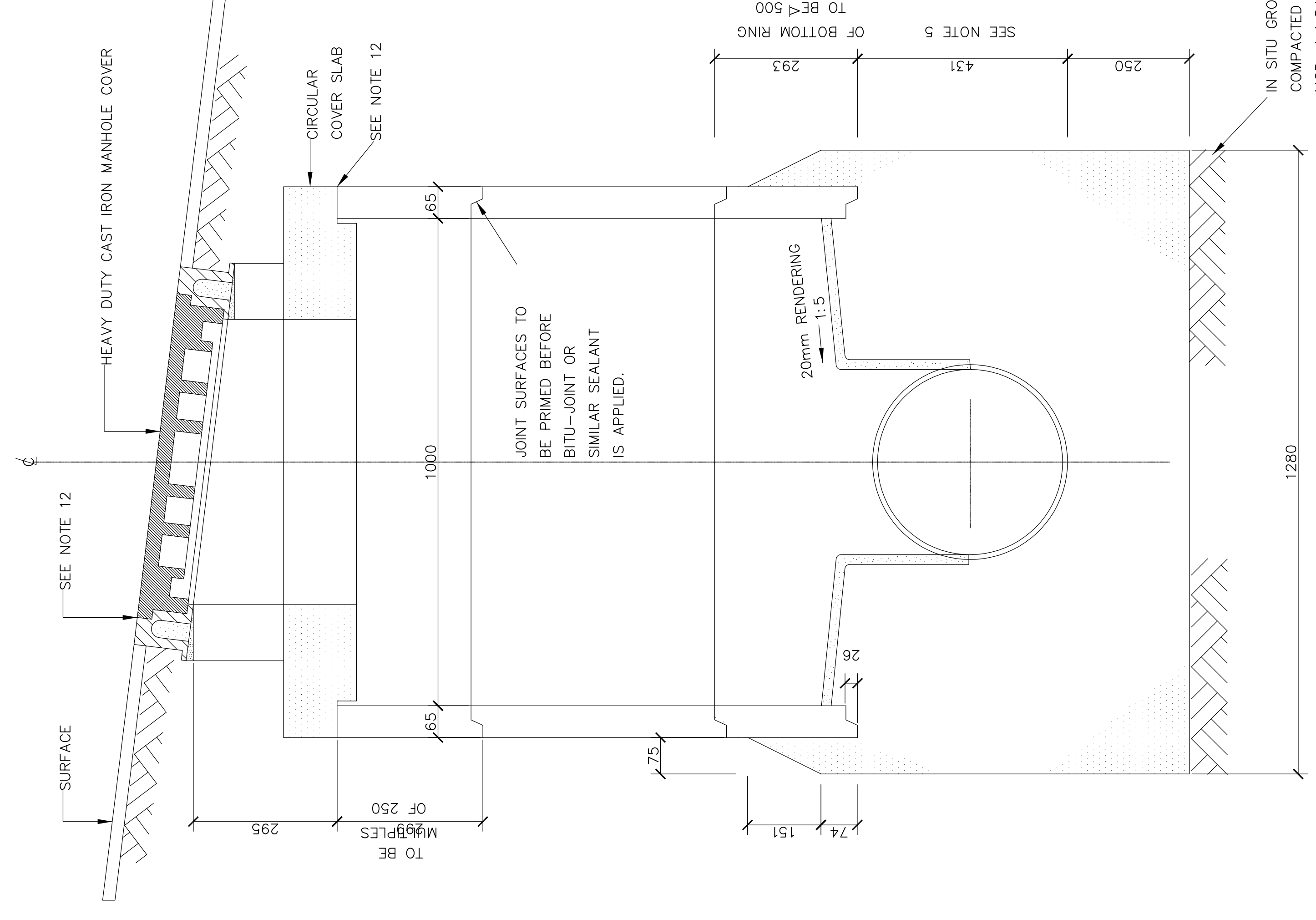
PLAN DESCRIPTION	DWG. NO.
CONTINUED FROM	
CONTINUED ON	
CROSS SECTIONS	
TYPICAL CROSS SECTION	
SURVEY LAYOUT	



PLAN OF CIRCULAR COVER SLAB

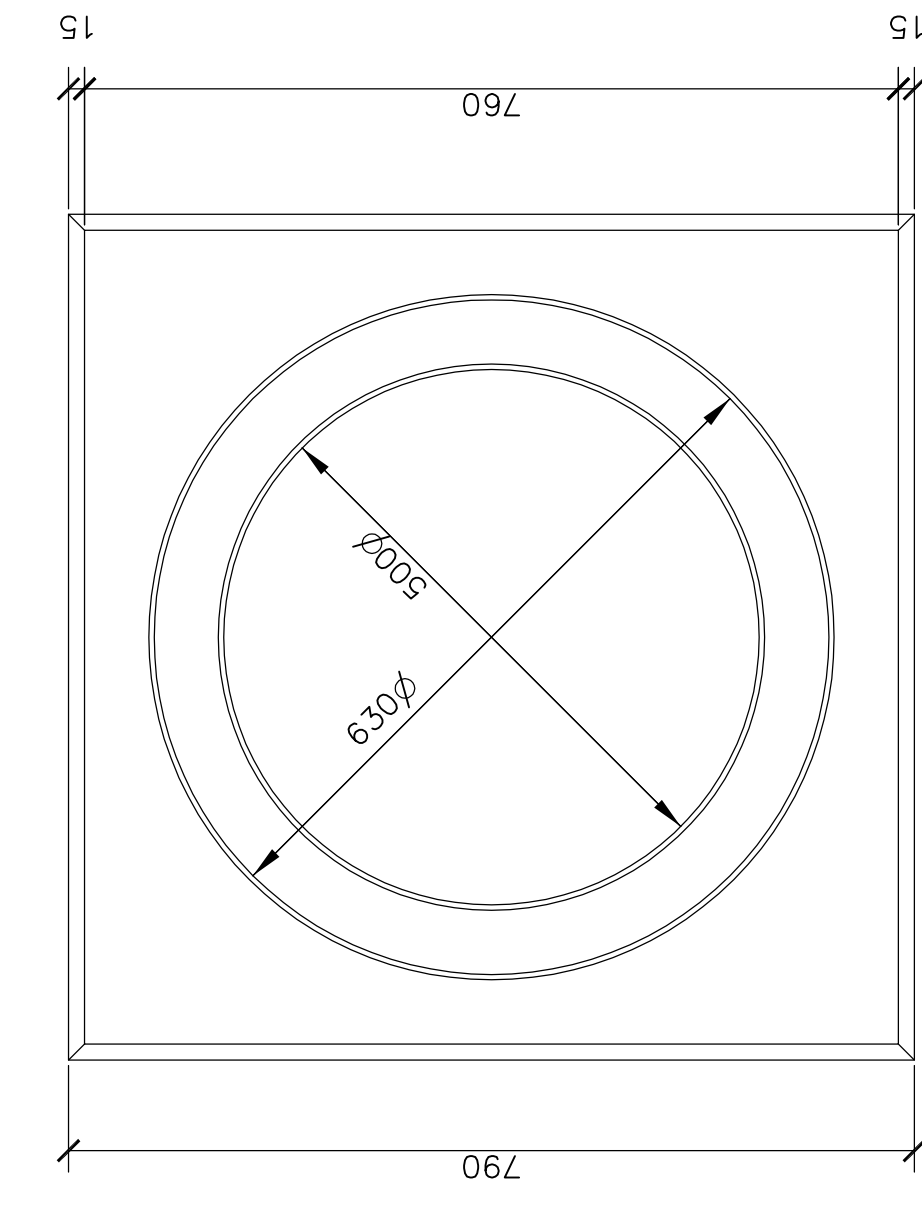


SECTION OF CIRCULAR COVER SLAB

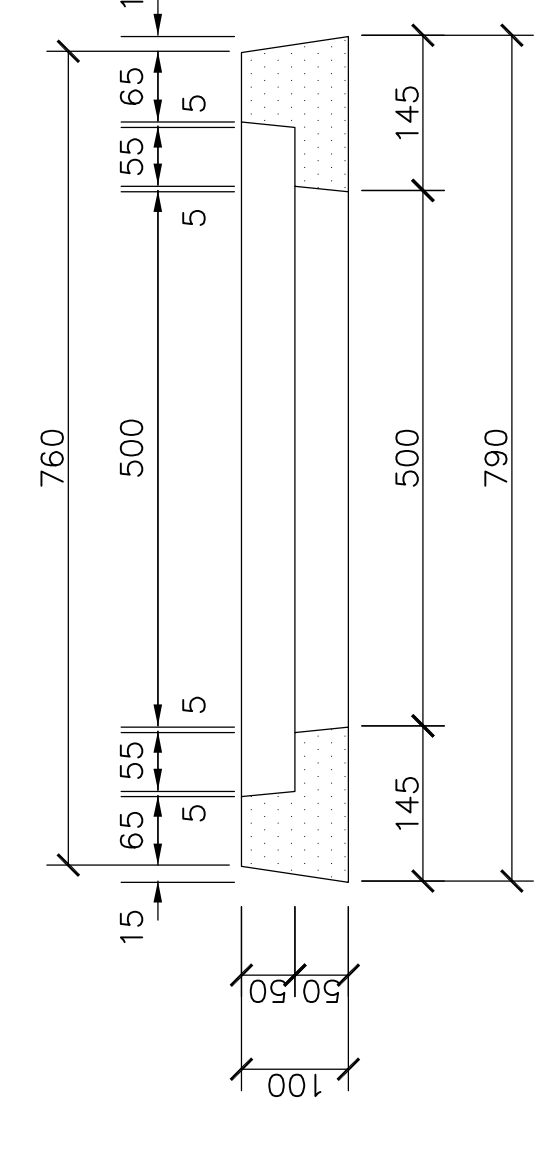


SECTION OF 1000 DIA. MANHOLE

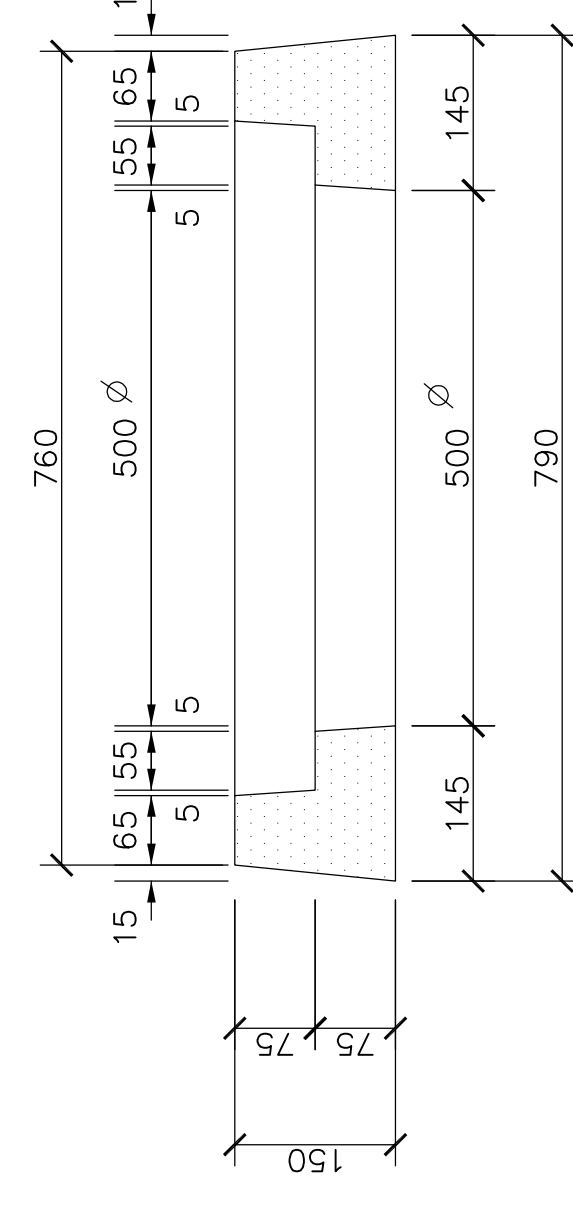
PRECAST PRODUCT DETAILS	
RING MANHOLES	38850
CIRCULAR FRAMES AND COVER SLAB	38851
SQUARE MANHOLE FRAMES	38852
MANHOLE COVERS	38853



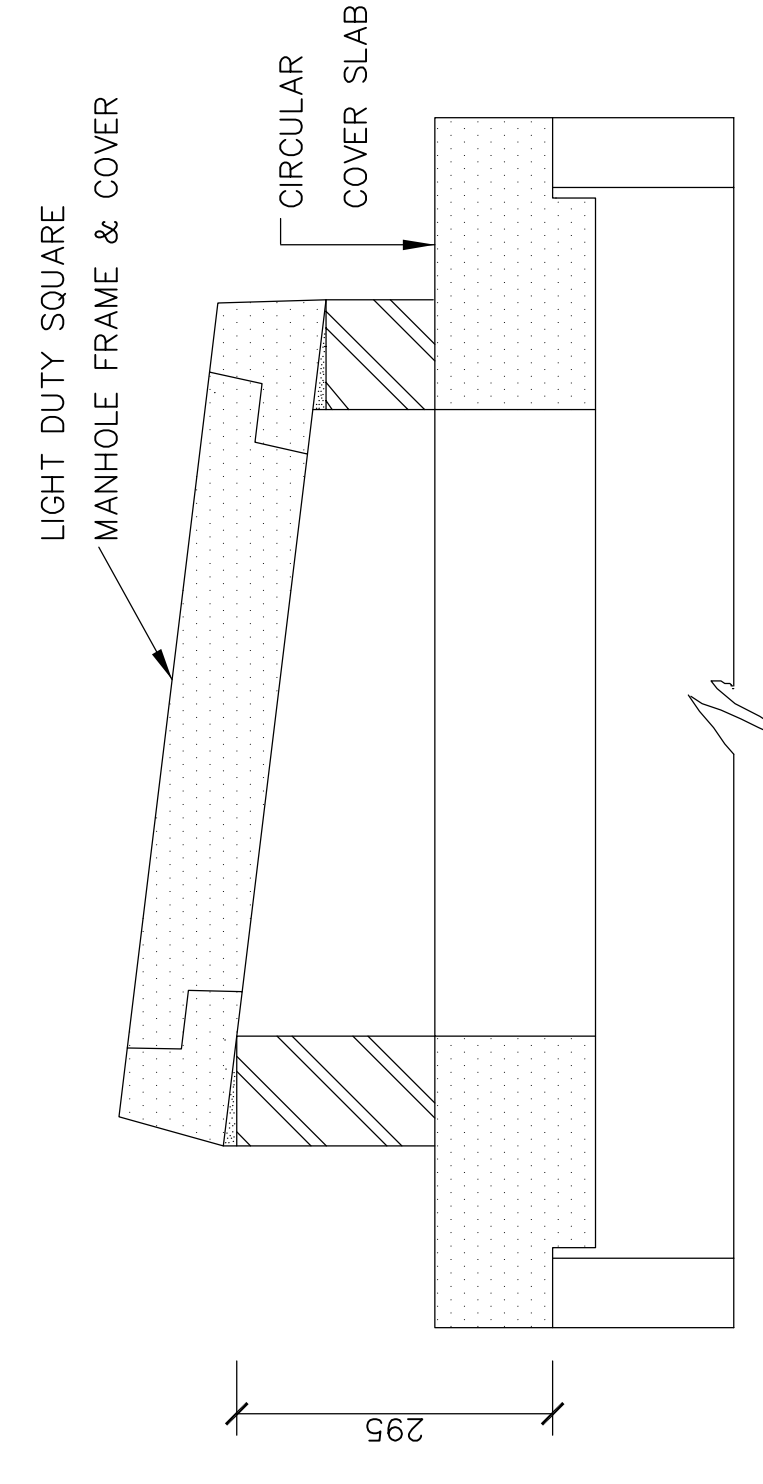
PLAN



SECTION OF LIGHT DUTY SQUARE MANHOLE FRAME

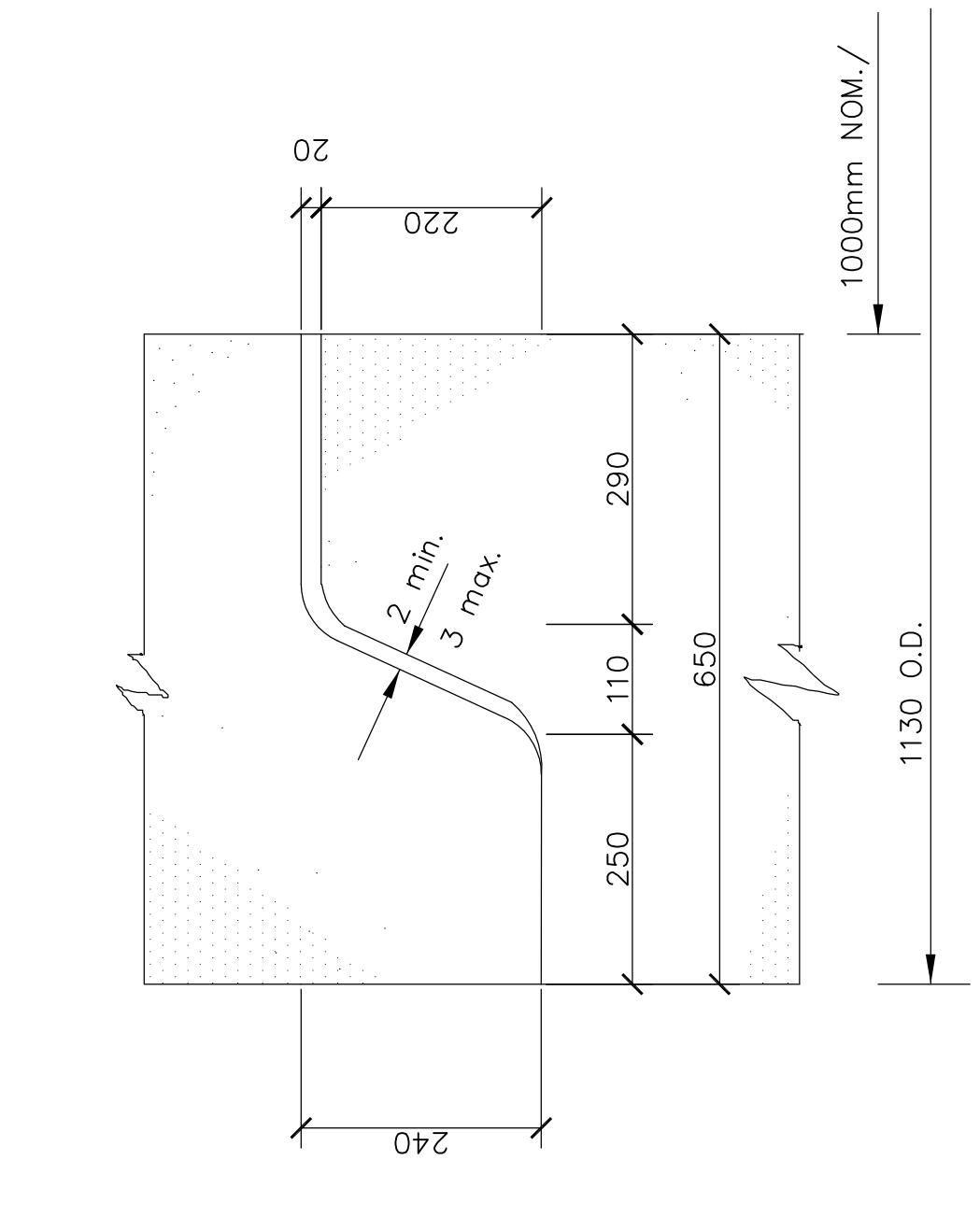


SECTION OF HEAVY DUTY SQUARE MANHOLE FRAME.



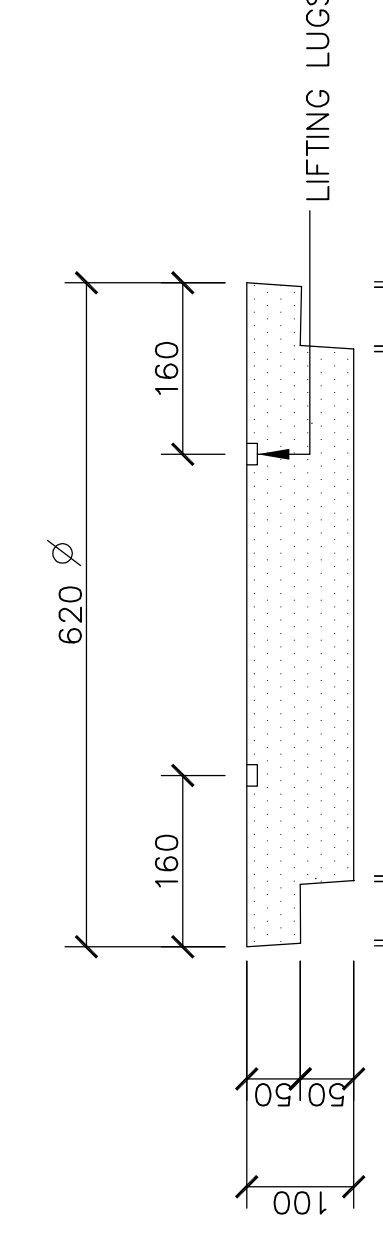
SECTION OF LIGHT DUTY SQUARE MANHOLE FRAME AND COVER

- C. SEMI MANHOLE:-
- THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING 38574.
 - RENDERING FOR MANHOLE BENCHING SHALL CONSIST OF 1 PART H.A.C. TO 2 PARTS SAND THOROUGHLY MIXED AND APPLIED TO CONCRETE SURFACES WHILE THE LATTER ARE STILL GREEN. RENDERING SHALL BE AT LEAST 20mm THICK.
 - ALL PIPES BUILT INTO MANHOLES SHALL NOT EXCEED 1.0m IN LENGTH, AND THE ADDING PIPE SHALL NOT EXCEED 2.0m IN LENGTH.
 - EVERY U.P.V.C. PIPE BUILT INTO A MANHOLE SHALL HAVE CLEAN DRY SAND (TO S.A.B.S.1083 TABLE 1.) GLUED TO ITS OUTSIDE AS RECOMMENDED BY PIPE MANUFACTURER USING SPECIAL PVC CEMENT (HENKEL S.A. PTY. LTD. TANGIT OR SIMILAR) TO ENSURE GOOD ADHESION TO BASE CONCRETE.
 - IN LOCATIONS DEFINED BY THE ENGINEER AS SUBJECT TO FLOODING, C.I. MANHOLE COVERS AND JOINTS SEALED WITH BOSTIK BUTYL TAPE OR SIMILAR, SHALL BE USED.

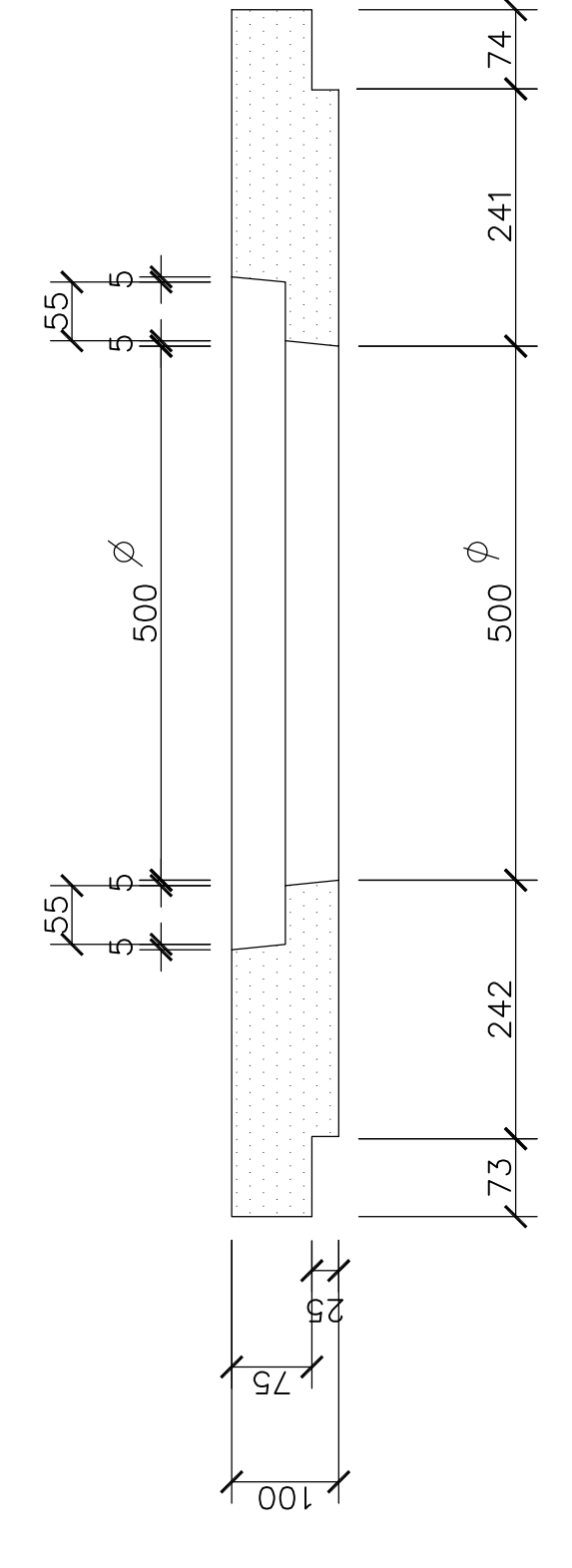


DETAIL OF JOINT

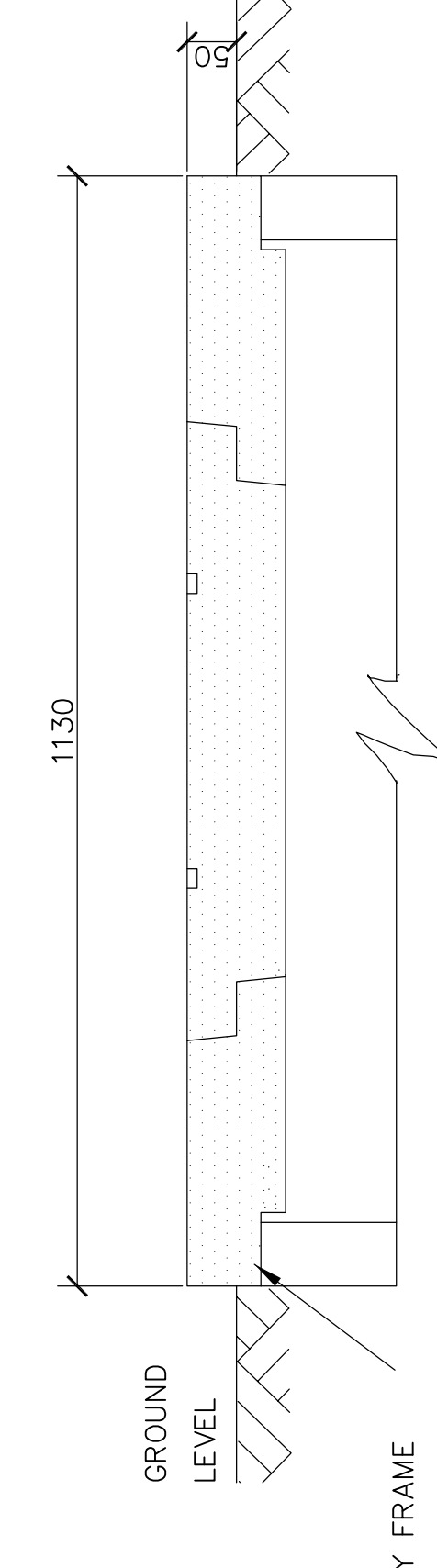
ALL RADII TO BE 10mm



SECTION OF CIRCULAR LIGHT DUTY MH COVER

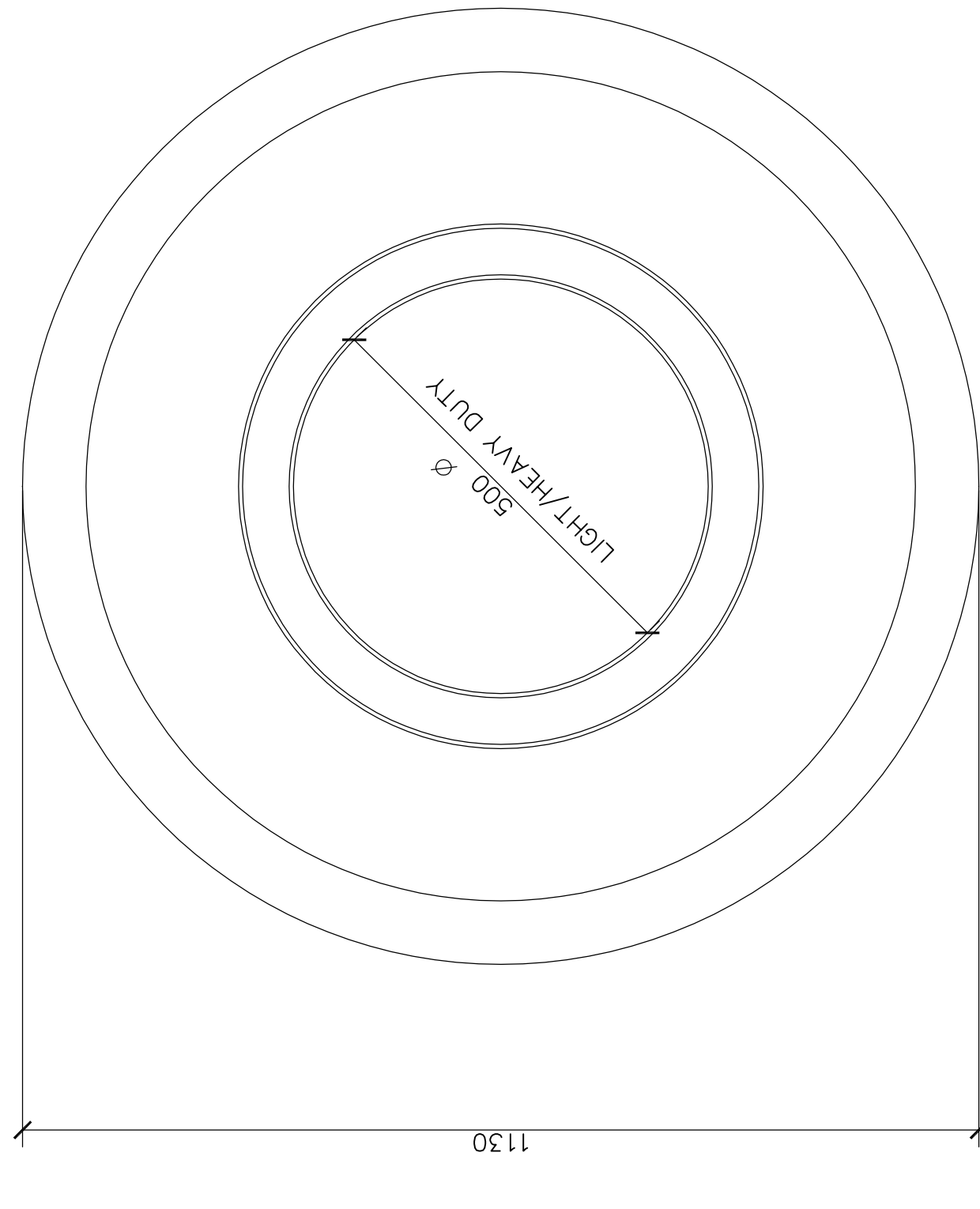


SECTION OF CIRCULAR LIGHT DUTY MH FRAME

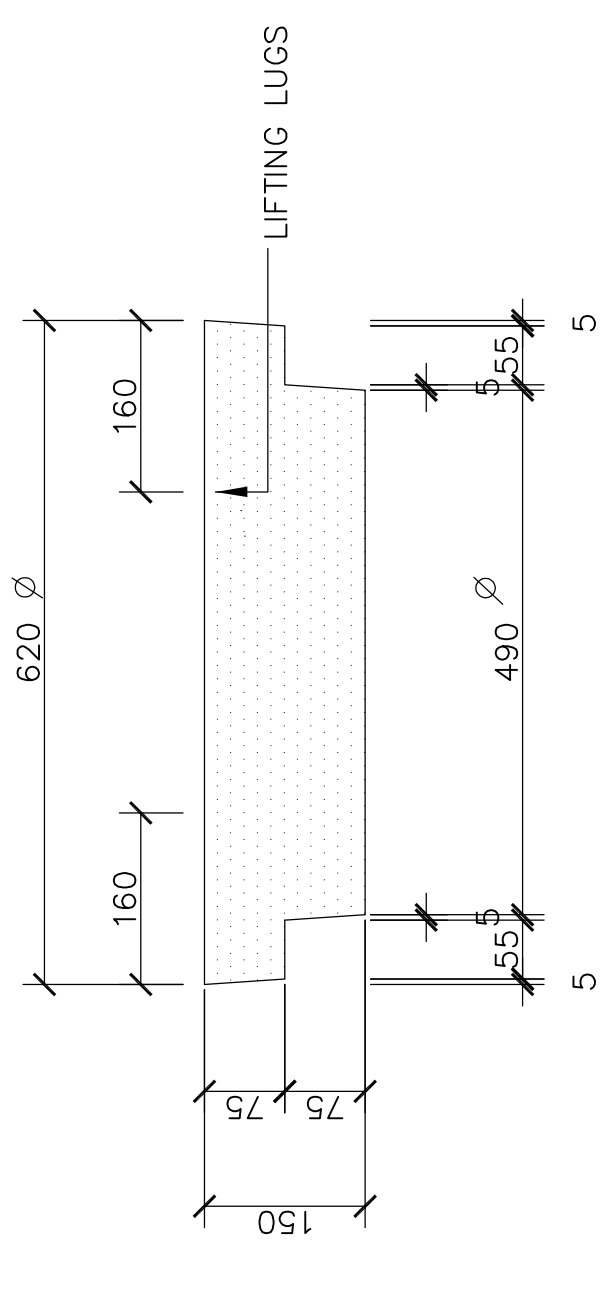


SECTION OF CIRCULAR LIGHT DUTY MANHOLE COVER AND FRAME

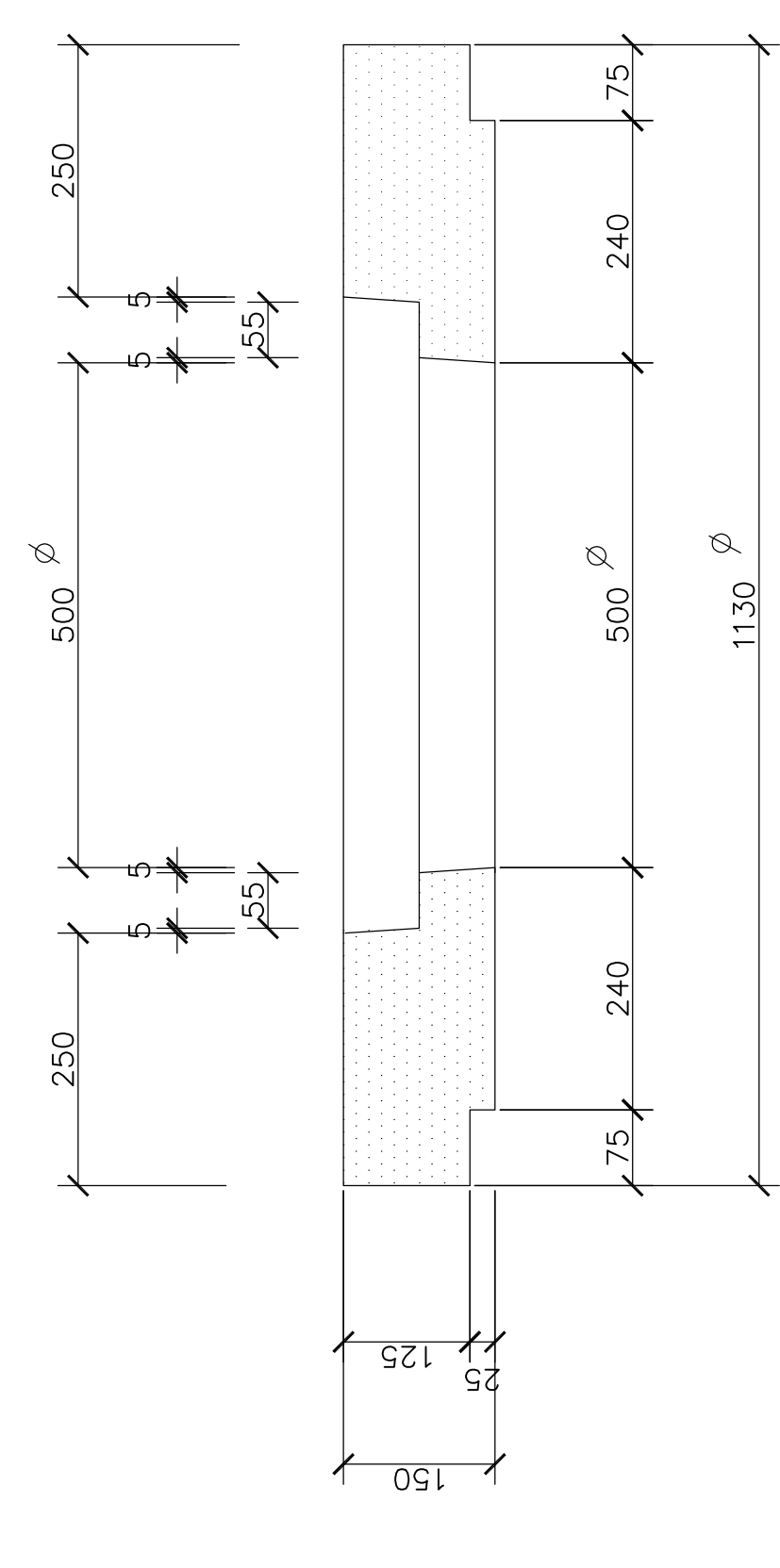
- NOTES:
- GENERAL
 - ALL PRECAST CONCRETE MANHOLE COMPONENTS TO COMPLY WITH THE REQUIREMENTS OF S.A.B.S.1294 (WHERE APPLICABLE)
 - LENGTHS OF INDIVIDUAL WALL UNITS ARE TO VARY IN MULTIPLES OF 250mm.
 - HEAVY DUTY CAST IRON COVERS AND FRAMES TO DRG.NO.DW281/A ARE TO BE USED ON MANHOLES UNDER VEHICULAR TRAFFIC.
 - FOR DETAILS OF STEEL REINFORCEMENT TO MANHOLE COVERS,COVER SLABS AND FRAMES — SEE STANDARD PRECAST DETAILS LISTED ABOVE.
 - STORMWATER MANHOLE
 - DIMENSION D VARIES WITH THE DIAMETER OF THE PIPES. DIMENSION D SHALL BE TO A POINT 50mm ABOVE THE HIGHEST CROWN OF THE PIPES.
 - RENDERING FOR MANHOLE BENCHING SHALL CONSIST OF 1 PART CEMENT TO 3 PARTS SAND THOROUGHLY MIXED AND APPLIED TO CONCRETE SURFACES WHILE THE LATTER ARE STILL GREEN. RENDERING SHALL BE AT LEAST 20mm THICK.
 - THE LENGTH OF PIPE BUILT INTO THE MANHOLE SHALL NOT EXCEED 2.5m.



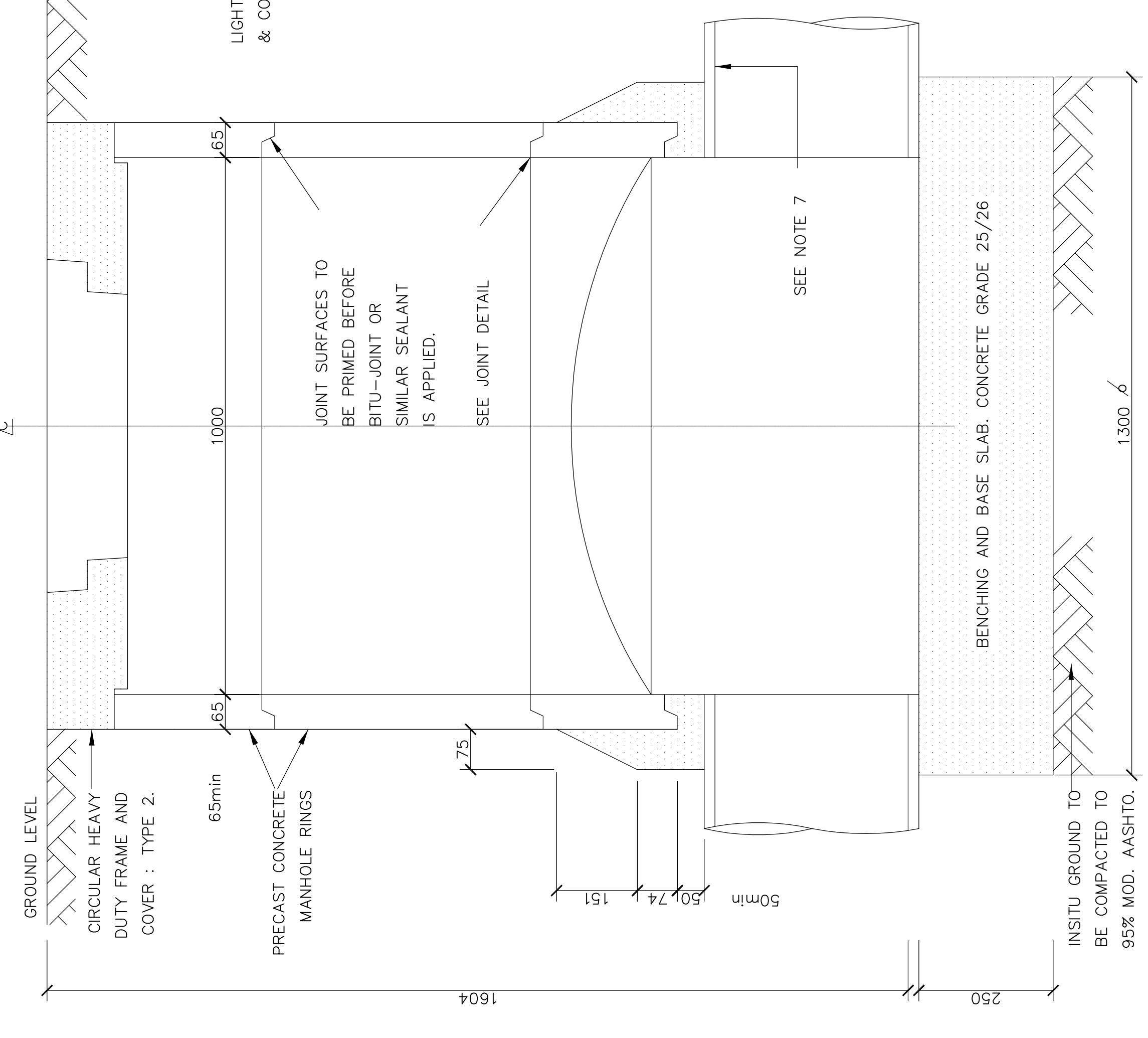
PLAN OF CIRCULAR LIGHT AND HEAVY DUTY FRAME FOR 1000 NOM. DIA. MANHOLE



SECTION OF CIRCULAR HEAVY DUTY MH COVER

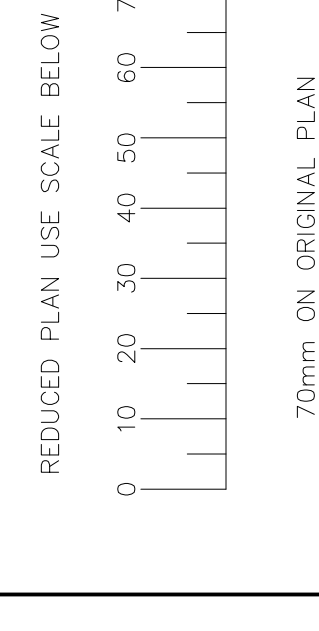


SECTION OF CIRCULAR HEAVY DUTY M.H. FRAME



SECTION OF 1000 DIA. MANHOLE

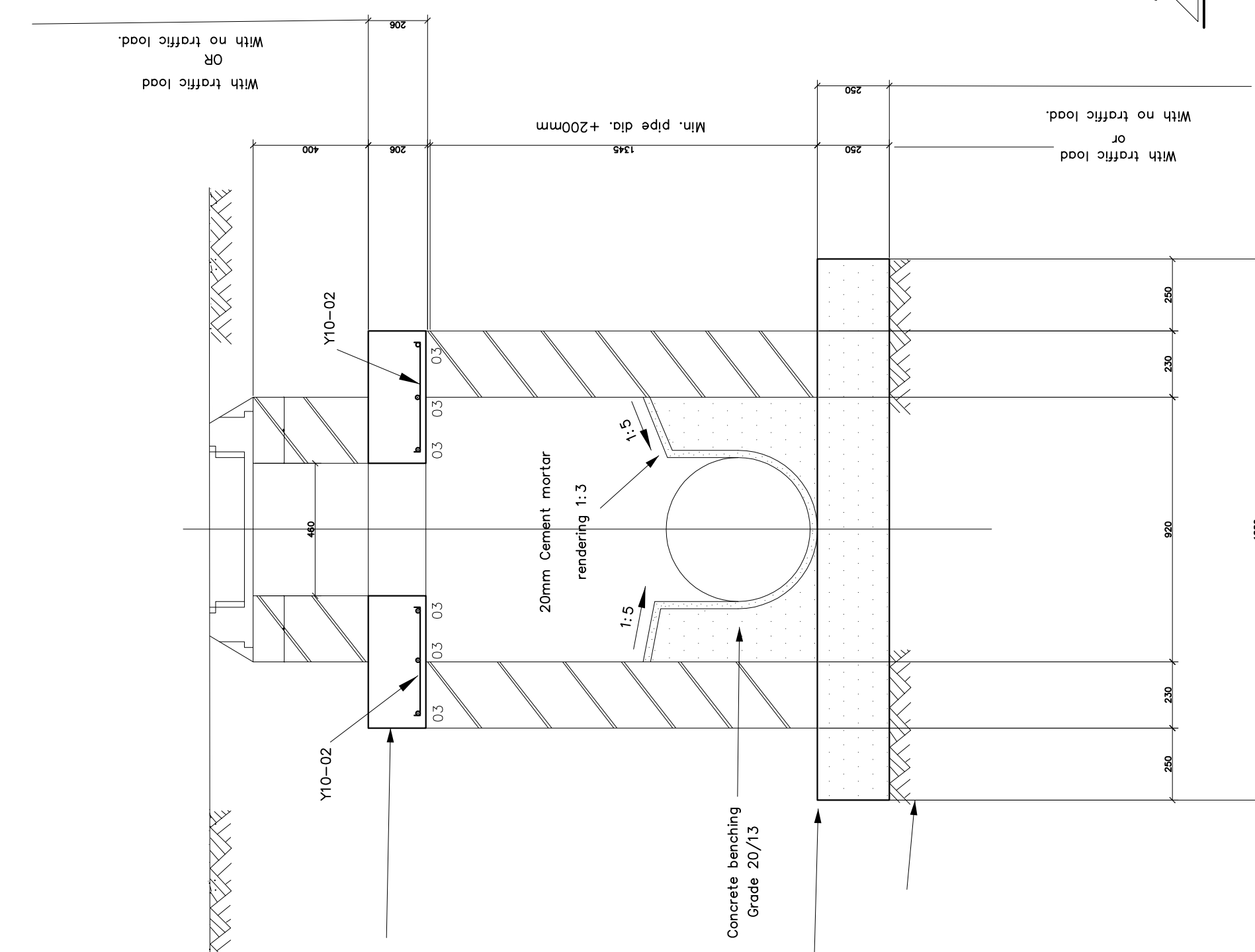
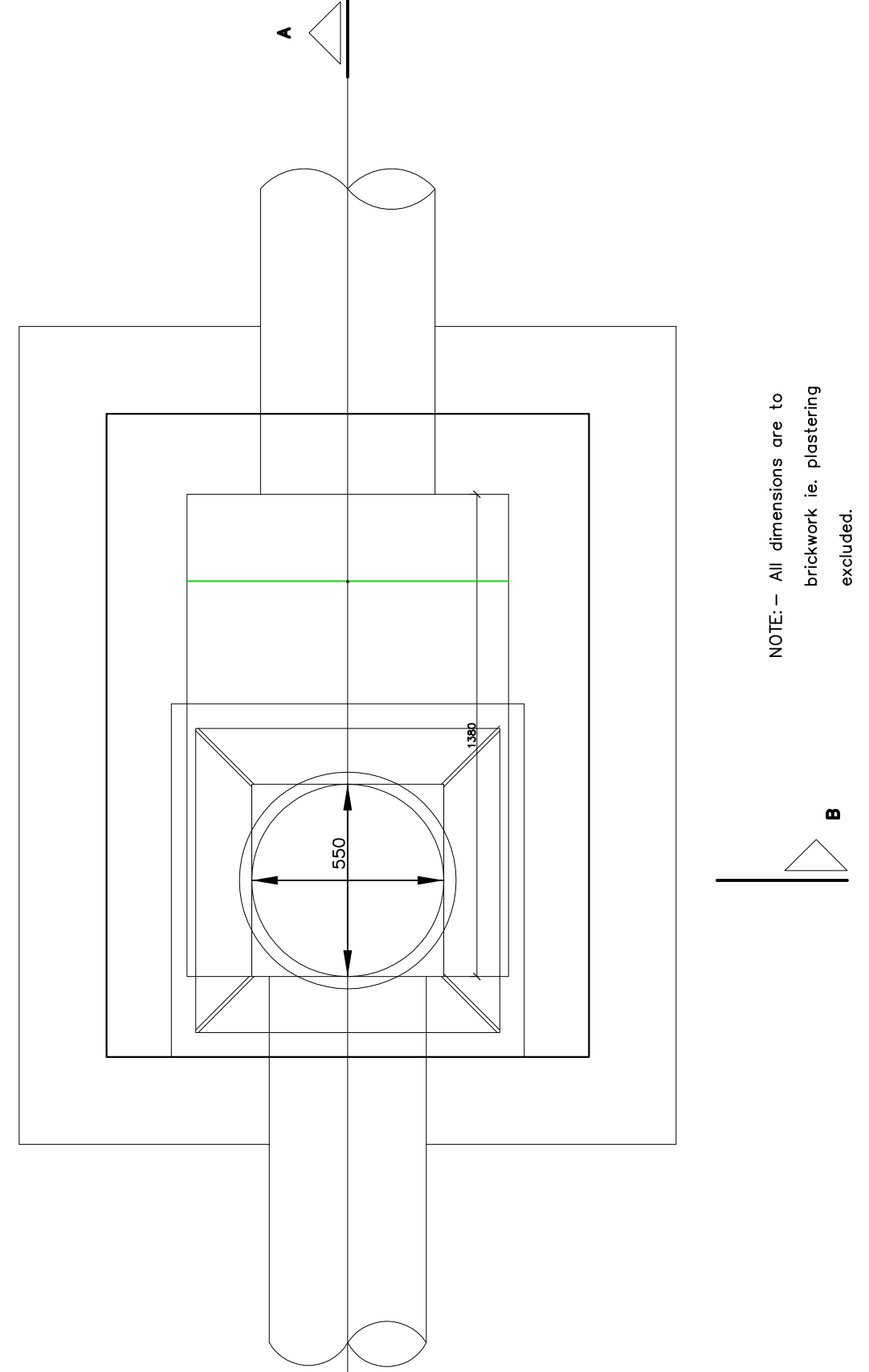
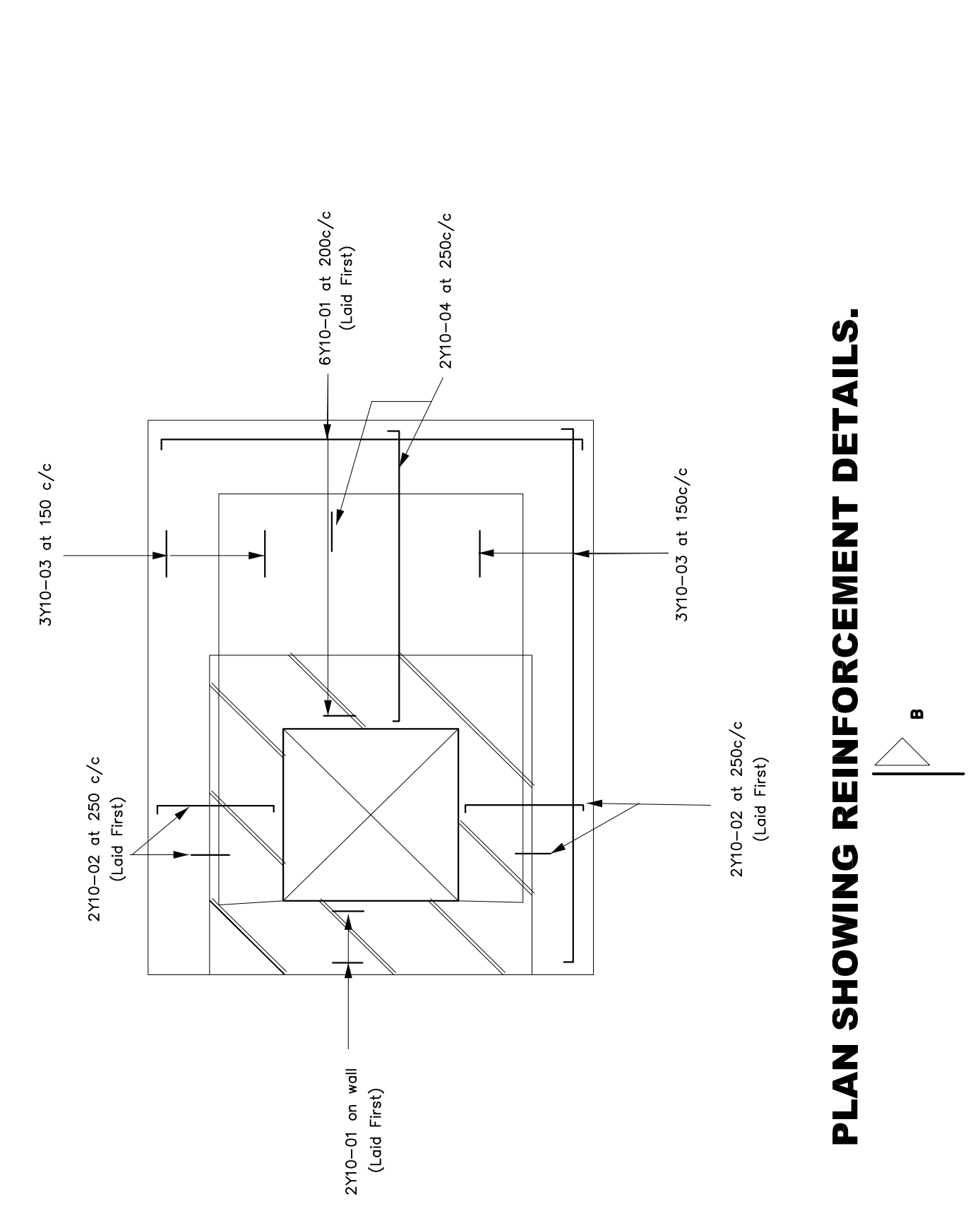
CITY ENGINEERS ROADS DEPARTMENT SERVICE UNIT	DWG. NO.
PLAN DESCRIPTION	
CONTINUED FROM	
CONTINUED ON	
CROSS SECTIONS	
TYPICAL CROSS SECTION	
SURVEY LAYOUT	



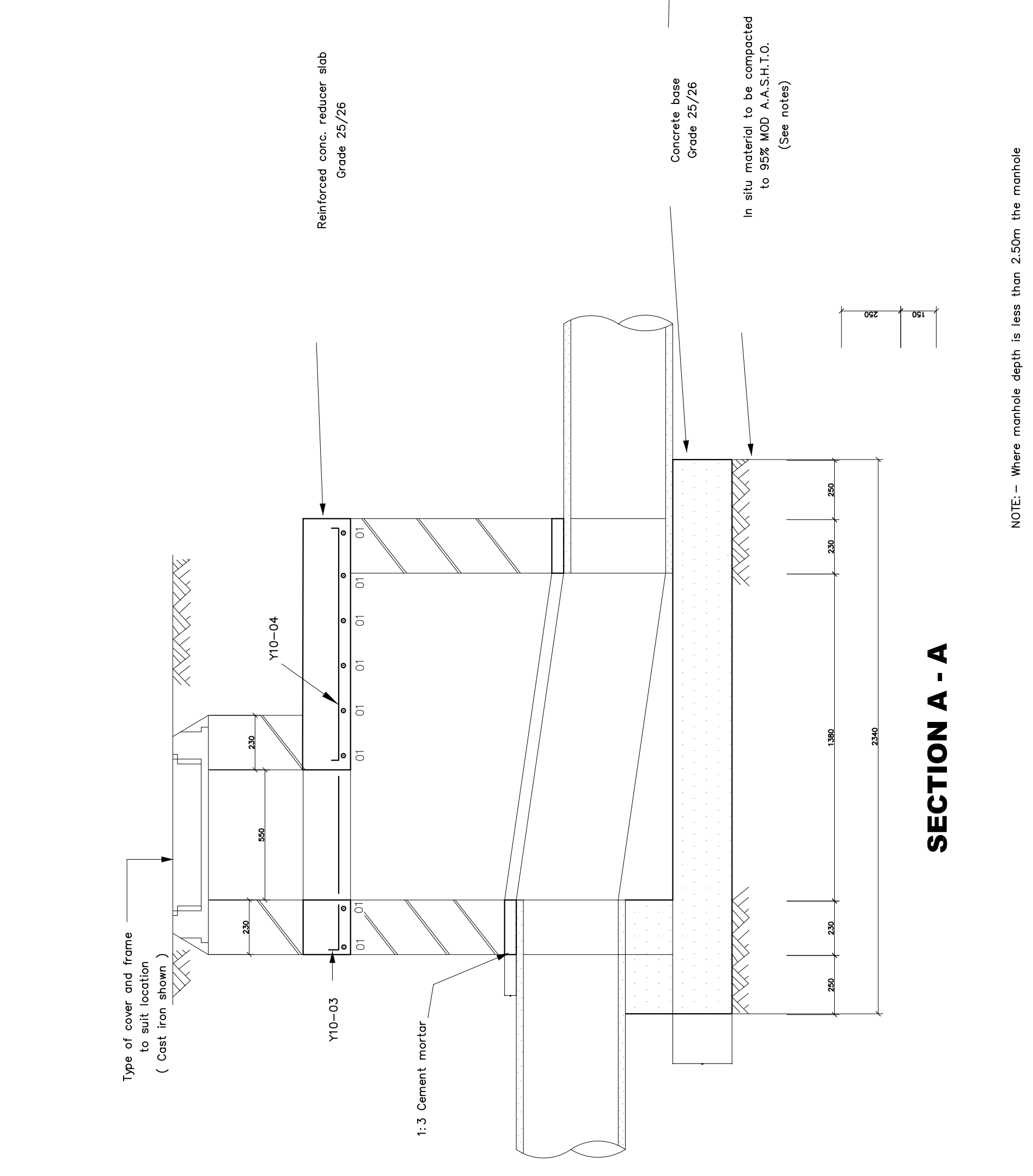
MANHOLE TYPE "A" (TOTAL MASS = 16.81kg)		
BAR MARK No.	LENGTH	TOTAL LENGTH
Y10 01	1450	11.60
Y10 02	500	2.0
Y10 03	1900	11.40
Y10 04	1150	2.30

MANHOLE TYPE "B" (TOTAL MASS = 36.36kg)		
Y12 01	2250	18.00
Y12 02	1000	3.0
Y12 03	2250	15.75
Y12 04	700	4.2

- NOTES:-
- Structural conc. to consist of Grade 25/28 with cube crushing strength of 25 MPa at 28 days.
 - Binding to consist of Grade 1 1/2 with cube crushing strength of 15 MPa at 28 days.
 - Clear cover to min steel 40mm.
 - Mortar to consist of 1 cement to 3 sand.

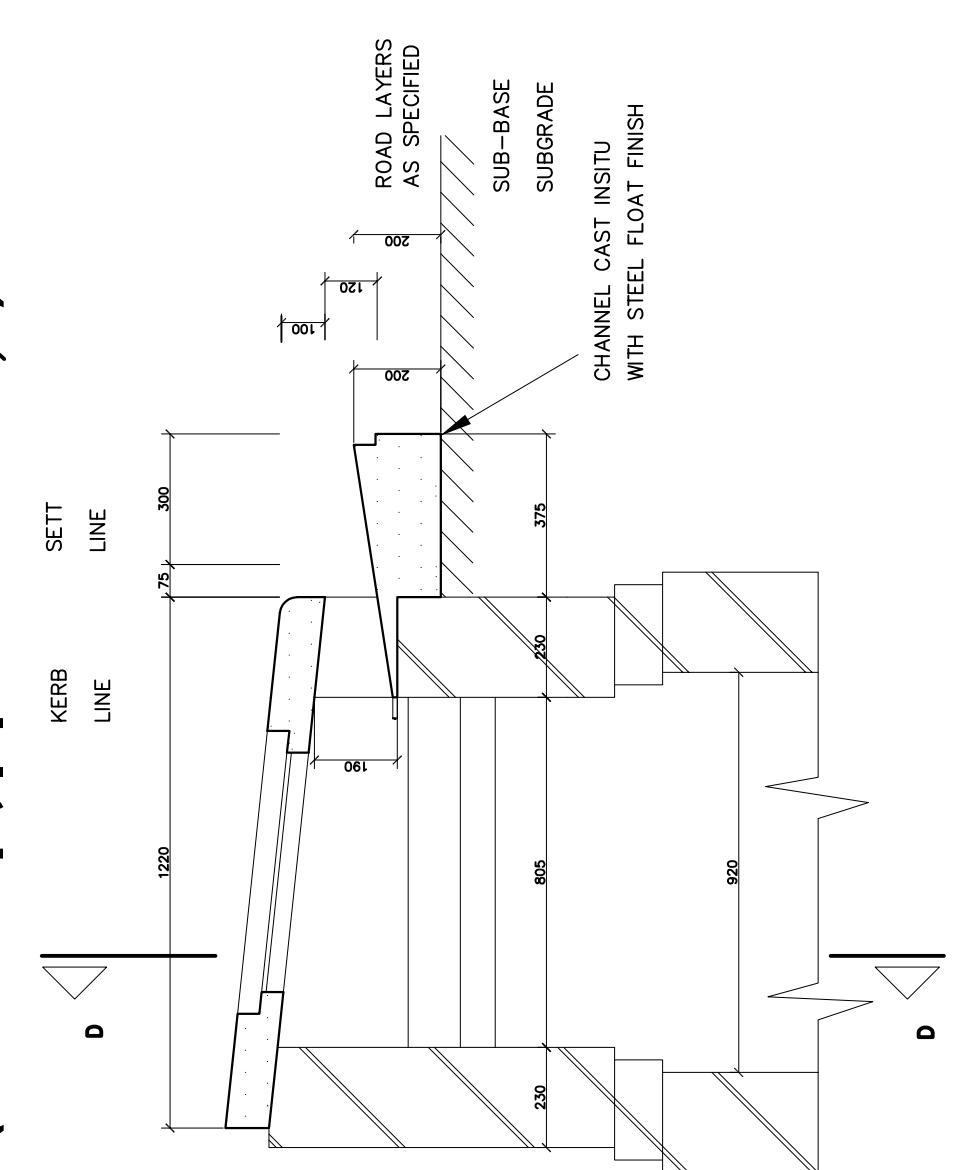


SECTION B - B



SECTION A - A

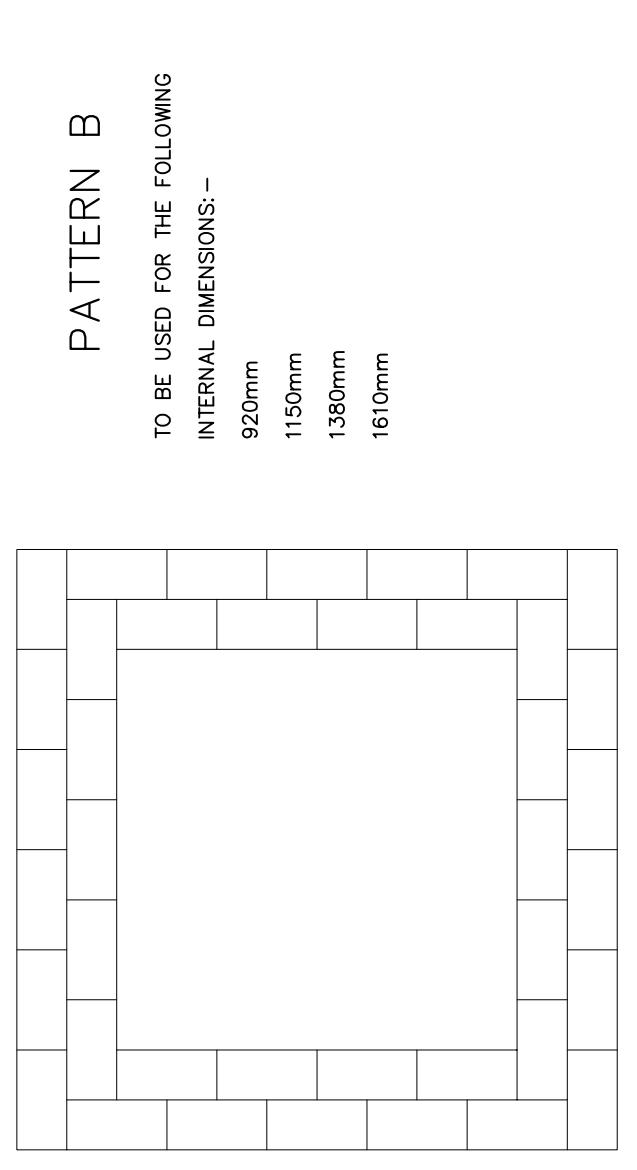
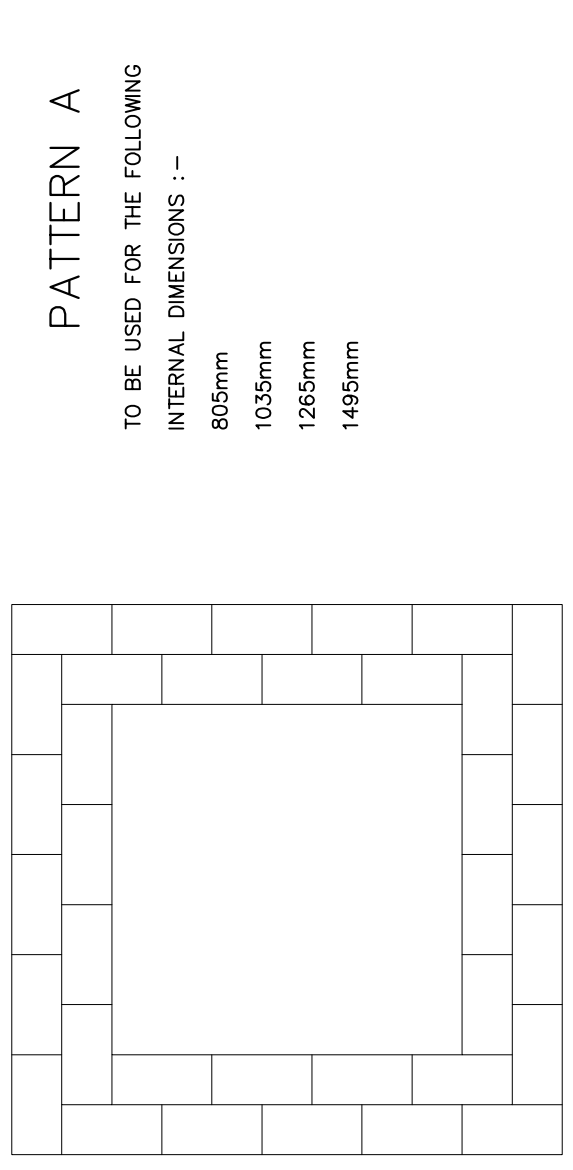
MANHOLE TYPE A (< 3m deep , pipes < 900mm φ)



INLET TYPE COVER

PRECAST CONC. UNIT	DWC. No.
L.D. MANHOLE COVER	38853
L.D. SQUARE MANHOLE FRAME	38852
H.D. MANHOLE COVER	38853
H.D. SQUARE MANHOLE FRAME	38852

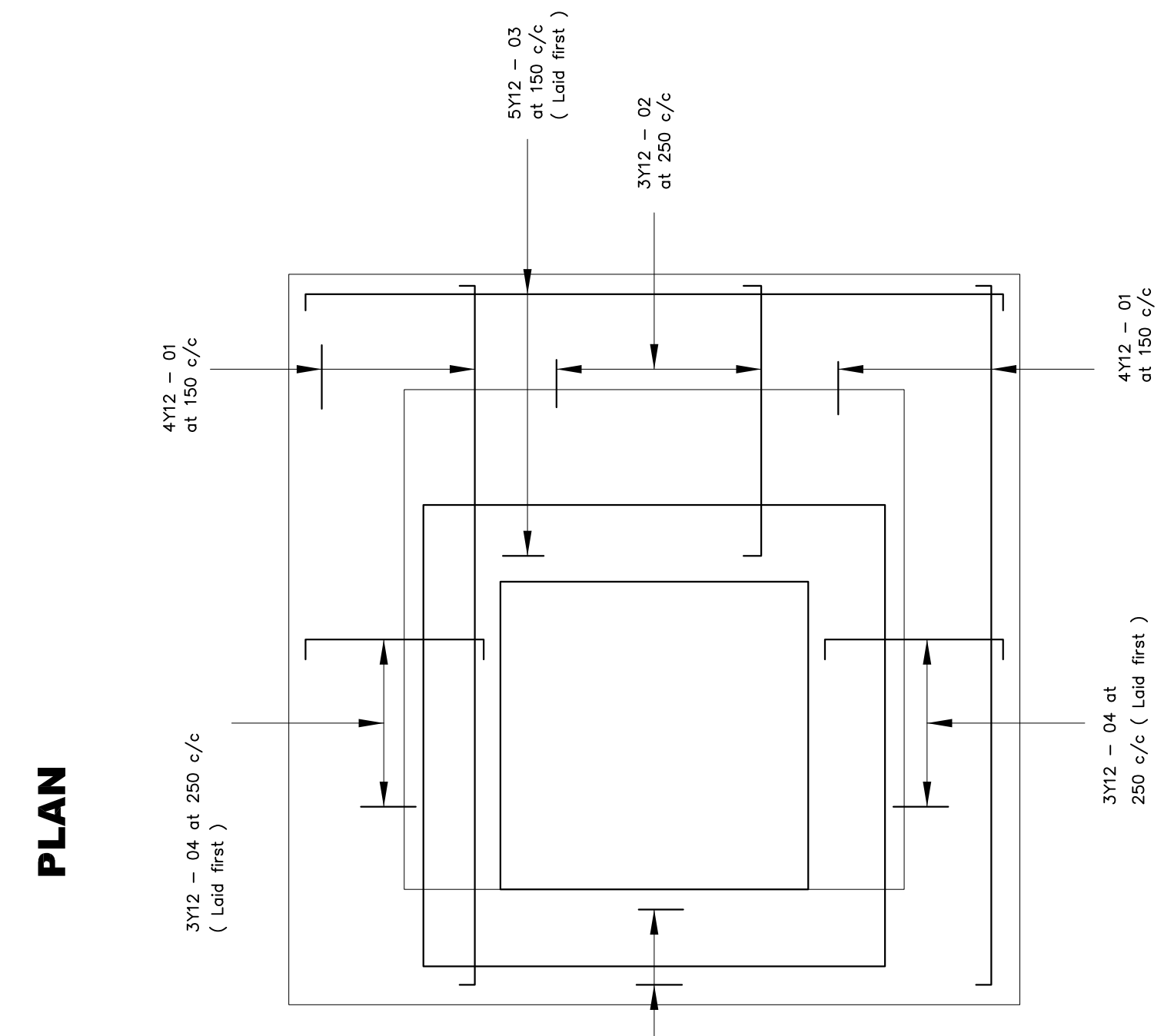
NOTE:- Where manhole depth is more than 3.50m the manhole shaft is to be 150mm and the height of the chamber is to vary.



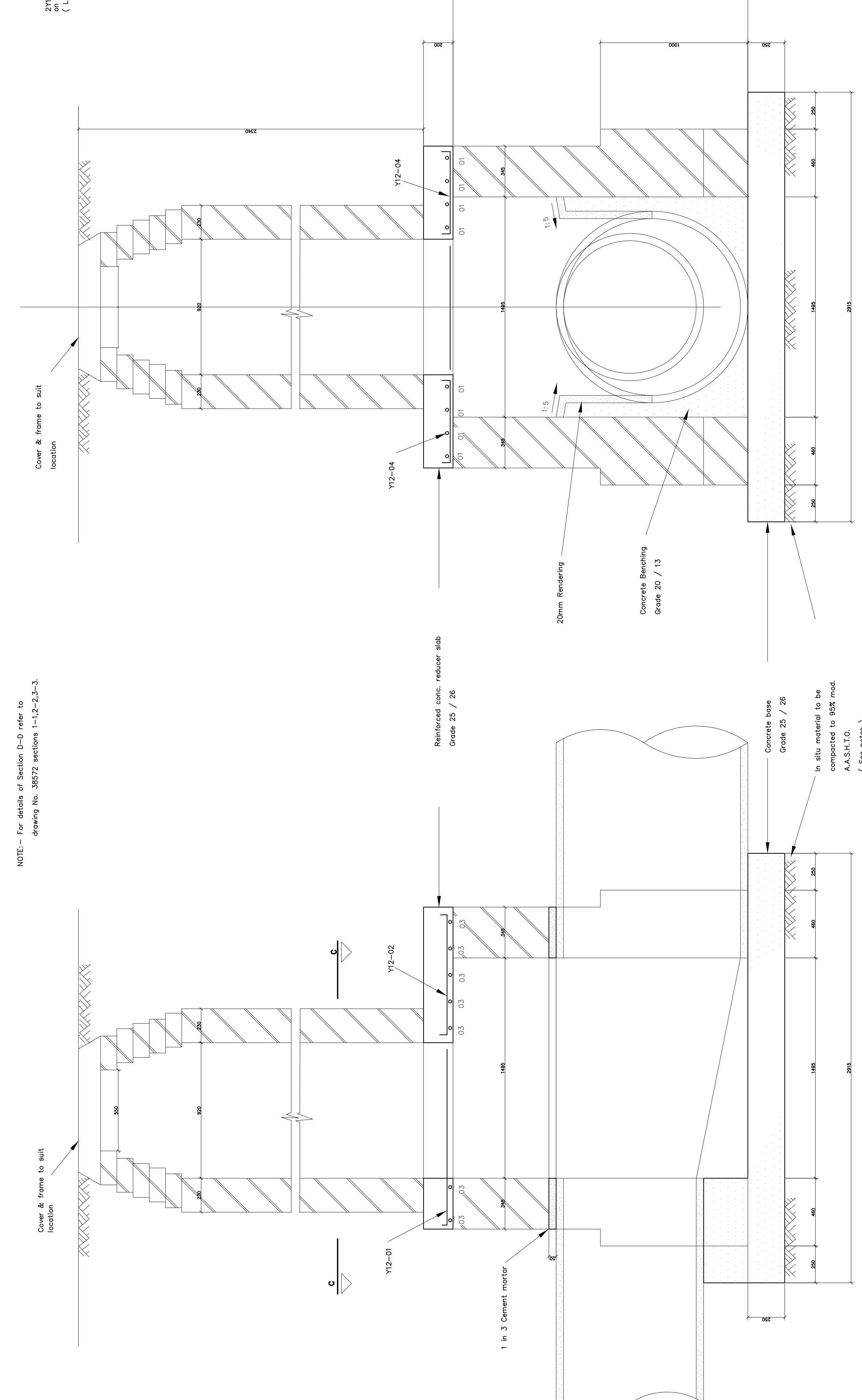
BRICK LAYING PATTERNS

- NOTES:-
- IN SITU GROUND MUST BE COMPACTED TO 95% MDD A.A.S.H.T.O. PRIOR TO MANHOLE BASE SLAB BEING CAST. IF THE DENSITY CANNOT BE ATTAINED THE IN SITU MATERIAL MUST BE REMOVED TO A DEPTH OF 300mm AND REPLACED WITH A SELECTED BACKFILL.

PLAN SHOWING REINFORCEMENT DETAILS



PLAN SHOWING REINFORCEMENT DETAILS



SECTION A-A

SECTION B-B

MANHOLE TYPE B (3-5m deep, pipe < 900mm o & 0-5m deep, pipe 900-1200mm φ)

PLAN - SECTION C - C

Revision	Date	Description

NOTE: No construction work shall be undertaken until all internal and service acquisitions have been completed.

Acquisitions completed

UNDERGROUND SERVICES CHECKED

DATE

SIGNATURE

DATE

SIGNATURE

DATE

SIGNATURE

DATE

SIGNATURE

DATE

SIGNATURE

DATE

SIGNATURE

DATE

Contract No.

Project Title

STANDARD DRAWING

Drawing Title

BRICK MANHOLE DETAILS

DATE OF ISSUE

FEBRUARY 1990

Scale

1:25

Designed

M.DYKMAN

Checked

M.F.BURNETT

Date

1995-12-06

Drawn

M.F.BURNETT

Manager

RD(N)

Director

Roops

Executive Director

R.A.Moore

Drawing No

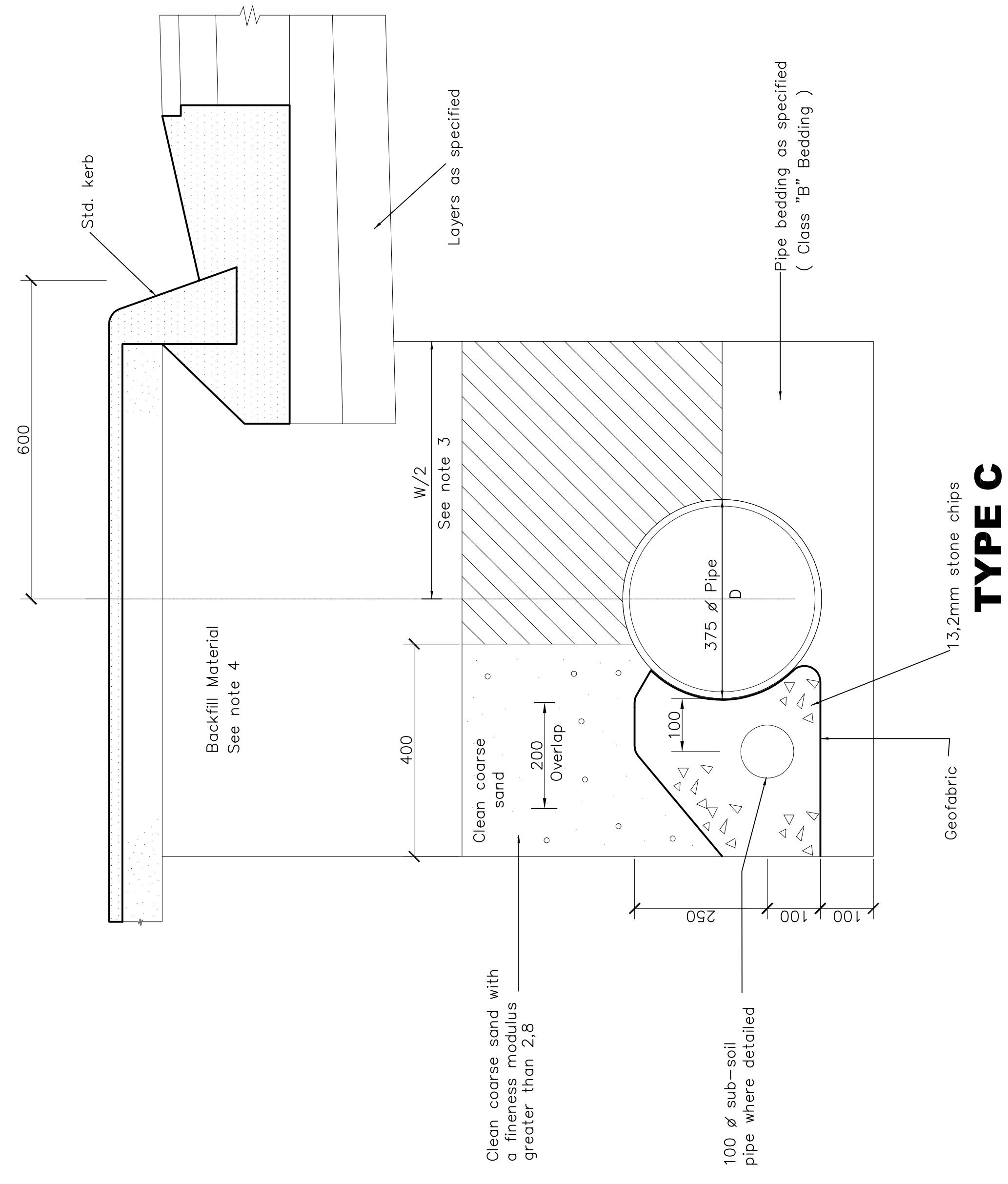
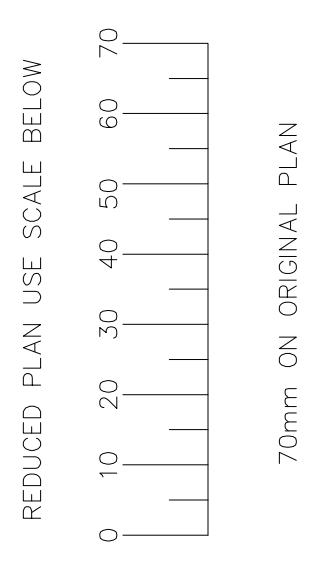
38571

Sheet of

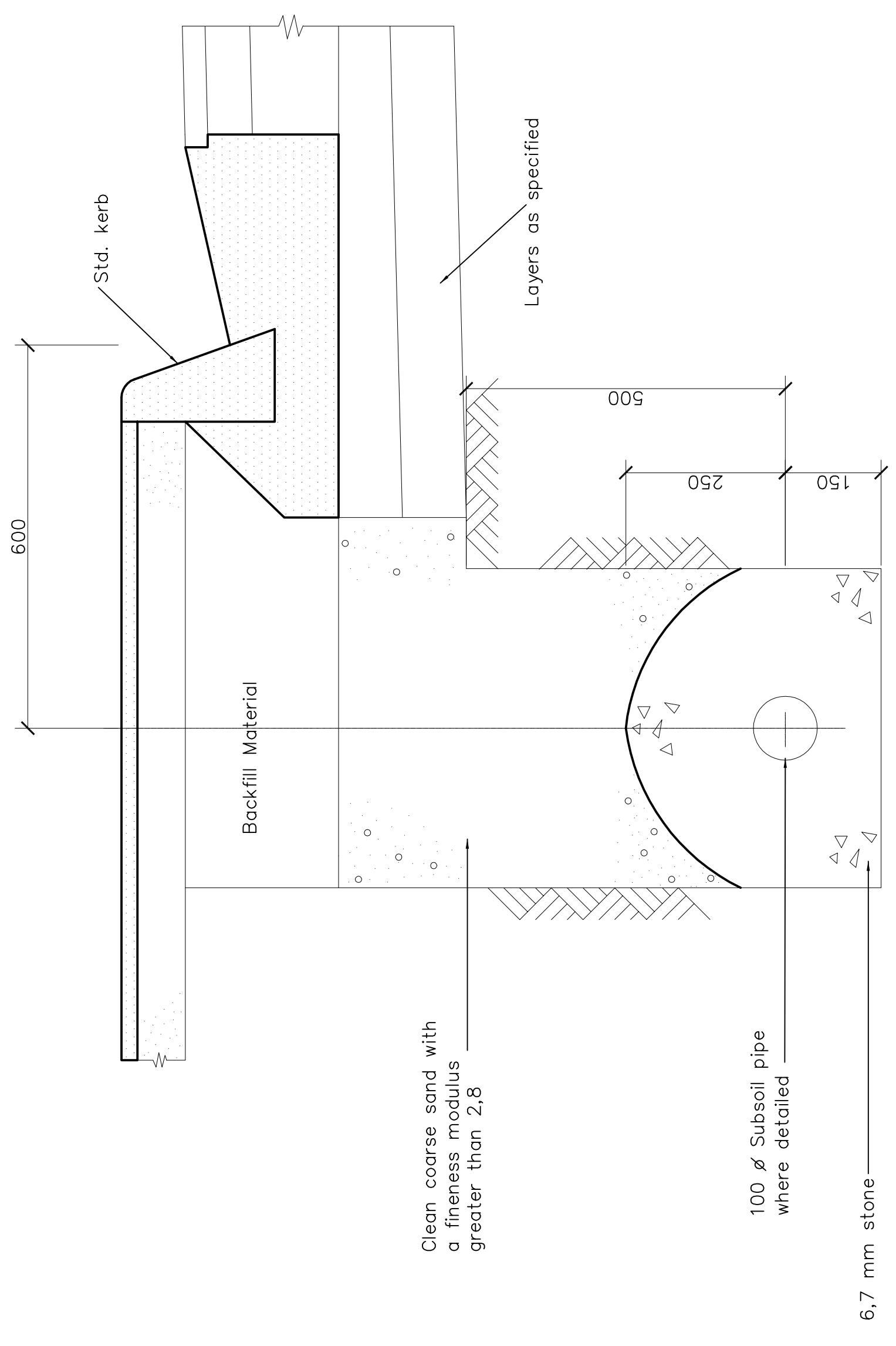
1

Sheets

CITY ENGINEERS SERVICE UNIT	DWG. NO.
ROADS DEPARTMENT	
PLAN DESCRIPTION	
CONTINUED FROM	
CONTINUED ON	
CROSS SECTIONS	
TYPICAL CROSS SECTION	
SURVEY LAYOUT	



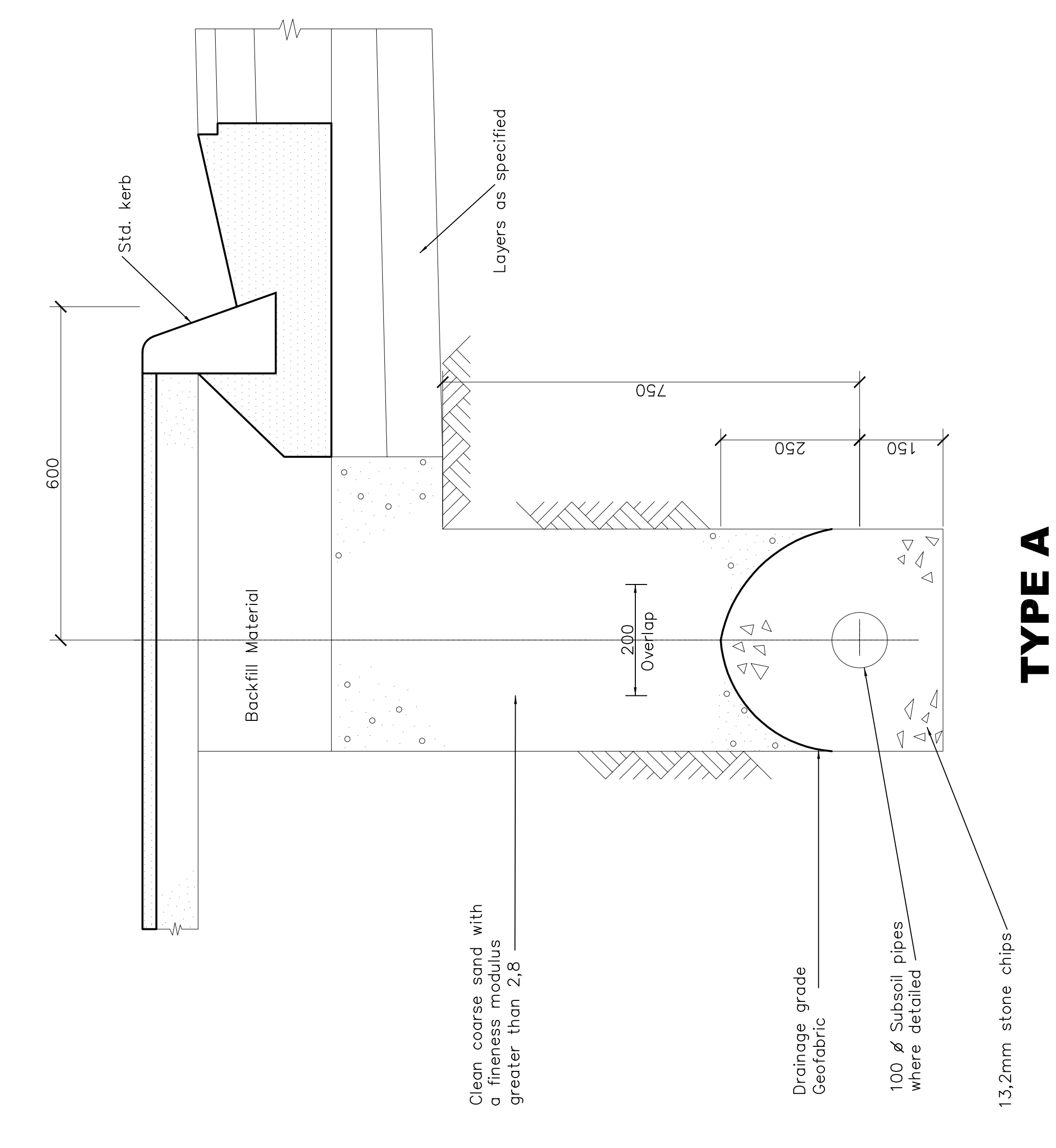
TYPE C COMBINED SUB-SOIL / S.W. TRENCH



TYPE B GRADED FILTER

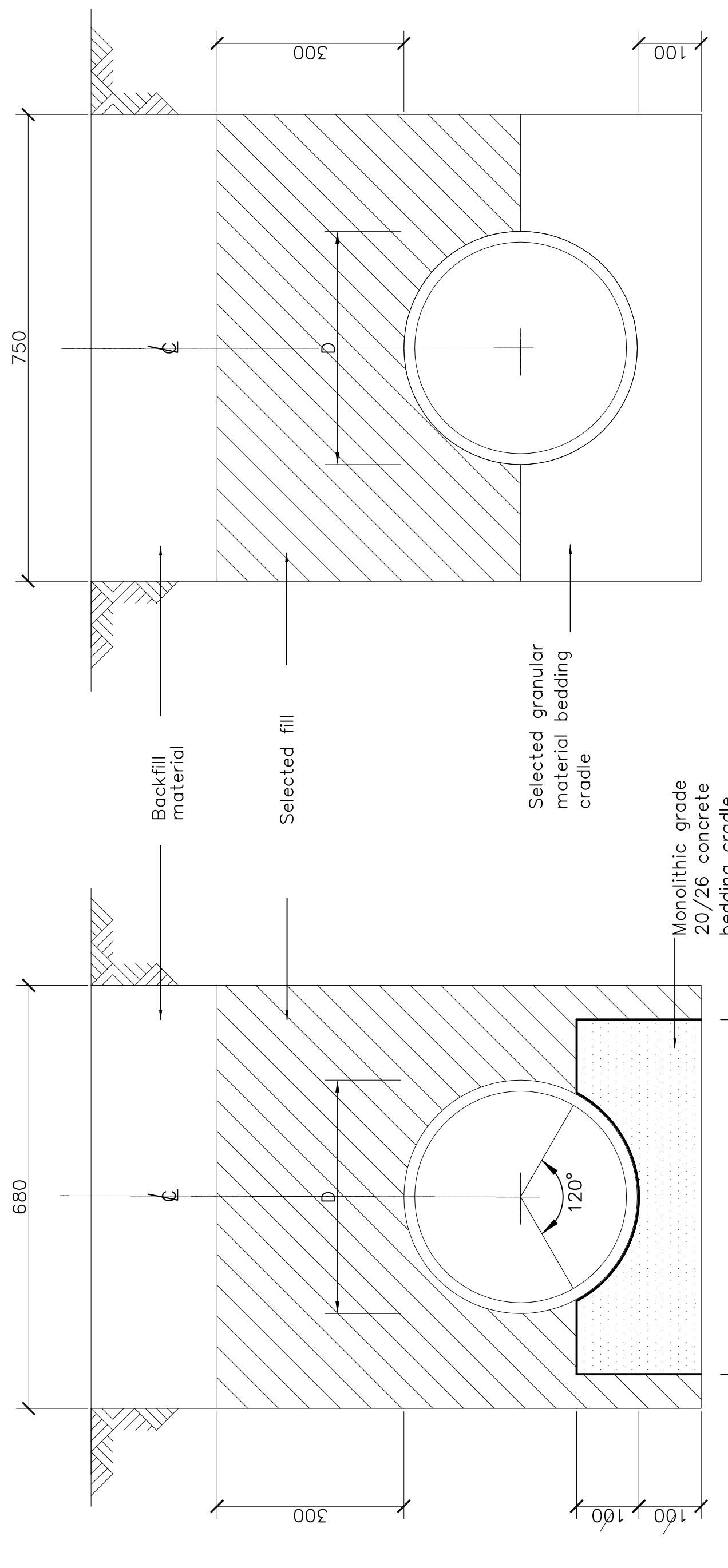
- NOTE:
- Sand, stone, geofabric and pipe required for the sub-soil drains are to comply with the requirements of Clause P.6.3 of the specification.
 - Unless otherwise specified the sub-soil drains are to be laid at the min. depths indicated. Min grade of the drain is to be 1%.
 - W = Pay width
 - D = O.D. of pipe
 - Where detailed by Engineer clean coarse sand layer shall be extended to the edge of the road and / or raised to the level indicated for types A and B.

SUB-SOIL DRAIN DETAILS SCALE: 1:10



TYPE A

- D/4 = 300 Max. with
- 100 min. Trench in soil
 - 50 min For trench in rock
- In soil:
- X = D/6; 75 min. 200 max.
 - In Rock X = D/4; 150 min. 200 max.

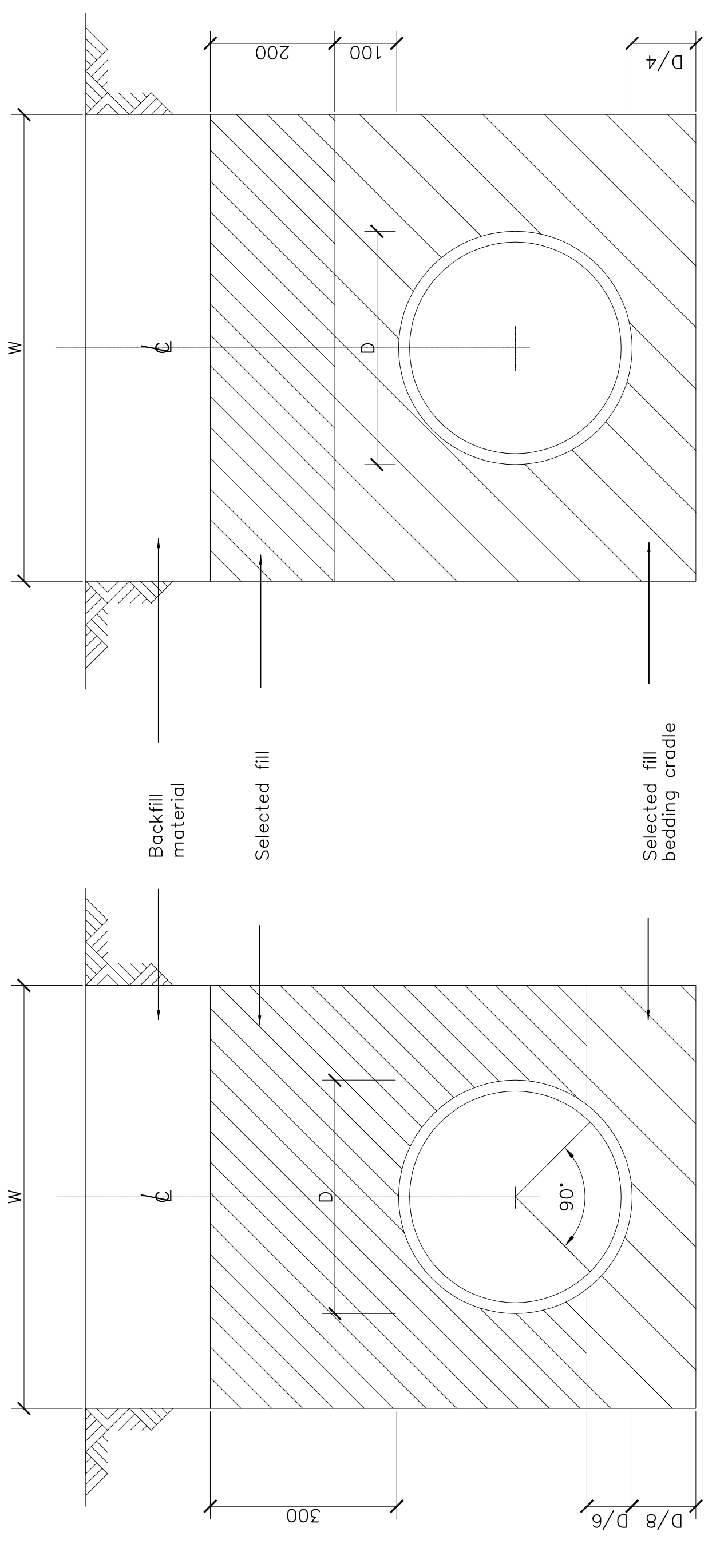


CLASS B

CLASS A

- In soil: D/8; 75 min. 200 max.
- In Rock: D/8; 100 min. 200 max.

D/4 = 100 min. 200 max.

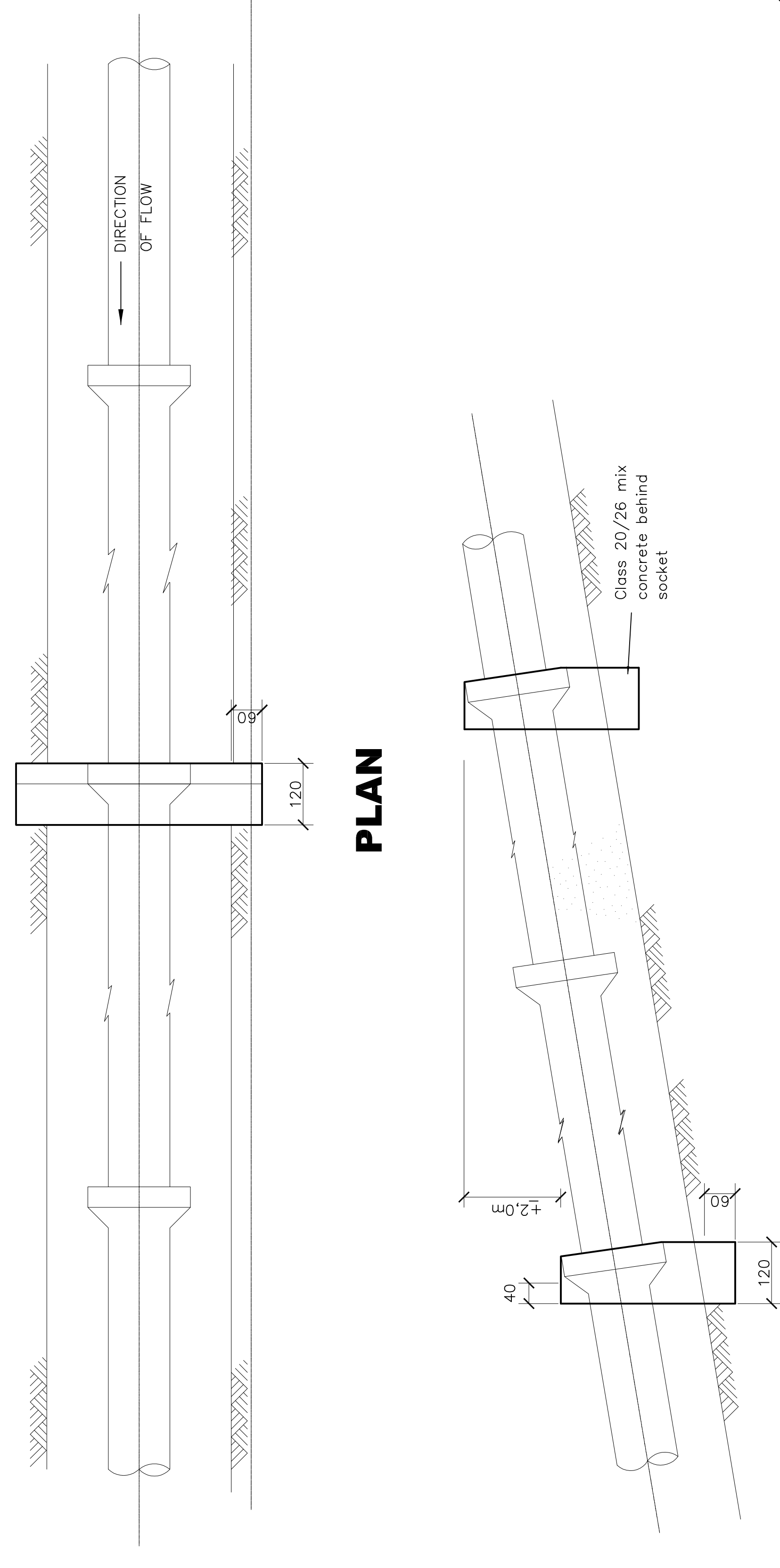


CLASS C

FLEXIBLE PIPE

W = Trench pay width
D = Outside diameter of pipe

PIPE BEDDING DETAILS SCALE: 1:10



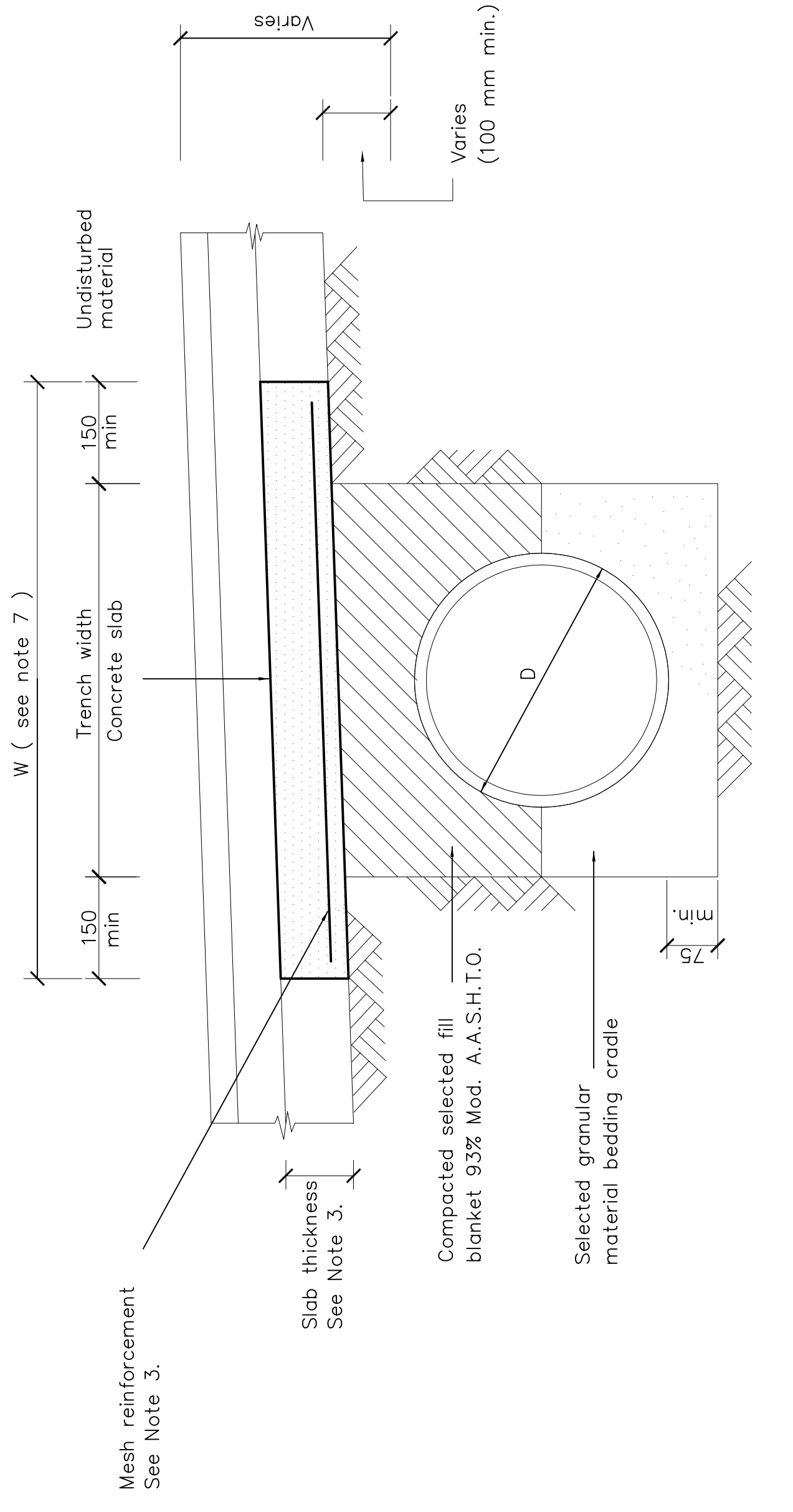
PLAN

SECTION

ANCHOR BLOCK DETAILS SCALE 1 : 25

- NOTE:
- Sides and bottom of anchor blocks to be embedded to a min. depth of 150 mm into undisturbed in situ material.
 - No anchor blocks required where flexible pipes are used i.e. H.D. u.p.v.c. pipes.

DETAILS OF PIPE PROTECTION FOR REDUCED DEPTH OF COVER SCALE 1:10



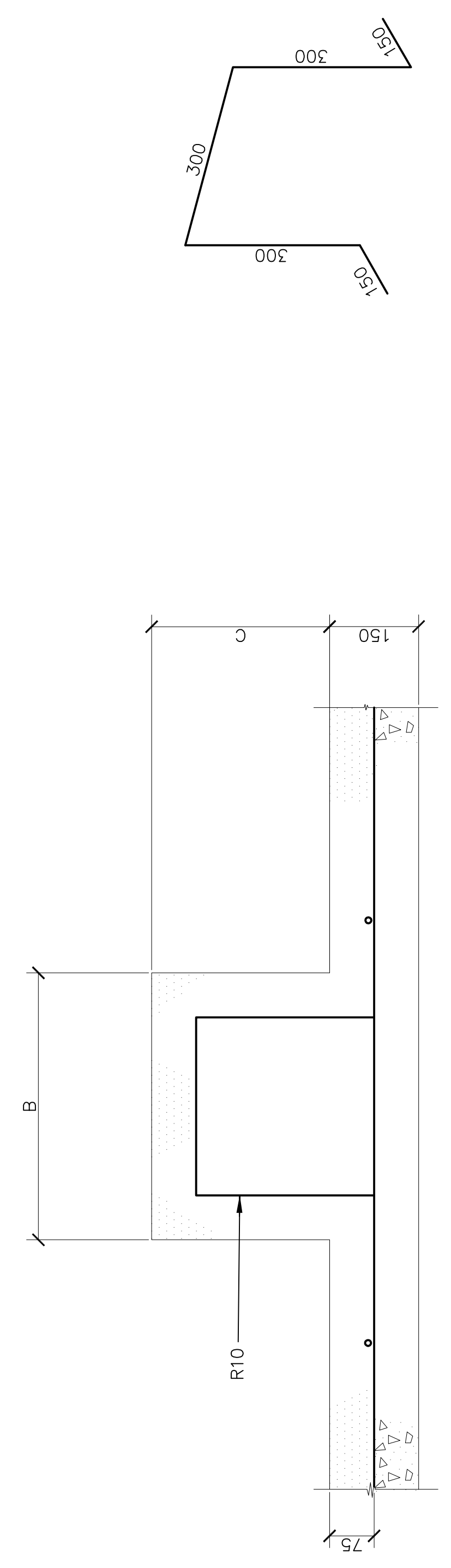
NOTE

- This detail applies where cover is less than 300mm in servitudes and less than 600mm in road reserves.
- Class "B" Bedding is shown.
- Slab thickness and reinforcing details will be confirmed by the Engineer.
- Slab is to consist of grade 20/26 concrete.
- Cover to reinforcement is to be 35mm.
- Construction joints are to be formed in the slab at intervals not exceeding 5.0m.
- W = Trench width + 300mm in undisturbed material.

PLAN DESCRIPTION	DWG. NO.
CONTINUED FROM	
CONTINUED ON	
CROSS SECTIONS	
TYPICAL CROSS SECTION	
SURVEY LAYOUT	



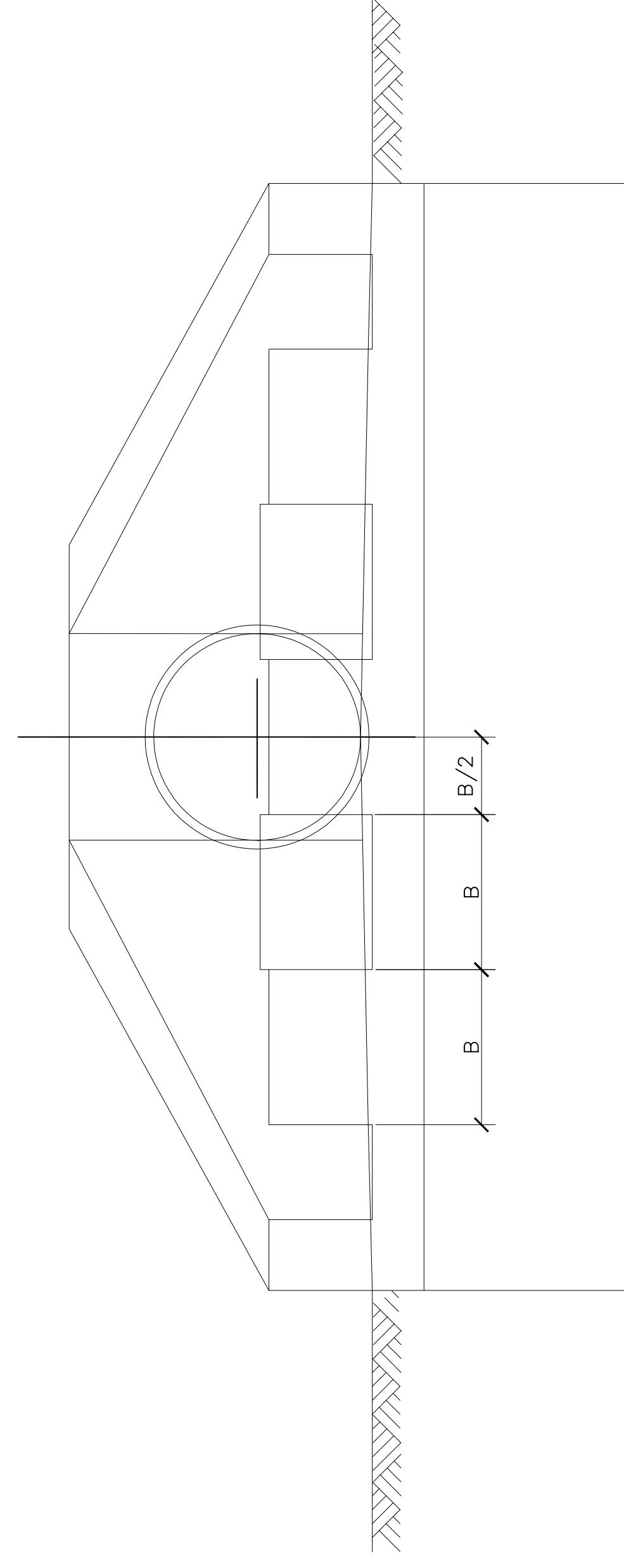
SECTION THROUGH BLOCK



BLOCK REINFORCING (R 10)

SPLITTER BLOCK DETAILS

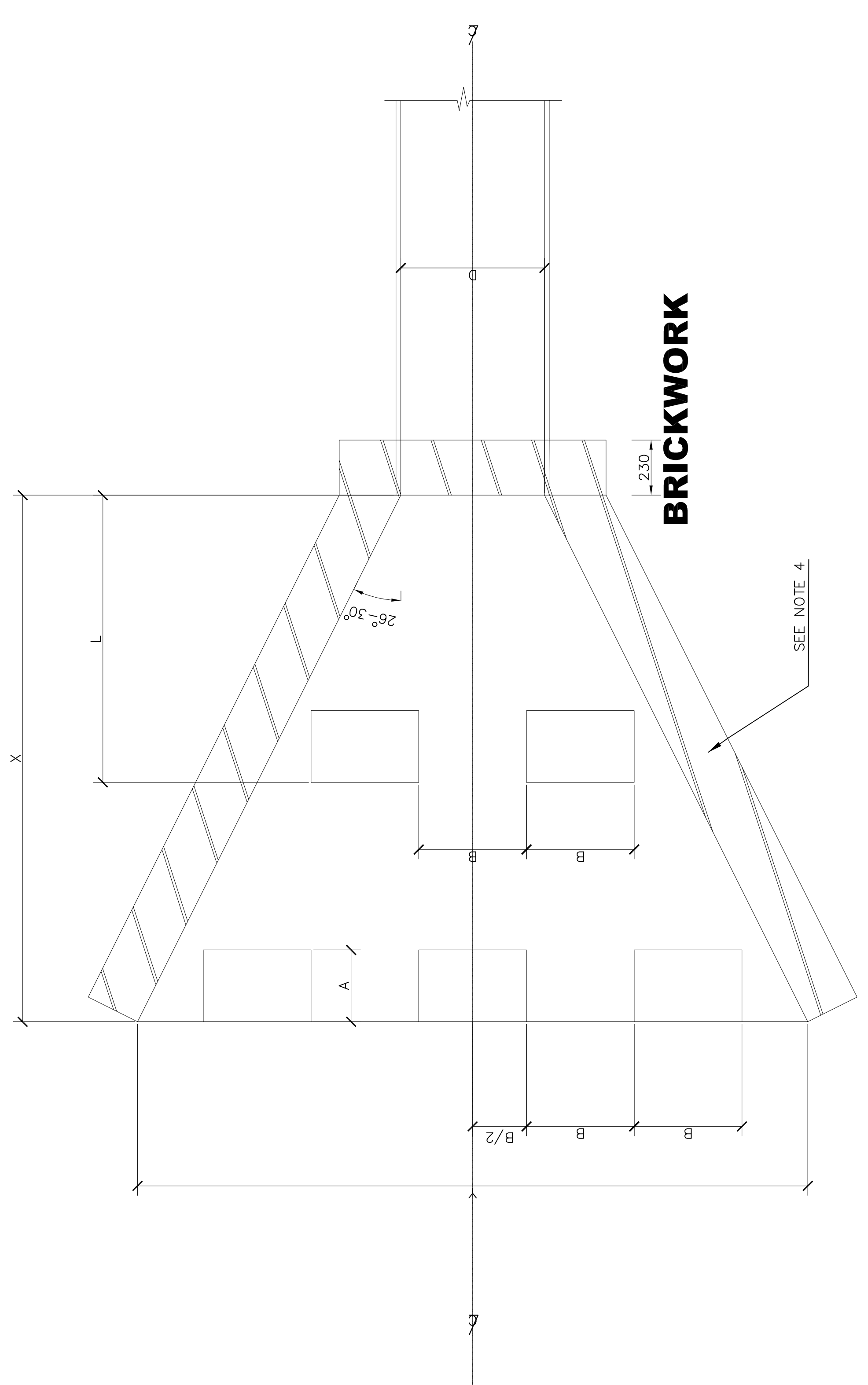
SCALE 1:10



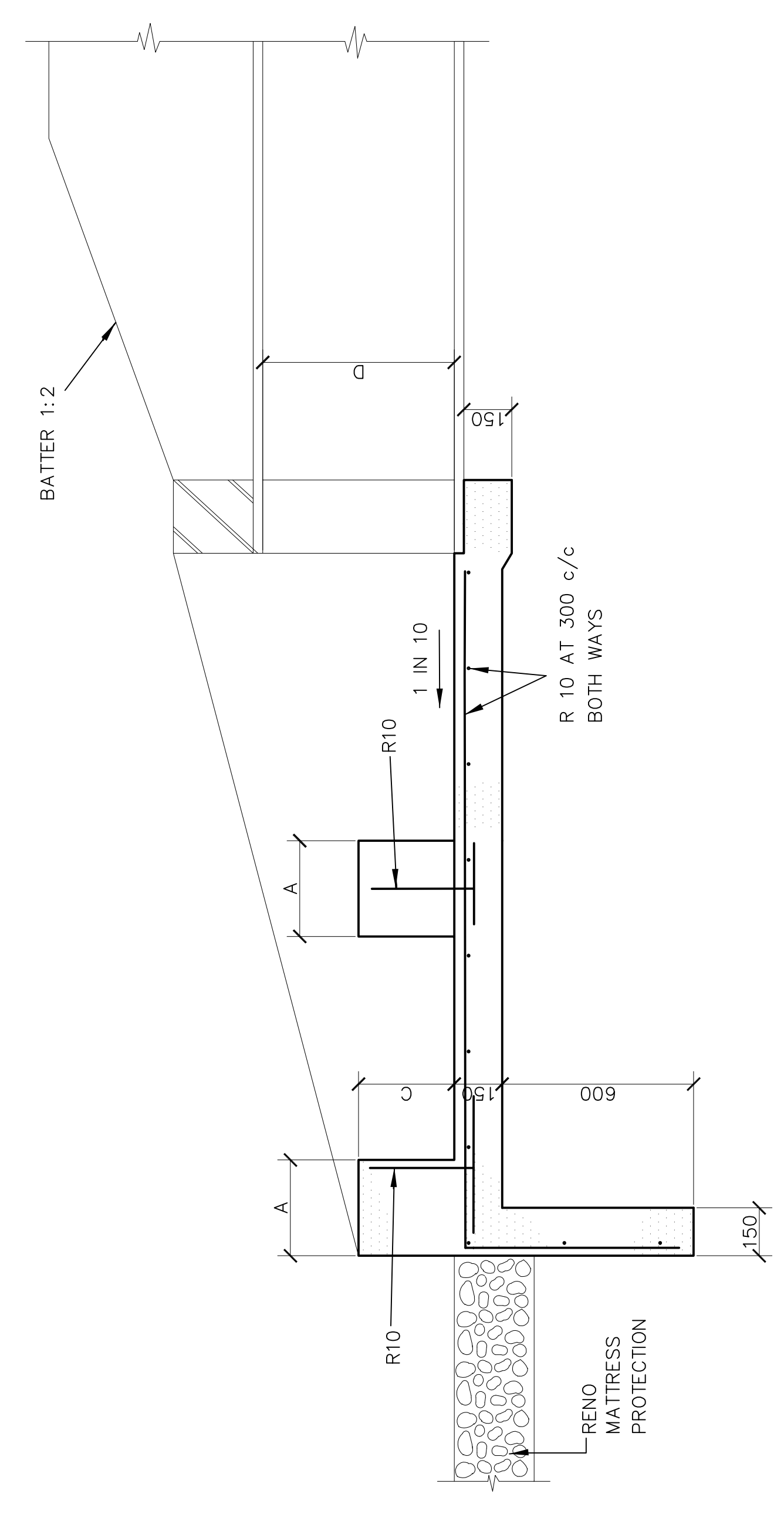
TYPE 'A' HEADWALL - ELEVATION

NOM. PIPE DIA.	DIMENSIONS (mm)									
	D	A	B	C	L	X	Y			
375	245	350	250	980	980	1800	2250			
450	245	360	250	980	980	1800	2250			
525	250	375	250	1050	1050	2000	2525			
600	300	450	300	1200	1200	2200	2800			
750	300	450	300	1500	1500	2400	3150			
825	300	450	300	1650	1650	2600	3425			
900	300	450	300	1800	1800	2800	3700			
1050	300	450	300	2100	2100	3000	4050			
1200	300	450	300	2400	2400	3200	4400			

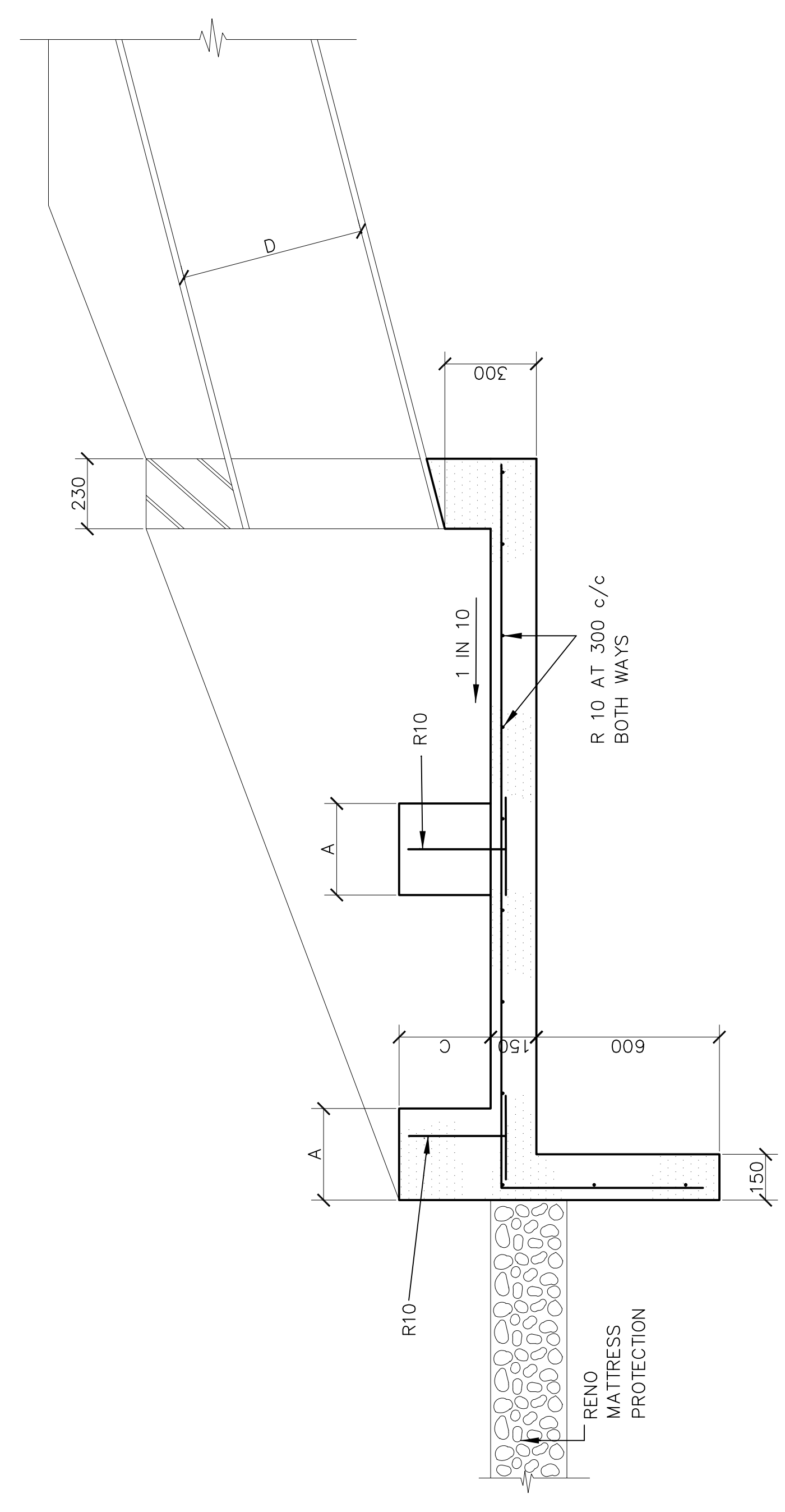
- NOTES :
- 1) CONCRETE GRADE 20/25 MPa
 - 2) COVER TO STEEL 40mm MIN.
 - 3) REINFORCING TO BE CUT AND BENT ON SITE. MIN. LAPS 500mm
 - 4) HEADWALL BRICKWORK SIZES (IN mm) :
WALL HEIGHT 0-1100 230
1100-1400 345
1400-1800 460
 - 5) ALL EXPOSED BRICKWORK TO BE FACEBRICK (REFER CLAUSE F 3.5.2. DEPARTMENTAL STANDARD SPECIFICATION)



PLAN OF TYPES 'A' AND 'B' HEADWALLS



TYPE 'A' HEADWALL WHERE PIPE GRADE IS LESS THAN 20% (1:5)



TYPE 'B' HEADWALL WHERE PIPE GRADE IS GREATER THAN 20% (1:5)

Revision	Date	Description
A	19-3-98	DIMENSIONS FOR PIPE COVER TO BE 450 ALTERED IN TABLE

NOTE: No construction work of any kind and service acquisitions have been completed		NORTH POINT
Acquisitions completed		
TYPE	DATE	SIGNATURE
UNDERGROUND SERVICES CHECKED		
SEWERAGE		
WATER MAINS		
G.P. CABLES		
ELECTRIC CABLES		
T.V. CABLES		
TELEPHONE		
CO. PIPE LINE		

NOTE: Only underground services affected by new construction work. Contractors must be given advance notice for road boundaries, services, drains, culverts, water mains and connections. Wherever possible, these must be located before any projects.

Contract No.	
Project Title	

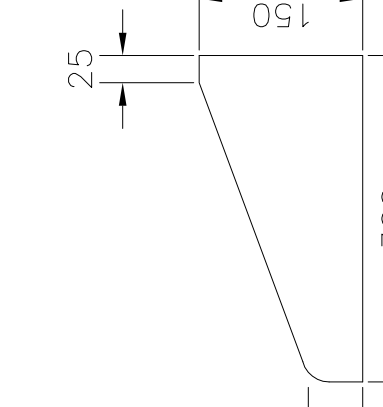
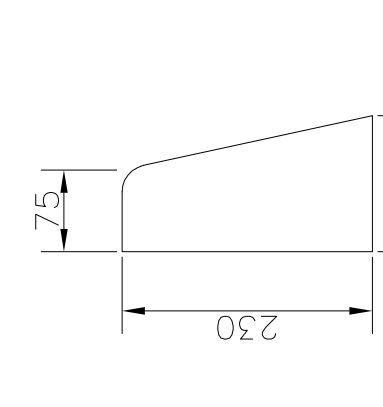
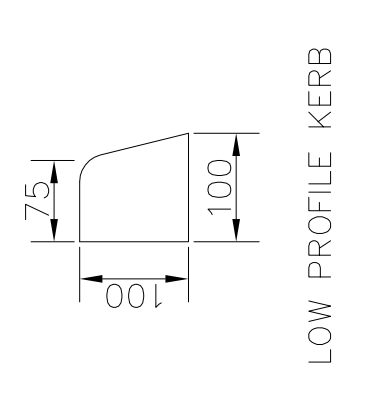
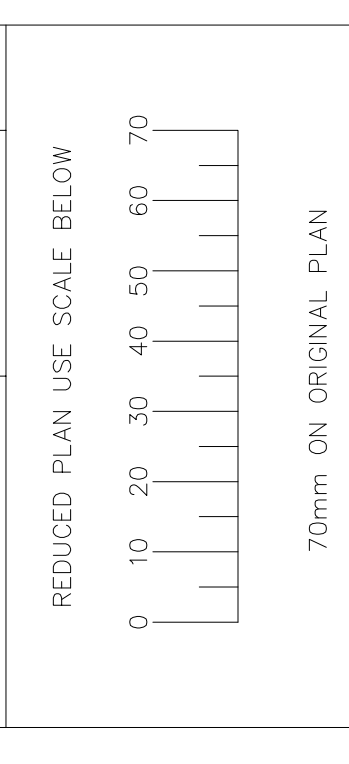
STANDARD DRAWING

Drawing Title	
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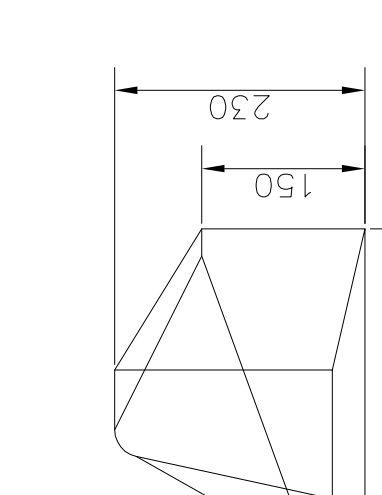
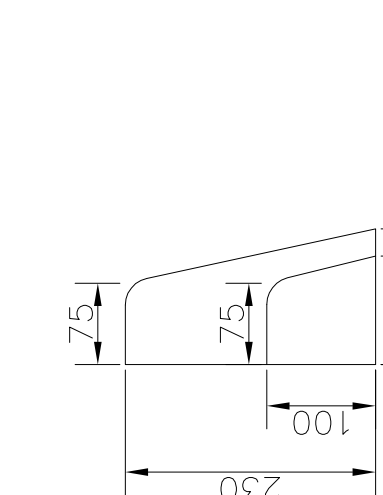
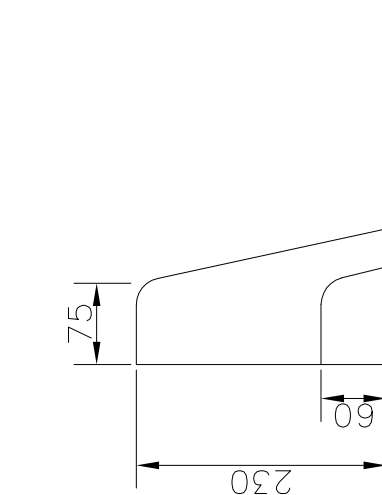
HEADWALL DETAILS

Scales	DATE OF ISSUE
	1:20 FEBRUARY 1990
AS SHOWN	DESIGNED
	DATE
	1995-12-05
	DRAWN
	M.F. BURNETT
	CHECKED
	MANAGER
	RD(N)
	DIRECTOR
	ROOFS

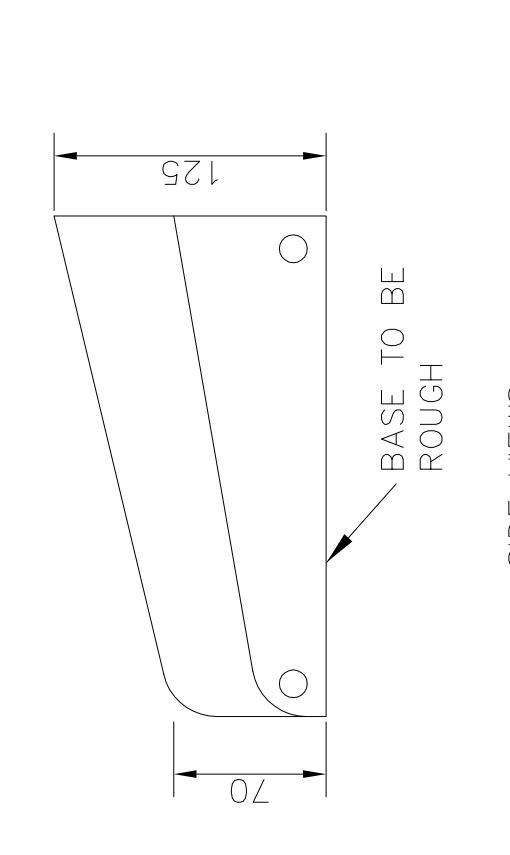
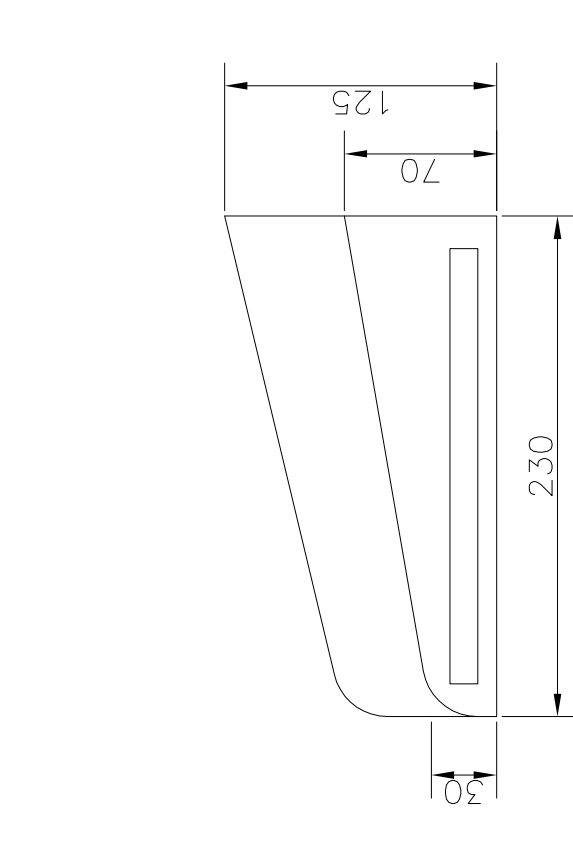
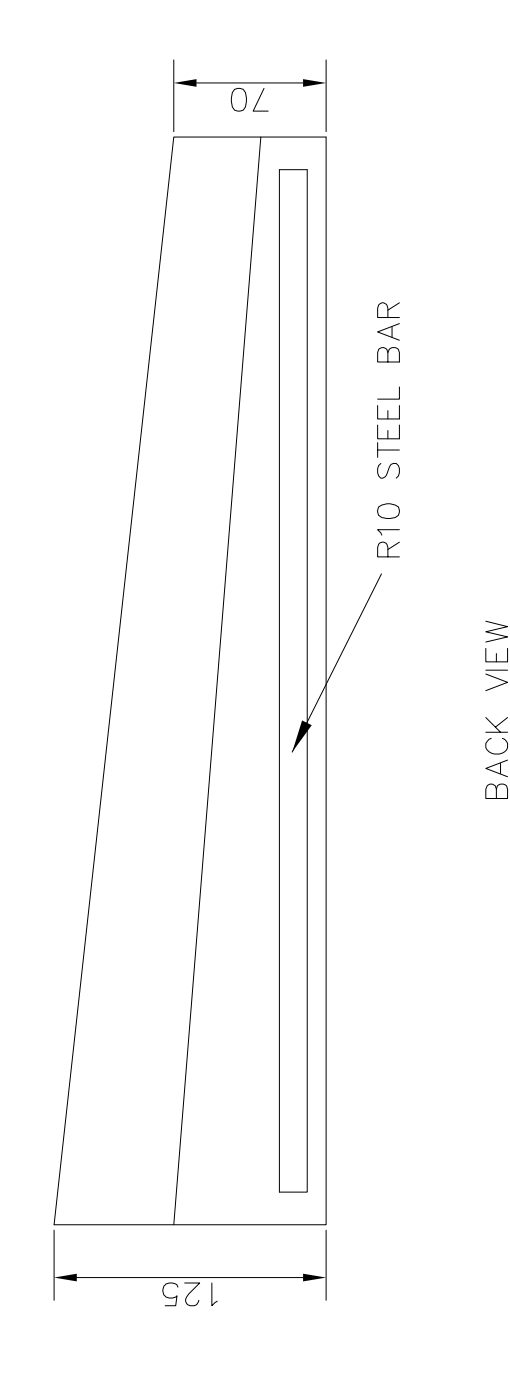
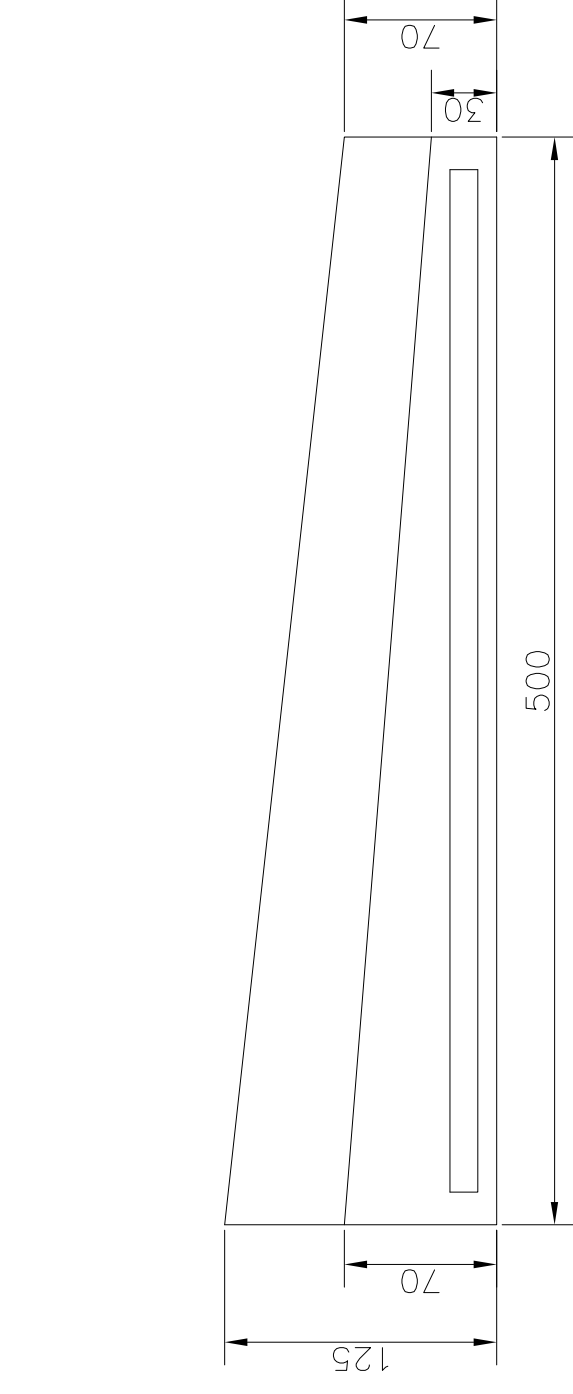
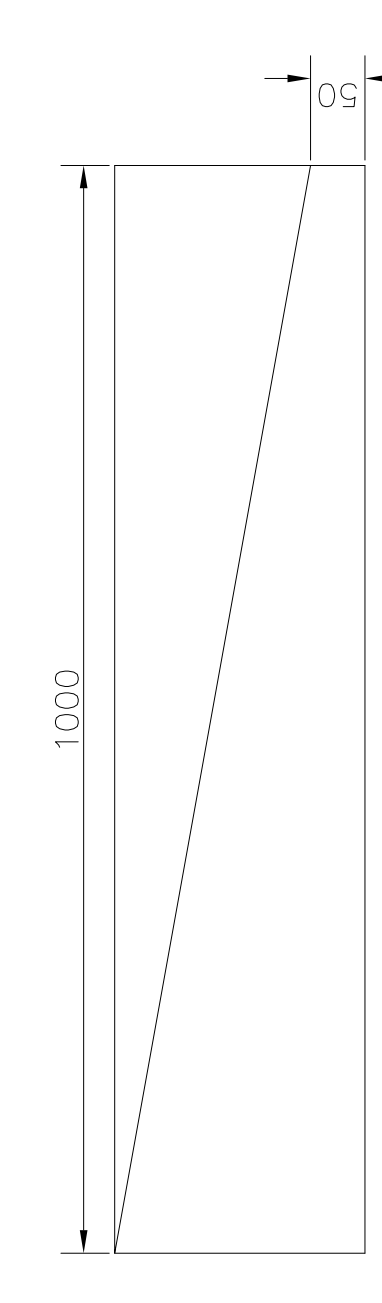
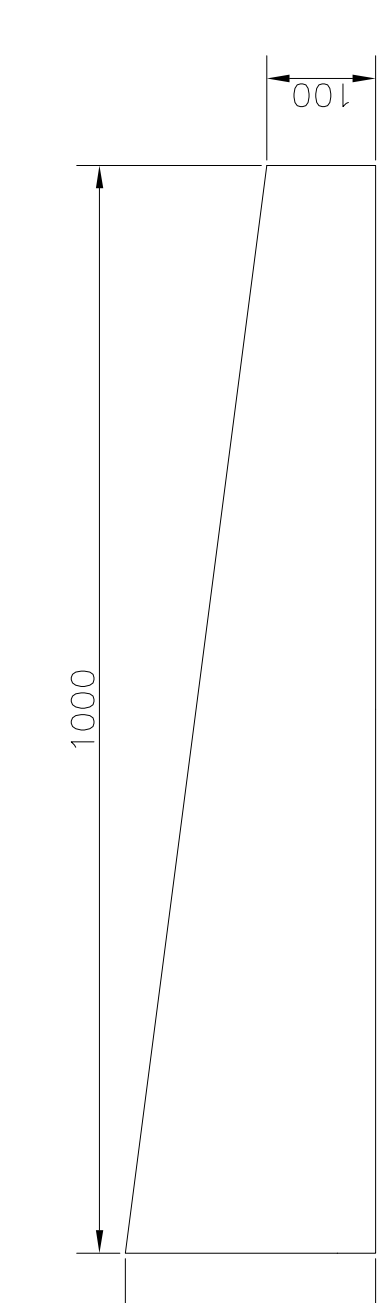
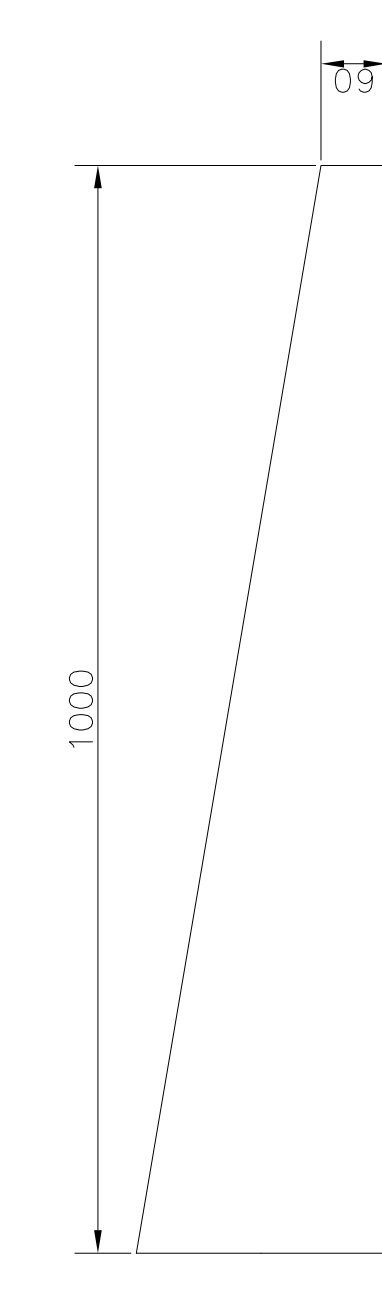
CITY ENGINEERS SERVICE UNIT ROADS DEPARTMENT	DWG. NO.
PLAN DESCRIPTION	
CONTINUED FROM	
CONTINUED ON	
CROSS SECTIONS	
TYPICAL CROSS SECTION	
SURVEY LAYOUT	



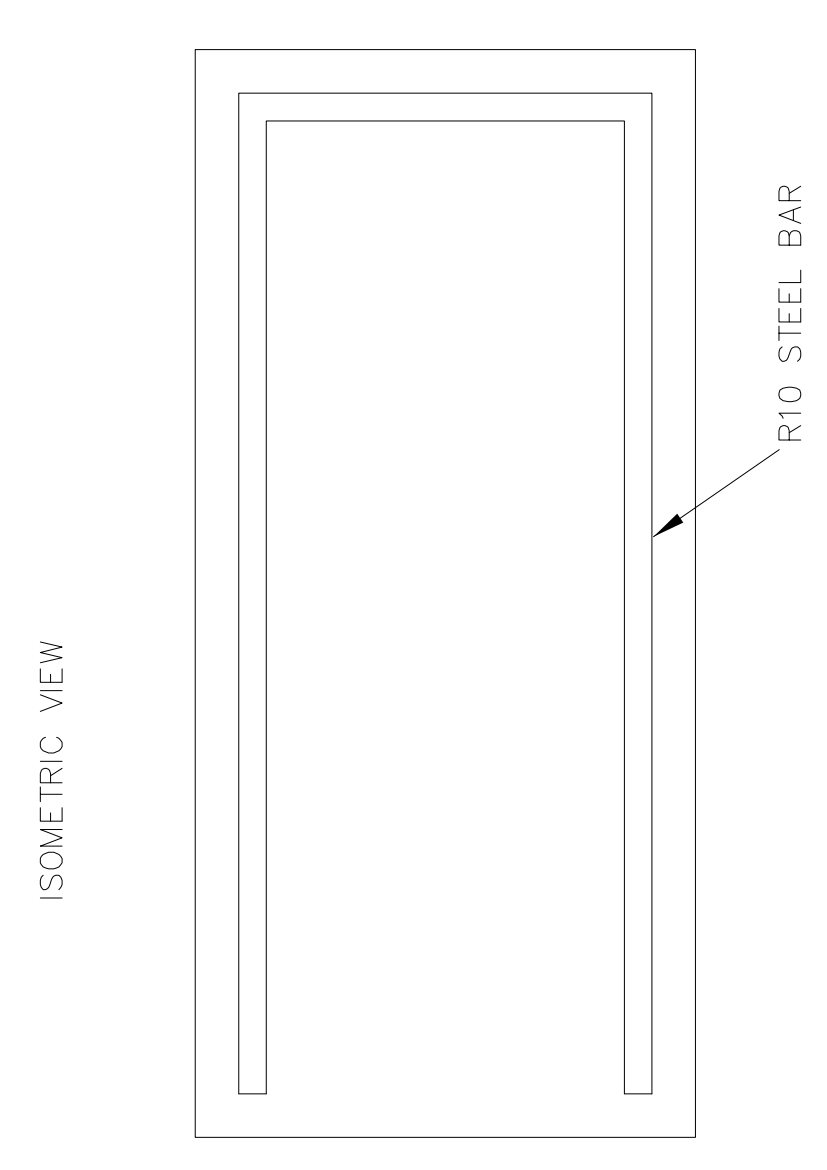
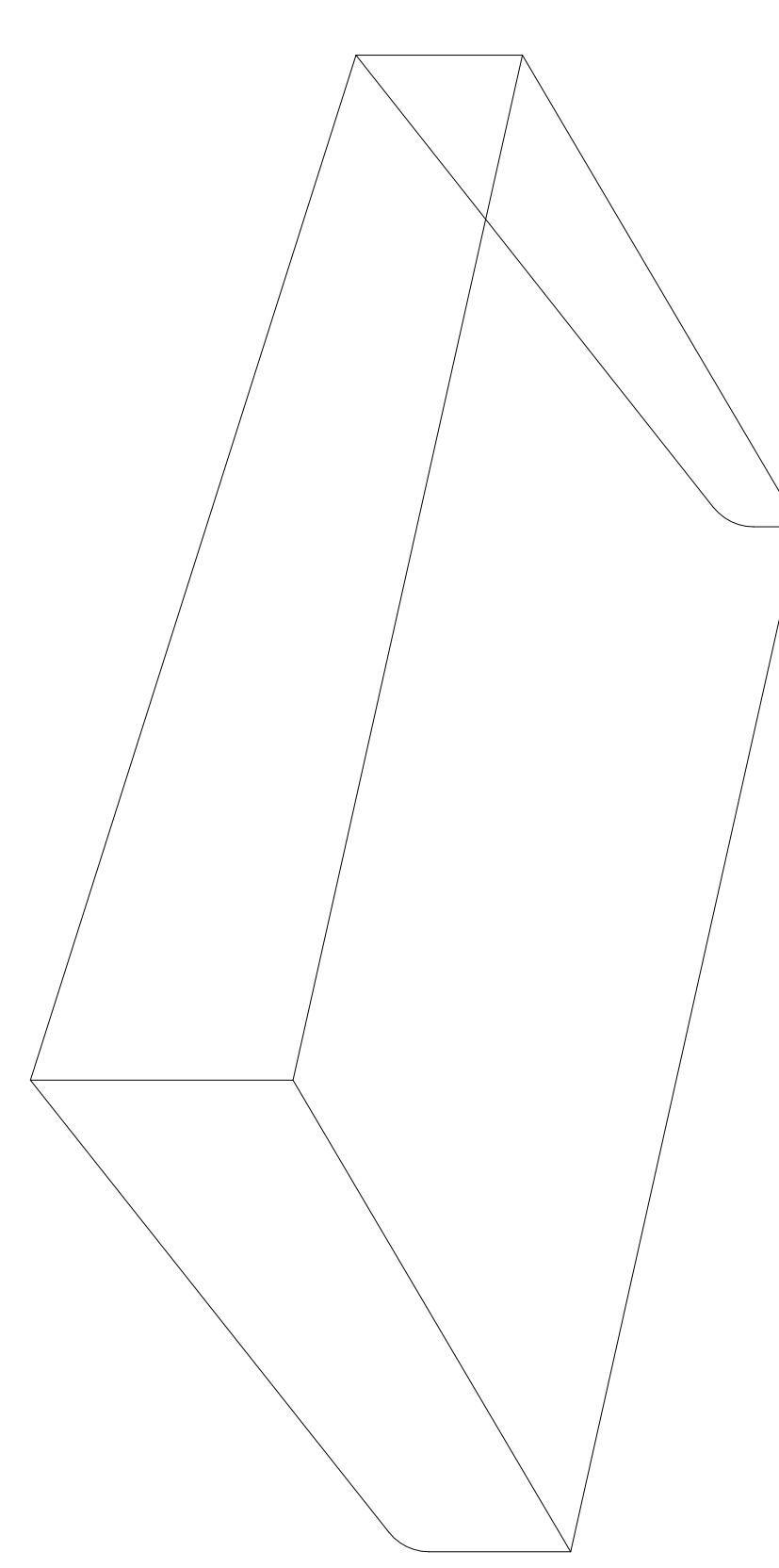
KERB DETAILS



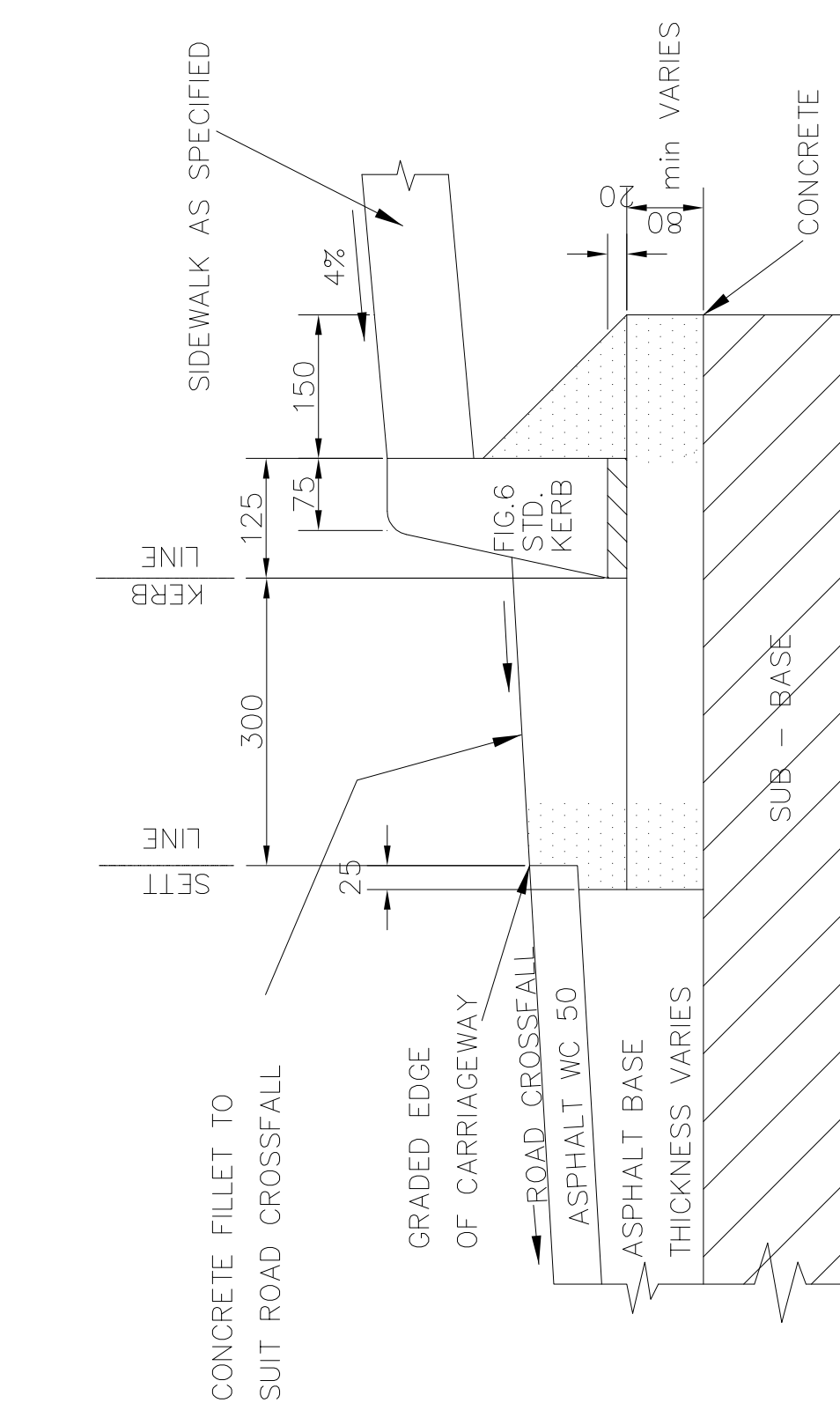
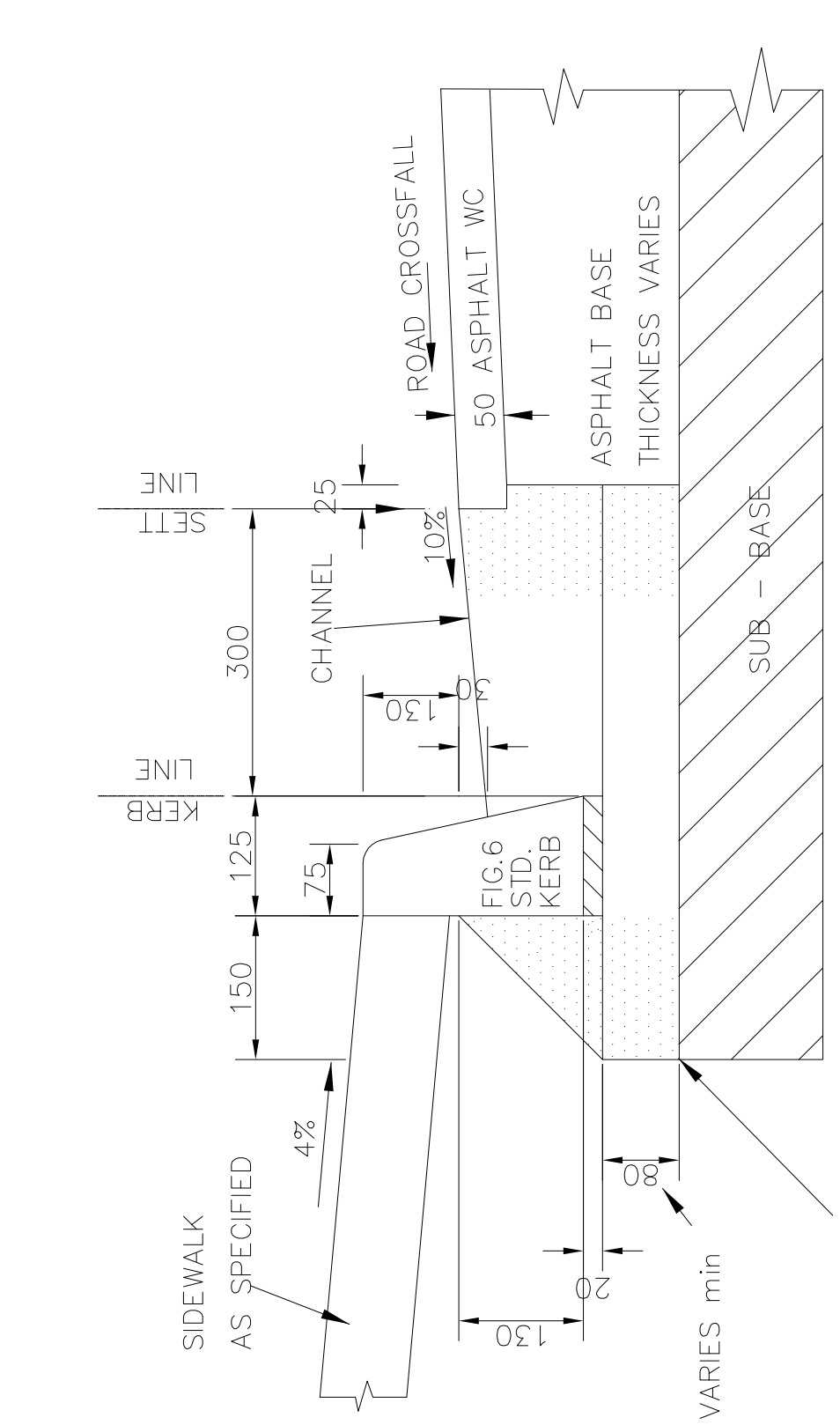
PRECAST CONCRETE STD TRANSITION KERBS USED WITH TYPES A,B,C & D KERBING.
SCALE 1:10



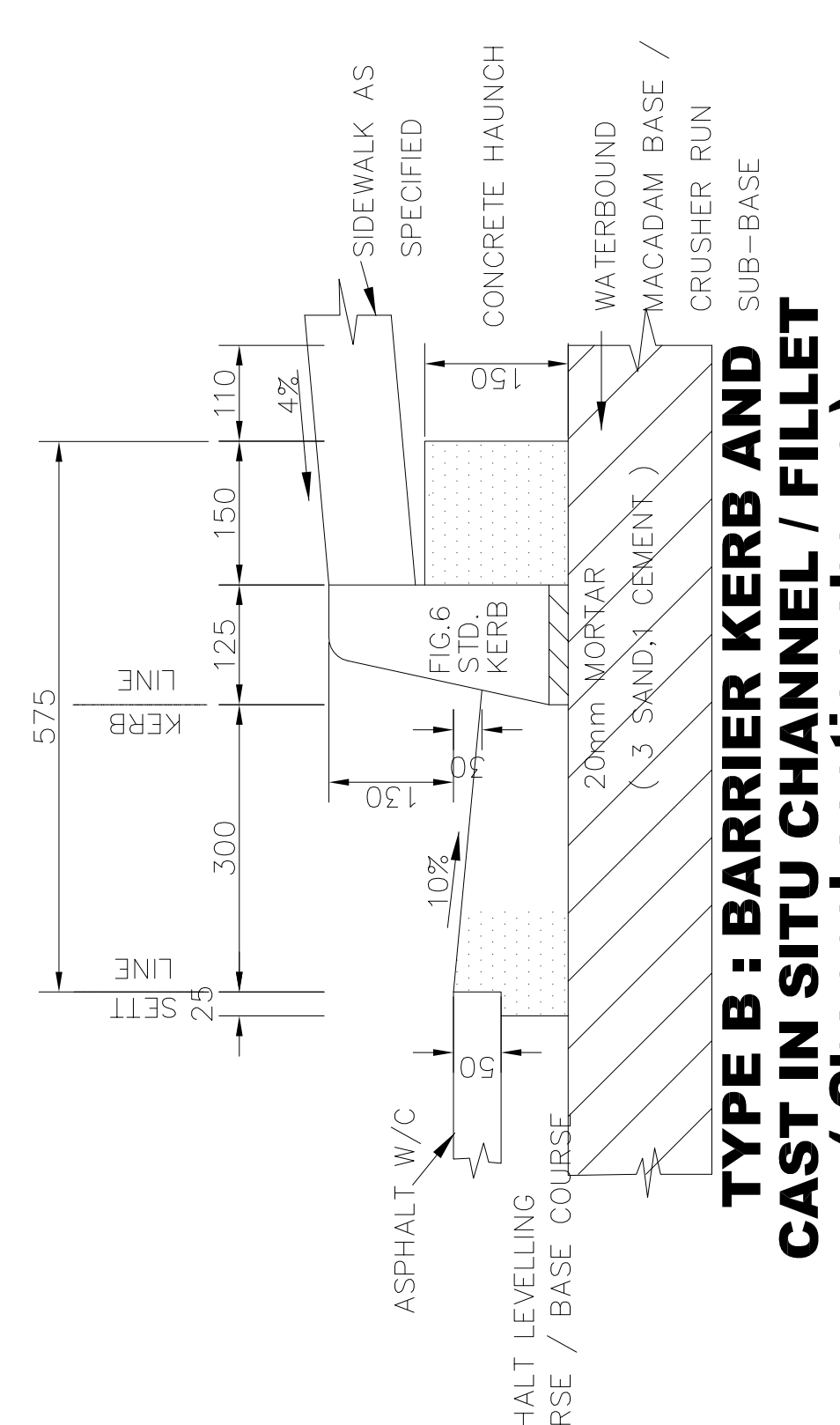
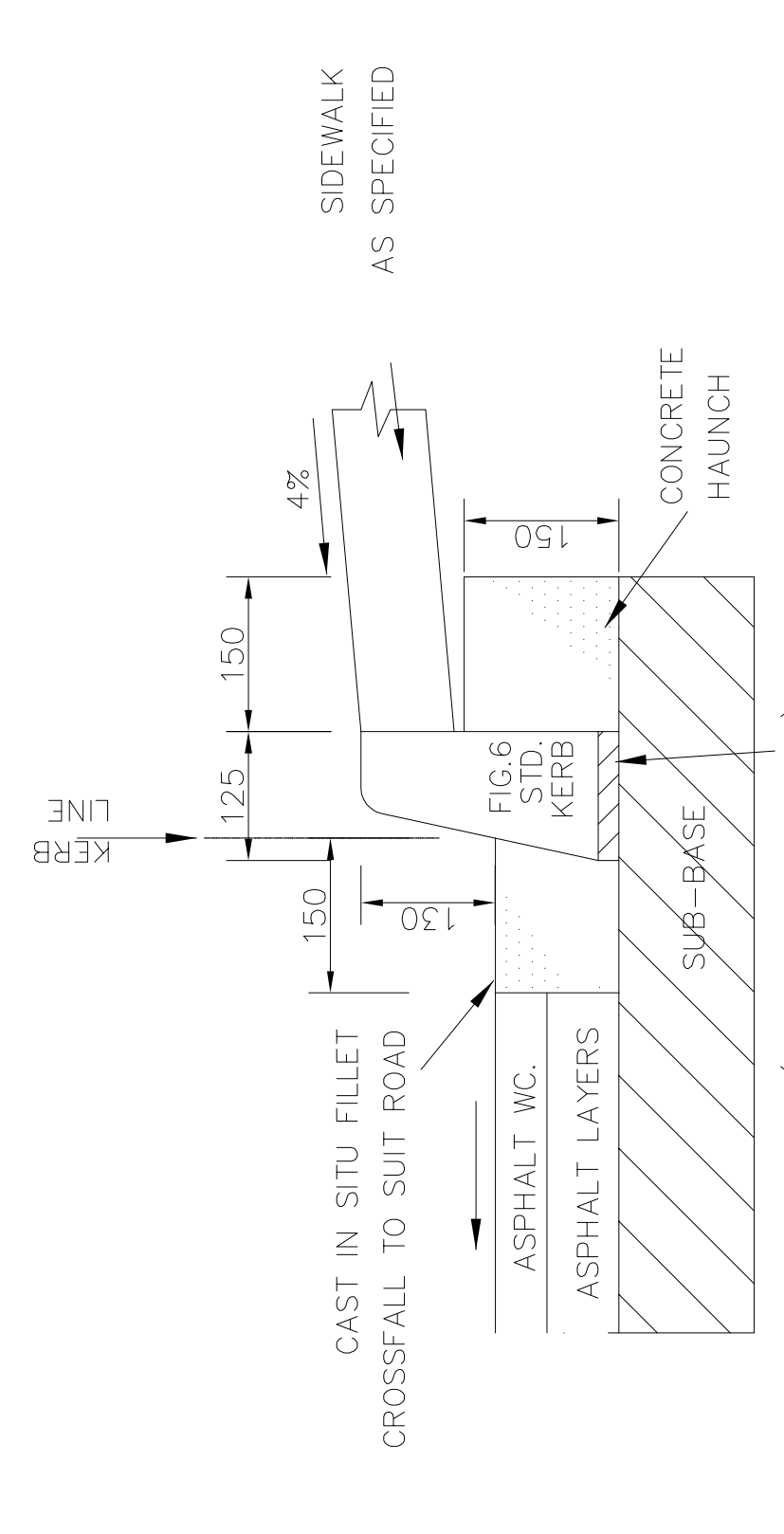
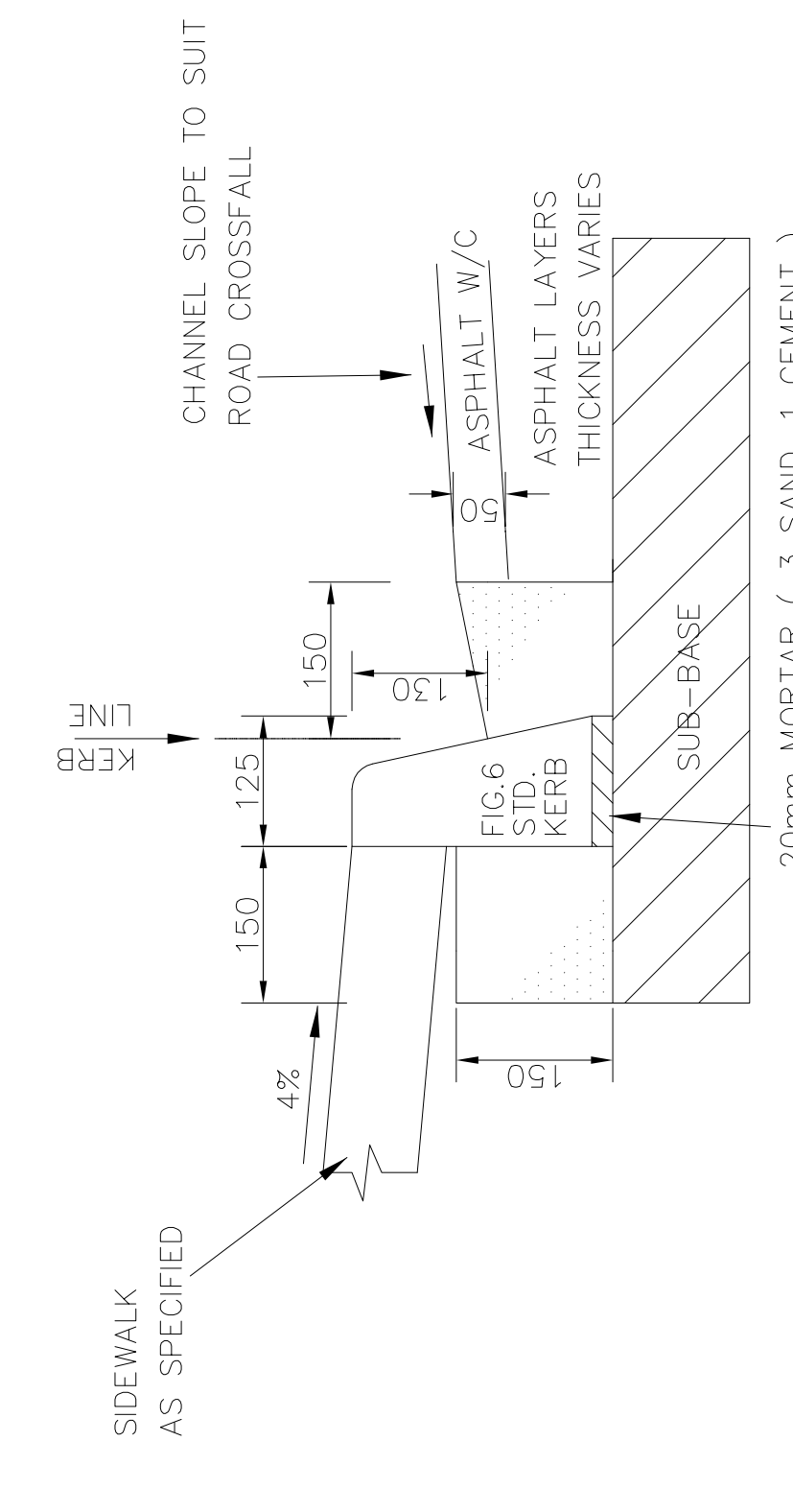
REINFORCED PRECAST CONCRETE TRANSITION KERB USED WITH TYPE "E" KERBING
SCALE 1:5



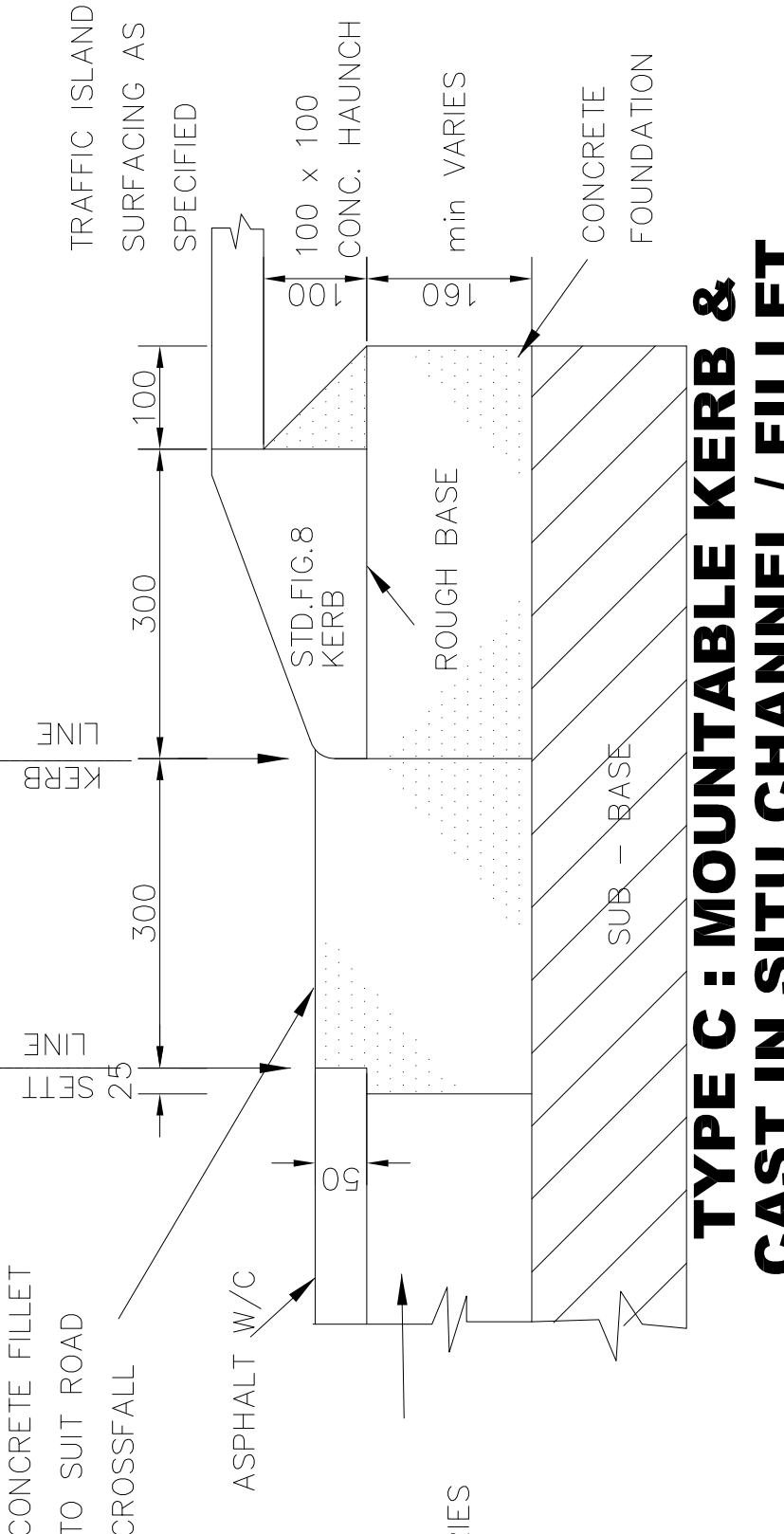
PLAN



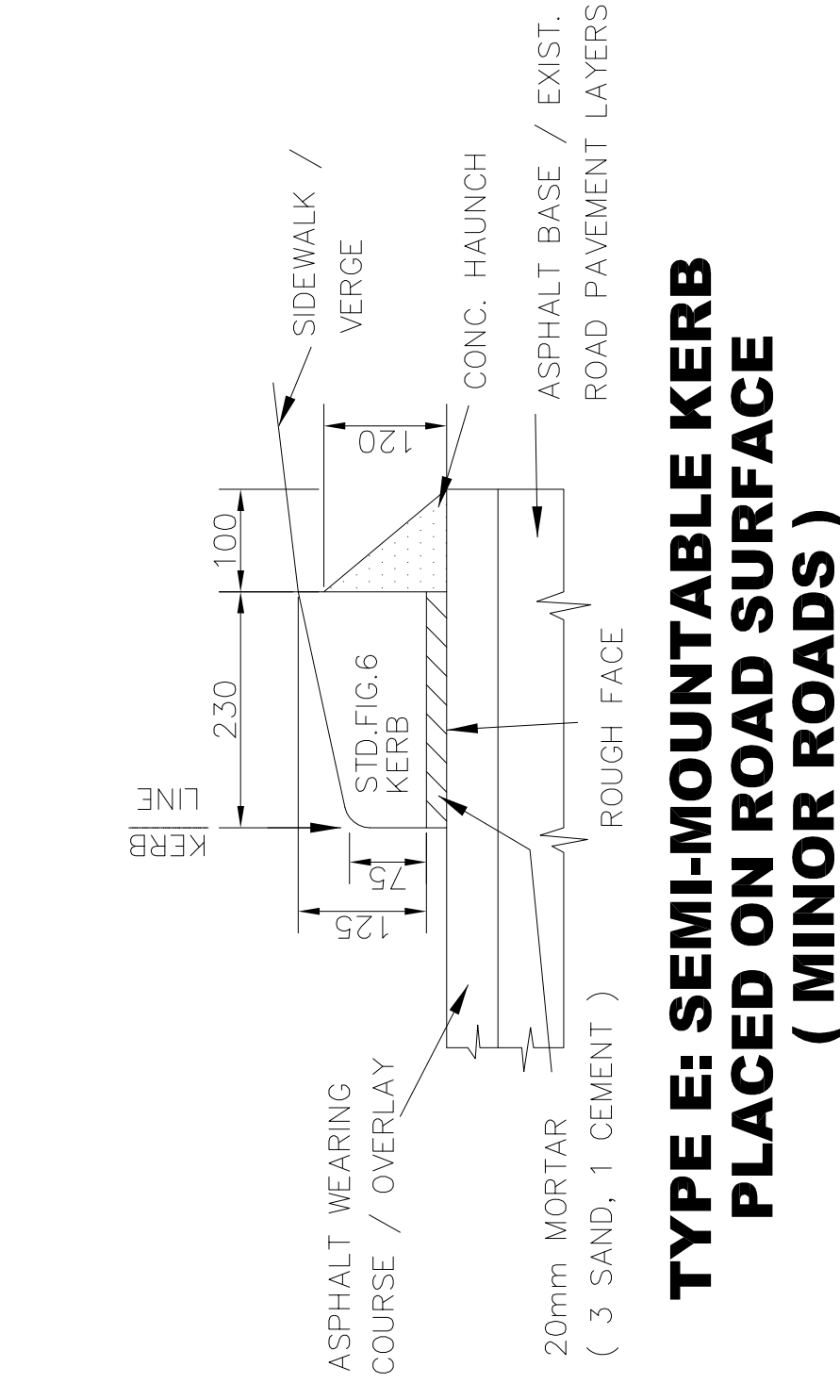
TYPE A : BARRIER KERB AND CAST IN SITU CHANNEL / FILLET (ARTERIAL ROADS)
SCALE 1:10



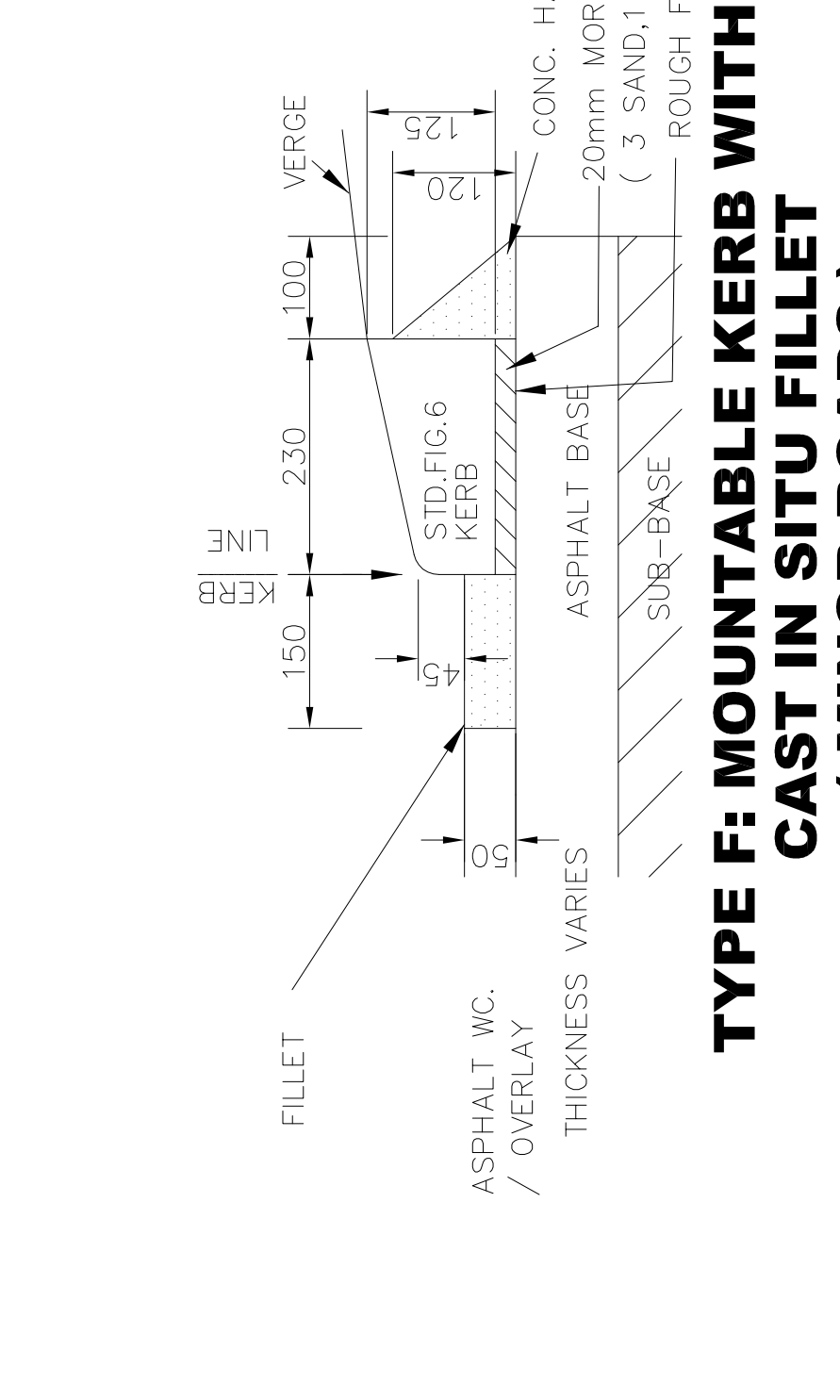
TYPE B : BARRIER KERB AND CAST IN SITU CHANNEL / FILLET (Channel section shown)
SCALE 1:10



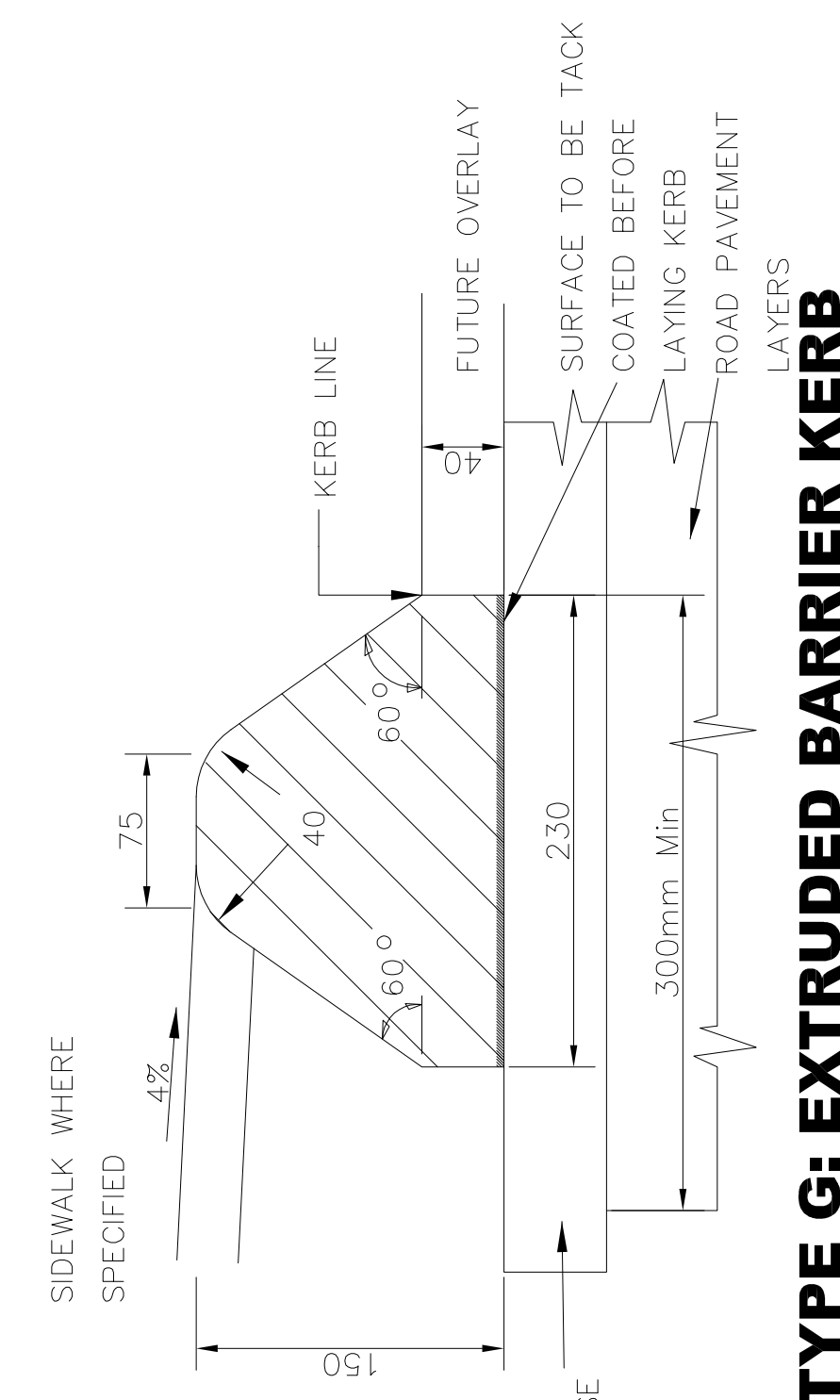
TYPE C : MOUNTABLE KERB & CAST IN SITU CHANNEL / FILLET (Fillet section shown)
SCALE 1:10



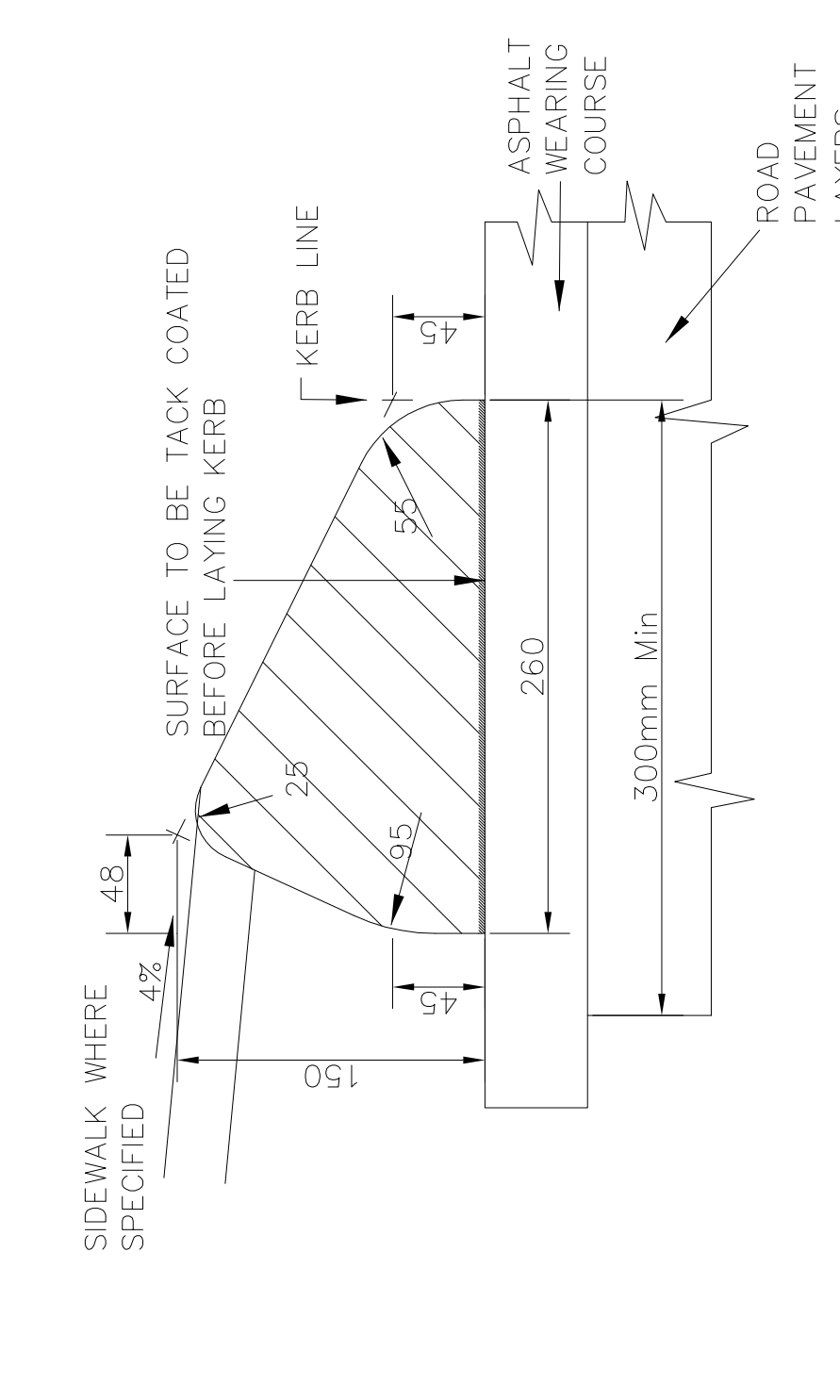
TYPE E: SEMI-MOUNTABLE KERB PLACED ON ROAD SURFACE (MINOR ROADS)
SCALE 1:10



TYPE F: MOUNTABLE KERB WITH CAST IN SITU FILLET (MINOR ROADS)
SCALE 1:10



TYPE G: EXTRUDED BARRIER KERB
SCALE 1:5



TYPE H: EXTRUDED MOUNTABLE KERB
SCALE 1:5

- GENERAL NOTES:-
- ALL CAST IN SITU CONCRETE IS TO BE GRADE 20 / 13.
 - THE SURFACES OF THE CAST IN SITU CHANNEL / FILLET ARE TO HAVE A STEEL FLOAT FINISH.
 - EXPANSION JOINTS TO BE FORMED THROUGH THE KERBING, CHANNEL / FILLET AND FOUNDATIONS AT INTERVALS NOT EXCEEDING 18.0m.
 - CONTRACTION JOINTS TO BE FORMED THROUGH THE CHANNEL / FILLET AT 20m INTERVALS.
 - WHERE KERB RADIUS IS LESS THAN 25m THE KERB LENGTH SHALL BE 300mm. WHERE THE KERB RADIUS IS LESS THAN 2m THE KERBING SHALL BE CAST IN SITU. PRECAST KERBS ARE TO BE LAID WITH A 13mm GAP BETWEEN KERBS, WHICH SHALL THEN BE FILLED WITH A CEMENT MORTAR.
 - EXTRUDED KERBS:
 - a) ASPHALT KERB: ASPHALT TO COMPLY WITH THE REQUIREMENTS OF CLAUSE EG.3.1
 - b) CONCRETE KERB: THE CONCRETE IS TO HAVE A CUBE STRENGTH OF 20MPa AT 28 DAYS. THE CONCRETE MIX DESIGN IS TO BE APPROVED BY THE ENGINEER.
 - c) CONTRACTION JOINTS TO BE FORMED AT 2.0m INTERVALS.
 - d) EXPANSION JOINTS ARE TO FORMED AT 6.0m INTERVALS ON STRAIGHTS AND 2.0m INTERVALS WHERE THE KERB RADIUS IS LESS THAN 50m.

Revision	Date	Description
NOTE: No construction work is to be undertaken until all services and materials acquisitions have been completed.		
Acquisitions completed		
Author	DATE	SIGNATURE
Checked	DATE	SIGNATURE
Drawn	DATE	SIGNATURE
Water Marks		
Electric Cables		
Water Mains		
Gas Mains		
Other Services		
Scale		
North		
Point		
NOTE: Only approved services effected by the construction work may be used. All other services are to be provided by the contractor. The contractor is responsible for the provision of all services and materials. The contractor is responsible for the provision of all services and materials. The contractor is responsible for the provision of all services and materials.		
Contact No.		
Project Title		

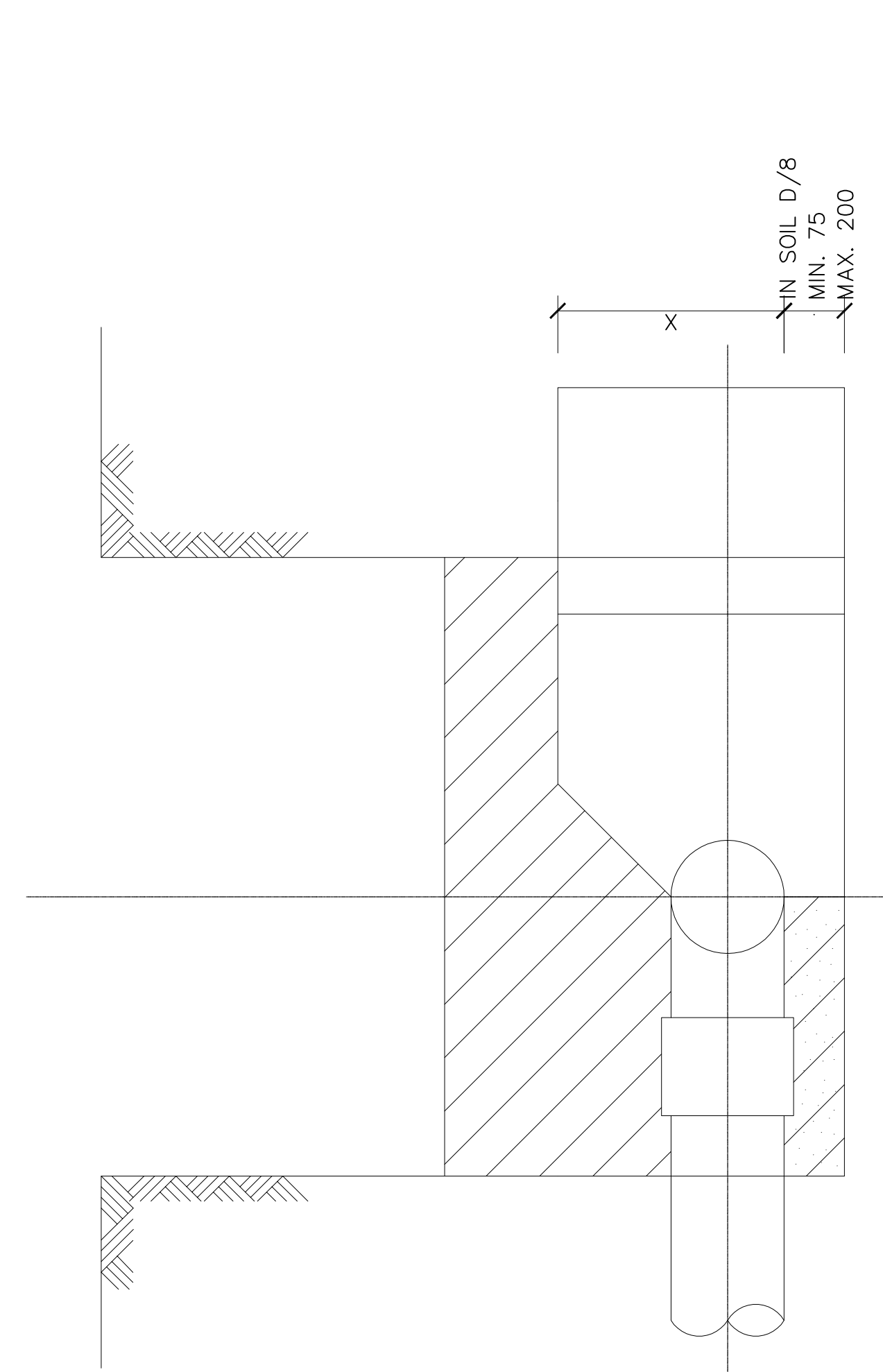
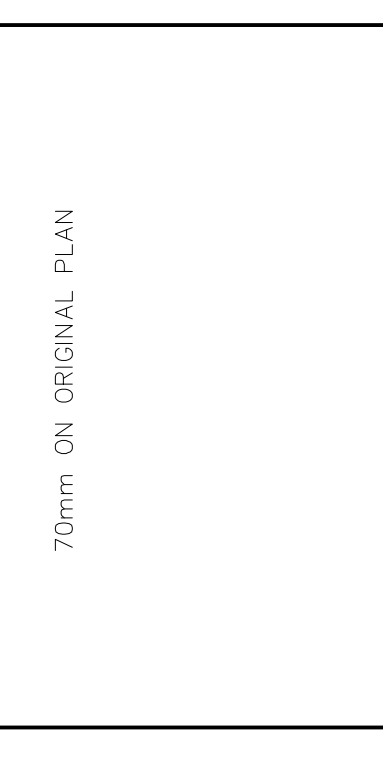
STANDARD DRAWING

KERBING DETAILS

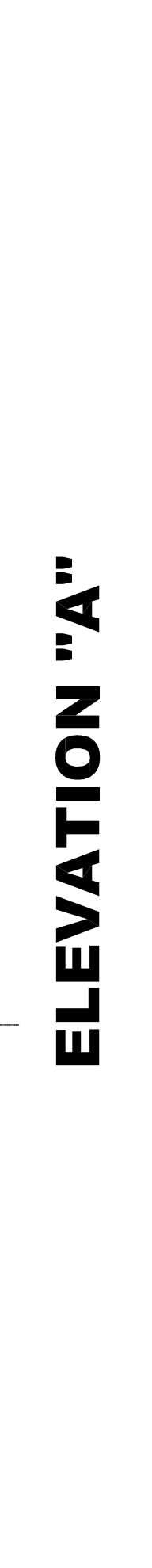
Scales	DATE OF ISSUE
AS SHOWN	FEBRUARY 1990
Plotting Scale	
1 : 10	
Designed	Date
G.J.P.	1985-12-06
Checked	Drawn
	M.F.BURNETT
Manager (B/N)	
Director : Roads	
R.A.Moore	Executive Director
Drawing No	38577
Sheet	of

NOTE:- WEARING COURSE LAID & THEN CUT BACK TO 150mm FROM FRONT TO KERB PRIOR TO THE FILLET BEING CAST.

PLAN DESCRIPTION	DWG. NO.
CONTINUED FROM	
CONTINUED ON	
CROSS SECTIONS	
TYPICAL CROSS SECTION	
SURVEY LAYOUT	



TEE



BEND

PLAN

PLAN

ELEVATION "A"

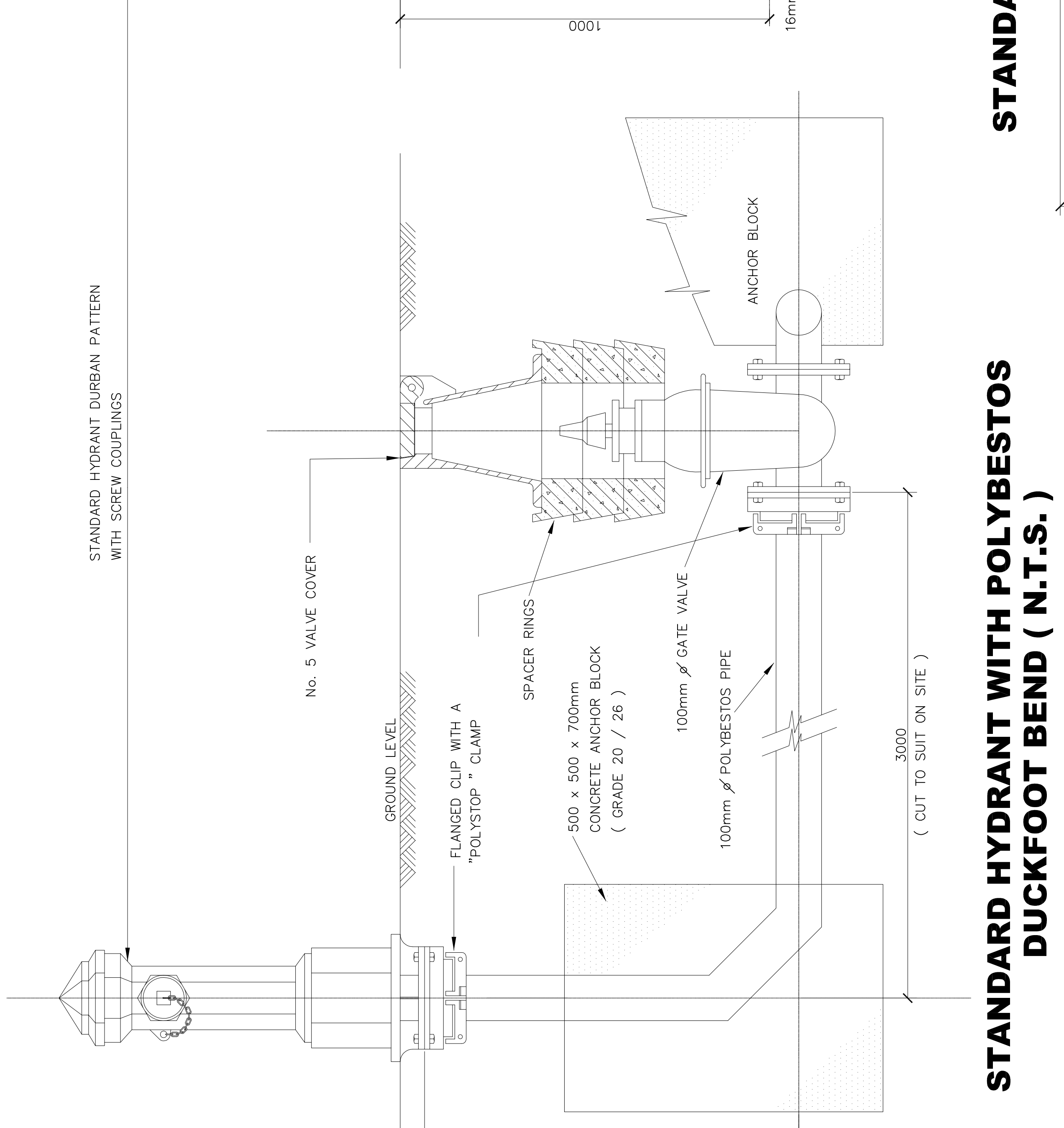
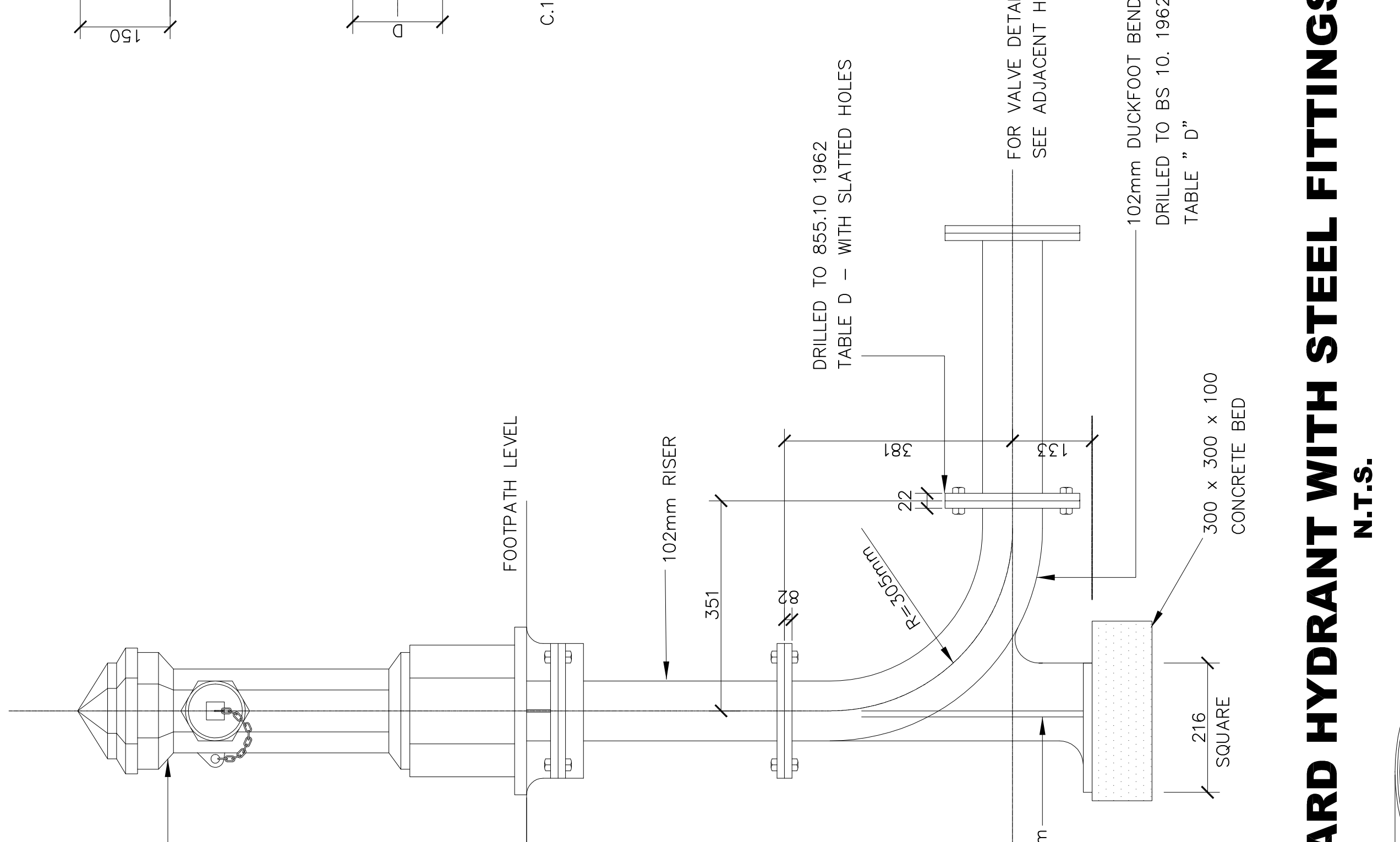
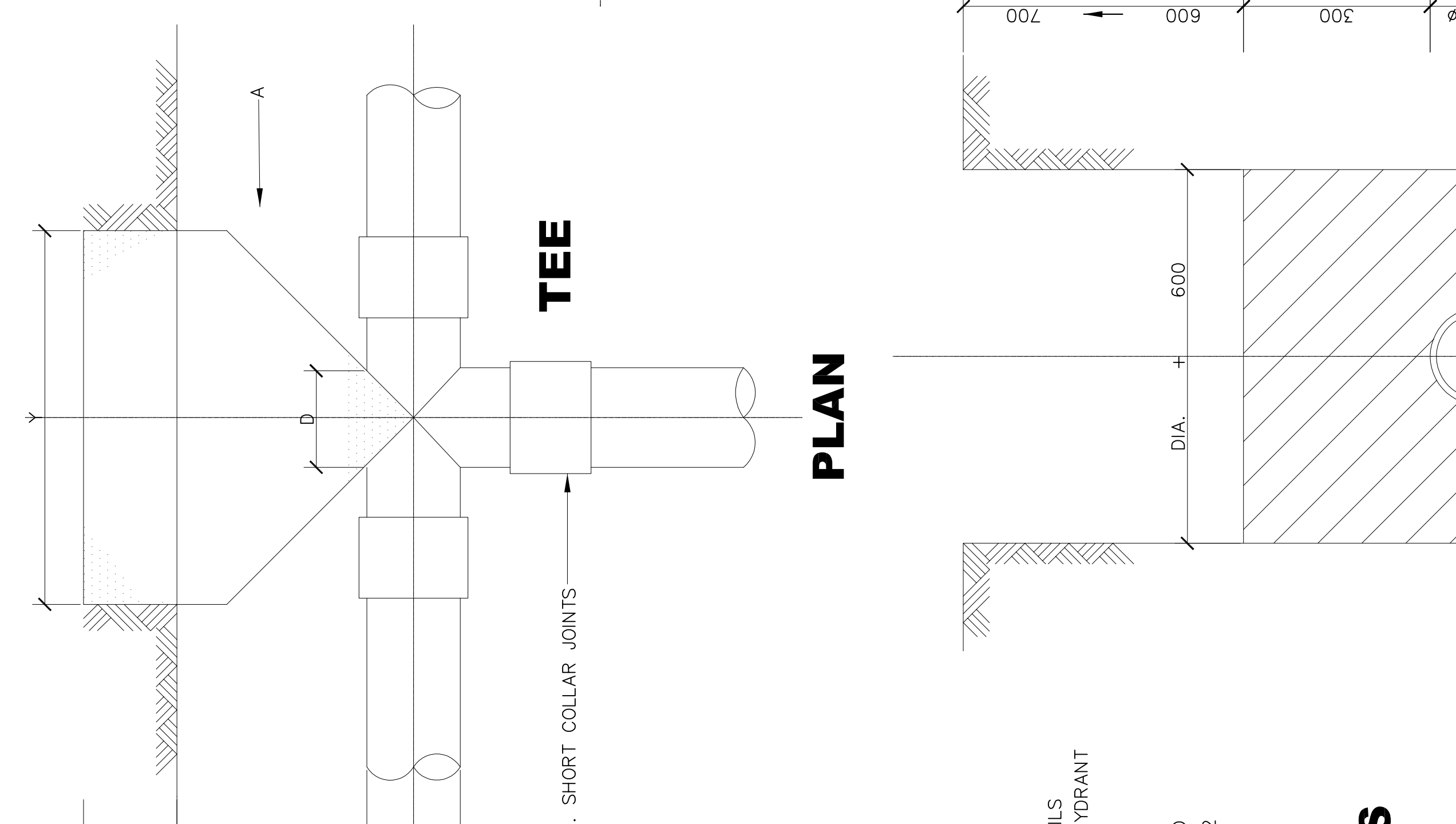
ELEVATION "B"

ELEVATION "C"

THRUST BLOCK SIZES (in mm)
in normal earth for heads of 120 mm

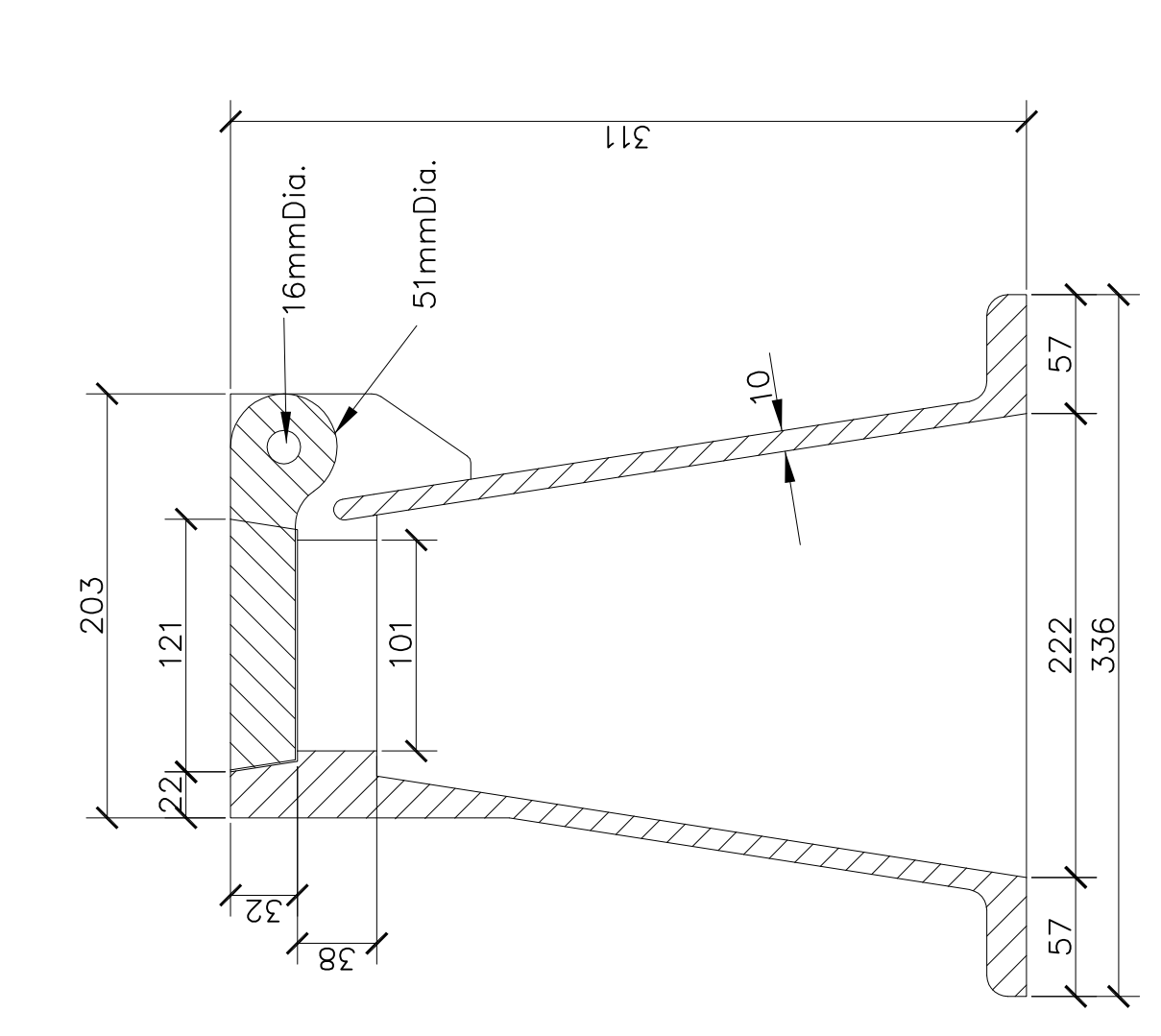
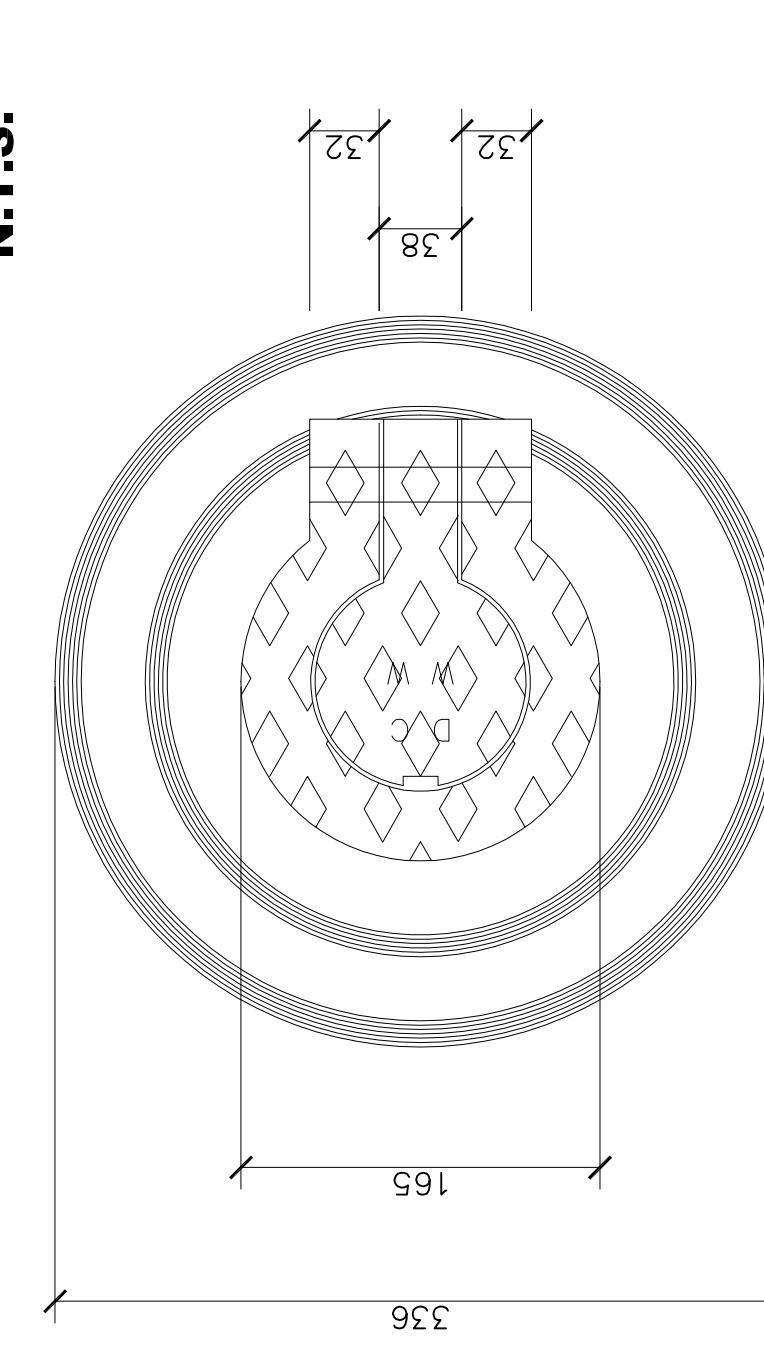
PIPE SIZE	CAP	TEE(BRANCH)	90° 1/4 BEND	45° 1/8 BEND	22.5° 1/16 BEND	11.25° 1/32 BEND
75mm	200 x 200	200 x 200	250 x 300	200 x 250	200 x 200	200 x 200
100mm	200 x 400	200 x 400	300 x 500	250 x 300	200 x 200	200 x 200
150mm	300 x 600	300 x 600	500 x 600	350 x 500	300 x 300	200 x 250
200mm	400 x 800	400 x 800	600 x 900	400 x 800	300 x 500	250 x 300
250mm	600 x 800	600 x 800	900 x 900	600 x 800	400 x 600	300 x 300
300mm	700 x 1000	700 x 1000	1000 x 1300	700 x 1000	600 x 600	300 x 500

AS PER PART "DB" DEPT. SPECIFICATION FOR EARTHWORKS FOR PIPE TRENCHES. (CLASS "C")



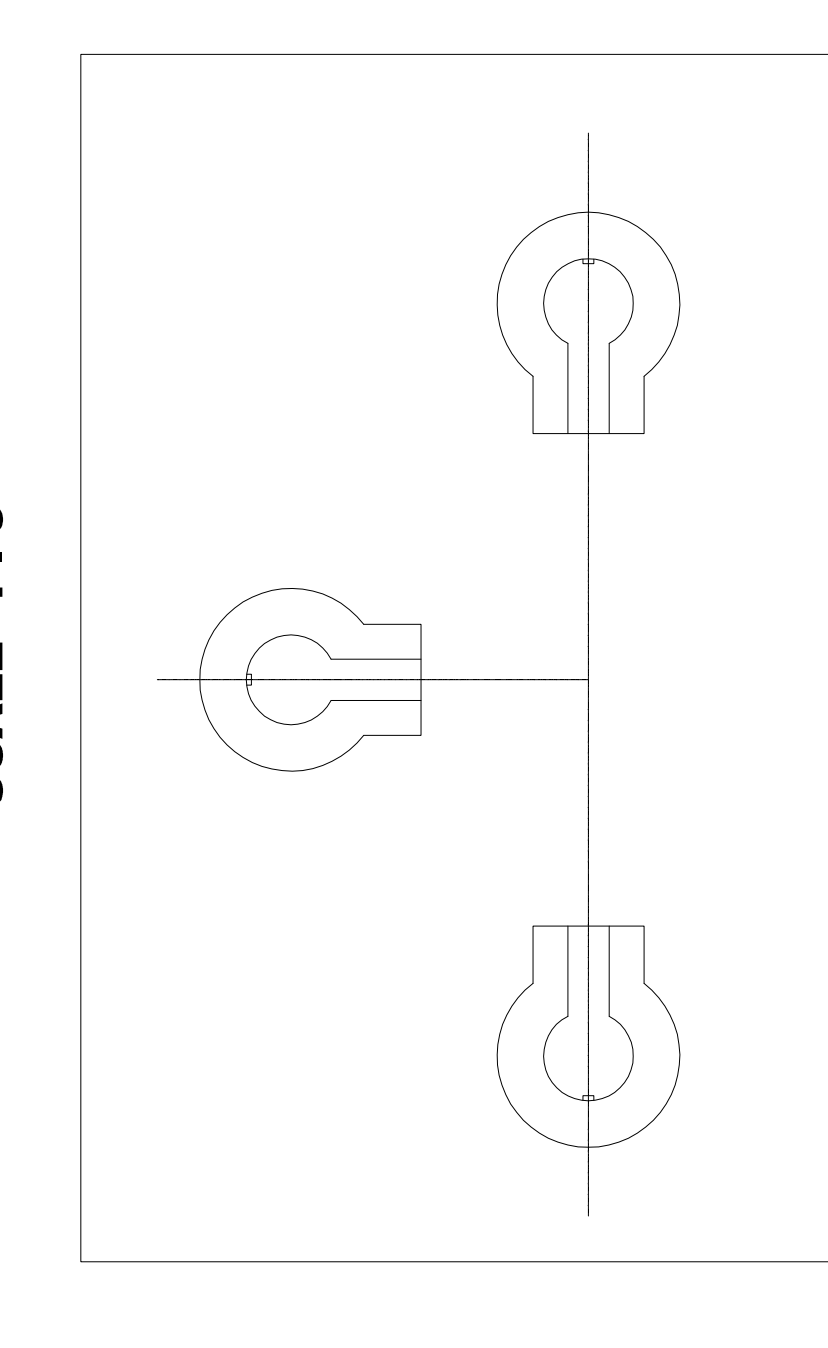
STANDARD HYDRANT WITH STEEL FITTINGS
N.T.S.

PLAN OF WATER VALVE COVER No.5
SCALE: 1 : 5

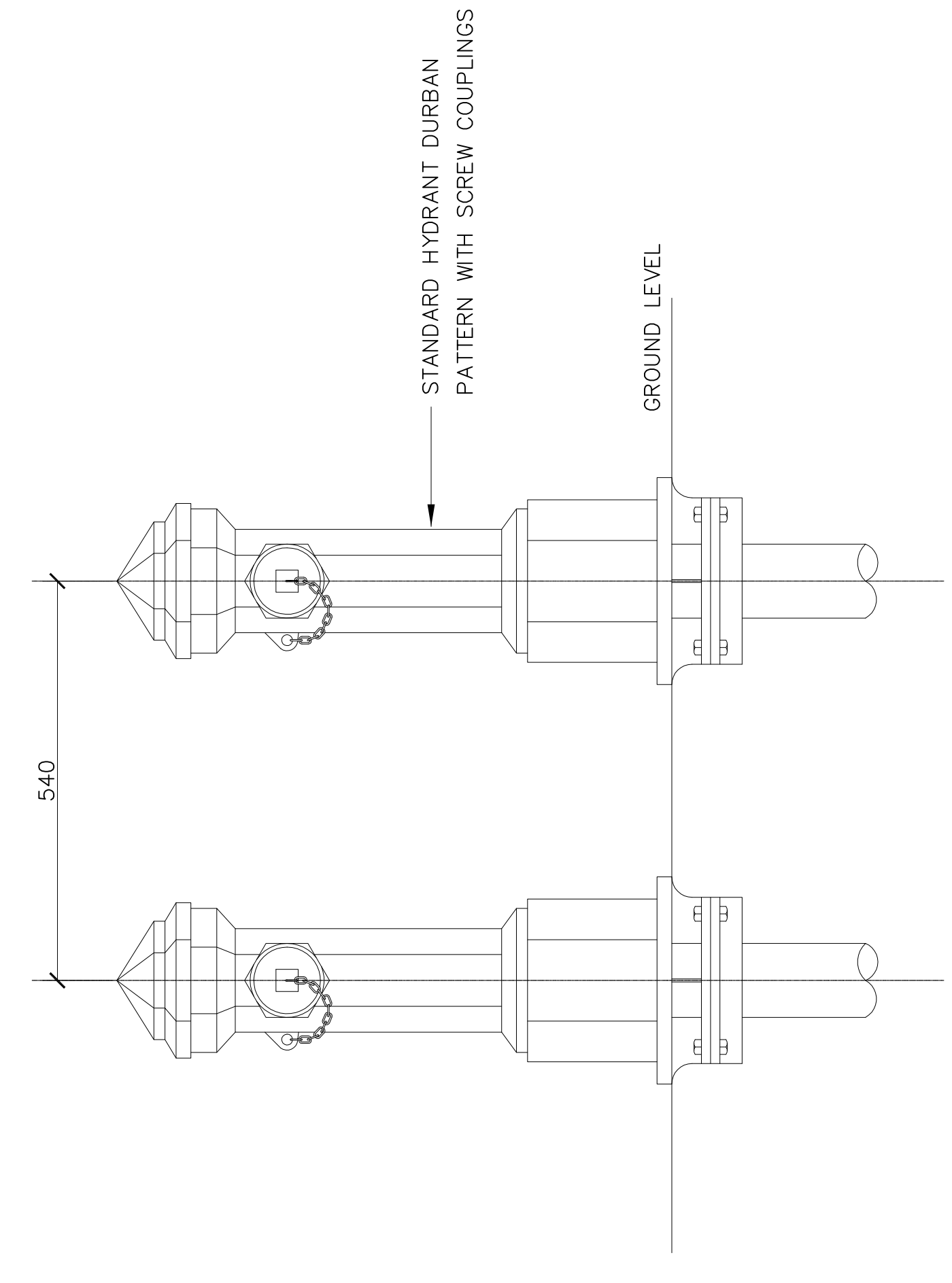


SECTION
SCALE 1 : 5

TYPICAL ORIENTATION OF No.5 VALVE COVERS

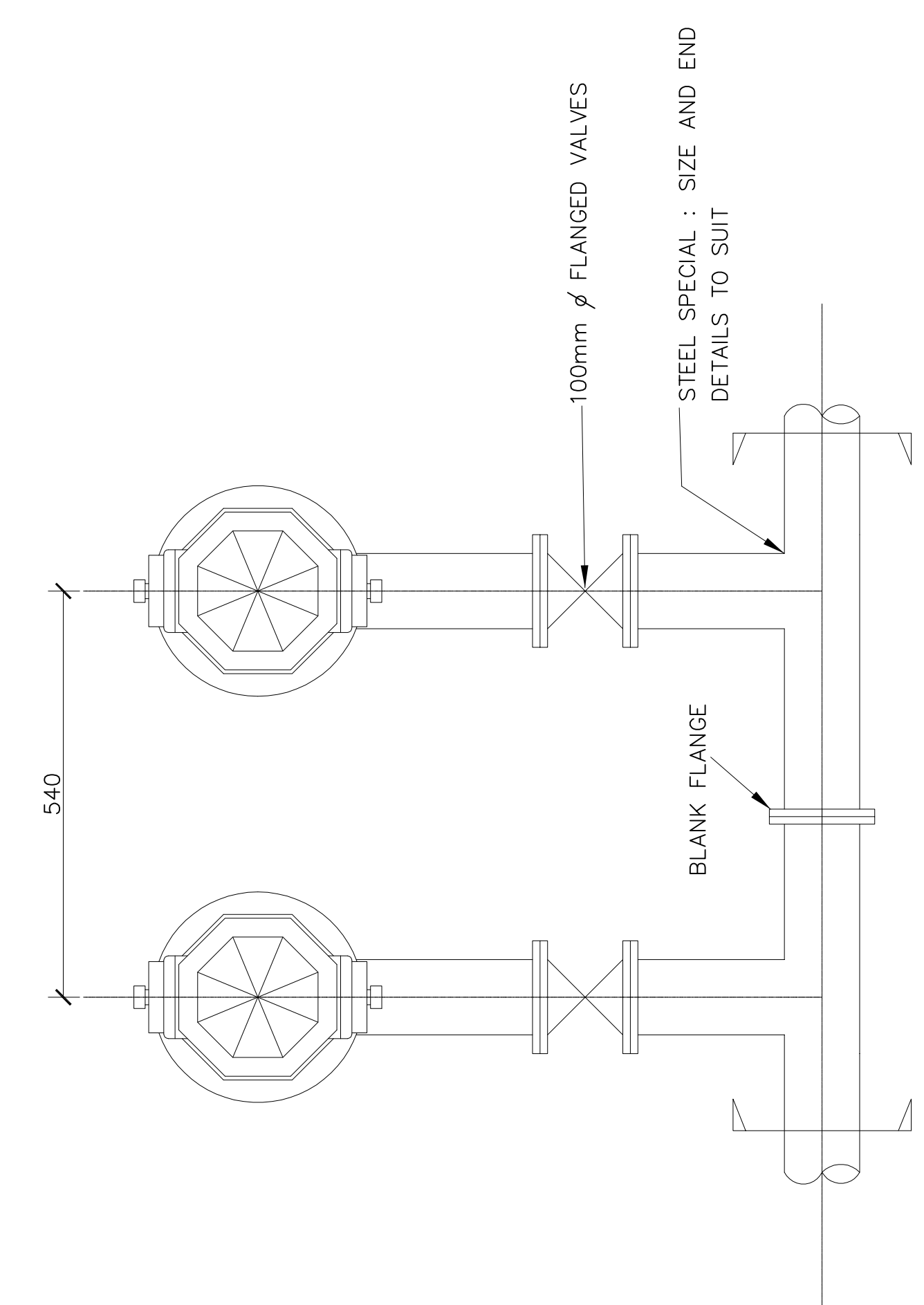


STANDARD HYDRANT WITH POLYBESTOS DUCKFOOT BEND (N.T.S.)



NOTE: - ALL JOINTING MATERIAL TO BE SUPPLIED AND INSTALLED BY CONTRACTOR

DOUBLE HYDRANT DETAIL
SUPPLIED BY DC.



SUPPLIED BY DC.

Revision	Date	Description

NOTE: No construction work of this kind and service acquisitions have been completed

Acquisitions completed	

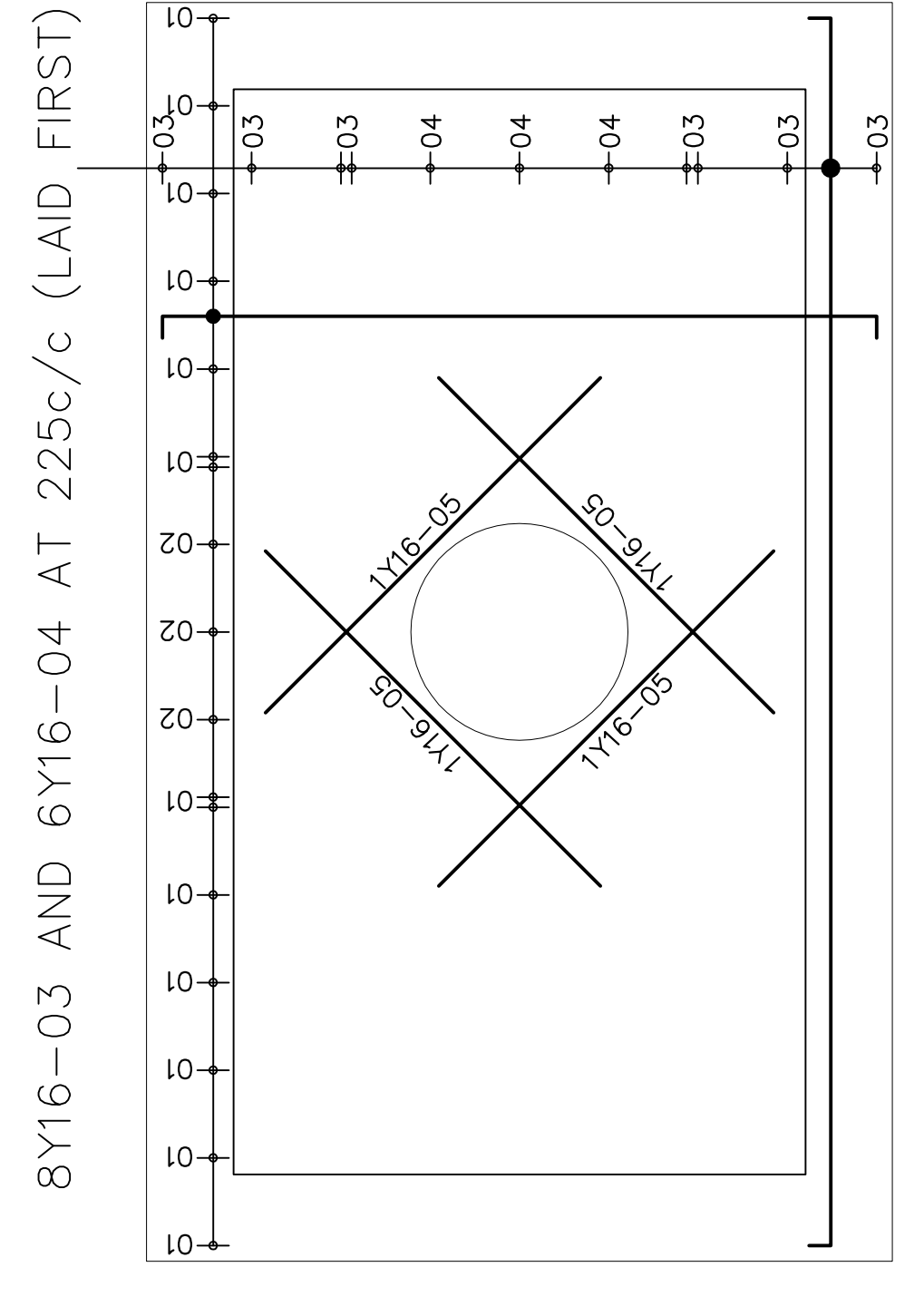
Contract No.	
Project Title	

STANDARD DRAWING

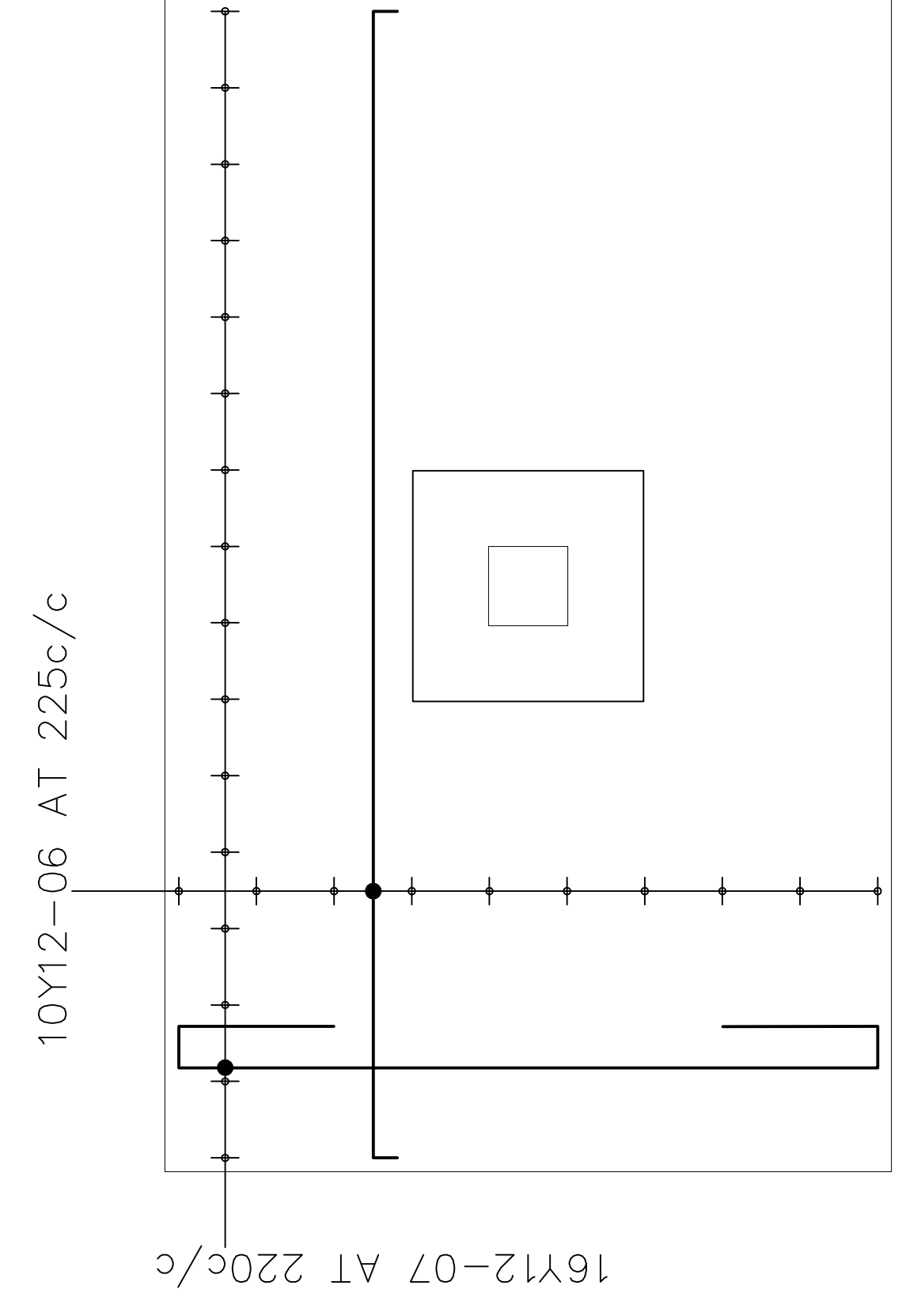
DETAILS OF :-
STANDARD HYDRANT
THRUST BLOCKS
TRENCHES.

Scales	DATE OF ISSUE
1:10 or AS SHOWN	1 FEBRUARY 1990
Designed	Date
Checked	Drawn

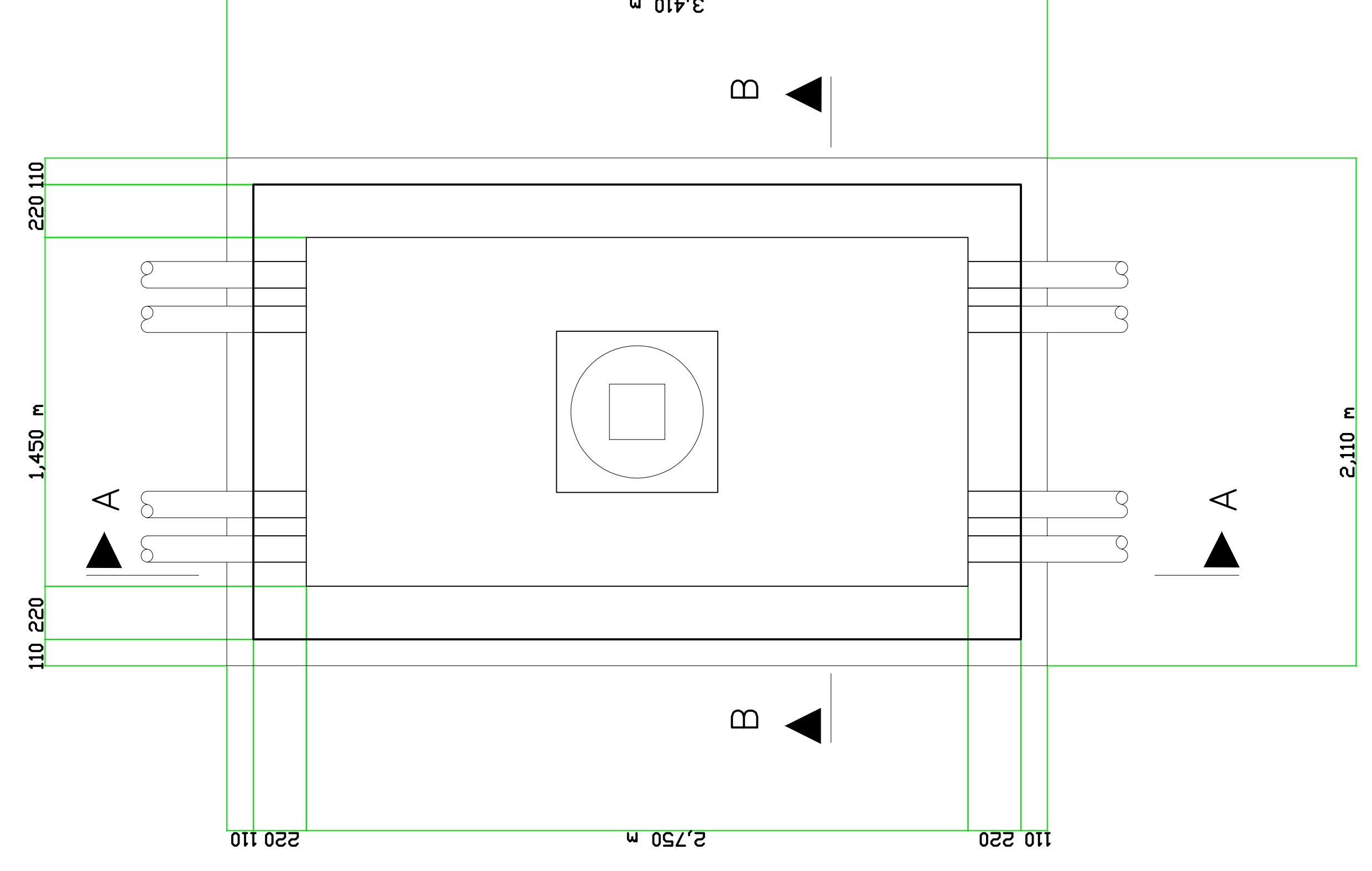
Manager (D/N)	
Director - Roads	
Executive Director	
Drawing No	38584
Sheet of	



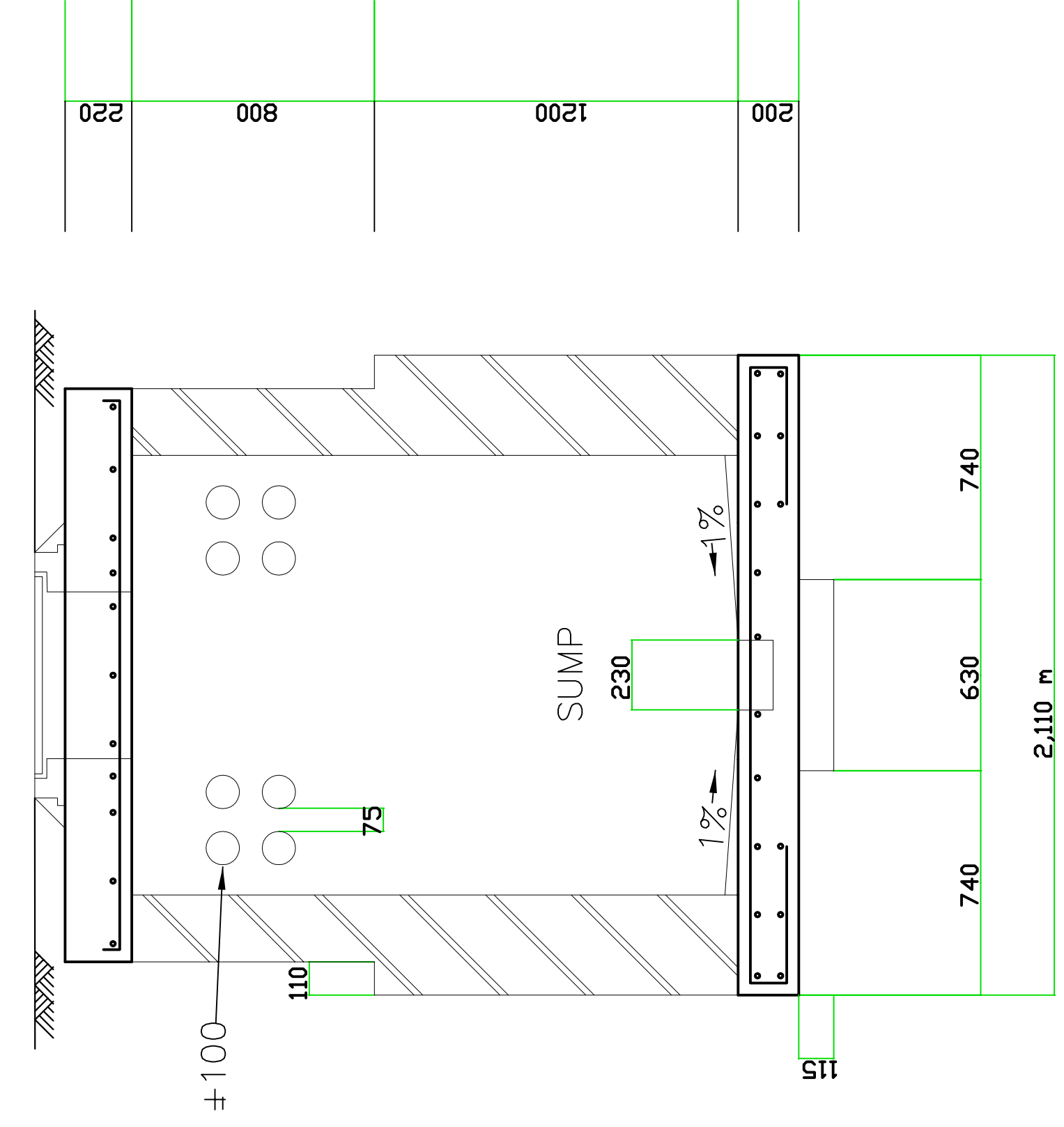
COVER SLAB REINFORCEMENT DETAILS



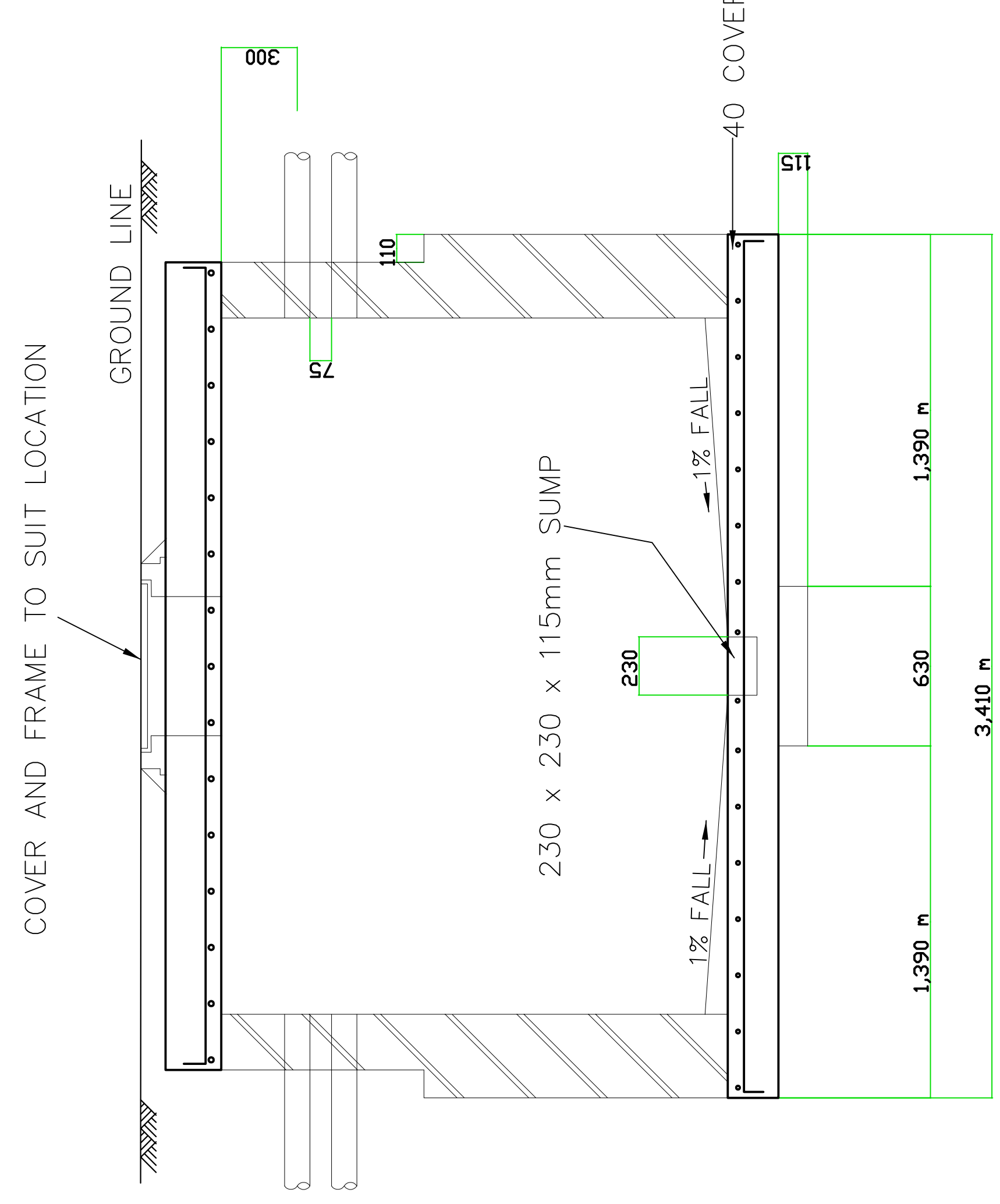
BASE SLAB REINFORCEMENT DETAILS



PLAN



SECTION B-B



SECTION A-A

DECK STEEL DETAILS					
BAR Dia	MARK	No.	LENGTH	TOTAL LENGTH	
				Y16	Y12
Y16	01	14	1950	27,30	
Y16	02	6	750	4,50	
Y16	03	8	3250	26,00	
Y16	04	6	1400	8,40	
Y16	05	4	1200	4,80	
BASE STEEL DETAILS					
Y12	06	10	3500	35,00	
Y12	07	16	3100	49,60	

NOTE
REINFORCING DETAILS SHOWN ARE FOR ROADWAY MANHOLES. WHERE MIDBLOCK MANHOLES ARE REQUIRED DIMENSION AND STEEL DETAILS ARE UNCHANGED EXCEPT THAT THE BARS SHOWN ARE TO BE REPLACED BY Y10 BARS.

NOTES :-

- 1) IN SITU GROUND MUST BE COMPACTED TO 95% MOD. AASHTO PRIOR TO THE MANHOLE BASE SLAB BEING CAST. IF DENSITY CANNOT BE ATTAINED THE IN-SITU MATERIAL MUST BE REMOVED TO A DEPTH OF 300mm AND REPLACED WITH A SELECTED BACKFILL.
- 2) BLINDING TO CONSIST OF GRADE 15/26 WITH CUBE CRUSHING STRENGTH OF 15 MPa AT 28 DAYS.
- 3) CLEAR COVER TO MAIN STEEL 40mm
- 4) MANHOLE COVER AND FRAME TO BE SUPPLIED BY TELKOM.
- 5) CEMENT MORTAR FOR BRICKWORK SHALL BE COMPOSED OF 1 PART CEMENT TO 3 PARTS SAND.
- 6) THE BRICKWORK TO THE MANHOLES SHALL BE WELL AND REGULARLY BONDED IN DOUBLE STRETCHER BOND WITH NO FALSE HEADERS EXCEPT WHERE REQUIRED AS CLOSERS.
- 7) ALL CABLE DUCT PIPES TO BE SUPPLIED BY TELKOM UNLESS OTHERWISE SPECIFIED.
- 8) CONCRETE TO BASE AND DECK SLABS TO CONSIST OF 30/26 WITH CUBE CRUSHING STRENGTH OF 30MPa AT 28 DAYS.

Revision	Date	Description

NOTE: No construction work shall be undertaken until all necessary land and servitude acquisitions have been completed.

Acquisitions completed

DATE: _____

SIGNATURE: _____

DATE: _____

SIGNATURE: _____

DATE: _____

SIGNATURE: _____

DATE: _____

SIGNATURE: _____

DATE: _____

SIGNATURE: _____

DATE: _____

SIGNATURE: _____

DATE: _____

SIGNATURE: _____

STANDARD DRAWING

TELKOM MANHOLES
RECTANGULAR
ROADWAY AND MIDBLOCK

Scale: 1:250
DATE OF ISSUE: FEBRUARY 1990

Designed: 1995-12-06
Checked: _____
Drawn: C.E.S.

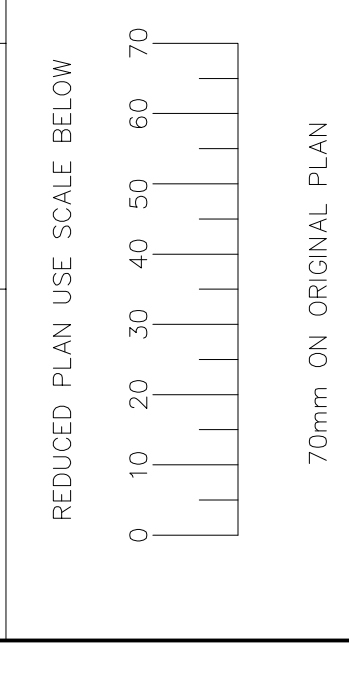
Manager: RD(N)

Director: Roads

R.A.Moore
Executive Director

Drawing No: 368586
Sheet of: _____

CITY ENGINEERS SERVICE UNIT	DWG. NO.
ROADS DEPARTMENT	
PLAN DESCRIPTION	
CONTINUED FROM	
CONTINUED ON	
CROSS SECTIONS	
TYPICAL CROSS SECTION	
SURVEY LAYOUT	

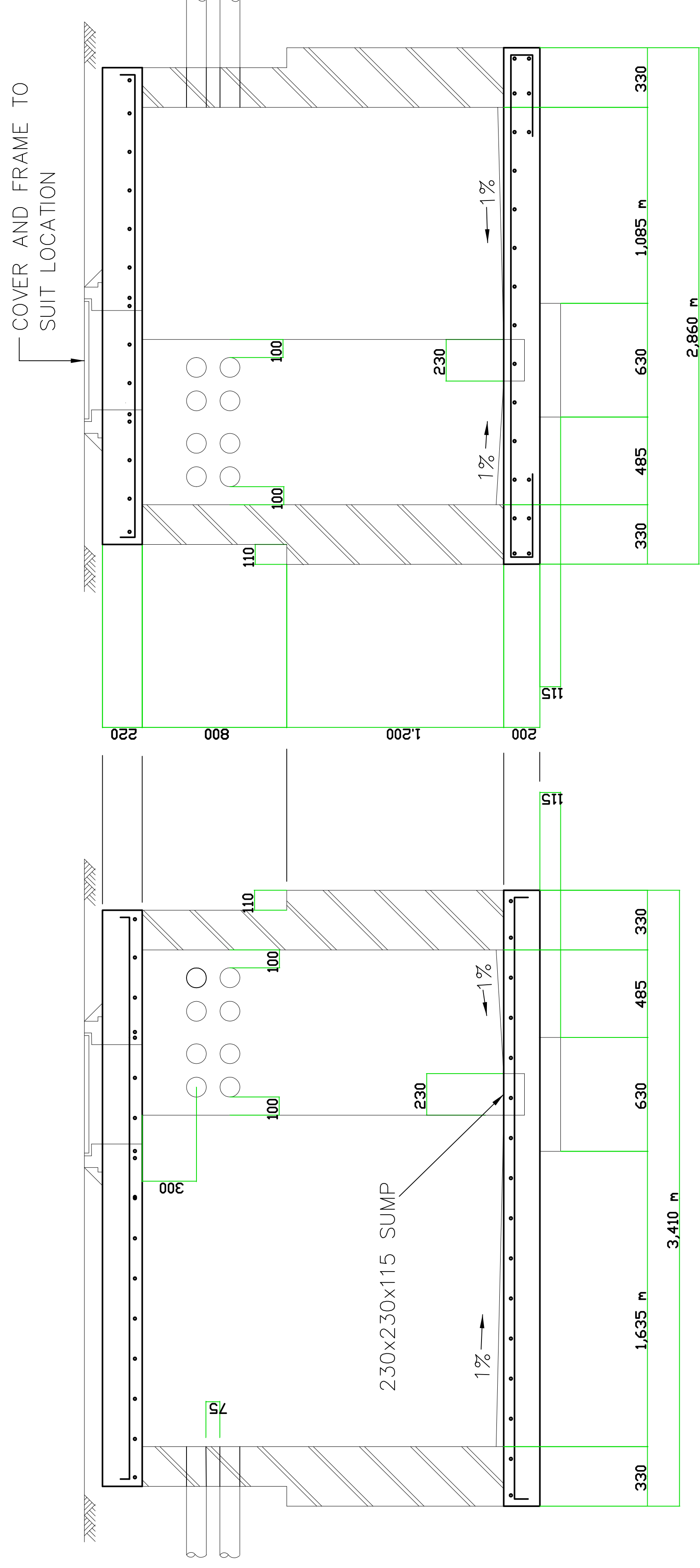
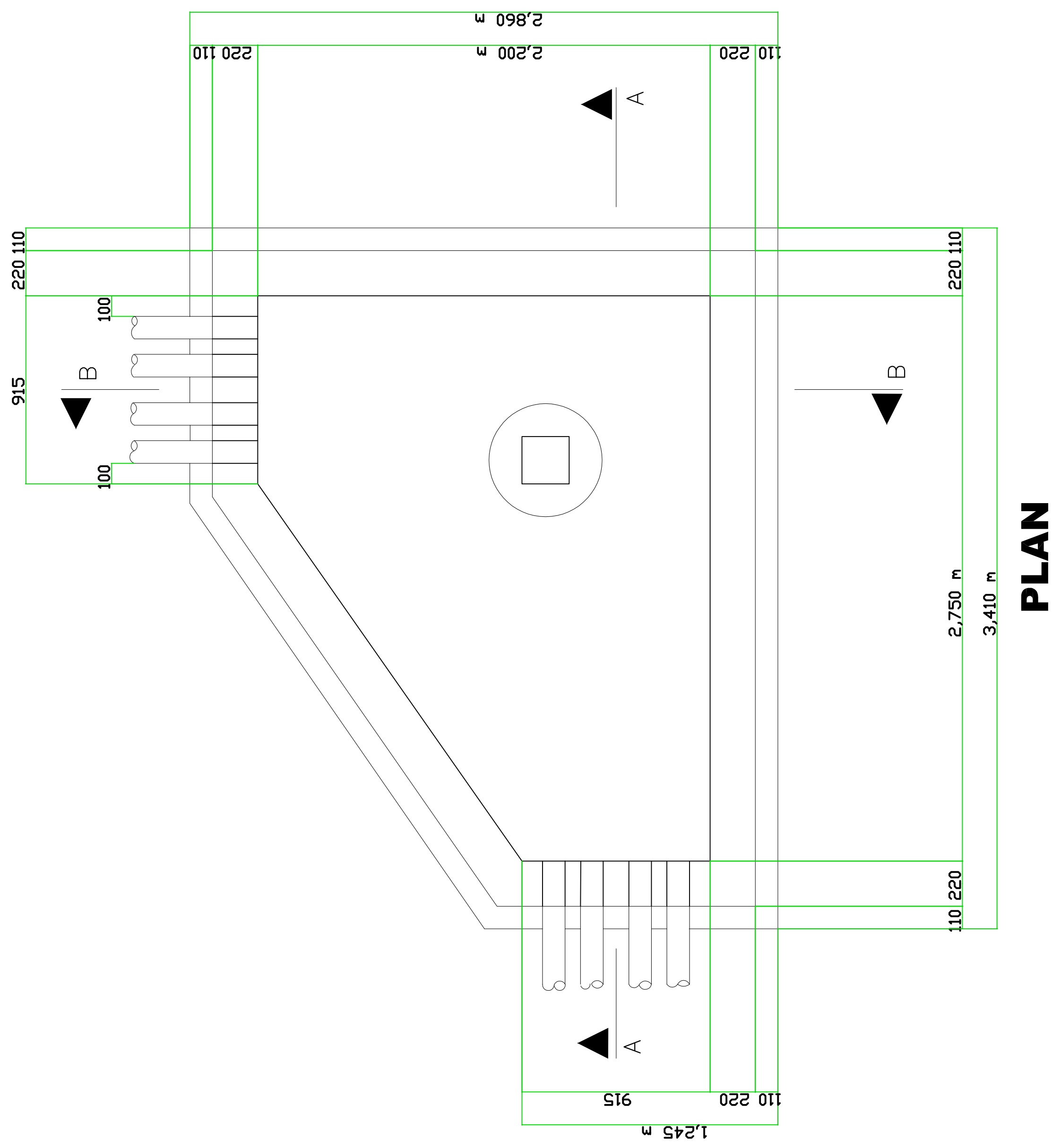


DECK STEEL DETAILS		No.	LENGTH	TOTAL LENGTH
BAR Ø	MARK			
Y16	01	1	1350	1,350
Y16	02	1	1500	1,500
Y16	03	1	1650	1,650
Y16	04	1	1800	1,800
Y16	05	1	1950	1,950
Y16	06	1	2100	2,100
Y16	07	1	2250	2,250
Y16	08	1	2450	2,450
Y16	09	2	2600	5,200
Y16	10	2	1450	2,900
Y16	11	2	850	1,700
Y16	12	5	2700	13,500
Y16	13	1	1300	1,300
Y16	14	1	1600	1,600
Y16	15	1	1950	1,950
Y16	16	1	2200	2,200
Y16	17	1	2500	2,500
Y16	18	1	2800	2,800
Y16	19	2	3100	6,200
Y16	20	2	1950	3,900
Y16	21	2	850	1,700
Y16	22	5	3520	16,250
Y16	23	4	1200	4,800

BASE STEEL DETAILS		No.	LENGTH	TOTAL LENGTH
BAR Ø	MARK			
Y12	01	1	2400	2,400
Y12	02	1	2550	2,550
Y12	03	1	2700	2,700
Y12	04	1	2850	2,850
Y12	05	1	3050	3,050
Y12	06	1	3200	3,200
Y12	07	1	3350	3,350
Y12	08	1	3500	3,500
Y12	09	1	3650	3,650
Y12	10	1	3800	3,800
Y12	11	6	3850	23,100
Y12	12	2	1400	2,800
Y12	13	2	1750	3,500
Y12	14	2	2050	4,100
Y12	15	1	2350	2,350
Y12	16	1	2650	2,650
Y12	17	1	2950	2,950
Y12	18	1	3300	3,300
Y12	19	10	3500	35,000

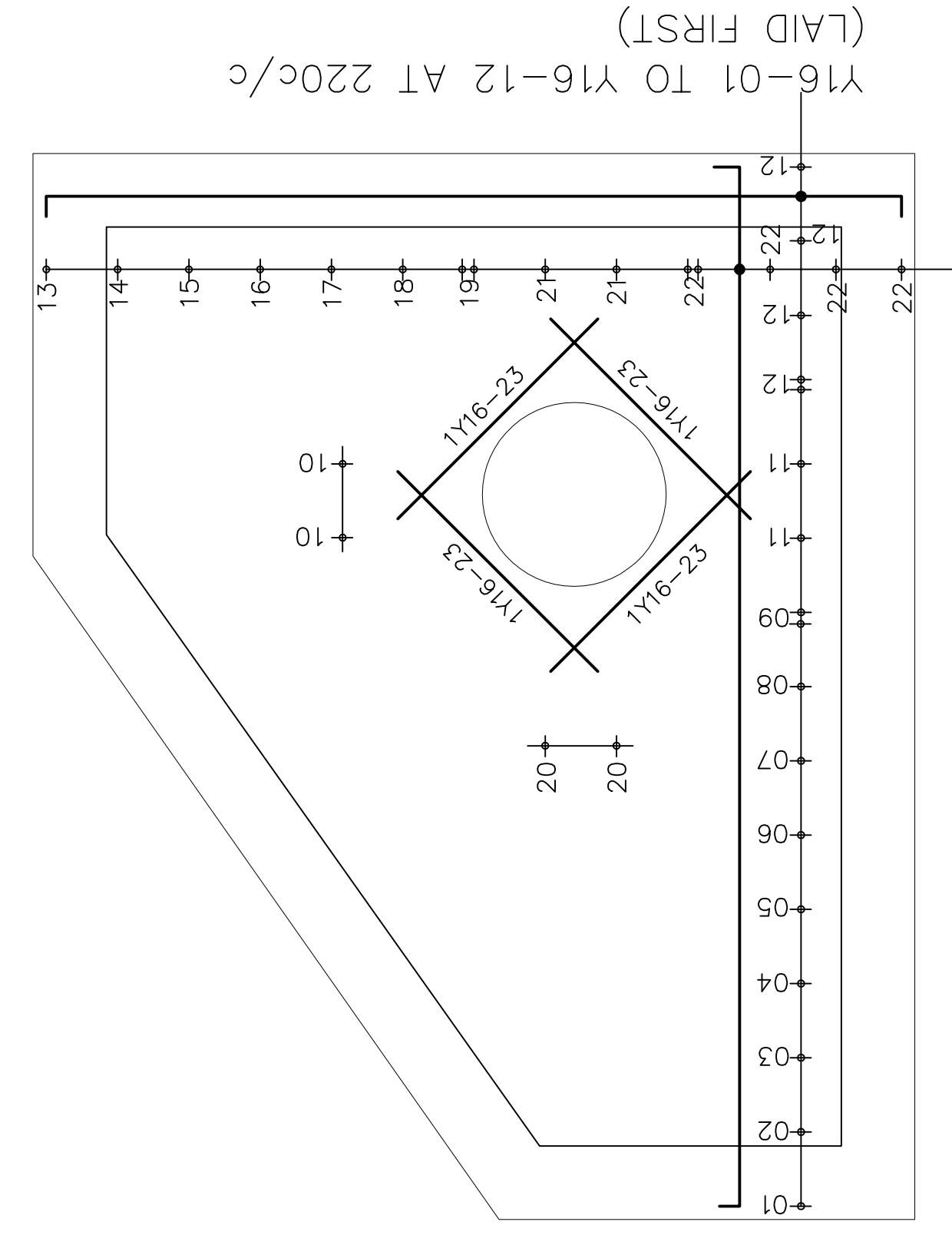
- NOTES :-
- 1) IN SITU GROUND MUST BE COMPACTED TO 95% MOD. AASHTO PRIOR TO THE MANHOLE BASE SLAB BEING CAST. IF DENSITY CANNOT BE ATTAINED THE IN-SITU MATERIAL MUST BE REMOVED TO A DEPTH OF 300mm AND REPLACED WITH A SELECTED BACKFILL.
 - 2) BLINDING TO CONSIST OF GRADE 15/26 WITH CUBE CRUSHING STRENGTH OF 15 MPa AT 28 DAYS.
 - 3) CLEAR COVER TO MAIN STEEL 40mm
 - 4) MANHOLE COVER AND FRAME TO BE SUPPLIED BY TELKOM.
 - 5) CEMENT MORTAR FOR BRICKWORK SHALL BE COMPOSED OF 1 PART CEMENT TO 3 PARTS SAND.
 - 6) THE BRICKWORK TO THE MANHOLES SHALL BE WELL AND REGULARLY BONDED IN DOUBLE STRETCHER BOND WITH NO FALSE HEADERS EXCEPT WHERE REQUIRED AS CLOSERS.
 - 7) ALL CABLE DUCT PIPES TO BE SUPPLIED BY TELKOM UNLESS OTHERWISE SPECIFIED.
 - 8) CONCRETE TO BASE AND DECK SLABS TO CONSIST OF 30/26 WITH CUBE CRUSHING STRENGTH OF 30MPa AT 28 DAYS.

NOTE:
REINFORCING DETAILS SHOWN ARE FOR ROADWAY MANHOLES. WHERE MIDBLOCK MANHOLES ARE REQUIRED DIMENSIONS AND STEEL DETAILS ARE UNCHANGED EXCEPT THAT THE BARS SHOWN ARE TO BE REPLACED BY Y10 BARS.

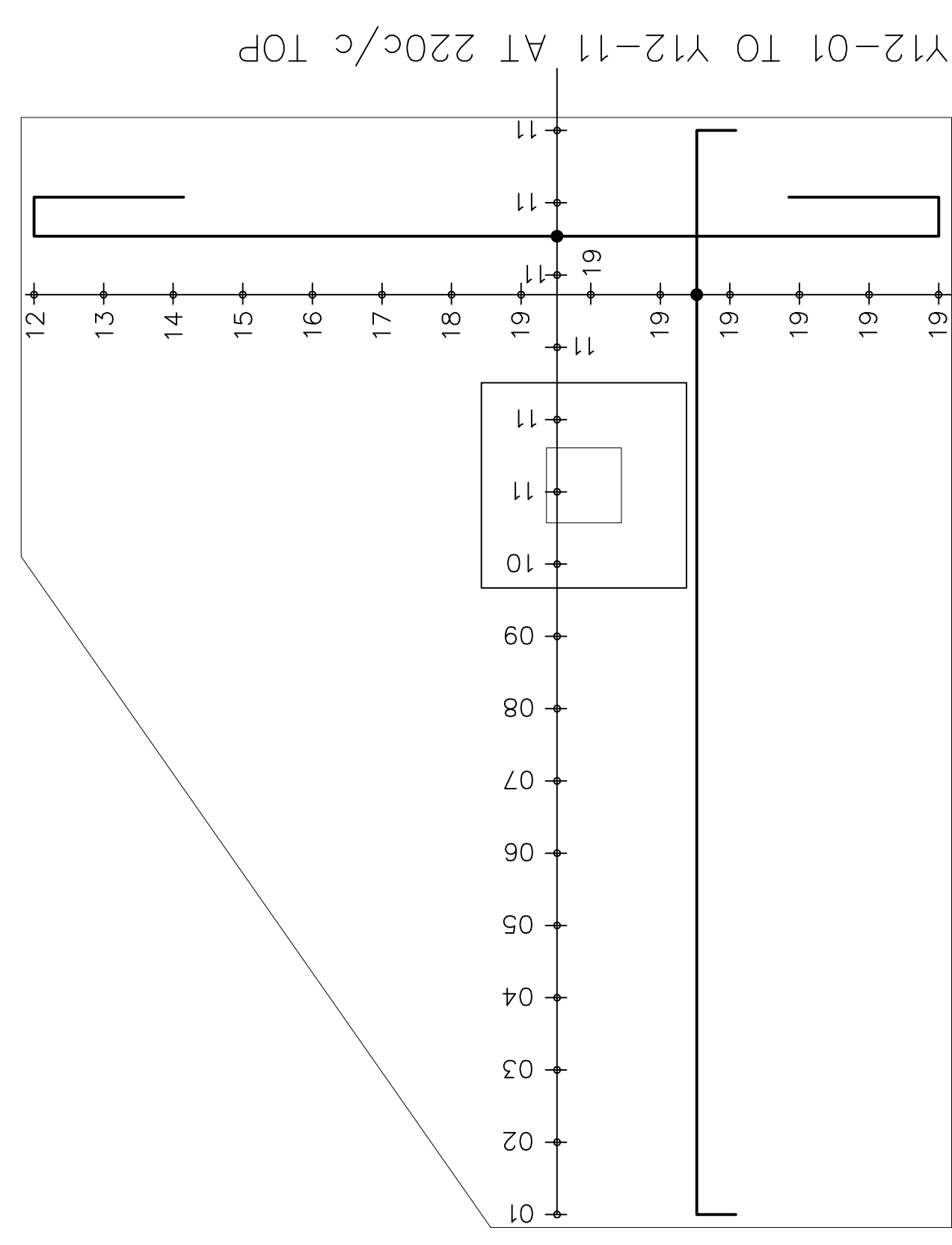


SECTION A-A

SECTION B-B



COVER SLAB REINFORCEMENT DETAILS
Y16-13 TO Y16-23 AT 210c/c



BASE SLAB REINFORCEMENT DETAILS
Y12-12 TO Y12-19 AT 210c/c TOP AND BOTTOM

Revision	Date	Description
NOTE: No construction work shall be undertaken until all services and service acquisitions have been completed.		
Acquisitions completed		
DATE	SIGNATURE	POINT
UNDERGROUND SERVICES CHECKED		
DATE	SIGNATURE	POINT
WATER MAINS		
DATE	SIGNATURE	POINT
G.P. CABLES		
DATE	SIGNATURE	POINT
ELECTRIC CABLES		
DATE	SIGNATURE	POINT
S.A. CABLES		
DATE	SIGNATURE	POINT
DRAINAGE		
DATE	SIGNATURE	POINT

Contract No.
Project Title

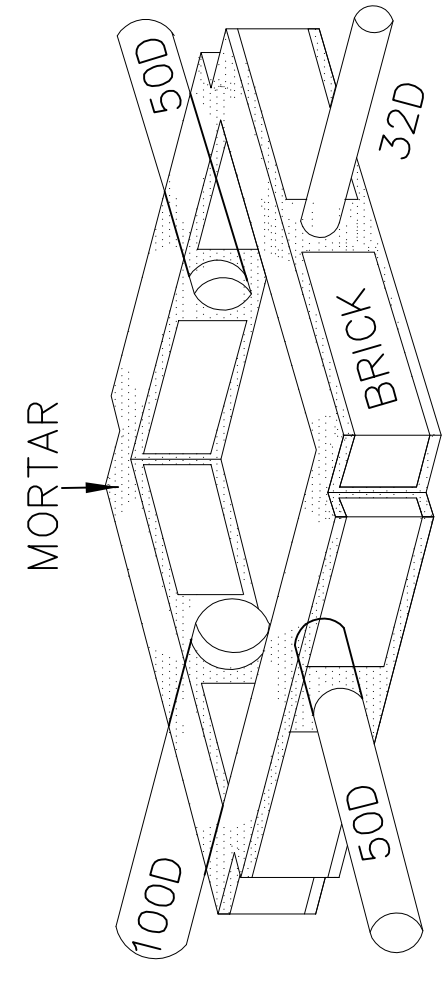
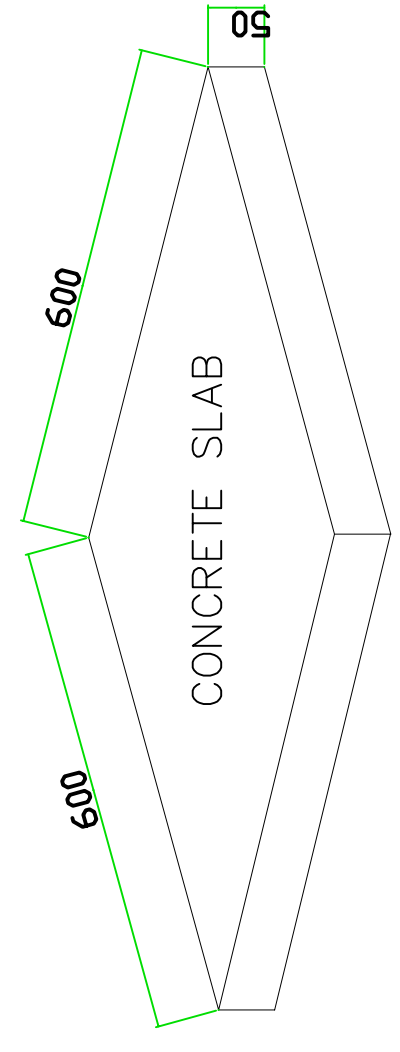
STANDARD DRAWING

TELKOM MANHOLES
'L' SHAPED
ROADWAY AND MIDBLOCK

Scale	DATE OF ISSUE
1 : 250	FEBRUARY 1990
Designed	Date 1985-12-06
Checked	Drawn C.E.S.
Manager ED(N)	
Director - Roads	
R.A.Moore	Executive Director

UNDERGROUND PIPE JUNCTION BOX

(SIDEWALK ONLY)



PLAN VIEW

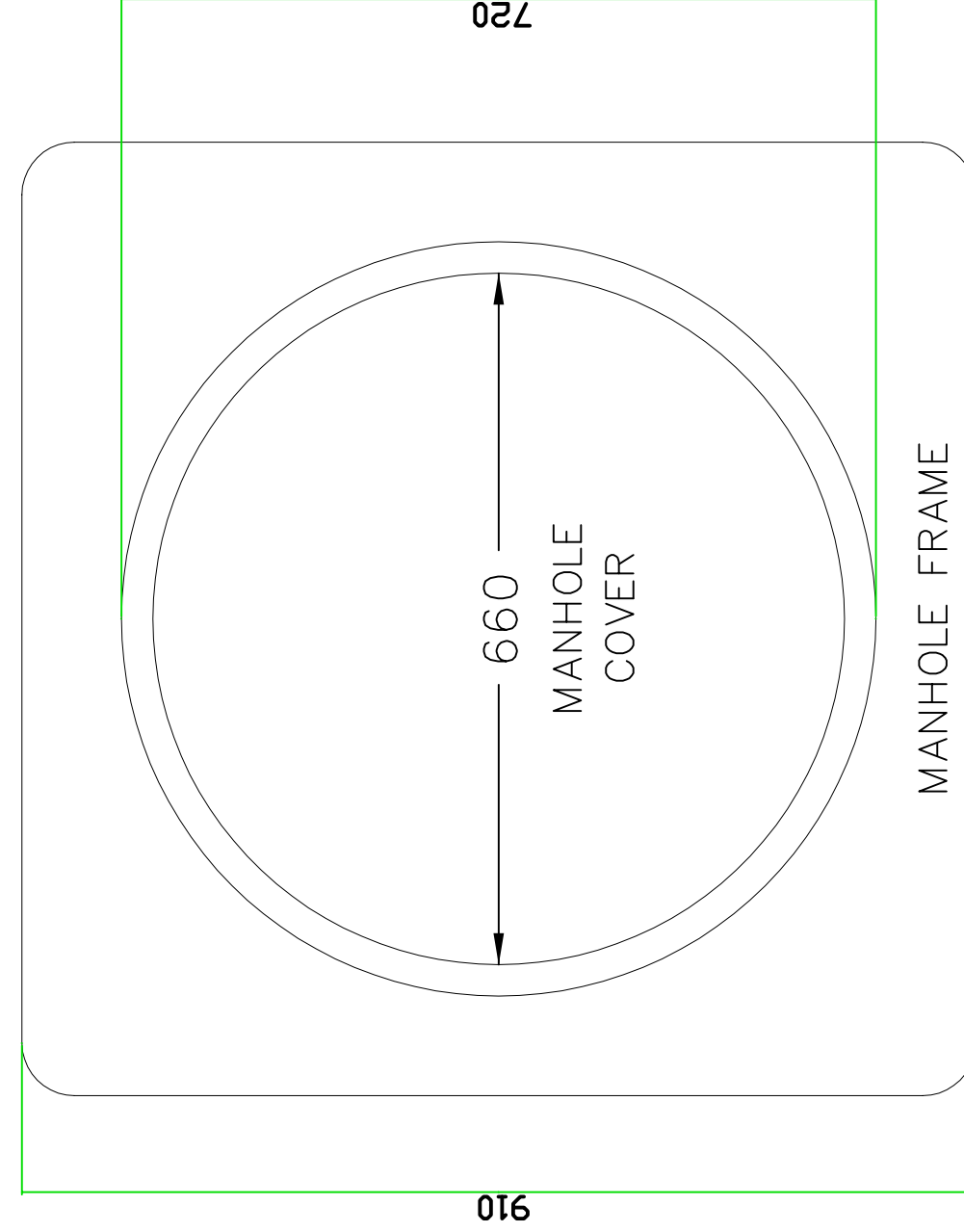
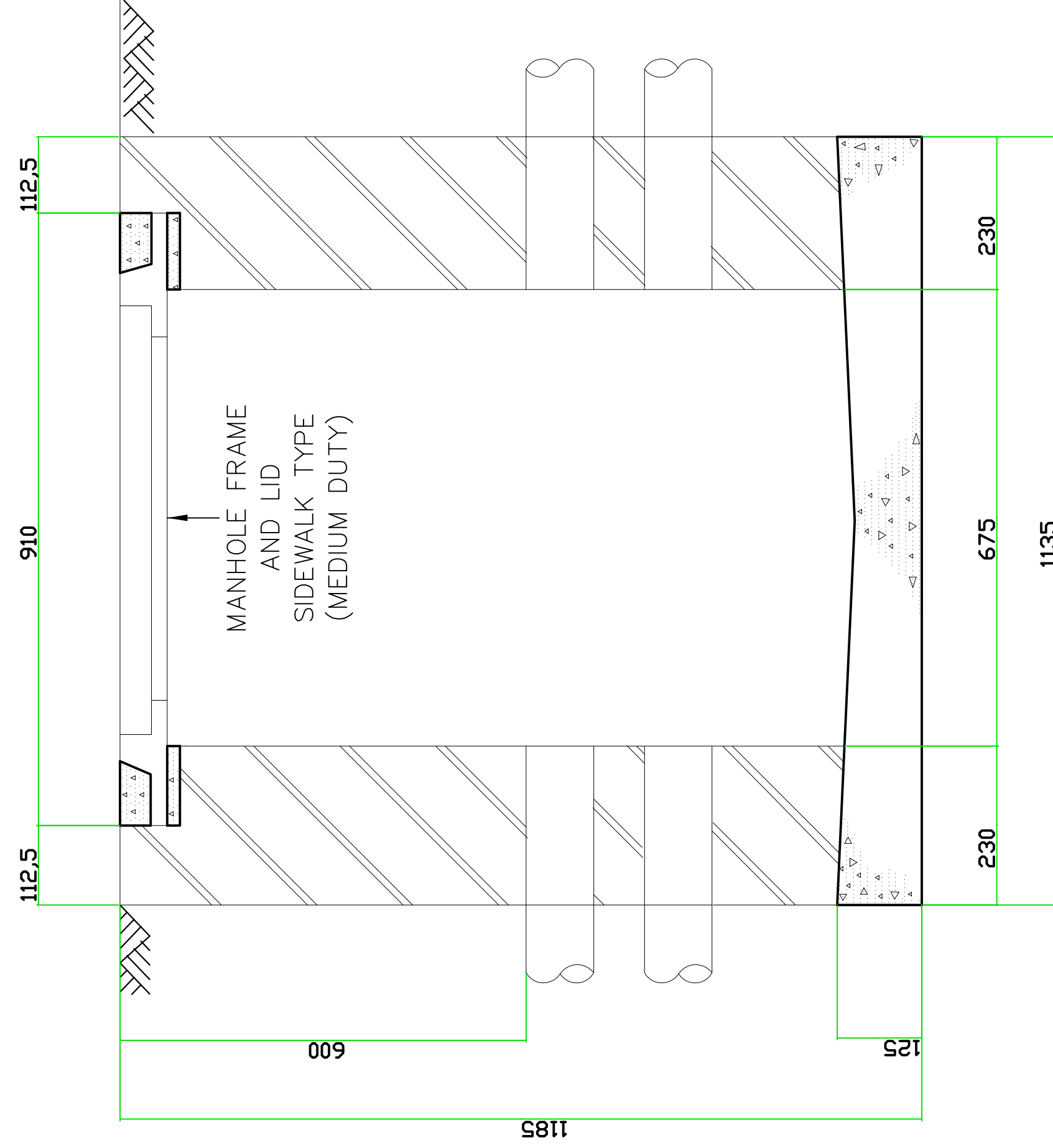
ISOMETRIC VIEW

NOTES:

- 1) UPPER PAVING SLAB NOT TO BE SET INTO WET MORTAR.
- 2) TOP SURFACE OF MORTAR TO BE LEVEL AND SMOOTH.
- 3) BRICKS TO BE ARRANGED TO ACCOMMODATE PIPES AND PIPE DIRECTION.

BRICK DUG OUT

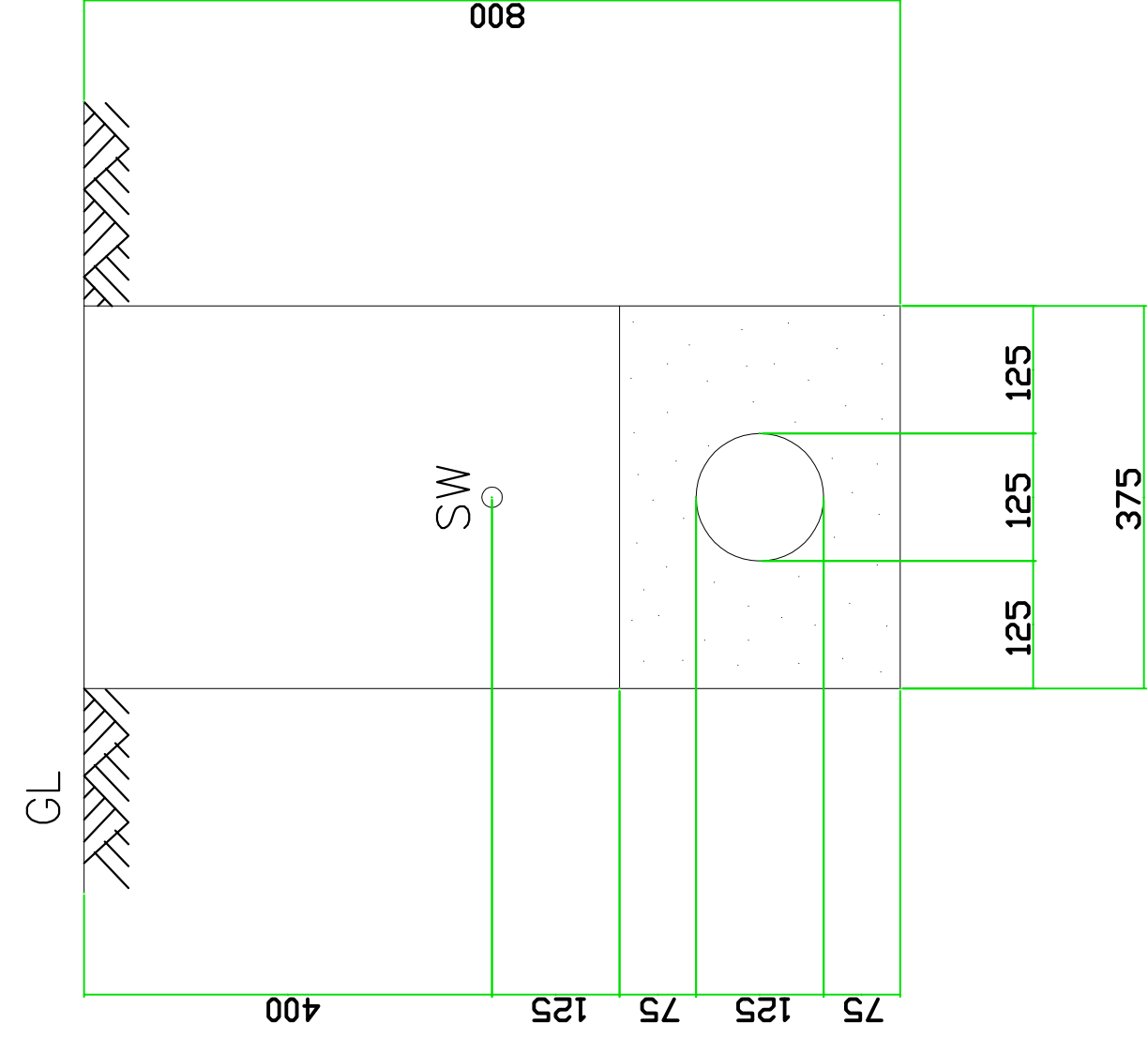
(SIDEWALK ONLY)



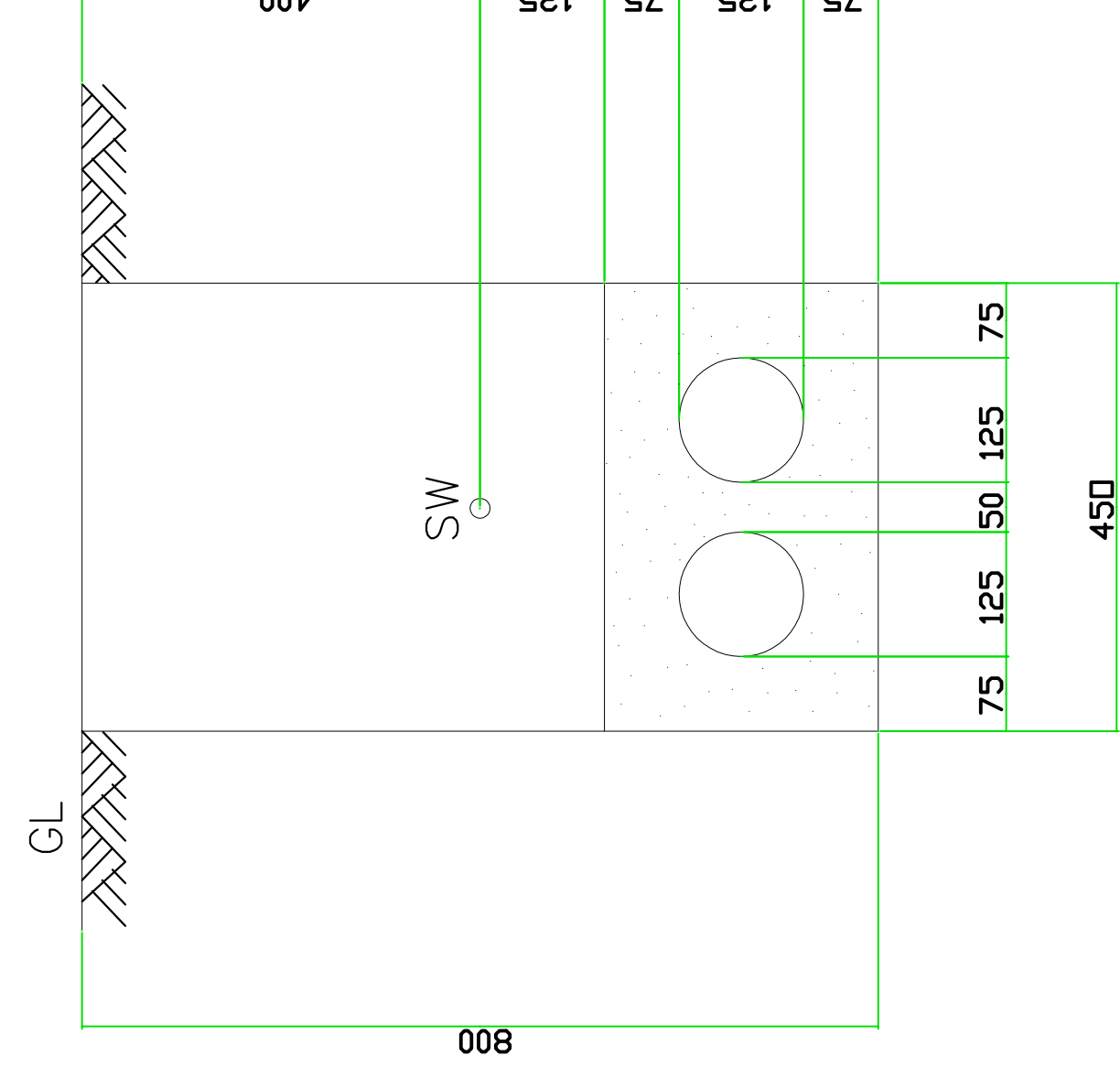
NOTES :-

- 1) IN SITU GROUND MUST BE COMPACTED TO 95% MOD. AASHTO PRIOR TO THE BASE SLAB BEING CAST. IF DENSITY CANNOT BE ATTAINED THE IN-SITU MATERIAL MUST BE REMOVED TO A DEPTH OF 300mm AND REPLACED WITH A SELECTED BACKFILL.
- 2) BLINDING TO CONSIST OF GRADE 15/26 WITH CUBE CRUSHING STRENGTH OF 15 MPa AT 28 DAYS.
- 3) MANHOLE COVER AND FRAME TO BE SUPPLIED BY TELKOM.
- 4) CEMENT MORTAR FOR BRICKWORK SHALL BE COMPOSED OF 1 PART CEMENT TO 3 PARTS SAND.
- 5) THE BRICKWORK TO THE MANHOLES SHALL BE WELL AND REGULARLY BONDED IN STRETCHER BOND WITH NO FALSE HEADERS EXCEPT WHERE REQUIRED AS CLOSERS.

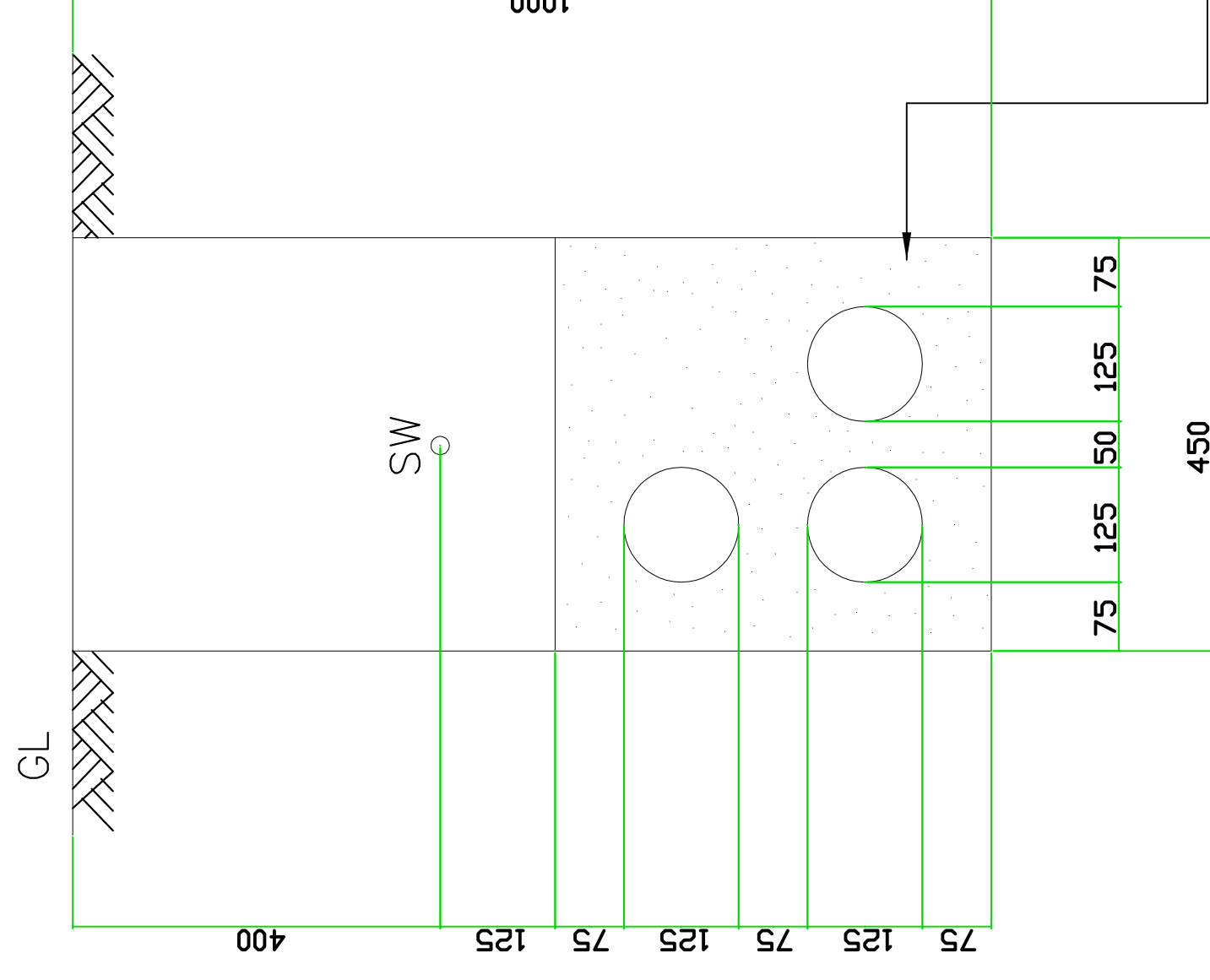
CABLE DUCT LAYOUTS



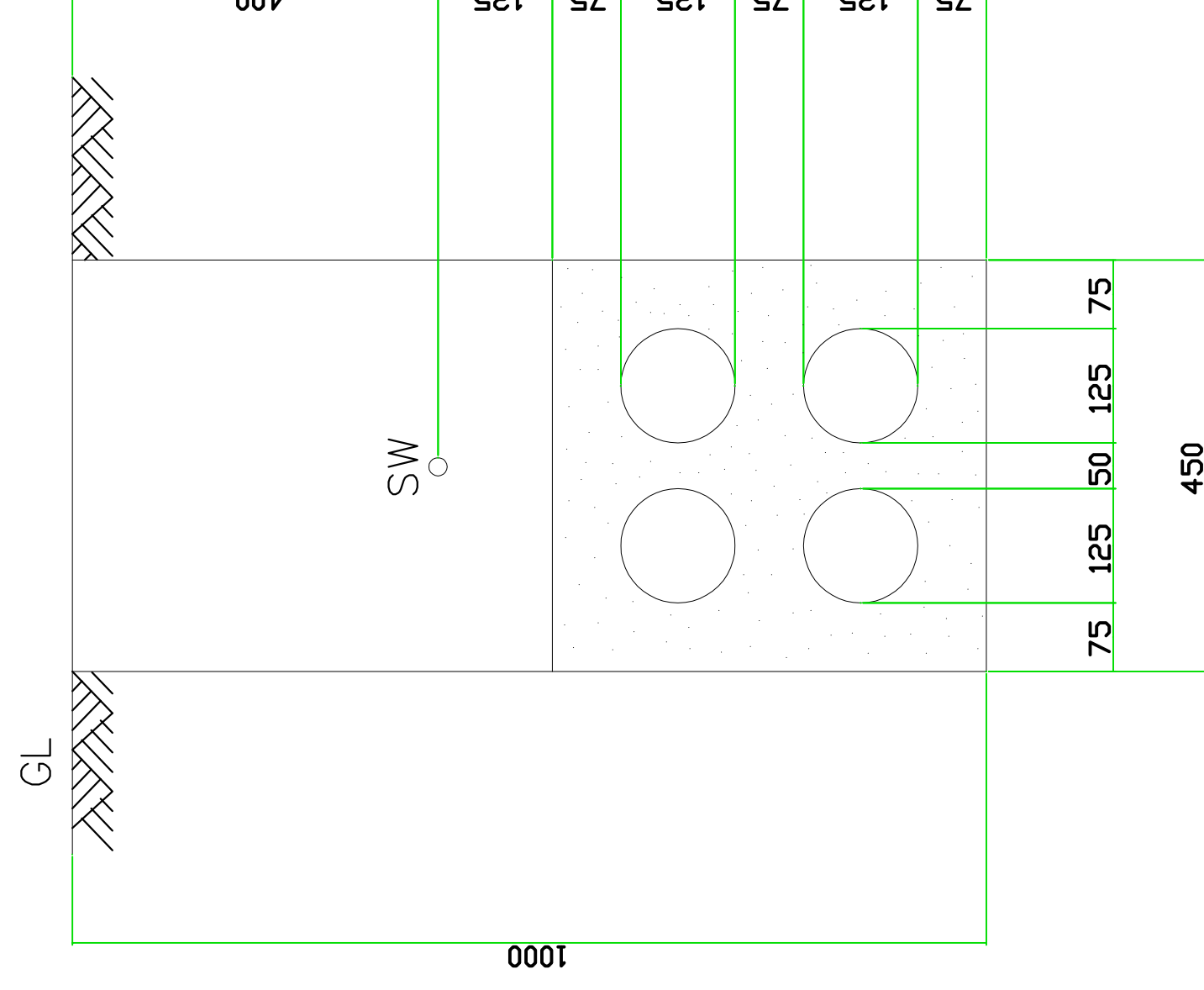
1 PIPE



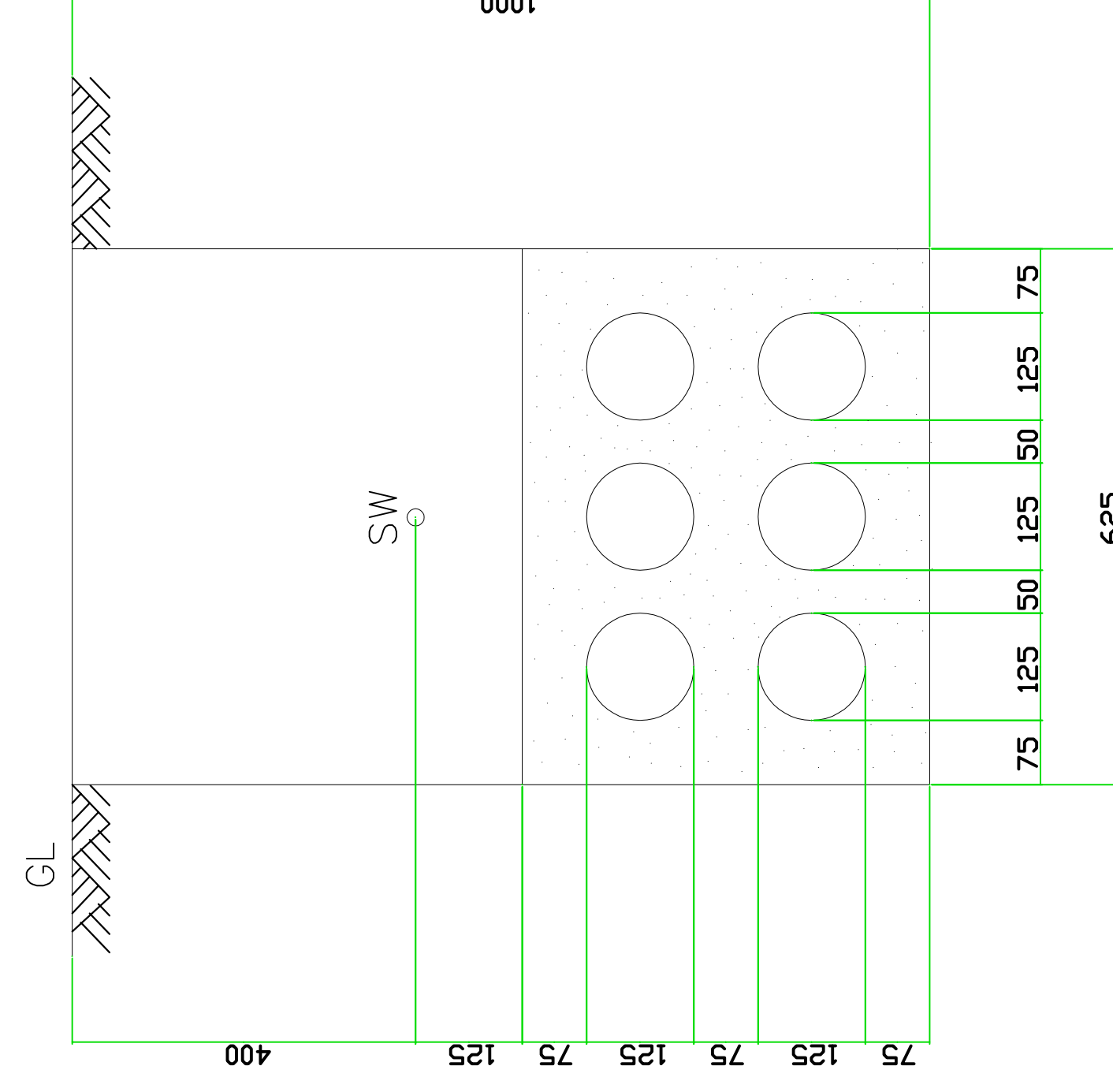
2 PIPES



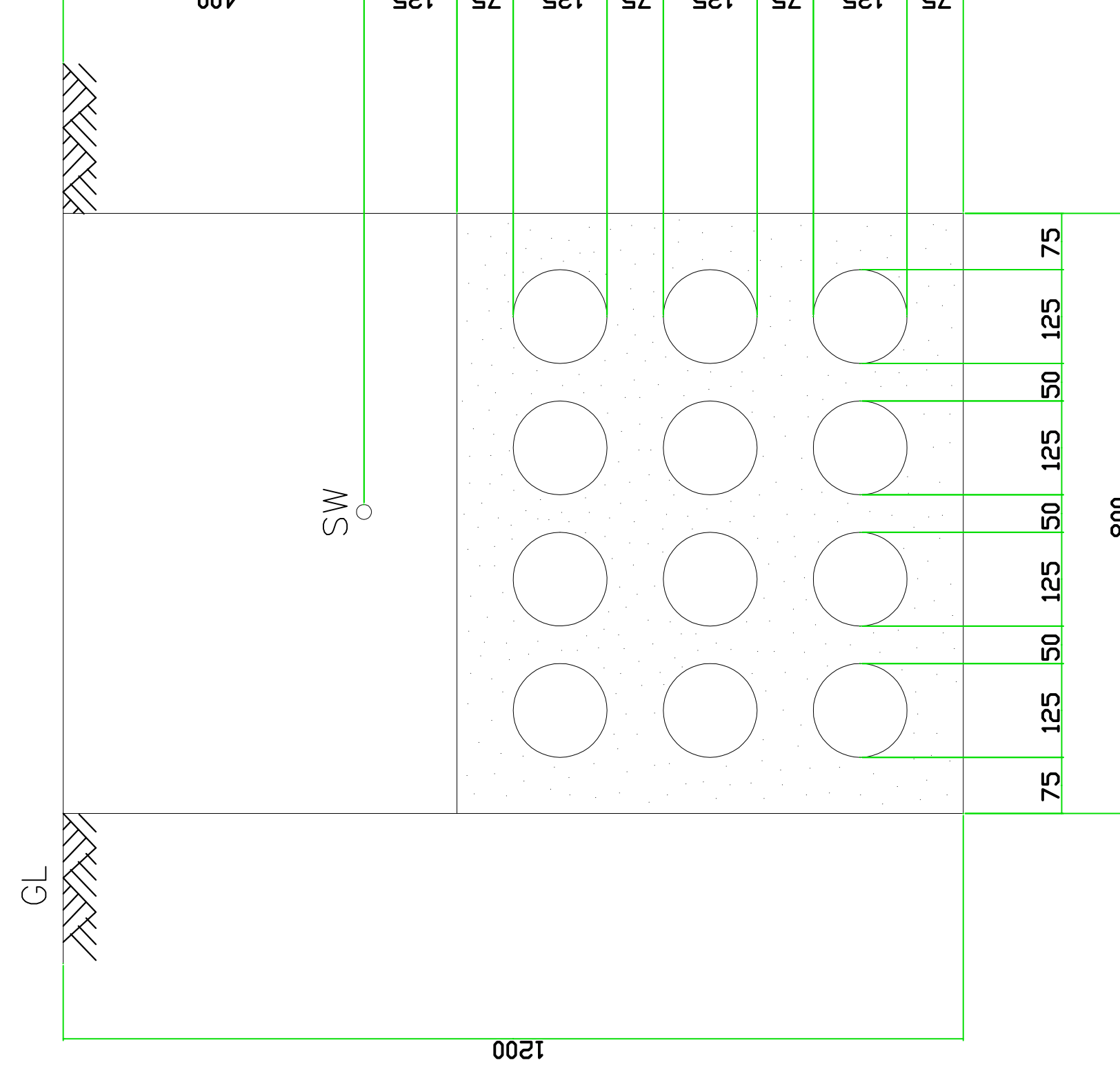
3 PIPES



4 PIPES



6 PIPES



12 PIPES

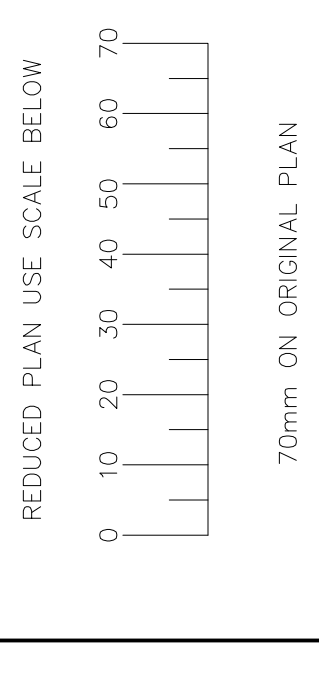
NOTES:

- 1) FOR CABLE DUCT HEADWALL POSITIONS REFER TO PLAN NO. 38581.
- 2) DUCT SURROUNDS ARE TO VARY ACCORDING TO THE LOCATION OF THE DUCTS:
 - a) ROAD CROSSING: DUCTS SHALL GENERALLY BE ENCASED IN GRADE 20/26 CONCRETE. FOR ENCASEMENT DIMENSIONS SEE PLAN NO. 38
 - b) VERGES AND MINOR ROADS: DUCTS SHALL BE BEDDED IN A SELECTED GRANULAR MATERIAL BACKFILL. THE GRANULAR BEDDING IS TO BE LAID TO A HEIGHT OF 150mm ABOVE THE TOP DUCT.

LEGEND

- GL GROUND LINE
- SW SCREEN WIRE
- BACKFILL
- SELECTED FILL

PLAN DESCRIPTION	DWG. NO.
CONTINUED FROM	
CONTINUED ON	
CROSS SECTIONS	
TYPICAL CROSS SECTION	
SURVEY LAYOUT	



Revision	Date	Description
NOTE: No construction shall be undertaken until all land and servitude acquisitions have been completed.		
Acquisitions completed		
DATE	SIGNATURE	POINT
DATE	SIGNATURE	POINT

UNDERGROUND SERVICES CHECKED	
SEWER	
WATER MAINS	
G.P. CABLES	
ELECTRIC CABLES	
DATA CABLES	
TELEPHONE CABLES	
CO. PIPE LINE	

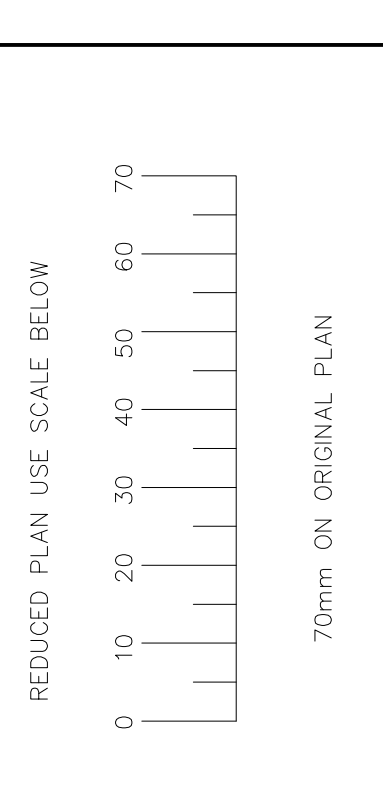
STANDARD DRAWING

TELKOM
CABLE DUCTS AND
JUNCTION BOX
DETAILS

Scales	DATE OF ISSUE
1 : 10	FEBRUARY 1990
Designed	Date
Checked	Drawn
	C.E.S.

Manager (D/N)	Director - Roads
Executive Director	

PLAN DESCRIPTION	DWG. NO.
CONTINUED FROM	
CONTINUED ON	
CROSS SECTIONS	
TYPICAL CROSS SECTION	
SURVEY LAYOUT	



CONSULTING ENGINEER:
MACKINTOSH BERGH & STURGES
2nd Floor
150 Princes Street
Pretoria
Tel. (031) 701-4847
Fax. (031) 701-4640
3810

SUPERVISOR:

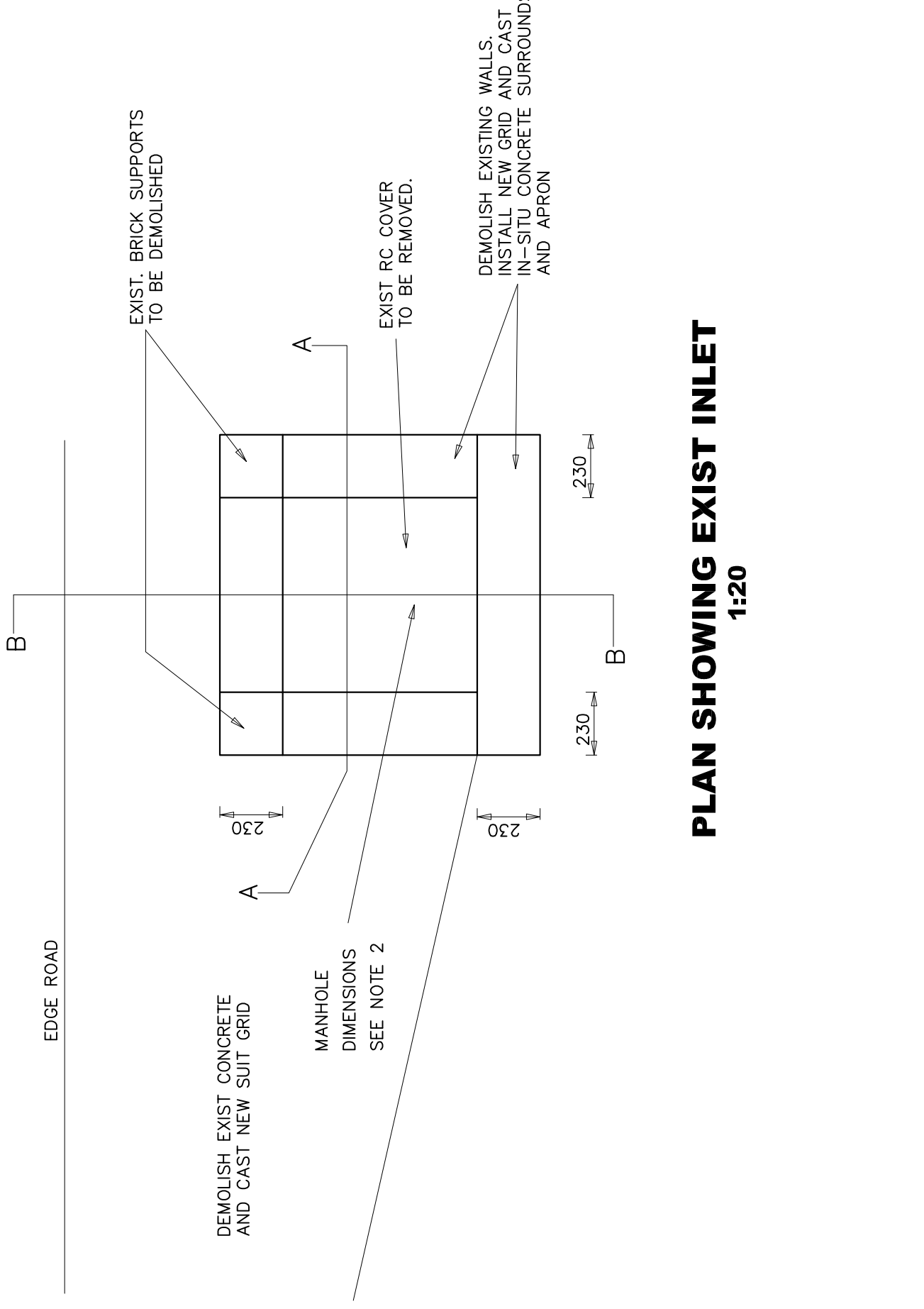
Revision	Date	Description
01		NOTE: No construction work to commence until land and servitude obligations have been completed
02		Acquisitions completed
DATE	ENGINEER	
UNDERGROUND SERVICES CHECKED	DATE	SIGNATURE
S. W. DRAINS		
WATER MAINS		
C.P. & CABLES		
ELECTRIC CABLES		
S.A.R. CABLES		
TELEPHONE		
OT. PIPE LINE		

NOTE: City underground services affected by new construction work are shown. Be taken during construction for road foundations, retaining etc. to road works. No underground services such as water, gas, sewer, etc. are shown. If any are shown, they are shown as they are. It is the responsibility of the contractor to ensure that all possible these must be located before work proceeds.

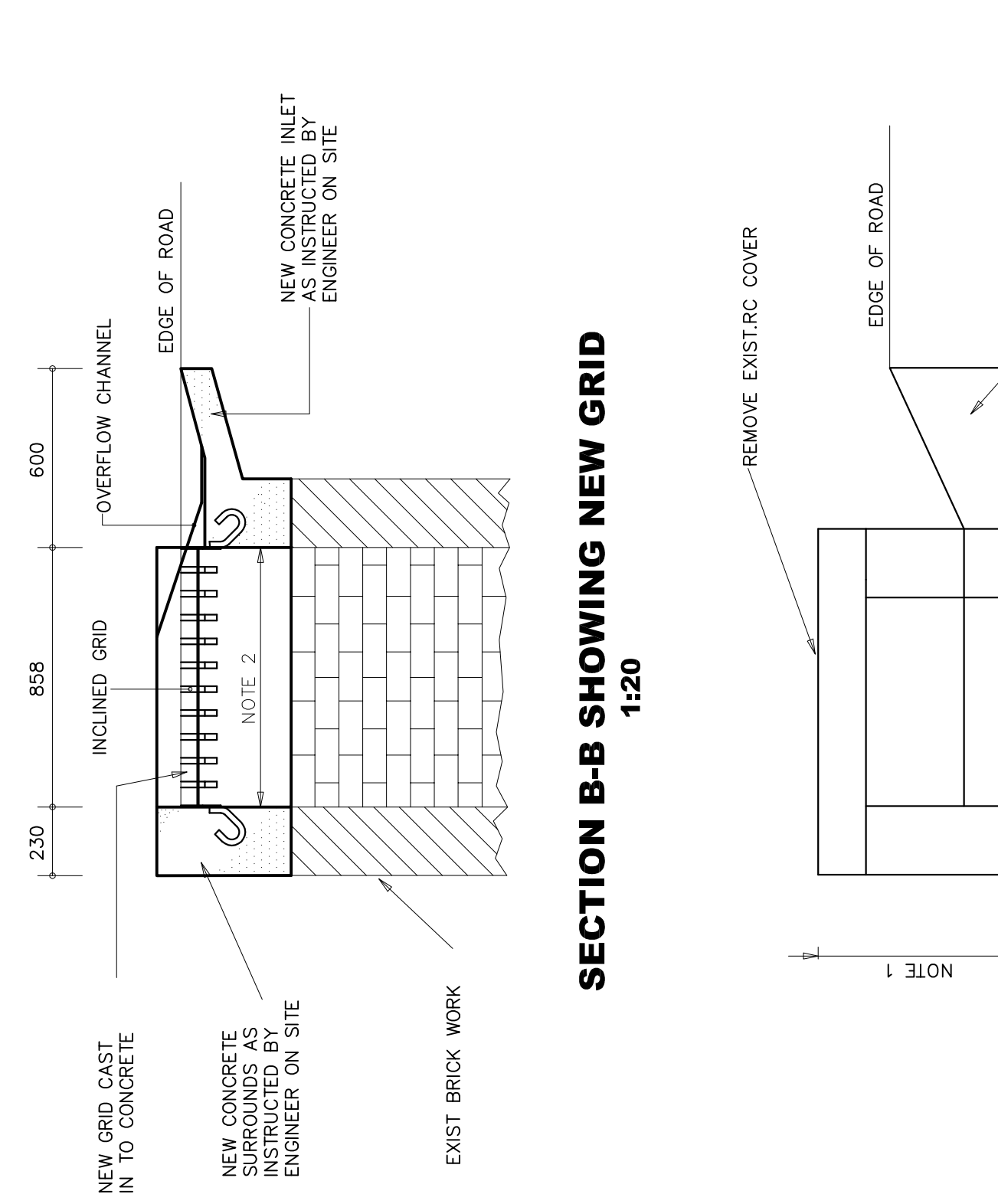
Contract No.
Project Title

STANDARD DRAWINGS
TYPICAL DETAILS OF GRID INLETS

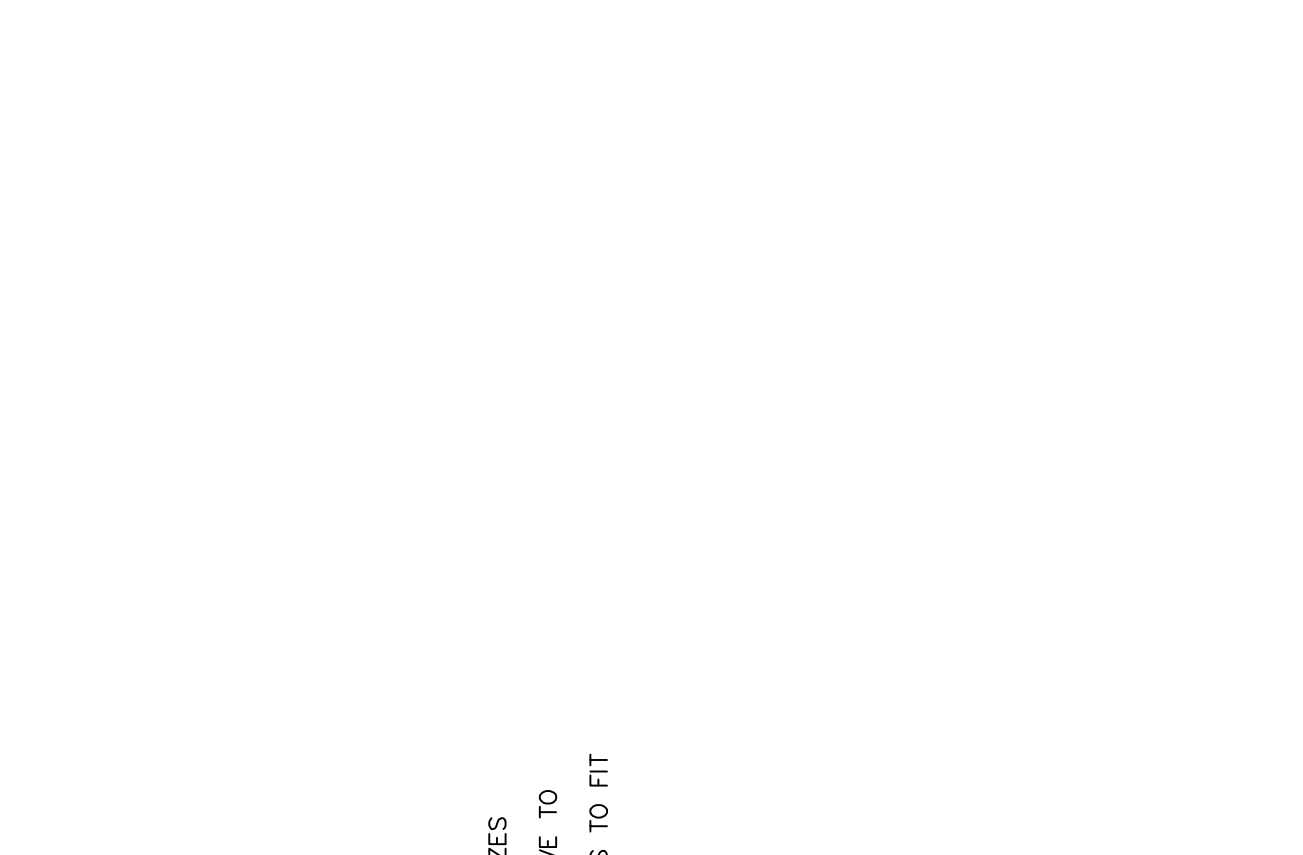
Scale	Reference
1 : 20	
Designed A.B.	Date JAN 97
Checked J.T.L.	Drawn CAD
Manager B.D. (N)	
Director : Roads	
R.A. Moore	Executive Director
43120	Sheet
No	of



PLAN SHOWING EXIST INLET
SCALE 1:20



SECTION B-B SHOWING NEW GRID
SCALE 1:20



SECTION A-A SHOWING EXIST INLET
SCALE 1:20

DETAILS OF EXISTING CATCHPIT WITH NEW GRID
(DETAILS OF NEW GRID BELOW)

DETAILS OF EXISTING CATCHPIT WITH NEW GRID
(DETAILS OF NEW GRID BELOW)

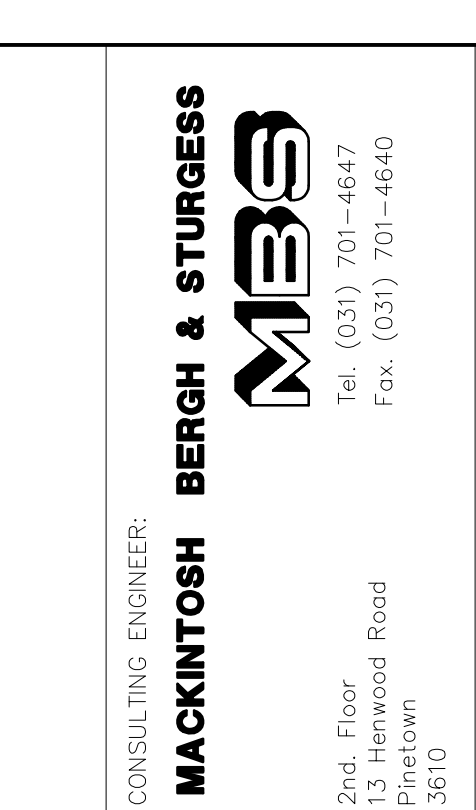
DETAILS OF EXISTING CATCHPIT WITH NEW GRID
(DETAILS OF NEW GRID BELOW)

DETAILS OF EXISTING CATCHPIT WITH NEW GRID
(DETAILS OF NEW GRID BELOW)

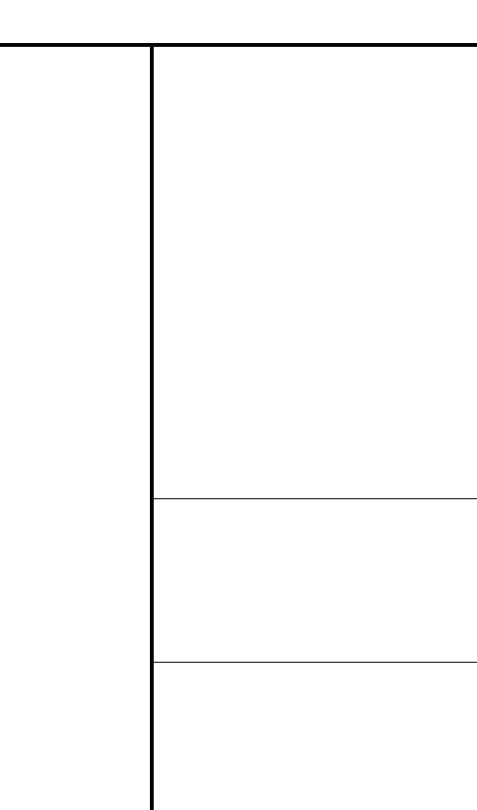
DETAILS OF EXISTING CATCHPIT WITH NEW GRID
(DETAILS OF NEW GRID BELOW)

DETAILS OF EXISTING CATCHPIT WITH NEW GRID
(DETAILS OF NEW GRID BELOW)

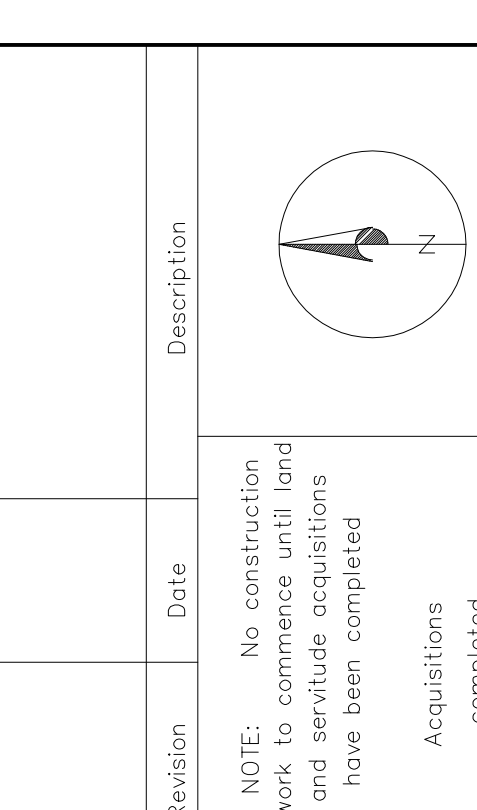
DETAILS OF EXISTING CATCHPIT WITH NEW GRID
(DETAILS OF NEW GRID BELOW)



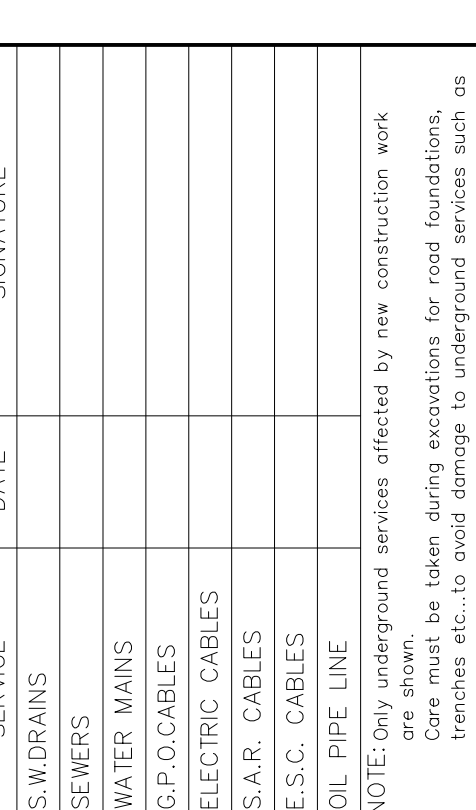
DETAILS OF GRID BAR TYPE 1
SCALE 1:5



DETAILS OF GRID BAR TYPE 3
SCALE 1:5



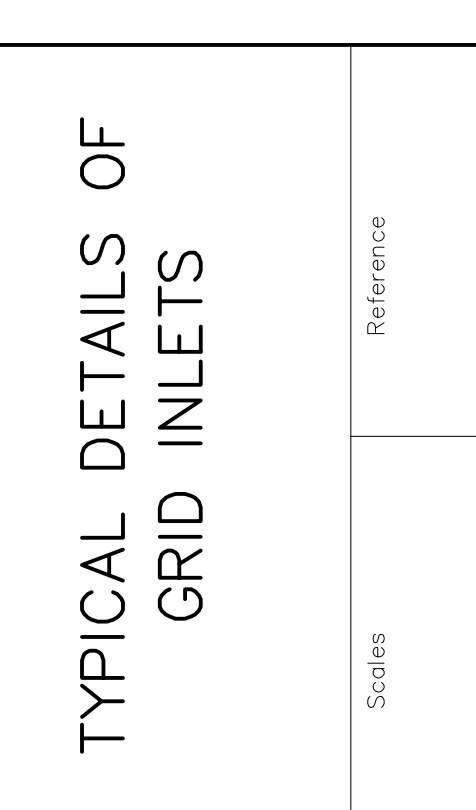
SECTION C-C
SCALE 1:5



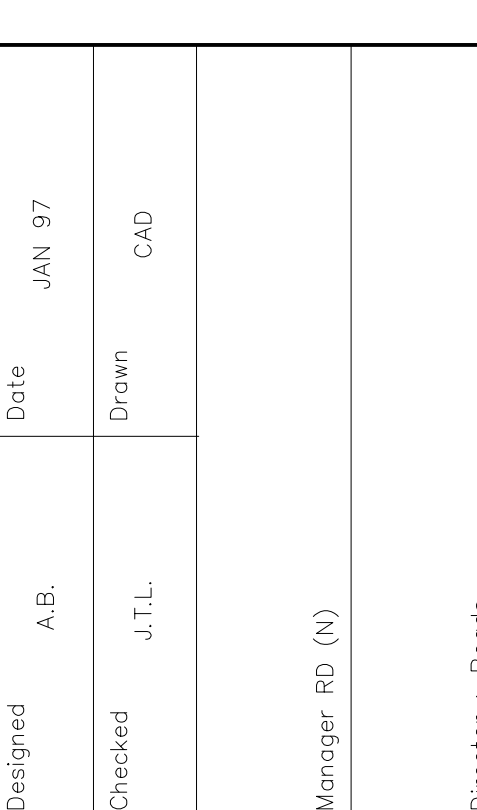
DETAILS OF ANCHOR
SCALE 1:5



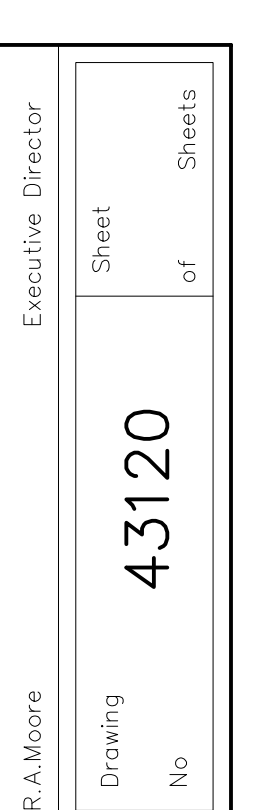
DETAILS OF HINGE BEARING
SCALE 1:5



DETAILS OF 60 x 6 x 6 FLAT
SCALE 1:5



DETAILS OF 60 x 60 x 5 ANGLE
SCALE 1:5



DETAILS OF 20dia. HINGE
SCALE 1:5

SECTION A-A
SCALE 1:20

SECTION B-B
SCALE 1:20

GRID AND FRAME PLAN
SCALE 1:5

PLAN
SCALE 1:20

- NOTE:**
- HEIGHT TO WHICH EXIST CONCRETE/BRICKWORK TO BE DEMOLISHED WILL BE CONFIRMED BY ME FOR EVERY CATCHPIT.
 - EXISTING MANHOLES MAY VARY FROM THE SIZES AS DETAILED BELOW. ADJUSTMENTS WILL HAVE TO BE MADE IN THE NEW CONCRETE SURROUNDS TO FIT THE EXISTING CATCHPIT MANHOLE/CHAMBER.
 - GRID FRAME TO BE KEPT SQUARE DURING CONCRETE WORK. USE MIN. 3x10mm STRUTS BETWEEN 60x6 FLATS.
 - CONCRETE STRENGTH = 25MPa
 - MINIMUM COVER = 40mm
 - REFER TO DRAWING SD 105 FOR GRID FABRICATION DETAILS

NEW GRID CAST IN TO CONCRETE
NEW CONCRETE SURROUNDS AS INSTRUCTED BY ENGINEER ON SITE
EXIST BRICK WORK
REMOVE EXISTING COVER
EXIST BRICKWORK TO REMAIN
EXIST BRICKWORK TO BE DEMOLISHED
NEW MANHOLE INLET AS INSTRUCTED BY ENGINEER ON SITE

NEW GRID CAST IN TO CONCRETE
NEW CONCRETE SURROUNDS AS INSTRUCTED BY ENGINEER ON SITE
EXIST BRICK WORK
REMOVE EXISTING COVER
EXIST BRICKWORK TO REMAIN
EXIST BRICKWORK TO BE DEMOLISHED
NEW MANHOLE INLET AS INSTRUCTED BY ENGINEER ON SITE

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NEW GRID CAST IN TO CONCRETE
NEW CONCRETE SURROUNDS AS INSTRUCTED BY ENGINEER ON SITE
EXIST BRICK WORK
REMOVE EXISTING COVER
EXIST BRICKWORK TO REMAIN
EXIST BRICKWORK TO BE DEMOLISHED
NEW MANHOLE INLET AS INSTRUCTED BY ENGINEER ON SITE

NOTE 1:
CONCRETE - BENCHING : 15 MPa/19
OTHER : 25 MPa/13
MINIMUM COVER = 40mm
STEEL WORK TO BE HOT-DIP GALVANISED AFTER MANUFACTURE TO SABS 755
WELDS TO BE 6mm THICK FILLET WELDS.

NOTE 2:
THIS MANHOLE CHAMBER IS SUITABLE FOR MAX. 600dia PIPE
ENGINEERS TO PROVIDE SIZE ADJUSTMENT DETAILS ON SITE FOR LARGER PIPES.

NOTE 3:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 4:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 5:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 6:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 7:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 8:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 9:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 10:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 11:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 12:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 13:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 14:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 15:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 16:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 17:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 18:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 19:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 20:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 21:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 22:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 23:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 24:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 25:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 26:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 27:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 28:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 29:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 30:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 31:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 32:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 33:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 34:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 35:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 36:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 37:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 38:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 39:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 40:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 41:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 42:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 43:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 44:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 45:
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WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 46:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 47:
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CONCRETE BASE 25MPa/13

NOTE 48:
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CONCRETE BASE 25MPa/13

NOTE 49:
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CONCRETE BASE 25MPa/13

NOTE 50:
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CONCRETE BASE 25MPa/13

NOTE 51:
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CONCRETE BASE 25MPa/13

NOTE 52:
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NOTE 53:
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CONCRETE BASE 25MPa/13

NOTE 54:
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CONCRETE BASE 25MPa/13

NOTE 55:
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CONCRETE BASE 25MPa/13

NOTE 56:
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CONCRETE BASE 25MPa/13

NOTE 57:
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CONCRETE BASE 25MPa/13

NOTE 58:
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WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 59:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

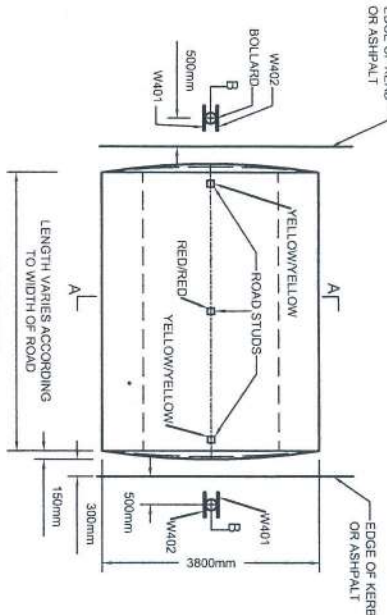
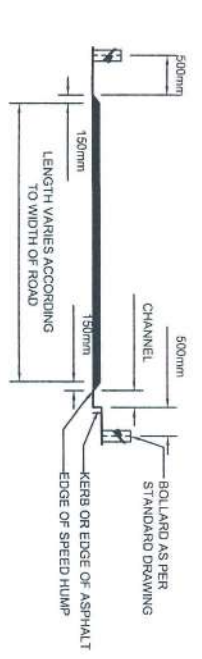
NOTE 60:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 61:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

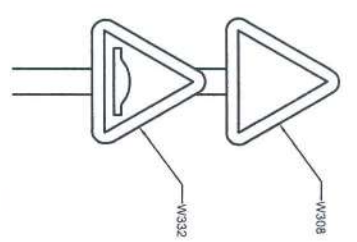
NOTE 62:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

NOTE 63:
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WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13

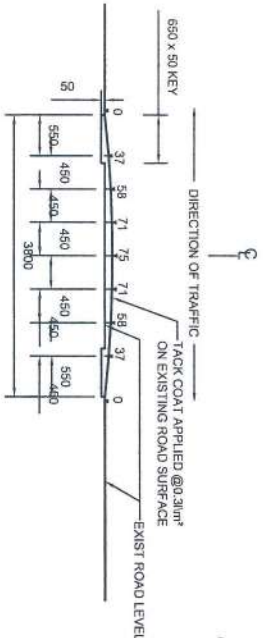
NOTE 64:
CONCRETE BENCHING 15MPa/19
WITH 20mm THICK 1:3 MORTAR RENDERING
CONCRETE BASE 25MPa/13



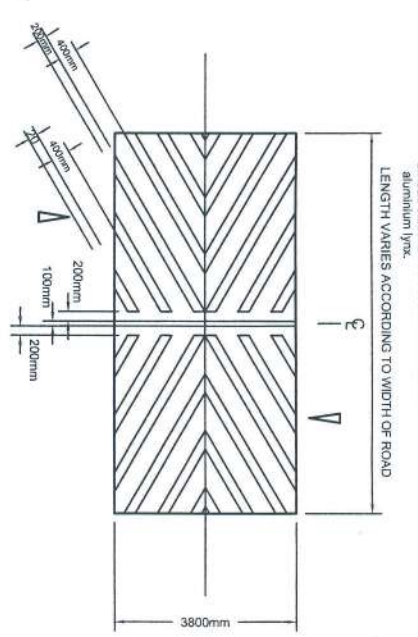
SPEED HUMP DETAIL



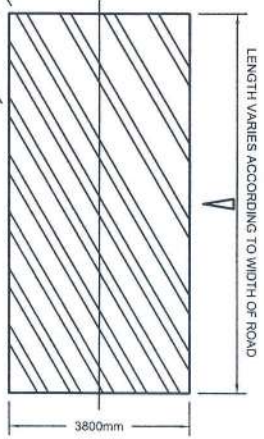
TRAFFIC CALMED ZONE SIGN



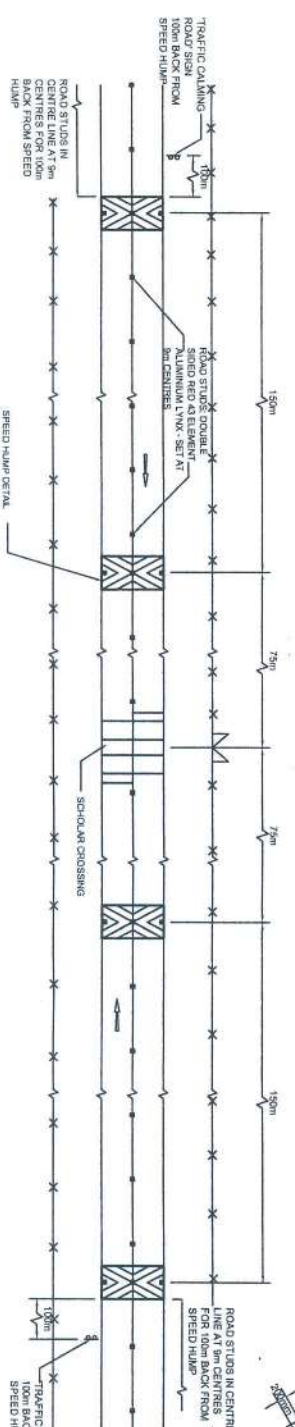
SECTION A - A



SPEED HUMP PAINT DETAIL FOR TWO WAY TRAFFIC MARKINGS
(FOR DETAILS OF THE USE OF ROAD MARKING W401 REFER TO SARTISIA VOL.1 CHAPTER 7, PAGE 7.3.17, & VOL.4 CHAPTER 12)



SPEED HUMP PAINT DETAIL FOR ONE WAY TRAFFIC MARKINGS



TRAFFIC CALMING: SCHOOL ZONES - TWO-WAY ROADS

CLASS 4 ROAD

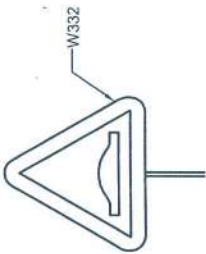
- NOTES:**
1. Road markings - refer to project specifications.
 2. Asphalt to be continuously graded Mix A bitumen content of 5%.
 3. Road studs: Double sided red 43 element aluminum 17x.

- NOTES:**
1. 17mm Chromadek sheeling backing with
 2. Line studs.
 3. 1.2m Dia Mod B - Black semi-rigid
 4. 80mm red retro-reflective
 5. Signs to be erected on 875mm hd dp galvanised post.
 6. Signs are to be erected such that the outer edge of all signs is a minimum of 75mm and a maximum of 150mm from the edge of the asphalt or kerb.
 7. Size: 900mm (W) x 1200mm (H).
 8. Sign to be erected such that the height clearance to the underside of the sign is 2200mm off the natural ground level.
 9. Sign to be in conformance with the SAOC Road Traffic Signs Manual.

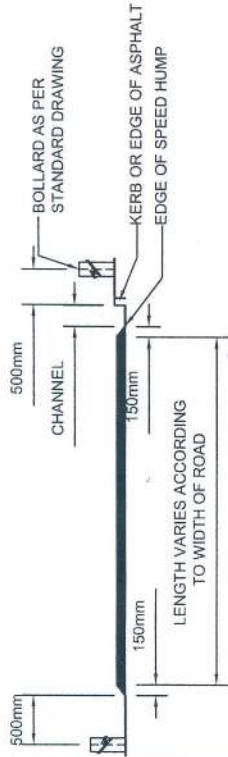
NOTE:
FOR ONE-WAY ROADS PLEASE CONTACT THE PROJECT ENGINEER

TRAFFIC CALMING
SCHOOL ZONES &
TWO-WAY ROADS &
ONE WAY ROAD
LAYOUTS
SECTIONS &
DETAILS

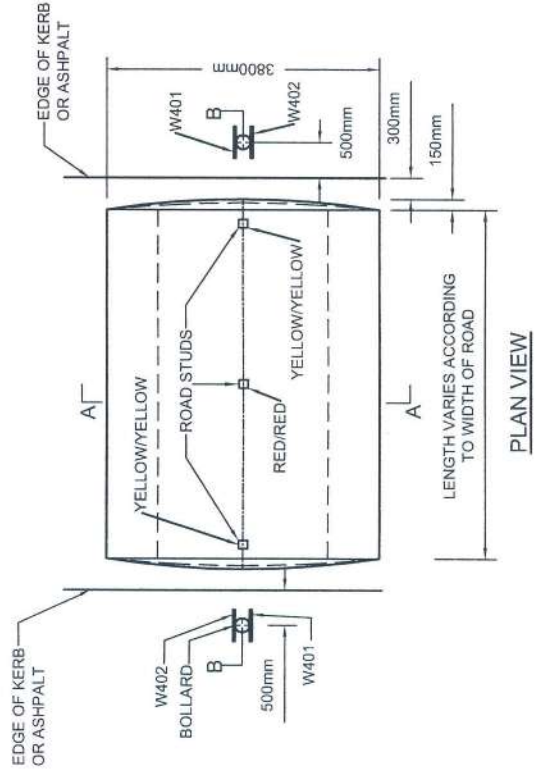
Boat



TRAFFIC CALMED ZONE SIGN



SECTION B - B

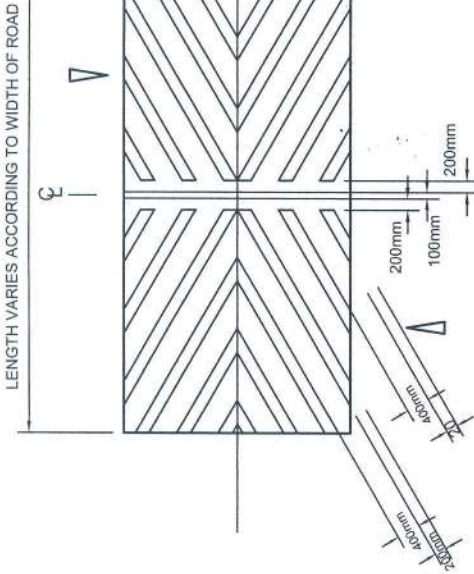


PLAN VIEW

SPEED HUMP DETAIL

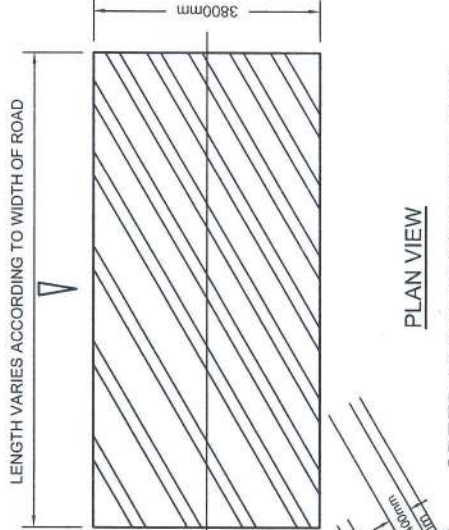
STANDARD DETAIL FOR SPEED HUMPS

- NOTES:**
1. Road markings - refer to project specifications.
 2. Asphalt to be continuously graded Mix A bitumen content of 5%.
 3. Road studs: Double sided red 43 element aluminium lynx.

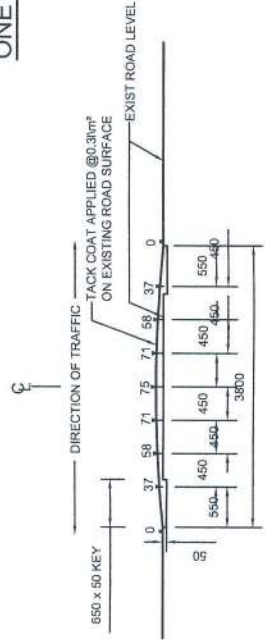


PLAN VIEW
SPEED HUMP PAINT DETAIL FOR TWO WAY TRAFFIC MARKINGS

(FOR DETAILS OF THE USE OF ROAD MARKING WM10 REFER TO SARTSM VOL1 CHAPTER 7, PAGE 7.3.17. & VOL4 CHAPTER 12)



PLAN VIEW
SPEED HUMP PAINT DETAIL FOR ONE WAY TRAFFIC MARKINGS



SECTION A - A

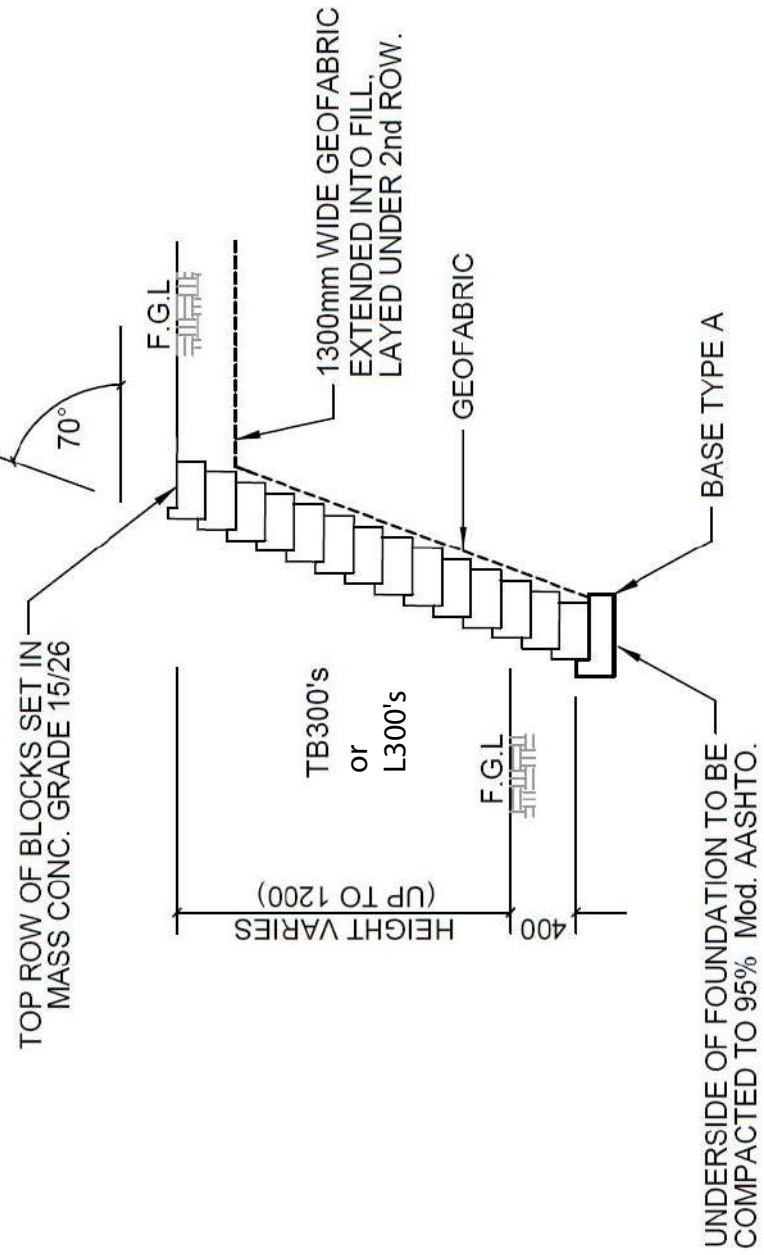
- NOTES:**
- 1) Road markings - refer to Project Specifications.
 - 2) Signs - W332 & W308 to be erected 30m away from the speed hump on both approaches. The W332 and W308 signs are to be combined on one pole.
 - 3) Signs are to be erected such that the outer edge of all signs is a minimum of 750mm and a maximum of 1500mm from the edge of the asphalt or kerb.
 - 4) Signs are to be erected such that the height clearance to the underside of the sign is between 2100mm minimum 2500mm maximum off the natural ground level.
 - 5) Asphalt is to be continuously graded Mix A Bitumen content 5%.
 - 6) Road studs: Double sided Red 43 Element Aluminium Lynx.

STANDARD DETAILS FOR SPEED HUMPS

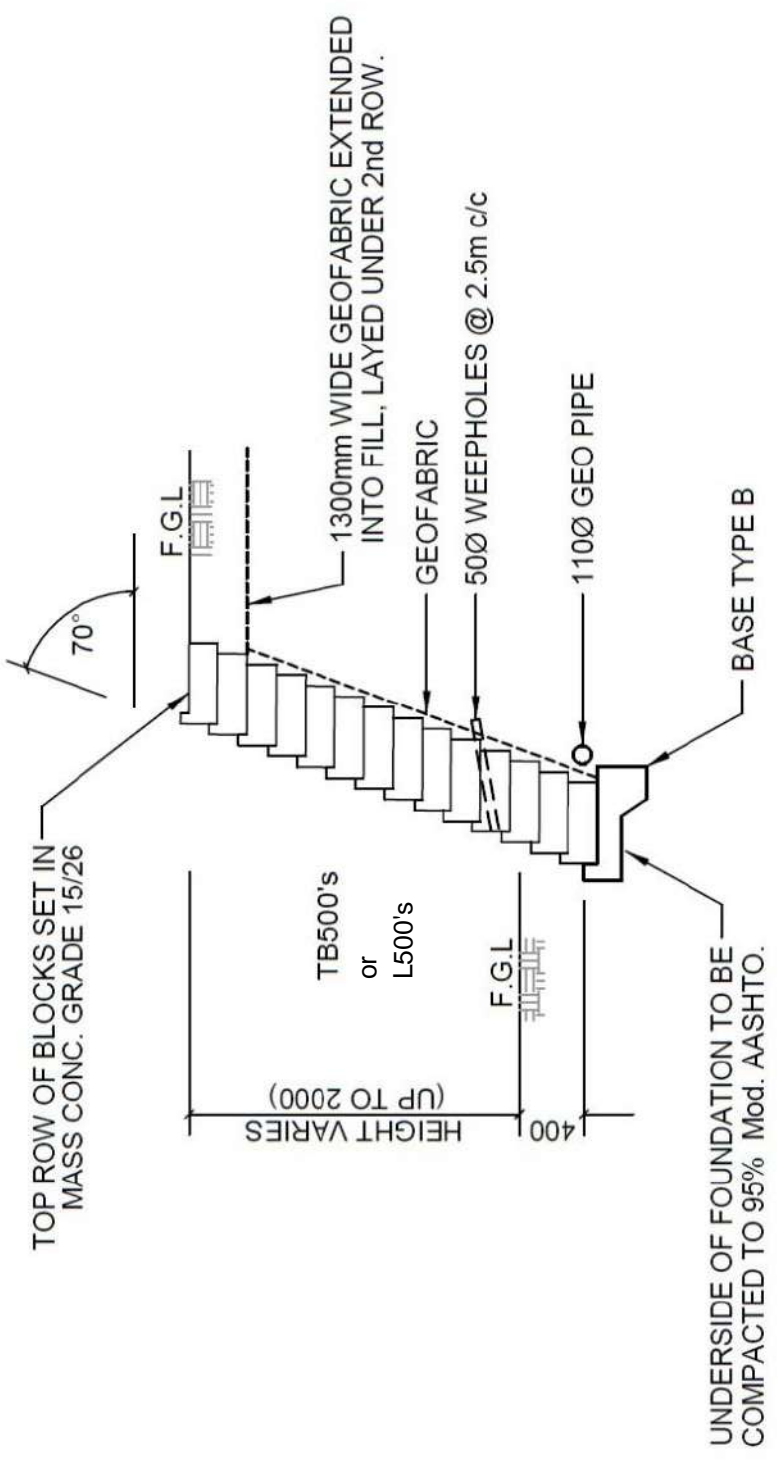
LAYOUTS, SECTIONS & DETAILS

Handwritten signature

NOTE:
FOR ONE-WAY ROADS, PLEASE CONTACT THE PROJECT ENGINEER

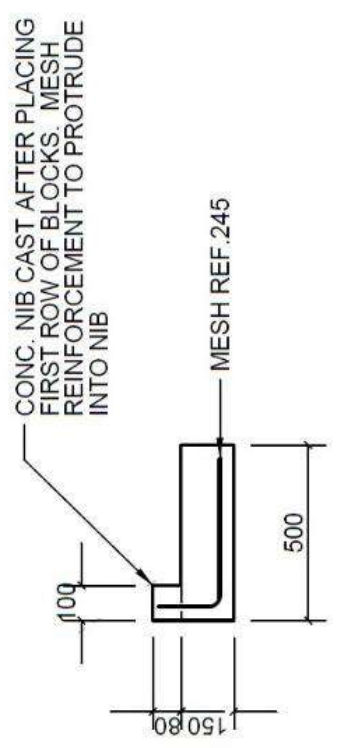


WALL TYPE 'A'
Scale 1 : 50

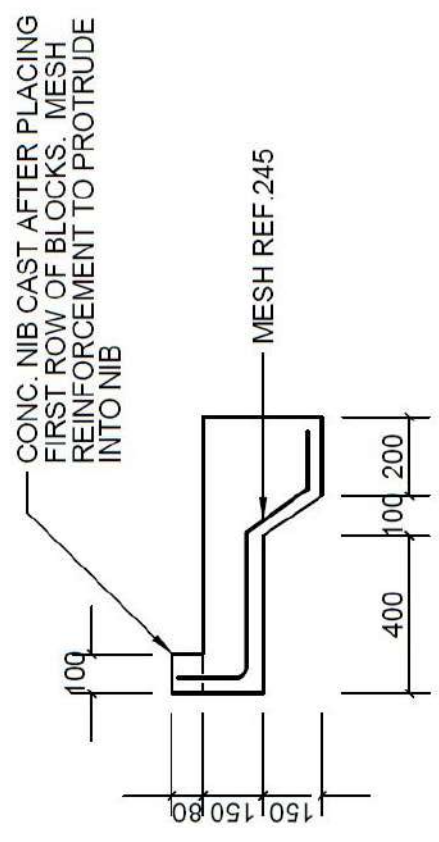


WALL TYPE 'B'
Scale 1 : 50

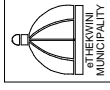
- RETAINING WALL NOTES:**
1. BLOCK TYPE : INFRASET "TERRACE BLOCK" OR SIMILAR APPROVED.
 2. ALL FOUNDATION TRENCHES TO BE APPROVED BY THE ENGINEER ON SITE PRIOR TO CASTING OF CONCRETE.
 3. BOTTOM ROW OF BLOCKS TO BE PLACED WHILE THE BASE CONCRETE IS STILL WORKABLE.
 4. FILL BEHIND WALL TO BE COMPACTED IN LAYERS TO 85% MOD AASHTO.
 5. CONCRETE IN WALL BASE - GR. 25/28 OR AS SPECIFIED
 6. STABILISED FILL, IF REQUIRED - 10:1 CLEAN COARSE SAND : CEMENT , WELL RAMMED BETWEEN BLOCKS, IN BLOCKS AND 500mm BEHIND BLOCKS AS DETAILED.
 7. MINIMUM OF 8 BLOCKS TO BE LAID PER SQ M.
 8. CONTRACTOR TO MAKE ALLOWANCE FOR +/- 70mm "STEP BACK" WITH EACH 180mm STEP UP WHEN SETTING OUT THE BASE.
 9. CONTRACTOR TO REFER TO DETAILED SURVEY DRAWINGS FOR THE LOCATION OF SERVICES, PROPERTY BOUNDARIES ETC.
 10. LEVELS AND DIMENSIONS INDICATED ON THIS DRAWING ARE ONLY A GUIDE AND THESE NEED TO BE CONFIRMED BY THE ENGINEER ON SITE.
 11. POSITION OF RETAINING WALLS TO BE CONFIRMED BY ENGINEER ON SITE.
 12. WALLS LESS THAN 1m HIGH TO BE BLOCK TYPE TB300. BOTTOM ROW LAYED ON 75mm THICK BLINDING LAYER, 400mm WIDE AND AS DIRECTED TO DO SO BY ENGINEER ON SITE.
 13. ALL RETAINING WALLS AS PER STRUCTURES DEPARTMENT DETAILS (ISSUED SEPARATELY IF REQUIRED).



BASE TYPE 'A'
Scale 1 : 20



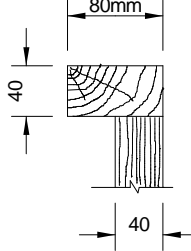
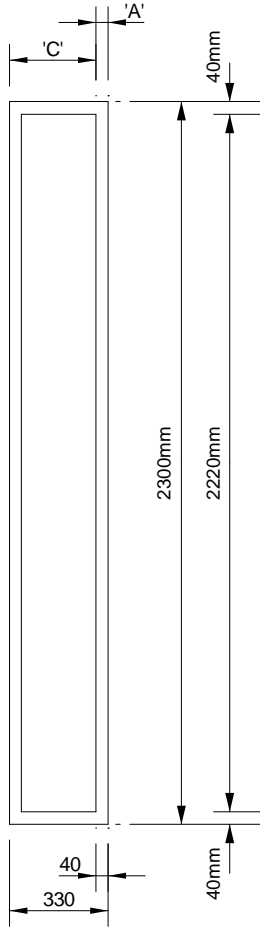
BASE TYPE 'B'
Scale 1 : 20



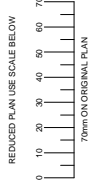
ENGINEERING UNIT
ROADS PROVISION DEPARTMENT



**HARDBOARD NOTICE BOARD FOR
MTAB SUBSIDISED PROJECTS**



DETAIL OF SURROUND
SCALE 1:5



C	15/05/2000	NAME CHANGE
D	27/08/2001	NAME CHANGE
E	14/03/2003	NAME CHANGE
Rev.	Date	Description

eTHEKWINI MUNICIPALITY
UMASIPALA OMKHULU
WETHEKU NAMAPHETHELO
NAME OF CONTRACT

DESIGNED : ENGINEERING UNIT 3117601
ABAQAMBI : ROADS PROVISION DEPARTMENT

CONTRACTOR : NAME OF FIRM
INKONTILEKA :



NOTES:

- A. Raised surround painted white.
- B. White letters.
- C. Royal Blue background - Ref. Blue 0-013.
- D. Grey background - ref. Grey 8-089.
- E. White dividing lines.

The face to be tempered hardboard in one piece.
The colour numbers refer to those on the colour cards of British Standard 2660 of 1955.

STANDARD DRAWING

TYPICAL NOTICE BOARD FOR ENGINEERING UNIT

Scales	Reference
Designed	Date 14/03/2003
Checked	Drawn C.E.HONEY
Manager: RD()	
D/H : RP	

A.M.Peters	Head : Engineering
Drawing No	40137E
Sheet	1
of 1 Sheets	

AS BUILT

420

20

100

15

145

594



Engineering Unit

ROADS PROVISION

ROAD REHABILITATION

**ROAD WORKS IN
PROGRESS**

FROM

TO

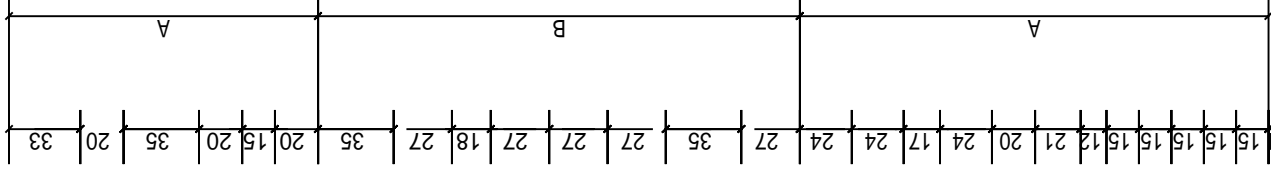
**THANKING YOU FOR YOUR
CO-OPERATION.**

QUERIES

TELEPHONE: 031 3117601

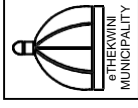
DURING OFFICE HOURS, WEEK DAYS

7:30AM TO 4:00PM



NOTES:

1. Hard White Board 420X594
2. "A" : Royal Blue Letters
Ref. Blue0-013.
3. "B" Red Letters
4. Logo to be Royal Blue Background,
Dome in Powder Blue & Letters in White
5. Colours are based from the colour
cards of British Standard 2660 of 1995



**ENGINEERING UNIT
ROADS PROVISION DEPARTMENT**



PLAN DESCRIPTION	DRG No.
CONTINUED FROM	
CONTINUED ON	
CROSS SECTIONS	
TYPICAL CROSS SECTION	
SURVEY LAYOUT	

REDUCED PLAN USE SCALE BELOW



Rev.	Date	Description

Contract No.
Project Title

**STANDARD
DRAWING**

**Drawing Title
TYPICAL NOTICE BOARD
FOR ENGINEERING UNIT
ROAD REHABILITATION**

Scalcs	Reference
Designed	Date
Checked	Drawn

Manager:RD()

D/H: RP

A.M.Peters

Head: Engineering

Drawing No.	Sheet of	Sheets

AS BUILT

C3.6: ANNEXURES

Annexure 1: Tests on pavements

a) General

The testing of macro-texture, roughness, rutting and deflection by specialised equipment in terms of TMH13: Automated Road Condition Assessments, shall be subject to the provisions herein.

b) Surface macro texture: Instrument assessment

The surface macro-texture shall be measured following draft TMH 13 – Part E using non-contact laser spot sensors with a minimum resolution of 64KHz capable of meeting the output requirements for Mean Profile Depth (MPD) specified in ISO 13473-1 calculated and recorded at 10 m intervals. The position of the measurements shall be as specified and demarcated by the Employers Agent which normally includes one or both wheel paths and in-between wheel paths for segment lengths of 500m or as otherwise specified in the Contract Documentation.

The operation and quality checks of the equipment shall be undertaken by an Independent ISO 9001-2015 certified service providers in accordance with the manufacturer's and draft TMH 13 requirements.

A validation of the equipment components shall be conducted and analysed for conformance by the Employer or his experienced and approved agent following the draft TMH 13 validation protocols. Such validation shall not be older than six months or as otherwise specified in the Contract Documentation. The Employers Agent, however may also conduct validation checks on site following the validation protocols on surfaces with texturing similar to that to be measured.

c) Road Roughness Measurements

(i) Direct Contact Roughness Measuring Devices

Direct contact Roughness devices, also known as static devices, which are class 1 for vertical sampling intervals and class 3 longitudinal sampling interval profiling devices taking direct roughness measurements using precision inclinometers on the road surface, with built-in data capturing systems and outputs in International Roughness Index (IRI) reported in m/km or which can be processed into IRI outputs using public domain "Road Ruf" or "Proval" software. Longitudinal sampling intervals of 250 mm, or less, are typically used. These devices must be operated by experience staff and are used for benchmarking of IRI-values on selected road sections for Validation and Calibration purposes of other high-speed roughness measuring devices. These devices shall meet the standards and data output criteria, in IRI (m/km), specified in draft TMH 13 - Part C. These devices can also be used for the measuring of IRI (m/km) of shorter lengths of roadway, averaged for 100 m lengths, in both wheel paths separately of all traffic lanes and shoulders in excess of 2,0 m widths following the manufacture's operation manual and the requirements of TMH 13 – Part C. Using these devices, unless otherwise specified in the Contract Documentation, only one single pass of measurement is normally sufficient. For judgement purposes, the Average IRI per 100 m for a traffic lane or shoulder is calculated as follows:

Average IRI 100 m = (100 m IRI left wheel path + 100 IRI right wheel path)/2 for single passes with the equipment.

(ii) High Speed Inertial Non-Contact Laser Profilometers

All the equipment elements are attached to a motor vehicle which measures roughness at high speeds (between 30 and 100 kms/h). The accuracy and data output of profilometers shall comply with draft TMH 13 – Part C with a class 1 vertical resolution of equal to or less than 0,1 mm and a class 1 longitudinal sampling interval of less than or equal to 25 mm as defined in ASTM E95009.

The roughness output, in International Roughness Index (IRI) in m/km is characterised by a fixed

and specific computer algorithm for both wheel paths separately recorded and stored at 10 m intervals and averaged for each 100 m. The processing of the data in each wheel path shall be in accordance with ASTM E1170-97 and the World Bank Technical Paper 46.

These profilometers are calibrated by the manufacturer and shall be validated regularly on road sections specifically selected for this purpose against known IRI reference values established by class 1 direct contact profiling devices conforming to the requirements of TMH 13 – Part C. The validation shall be conducted and analysed for conformance by the Employer or his experienced and approved agent following the draft TMH 13 – Part C procedures and protocols. Such validation certificate shall not be older than six months or as otherwise specified in the Contract Documentation.

The operation of the device shall be conducted by trained and experienced staff of an Independent ISO 9001 - 2015 certified service provider following ASTM E950-09(or latest version) test procedures together with strict daily quality measures and check lists. The roughness measurements for each wheel path shall be taken simultaneously, with the lasers, at a spacing of 1,75 m apart for all traffic lanes and shoulders in excess of 2,0 m in width, as determined according to the final line markings, following the Manufacturer's operational manual and the procedures of draft TMH13 - Part C. The lengths for testing with high speed inertial non-contract profilometers shall be 500m or multiples thereof, unless otherwise specified in the Contract Documentation.

Three repeat runs for each measured traffic lane or shoulder, unless otherwise specified in the Contract Documentation, shall be conducted and the measurements of the left and right wheel paths per 100 m IRI-values of the runs shall be averaged to produce an Average IRI for each 100 m. The Average IRI for the 100 m traffic lane or shoulder is calculated as follows:

Run 1 IRI 100 m average = (100 m IRI left wheel path + 100 m IRI right wheel path)/2

Run 2 IRI 100 m average = (100 m IRI left wheel path + 100 m IRI right wheel path)/2

Run 3 IRI 100 m average = (100 m IRI left wheel path + 100 m IRI right wheel path)/2

Average IRI 100 m = (Run 1 IRI 100 m average + Run 2 IRI 100 m average + Run 3 IRI 100 m average)/3

d) Rutting Measurements

(i) High speed profilers

These profilers are high speed (80 km/h) instrumented vehicles using non-contact laser sensors to measure the transverse profile of the road surface meeting the requirements of ASTM E950-09 referred to in draft TMH13 Part D. To meet the accuracy requirements, the number of lasers shall be between 15 and 25 with the spacing configuration and focus of the sensors optimised to locate the low and high profiles in both wheel paths separately covering a measuring width of at least 3,2 m. At least one inertial motion sensor (IMS) shall also be fitted rendering the data collected suitable for the calculation of other rutting parameters such as rut area, ponding area cross fall and gradient.

The average rut depth in mm is characterised by a fixed mathematical algorithm and shall be recorded and stored at 10 m intervals, averaged and reported for each wheel path at 100 m intervals. In addition, the maximum rut measured within the reported 100 m average for each wheel path shall also be reported. The operation and quality checks of the equipment shall be undertaken by experienced staff of an independent ISO 9001-2015 certified service provider in accordance with the manufacture's and draft TMH 13 – Part D requirements. A validation of the equipment components and systems shall be conducted following the TMH13 protocols and analysed for conformance by the Employer or his experienced and approved agent following draft TMH13 – Part D validation protocols. Such validation certificate shall not be older than six months or as otherwise specified in the Contract Documentation.

e) Deflection measurements using the Falling Weight Deflectometer (FWD)

(i) The FWD system for the measurements of deflections is based on a dynamic impulse load on a rubber buffer that transmits the force to a standard sized load plate with geophones (velocity transducers) attached to a bar to capture the deflection bowl of the pavement structure. A target load of 40 KN, as well as a 50KN, or as otherwise specified in the Contract Documentation, is normally applied for 20 – 30 milliseconds.

(ii) The primary equipment elements consist of the following:

- An appropriate vehicle or a vehicle and trailer combination
- A FWD device with a 300 mm diameter split or segmented base plate with a 5 mm patterned rubber pad
- A sensor bar with geophone sensors pointing in the direction of travel
- Appropriate weights to apply loads of 10 – 120 KN fitted on to adjustable height stops
- Appropriate thermometers for the measurements of air and road surface temperature – and / or pavement temperatures, when specified in the Contract Documentation.
- A calibrated distance measuring instrument fitted to the vehicle
- A real time differentially corrected Global Positioning System (GPS) linked to the data fitted directly above the load plate
- A computer and operating system
- Software with real time displays for quality checks during the testing operations
- Drill and bits for at depth pavement temperatures measurements, if required
- An auxiliary power source for the operation of hydraulic / electrical equipment
- Aerosol paint for spot markings of test points
- Safety signs and flashing amber lights

The minimum requirements of the measuring components and data acquisition system are specified in draft TMH 13 – Part F.

(iii) The minimum number of geophone sensors shall be nine or eleven spaced at offsets as outlined in Table 1 below, for basic deflection bowl parameters i.e.:

-Maximum deflections (Ymax)	:	D0
-Base layer index (BLI)	:	D0 – D300
-Middle layer Index (MLI)	:	D300 – D600
-Lower layer Index (LLI)	:	D600 – D900

Note: D denotes the offset from the centre of the load plate.

Table 1: Sensor offsets from the centre of the base plate, for nine or eleven configurations shall be as follows

SENSOR NO	OFFSETS IN MILLIMETRES	
	NINE SENSOR CONFIGURATION	ELEVEN SENSOR CONFIGURATION
1	0	0
2	200	200
3	300	300
4	450	400
5	600	500
6	900	600
7	1 200	750
8	1 500	900
9	1 800	1 200
10	-	1 500
11	-	1 800

- (iv) Deflection measurements, in microns, are taken at test positions specified in the Contract Documentation, or the Employers Agent, following the manufacturer's procedures, regular quality control checks and operator validations/ operating procedures.

The weight shall be dropped four times at each test point as follows:

- Drop 1: At 40KN load, for seating purposes and not reported
 Drop 2 & 3: At 40KN load and the deflections are reported individually for each drop
 Drop 4: At 50KN load and the deflections reported separately

The deflections for each sensor are normalised for allowable small variation from the target loads, recorded for each drop separately and reported for each test position. The air and road temperatures together with the date and time shall also be recorded and reported together with the location details of each test point. All the deflection measurements shall be undertaken by trained and experienced staff of an Independent and ISO 9001 – 2015 certified service provider.

- (v) In the absence of formalised calibration trials for FWD equipment, as compiled by CROW and referred to in Draft TMH13, and for uniformity of calibrations, the protocols by SHRP and accepted by AASHTO designation: R32-11, shall be followed, the "reference" calibration of the load cell and sensors as well as the "relative" calibration of sensors (inter-sensor correlation) shall be conducted annually by an independent AASHTO-certified calibrating person. The operator shall in addition to the above independent calibrations also conduct at least monthly "operators" verification / reference Calibrations for temperature probes, distance measuring instruments, position of sensors and inter-sensors correlation (relative calibration). All the calibration and verification certificates and documentation shall be made available to the Employers Agent and /or Employer.
- (vi) For testing on trafficked roads, appropriate traffic accommodation shall be provided by the service provider as specified in the Contract Documentation.

f) Air Permeability Test

Determination of the air permeability of compacted Marshall specimens or cores.

(i) Scope

The measurement of air permeability is non-destructive and may be performed on laboratory-compact Marshall specimens or cores removed from a pavement.

(ii) Apparatus

Model AP-400 A, Asphalt Paving Meter, is a self-contained device capable of measuring air flow rates of up to 5,0 l per minute at low pressure differentials. The device has a maximum volume capacity of 1,0 l. It is

equipped with two calibrated sight tubes; one measures in 25 ml increments for dense specimens, and the other is graduated in 500 ml increments for open, permeable specimens.

Incorporated in the unit are the valves required to perform the test: a pressure squeeze bulb for filling the test system with water; a sensitive manometer for pressure setting; a metal cylindrical jacket slightly larger than the 101,6 mm diameter Marshall specimen and containing a 101,6 mm diameter rubber triaxial sleeve as an inner liner; a domed test cap; and a specimen support.

(iii) Test Procedure

1. Remove either stem valve by screwing counter-clockwise and lifting out of the case. Set the main control valve at 'exhaust' or 'test'. Fill the unit with 2 000 ml of water through the recess left by the stem valve.
2. Replace the stem valve in its mounting.
3. Fill one of the two calibrated volumetric cylinders in the following manner: NOTE: 1 000 ml cylinder is used for open specimens. 300 ml cylinder is used for dense specimens. (a) Push the main control valve to the 'off' position. (b) Open the stem valve above the selected cylinder by turning counter-clockwise. One revolution is adequate. Check to make certain that the volumetric cylinder stem valve not being used is closed tightly. The air flow valve on top of the rubber bulb assembly should be open (unscrewed about two turns). (c) Squeeze the rubber bulb, pumping air into the reservoir. The pressure will force water from the reservoir into the measuring cylinder, as can be seen by the rising water-level in the sight tube. Continue pumping until the sight tube is filled to within approximately 25 mm of the top. Close the stem valve connected to this tube. (d) Turn the main valve to the 'exhaust' position to allow excess air pressure to escape from the reservoir.

Connect the rubber tube of the specimen test cap to the pressure port located in the lower left corner of the instrument. Connect the second tube of the specimen test cap to the manometer port located at the top left of the manometer. (The rubber tubes of the test cap are interchangeable and may be connected to either the pressure port or the manometer port.)

4. Level the instrument by observing the level bubble and adjust the instrument on the swivel tripod.
5. Set the manometer at the 'zero' reading by loosening the screw at the bottom of the manometer and sliding the scale until the 'zero' reading coincides with the level of the manometer fluid in the nearly horizontal tube of the manometer. Be sure that the manometer valves are in an open position while zeroing the manometer and during a test.
6. The Marshall specimen is placed on the support and the metal cylinder, with the rubber triaxial sleeve in place, is slipped over both. The domed test cap with rubber tubes attached is then placed over the top of the specimen and the rubber -sleeve inflated with the hand bulb to seal the cap, specimen and support. If the vertical face of the specimen is rough, it may be sealed with paraffin wax prior to placing in cylinder.
7. The instrument is now ready to perform the test: the main valve is set at 'exhaust', the measuring cylinder is full, both manometer valves are open, the manometer is reading 'zero' and the test cap is sealed to the specimen.
8. Proceed as follows:
 - Push the main control valve to the 'test' position. Close the airflow valve at the top of rubber assembly.
 - Open the stem valve of the filled volumetric cylinder slowly, allowing water to flow from the cylinder back to the reservoir. Adjust the stem valve so that a constant pressure is developed and recorded by the manometer. Normally, tests are run at 6,4 mm of water pressure. The pressure is held constant throughout the test by minor adjustments to the stem valve.
 - Once constant pressure has been attained, the time required for water to flow between two of the calibration marks on the sight tube is measured accurately. A volume of flow sufficiently large to require a time interval of at least 20 seconds should be selected to obtain accurately repeatable results. Time intervals exceeding 2 minutes do not add to the accuracy of the test and only prolong the testing time.

9. A minimum of three Marshall specimens should be tested at each binder content and the mean rate of air flow through the specimens taken.

10. Calculation

The air permeability is then calculated using the following formula:

$$K = 2,331 \times 10^{-9} \frac{QL}{h}$$

Where:

K = fundamental permeability (cm²)

Q = rate of air flow through specimen (cm³/s) L = average height of specimen (cm) h = air pressure difference expressed in height of water column (cm)

It should be noted that the above formula applies only to a 101,6 mm diameter cylindrical specimen

Annexure 2: Pro-forma: Project Order Agreement



ETHEKWINI MUNICIPALITY

PROJECT ORDER AGREEMENT

between

eThekweni Municipality (“Employer”)

and

xxxxxx (“the Company”)

Project Name : Rehabilitation of various roads located in Wards

Project Number : 1R - xxxx / xx

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PRO-FORMA TEMPLATE

PROJECT ORDER DETAILS

Contract Number : 1R - **xxxx**

Contract Description : **Annual Contract for the Rehabilitation of roads located within the specify area and surrounding areas of the Ethekwini Municipality as and when required for a period of 36 months.**

Project Order No: : 1R - **xxxx** / **xx**

Project Order Description : **Rehabilitation of various roads located in Wards **xxxxx****

C1.A: FORM OF OFFER AND ACCEPTANCE

C1.A.1: FORM OF AGREEMENT

The Employer, identified in the Acceptance signature block, has entered into an agreement in respect of the following works:

Contract No : 1R - **xxxx**
 Contract Title : Annual Contract for the rehabilitation of roads located within the **specify area** and surrounding areas of the Ethekewini Municipality as and when required for a period of 36 months
 Project Order No: 1R - **xxxx / xx**
 Project Title : Rehabilitation of various roads located in Wards **xxxxx**

The Contractor, identified in the signature block below, has examined the Project Order Agreement, and by signing this document and together with the Form of Agreement of the Contract shall constitute a binding contract between the parties.

By the representative of the Contractor, deemed to be duly authorized, signing this part of this Form of Agreement and Acceptance, the Contractor offers to perform all of the obligations and liabilities of the Contractor under the Contract and Project including compliance with all its terms and conditions according to their true intent and meaning for an amount to be determined in accordance with the Conditions of Contract identified in the Contract Data and Project Specific Contract Data.

It must be noted that the Project Order is based on estimated quantities of work envisaged to be undertaken that is subjected to re-measure as the work progresses as well as change in design as the Geotechnical Conditions become evident. The Project Order total for this specific project may increase or decrease as the work progresses.

The estimated total of the priced bill, of the estimated quantities, inclusive of Value Added Tax, is for:

R xxx,xxx,xx.xx (including VAT, escalation, and rise and fall of special materials).

This agreement is accepted by the Employer by signing the Acceptance part of this Form of Agreement and Acceptance and returning one copy of this document to the Contractor.

For the Contractor:

Signature (of person authorized to sign the Contract) :

Name (of signatory in capitals) :

Capacity (of Signatory) :

Name of Contractor (organisation) :

Address :

Witness :

Signature :

Name (in capitals) :

Date :

C1.A.2: FORM OF ACCEPTANCE

By signing this part of the Form of Agreement and Acceptance, the Employer identified below accepts the Contractor's offer. In consideration thereof, the Employer shall pay the Contractor the amount due in accordance with the Conditions of Contract identified in the Contract Data and Project Specific Contract Data. Acceptance of the Contractor's offer shall form an agreement between the Employer and the Contractor upon the terms and conditions contained in this Agreement and in the Contract that is the subject of this Agreement.

The terms of the contract are contained in:

- Part C1.A : Form of Agreement and Acceptance of the Project Order
- Part C2.A : Project Specific Contract Data
- Part C3.A : Bill of Quantities (Compiled using the priced bill of the Contractor)
- Part C4.A : Project Order – Scope of Works
- Part C5.A : Site Information
- Part C6.A : Annexure

and the schedules, forms, drawings and documents or parts thereof, which may be incorporated by reference into Parts C1.A to C6.A above.

The Contractor shall within one week after receiving a completed copy of this Agreement, contact the Employer's agent (whose details are given in the Contract Data) to arrange the delivery of any proof of insurance and any other documentation to be provided in terms of the Conditions of Contract identified in the Contract Data/Project Specific Contract Data at, or just after, the date this Agreement comes into effect. Failure to fulfill any of these obligations in accordance with those terms shall constitute a repudiation of this Agreement.

Notwithstanding anything contained herein, this Agreement comes into effect on the date when the Contractor receives one fully completed original copy of this document. This Agreement shall constitute a binding contract between the parties.

Signature (*person authorized to sign the acceptance*) :

Name (*of signatory in capitals*) :

Capacity (*of Signatory*) :

Name of Employer (*organisation*) :

Address :

:

Witness:

Signature :

Name (*in capitals*) :

Date :

C2.A: PROJECT SPECIFIC CONTRACT DATA

C2.2.1 CONDITIONS OF CONTRACT

GENERAL CONDITIONS OF CONTRACT

The conditions of Contract are the General Obligations of Contract for Construction Works (2015 3rd Edition), (GCC 2015) published by the South African Institution of Civil Engineering. Copies of these Conditions of Contract may be obtained from the South African Institution of Civil Engineering (Tel: 011-805 5947, Fax: 011-805 5971, Email: civilinfo@saice.org.za) (Short title: "General Conditions of Contract 2015 or GCC 2015").

The contract data (including variations and additions) shall amplify, modify or supersede, as the case may be, the GCC 2015 to the extent specified below, and shall take precedence and shall govern.

Each item of data given below is cross-referenced to the clause in the GCC 2015 to which it mainly applies.

C2.2.2: SPECIAL CONDITIONS OF CONTRACT

These special conditions of contract, extracted from the Annual Contract for the Rehabilitation of Roads located within **specify area** and surrounding areas of the EThekweni Municipality, ie. 1R - xxxx, shall amplify, modify or supercede, as the case may be, the General Conditions of Contract 2015 to the extent specified and shall take precedence and shall govern for individual Project Orders issued under this contract.

- 5.5 "Time for practical completion": delete this clause and all references thereto throughout the General Conditions of Contract.
- 5.13.1 "Penalty for Delay": delete the first paragraph and replace with "If the Contractor fails to complete the whole Works specified in the Project Order by the Due Completion Date of the Project Order or as amended, the Contractor shall be liable to the Employer for the sum stated in the Project Order Contract Specific Data as a penalty for every day that elapses after the Due Completion Date or as amended, including non-working and special non-working days."
- 5.13.2 "Reduction of penalty": delete this clause and all references thereto throughout the General Conditions of Contract.
- 5.14.1 "Practical Completion": delete this clause and all references thereto throughout the General Conditions of Contract.
- 5.14.7 "Completion" Delete the words "Contract Data" and replace with "Project Order Specific Contract Data"
- 6.10.3 **Retention Money:** Delete the word "selected". The percentage retention on the amounts due to the Contractor per Project Order is 10%, which will be reduced to 5% upon receipt of completion certificate for that specific Project Order and will be reduced to 0% after the Defects Liability Period has elapsed.
- The limit of retention per Project Order is 10% of the Contract Sum.
Should the Contract Price exceed the Contract Sum then the limit of "retention money" is 10% of the Contract Price.

Interest will not be paid on retention withheld by the Employer.

- 6.11 “Variations exceeding 15%”: Delete this clause and all references thereto throughout the General Conditions of Contract.
- 8.3.1.7 “Epidemic famine or plague”, add the following, “ including the pandemic in relation to Coronavirus Disease 2019 caused by the SARS-CoV-2 virus”
- Subcontracting: Add the following sub-clauses
- 4.4.8.1 The Contractor shall enter into a written subcontract agreement with the Sub-contractors. The subcontract agreement between the Contractor and the Sub-contractors shall be the standard General Conditions of Subcontract for Construction Works (GCSC 2018).
- 4.4.8.1.1 Each subcontract shall include the provisions:
- a) The Contractor undertakes to make payment within 14 days after the date on which the Sub-contractor has submitted a statement for payment or a claim for payment to the Contractor for work completed or goods delivered in accordance with the contract between the Contractor and Sub-contractor: and
 - b) The Contractor undertakes to supply the sub-contractors with the relevant and sufficient data to undertake the works as specified by the Employer’s Agent /Employer, which shall include but not limited to the relevant contract data and special and/or additional conditions of contract, standard and/or amended specifications, contract standard and project specific drawings etc.
 - c) The training, coaching, guidance or mentoring to be provided to the sub-contractor’s workforce (as required and subject to the approval of the Employer’s Agent), and an obligation on the sub-contractor to participate and co-operate in such support as is provided for in this Contract.
 - d) Dispute avoidance and resolution procedures, including any sanctions in the event of failure by the sub-contractor to comply with the terms and conditions of the subcontract agreement.
- 4.4.8.2 The Contractor shall disclose all subcontracting arrangements to the Employer upon request thereof, within 3 working days.
- 4.4.8.3 No performance security shall be required for sub-contractors.
- 4.4.8.4 Delay Damages for sub-contractors shall be limited to 10% of the accepted sub-contract amount.

C2.2.3: CONTRACT DATA (Applicable to this contract)

A. DATA TO BE PROVIDED BY THE EMPLOYER

C2.2.3.1 DATA TO BE PROVIDED BY THE EMPLOYER

Ref / Clause Number	Data
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1.1.1.16 The name of the Employer’s Agent is the Senior Manager: Road Rehabilitation. (Londa Zwane)

1.1.1.26 The Pricing Strategy is by **Re-measurement Contract**.

1.2.1.2 The address of the Employer is:

<u>Physical</u> Engineering Unit 166 K.E. Masinga Road Durban 4001 Telephone: 031-311-7326	<u>Postal</u> Engineering Unit PO Box 680 Durban 4000 Fax: 031-311-7321
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1.2.1.2 The address of the Employer’s Agent is:

<u>Physical</u> Roads Provision Dept (Road Rehab.) 30 Archie Gumede Place Durban 4001 Telephone: 031-311-7442 Fax: 031-311-7321 e-mail : Zwane.Londa@durban.gov.za	<u>Postal</u> Roads Provision Dept PO Box 680 Durban 4000
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5.8.1 The **non-working days** are **Saturdays and** Sundays.

(5.1.1) The **special non-working** days are:

- All statutory holidays as declared by National or Regional Government.
- The year-end break:
- Commencing on the first working day after 15 December.
- Work resumes on the first working day after 5 January of the next year.

5.8.1 Delete the words “sunset and sunrise” and replace with “17:00 and 07:00”

Ref / Clause Number	Data
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5.12.2.2 **Abnormal Climatic Conditions (Rain Delays)**- The numbers of days per month, on which work is expected not to be possible as a result of rainfall, for which the Contractor shall make provision, is given in the table below. During the execution of the Works, the Employer's Agent's Representative will certify a day lost due to rainfall only if at least 75% of the work force and plant on site could not work during that specific working day.

Extension of time as a result of rainfall shall be calculated monthly being equal to the number days certified by the Employer's Agent's Representative as lost due to rainfall, less the number of days allowed for as in table below, which could result in a negative figure for certain months. The total extension of time for which the Contractor may apply, shall be the cumulative algebraic sum of the monthly extensions. Should the sum thus obtained be negative, the extension of time shall be taken as NIL.

<u>Month</u>	<u>Days Lost</u>	<u>Average Rainfall</u>	<u>Month</u>	<u>Days Lost</u>	<u>Average Rainfall</u>
January	4*	134	July	1	39
February	3	113	August	2	62
March	3	120	September	2	73
April	2	73	October	3	98
May	2	59	November	3	108
June	1	28	December	1*	102
TOTAL	27	1009mm	* = The number of working days lost allows for the annual statutory Construction holiday in December and January of each year.		

**ACCEPTANCE OF UNDERTAKING IN TERMS OF THE
OCCUPATIONAL HEALTH AND SAFETY ACT (ACT 85 of 1993)**

Definitions

a) "Council" means the **eTHEKWINI MUNICIPALITY**.

b) "Contractor" means:-

Name of Company :

Address :

:

:

UNDERTAKING

- (1) The Contractor undertakes to comply with the requirements of the Occupational Health and Safety Act, Act No. 85 of 1993, the regulations promulgated thereunder and any reasonable, lawful direction of the Council thereunder.
- (2) The Council shall at all times have the right to summarily suspend the performance of the Contractor hereunder pending compliance by the Contractor with any requirement, regulation and/or direction referred to in (1) hereof.
- (3) The Council shall be entitled to set-off against any amount owed by the eThekwini Municipality to the Contractor hereunder any loss or damage suffered by it as a result of the suspension of the Contractor's performance in the circumstances envisaged under (2) hereof.
- (4) This undertaking shall constitute the written agreement between the parties as required in terms of section 37(2) of the Act referred to in (1) hereof.

Signed :

Signed :

Name :

Name :

Capacity :

AS WITNESS

Date :

**APPOINTMENT AND ACCEPTANCE OF APPOINTMENT AS RESPONSIBLE PERSON
IN TERMS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT (ACT 85 OF 1993)**

APPOINTMENT

I, (name)

on behalf of (name of company)

do hereby appoint you (name)

as a Responsible Person in terms of the Occupational Health and Safety Act (Act 85 of 1993) to exercise general supervision over the works for which you are responsible that is to be carried out under the above mentioned contract.

Signed :

Capacity : Date :

ACCEPTANCE OF APPOINTMENT

I, (name)

hereby accept this appointment.

Signed :

Capacity : Date :

OCCUPATIONAL HEALTH AND SAFETY ACT 1993 (ACT NO. 85 OF 1993)

CONSTRUCTION REGULATION 5(1) (k) : APPOINTMENT: PRINCIPAL CONTRACTOR

The Ethekwini Municipality has appointed xxxxxxxx as the principal contractor responsible to carry out the above-mentioned contract.

In terms of this appointment you are responsible to ensure that all construction work herein referred to is carried out as follows:

1. You shall ensure that you meet all the requirements in terms of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) and in particular the Construction Regulations as promulgated under Government Notice No. R.1010 of 07 July 2014, or as amended;
2. Ensure that all contractors appointed by yourself and reporting to you complies with the requirements as stipulated in the SAID Regulations;
3. Ensure that all the information and specifications necessary to ensure that the construction work is carried out in a safe manner are discussed and provided to all appointed contractors reporting to you;
4. Ensure that a health and safety file is kept and maintained and made readily available for inspection by any interested party, which file is to be handed over on the completion of the contract;
5. You shall further ensure that all records, registers and required documents are maintained and that all persons appointed to carry out tasks as stipulated by these regulations are competent and have the necessary resources to complete their tasks effectively in such a manner that health and safety is not in any manner compromised.

This appointment is valid from to the completion of the stipulated construction work.

You shall submit a written weekly report on all shortfalls that have not been met in terms of these regulations.

.....
DEPUTY HEAD: ROADS PROVISION

.....
Date

Kindly confirm your acceptance of this appointment by completing the following:

I, (*name in block capitals*) understand the implications of the appointment as detailed above and confirm my acceptance thereof.

.....
Signature: xxxxxxxxxxxx

.....
Date

PROJECT DATA

The following Project Data in terms of General Conditions of Contract (2015) are applicable

Clause Description	GCC Clause No.	Specific Data
Commencement Date	1.1.1.5	Add the following: "Commencement of Date of Project," which means the date specified in "Project Order" and is signed and agreed by both parties.
Contract Data	1.1.1.8	Amend to read "Contract Data together with the Project Specific Data of the Project Order"
Defects Liability Period	1.1.1.13	Amend to read The Defects Liability Period from the date of the certificate of Completion per "Project", will be stated in the "Project Order" Project Specific Contract Data.
Due Completion Date	1.1.1.14	Add the following: The Due Completion Date per "Project", from the commencement Date of that "Project" will be stated in the "Project Specific Contract Data in the Project Order".
Commencement of the Works	5.3.1	Add the following: "Commencement of the Works of a Project Order" delete the words "Contract Data" and replace with "Project Specific Contract Data in the Project Order".
Documentation Required	5.3.2	Add the following: The time to submit the documentation required before commencement with Works execution of a "Project order" is: 7 days.
Penalty for Delay	5.13.1	Delete the words "Contract Data" and replace with "Project specific Data in the Project Order".
Completion	5.14.7	Delete the words "Contract Data" and replace with "Project Specific Data in the Project Order"

PROJECT SPECIFIC CONTRACT DATA

The following Project Specific Data in terms of the General Conditions of Contract (2015) are applicable:

Clause Description	GCC Clause No.	Specific Data
Commencement Date	5.2.1	Insert date (dd-mm-yyyy)
Commencement of Works	5.3.1	The Contractor shall commence executing the works within 14 days from the Commencement Date.
Programme	5.6.1	The Contractor shall deliver his programme of work within 7 days from the Commencement Date
Time for Completion Date	1.1.1.14	Insert duration (xx months)
Completion Date		Insert completion date (dd-mm-yyyy)
Employer's Agent Representative	1.1.1.16	The name of the Employer's Agent's Representative on site is Insert full name
Penalties	5.13.1	R 5 000.00
Percentage Retention	6.10.3	10 % of the net value of work for the Project, which will be reduced to 5% on receipt of a completion certificate and the remaining 5% after the Defects Liability Period as elapsed.
Defects Liability Period	1.1.1.13	12 months after the completion of the Project.
Dispute Resolution	10.5	Dispute resolution shall be by Adjudication .
Time to submit Documentation	5.3.2	Shall be 7 days from commencement date
		The documentation required before commencement with
		Works execution are:
		<ul style="list-style-type: none"> • Signed Project Order • Health and Safety Plan (refer to Clause 4.3); • Initial programme (refer to Clause 5.6); • Completed and signed "Appointment of Principle Contractor" form; • Completed and signed "Acceptance of Undertaking in terms of the OHS Act" form; • Completed and signed "Appointment of Responsible Person" form. • CPG plan

C3.A: BILL OF QUANTITIES

ESTIMATED PROJECT VALUE

The total estimated value of the Project as calculated from the Bill of Quantities (Attached below) is:

R xxx,xxx,xx.xx *(including VAT, escalation and rise and fall of special materials).*

PRO-FORMA TEMPLATE

4.1.1 DESCRIPTION OF THE WORKS – Road 1

The project comprises the rehabilitation of Road 1 from Road x (km 0.0) to Road y (km xx.x). A locality plan is included in Part C5A of this document. Road 1 is located in the xxx suburb of eThekweni Metropolitan area and consists of a single/dual carriageway with xx lanes in each direction.

Road 1 is located in Ward xx and such Municipal Councillor representative is Name Surname (email address | cell no.)

The works can be classified as surfacing/recycling/granular/subgrade improvement/ancillary works.

The following works are inter alia included:

- **General**

1. The horizontal and vertical alignment of the road is satisfactory in terms of safety considerations and is to be maintained as is. The existing cross-sectional width and levels of the roadway is in the order and to be maintained as is.

- **Pre-treatment Scope**

1. Cleaning of the roadway

Light/heavy cleaning of the roadway from km 00.0 to km 00.0 or as directed by the Employers Agent Representative on-site, where necessary dependent on the site conditions;

2. Patching strategy

- The Employers Agent Representative shall mark on-site out existing pavement defects in the presence of the Construction Manager at which time the quantities and the type of patching repair will be confirmed;

- Shallow/deep patching with asphalt only

The Contractor is to neatly saw-cut the demarcated patch area, excavate and cart to spoil the rubble material.

The Contractor is to compact the existing granular base material (if applicable) and such base shall be inspected by the Employers Agent Representative prior to the asphalt material being placed.

The Contractor is required to compact the asphalt on all patches to a minimum density of 93% R.I.C.E. This shall be measured by testing of patches with a nuclear gauge using the random stratified testing method.

The requirements for testing shall be as follows:

- A minimum of 5 tests per road
- A maximum spacing between tests of 50m

Therefore, the Contractor shall apply the TMH5 random stratified test method to obtain test positions for each road and test the closest patch to each location calculated using this method.

The Contractor shall provide the Employer's Agent Representative with such test results for approval prior to commencing with the construction of any subsequent pavement layers.

Structural patching with a G2/BSM base layer (category B/C/D)

The Contractor is to neatly saw-cut the demarcated patch area, excavate and cart to spoil the rubble material.

The Contractor is to compact the existing granular base material (if applicable) and such base shall be inspected by the Employers Agent Representative prior to the G2/BSM base material being placed.

The Contractor is required to compact the G2/BSM material on all patches to a minimum density of 98/100% MOD AASHTO. The Contractor is required to compact the asphalt on all patches to a minimum density of 93% R.I.C.E. The density requirements for all materials shall be measured by testing of patches with a nuclear gauge using the random stratified testing method.

The requirements for testing shall be as follows:

- A minimum of 5 tests per road
- A maximum spacing between tests of 50m

Therefore, the Contractor shall apply the TMH5 random stratified test method to obtain test

positions for each road and test the closest patch to each location calculated using this method.

The Contractor shall provide the Employer's Agent Representative with such test results for approval prior to commencing with the construction of any subsequent pavement layers.

- All final patch levels should match the existing roadway levels with no undulations/settlement of the patches when trafficked;
- Patching works are to be carried out in accordance with section PS4209.04 of the contract document;

3. Crack-sealing strategy

- Once the patching has been completed, crack sealing can be undertaken as instructed by the Employer's Agent Representative;
- The Employers Agent Representative shall indicate in the presence of the Construction Manager on-site the cracks which shall be sealed;
- All crack seal works are to be carried out in accordance with clause PS48.14 of the contract document.

• **Rehabilitation Scope**

1. Breaking/removal of existing asphalt pavement layers

The Contractor is to mill the existing asphalt pavement layer/s (including speedhumps) to a depth of xx mm from km xx.x to km xx.x;

The Contractor is to remove existing speed-humps in accordance to section PS4213 of the contract document.

2. Construction of asphalt layers

The pavement surface shall be cleaned of any foreign/deleterious material and weed killer applied where necessary as instructed by the Employer's Agent Representative on-site. Thereafter the pavement surface area is to be tacked and sufficient time allowed for the tack to break prior to being trafficked by plant. The Contractor is to pave a xx mm Sa-H14 asphalt wearing course from km xx.x to km xx.x;

- The Contractor is required to compact the asphalt to a minimum density of 93% R.I.C.E. This shall be measured with a nuclear gauge using the random stratified testing method. The requirements for testing shall be as follows:
 - A minimum of 5 tests per road
 - A maximum spacing between tests of 50m

Therefore, the Contractor shall apply the TMH5 random stratified test method to obtain test positions for this road.

The Contractor shall provide the Employer's Agent Representative with such test results for approval prior to commencing with the construction of any subsequent pavement layers.

- Intersections and/or drive-way accesses affected by the works will be identified by Employers Agent Representative and the Contractor shall re-work the tie in levels where instructed after the final wearing course has been constructed.
- All plant established on-site must be fit for purpose according to the contractual documentation and may be instructed for removal off-site by the Employers Agent Representative if such plant affects the quality and workmanship.
- All works are to be carried out in accordance with section PS4200 of the contract document.

- **Ancillary Scope**

1. Raising/lowering of services

- Raise/lower the following services within the road reserve:
 - 2 No. cast iron water valves to match final asphalt wearing course level at km xx.x, km xx.x
 - 1 No. D3 inlet to match final level of sidewalk at km xx.x (after sidewalk re-construction works)

2. Subsoil drainage

- The Contractor is instructed to install sub-soil drainage pipes (110mm diameter perforated) on the LHS/RHS from km xx.x to km xx.x. The sub-soil drain is to be constructed following the details in Standard Drawing No.38575.
- The sub-soil drain is to tie into the existing stormwater inlet at km xx.x. Invert level from final wearing course to centre of subsoil pipe is 1200mm, and width of trench 500mm. With regard to the installation of the sub-soil pipes the Contractor is instructed to:
 - Expose all the existing services prior to construction;
 - The Contractor shall assess the status of these manholes and report these to the Employer's Agent Representative. Should the manholes be silted and their respective inlet or outlet pipes be blocked, the reported information will assist the Employer's Agent Representative to issue relevant instructions to un-block such pipes and manholes.

Notes:

- Sub-soil drains are to be laid at a minimum grade of 1%;
- A trial pit is to be exposed on site to confirm the depth of excavations by the Employer's Agent Representative;
- Cleaning eyes at a maximum spacing of xxm.

3. Accessories

- The Contractor is instructed to break out and remove the following roadway elements and cart to spoil, and supply and install new accessories at the positions specified
 - 2 No. Light Duty left/right hand splay at km xx.x, km xx.x
 - 1 No. Light Duty Support Beam at km xx.x

4. Kerbing and channelling

- The Contractor is to break out and cart to spoil deteriorated/damaged kerbs or kerb-channel combination on the LHS/RHS from km xx.x to km xx.x
- Install new precast kerbs (Figure xx) mountable/barrier orientation on the LHS/RHS from km xx.x to km xx.x.
Install new precast kerbs-channel combination (Type xx, standard drawing detail no. 38577) mountable/barrier orientation on the LHS/RHS from km xx.x to km xx.x
- Quality control for precast kerbs - transverse strength tests to be carried out in accordance with SANS 927:2006, Edition 3.
- Quality control for concrete channel – curing and compressive strength of concrete cubes as per SANS 5863.

5. Sidewalks

- The Contractor is instructed to break out and remove the deteriorated/damaged sidewalks and cart to spoil on the LHS/RHS from km xx.x to km xx.x;
- The Contractor is to re-construct the sidewalk in accordance to section PS4212 of the contract document, using G2/in-plant foamed BSM base material on the LHS/RHS from km xx.x to km xx.x;
The Contractor is to compact the existing granular material (if applicable) and such base shall be inspected by the Employers Agent Representative prior to the G2/BSM material being placed.

The Contractor is required to compact the G2/BSM material to a minimum density of 98/100% MOD AASHTO. The Contractor is required to compact the asphalt to a minimum density of 93% R.I.C.E. The density requirements for all materials shall be measured by testing the materials with a nuclear gauge using the random stratified testing method.

The requirements for testing shall be as follows:

- A minimum of 5 tests per road
- A maximum spacing between tests of 10m

Therefore, the Contractor shall apply the TMH5 random stratified test method to obtain test positions.

- The sidewalk final finish level should match the kerb level with no undulations/settlement;

6. Speed-humps

- The Employers Agent Representative shall mark out on-site in the presence of the Construction Manager the positions at which new speed-humps are to be constructed;
- The speed-humps are to be constructed in accordance to section PS4214 of the contract document and drawing No 43924A/1.

7. Road marking

- The Contractor is to apply a 100mm thick solid white centre-line from km xx.x to km xx.x using hot-melt plastic road-marking material (complying to SANS 731-1)
- The Contractor is to apply a STOP line and symbol in accordance with SARTSM Volume 2 at the following intersections
Rd x – Rd y, km xx.x
Rd a – Rd b, Km xx.x
- The Contractor is to mark all newly constructed / existing speed-humps in accordance to standard drawing no. 43924A/1 (200mm wide)

The Contractor shall capture all as-built data within atleast two (2) weeks after the completion of the project and provide such to the Employer's Agent Representative. The template for capturing the as-built data is contained in Part C6 of this document.

PROJECT PERFORMANCE MONITORING

As per the Additional Conditions of Contract, Clause C1.2.3.7, Performance Monitoring of Service Providers, the Key Performance Indicators (KPI's) applicable to this project are:

- (a) Compliance with CPG targets.
- (b) Works achieved as per the approved programme.
- (c) Construction of pavement layers (where applicable) must be to specification.
- (d) Traffic accommodation requirements to be addressed at all times

PROJECT SPECIFIC TECHNICAL REQUIREMENTS

C4.A.1 Traffic Accommodation

In order to maintain the inconvenience caused to the motorists and the public at a minimal level and in compliance with COLTO Section 1500 and with the South African Road Traffic Signs Manual (SARTSM), volume 2, chapter 13, the Contractor is required to submit a traffic management plan to the Employers Agent Representative for his approval. No work shall be allowed to commence on site before such approval.

It is also brought to the Contractor's attention that no work shall commence prior to the signage installation of construction warning signage and of the required traffic signage.

A **minimum of one lane** shall always be kept open to traffic.

C4.A.2 Road Markings

The Contractor is required to log all the existing road markings by way of a hand-drawn sketch and be submitted to the Employers Agent Representative for approval at least 48 hours prior to the physical commencement of any construction works.

It is recommended that the eThekweni Municipality Road Rehabilitation site team be consulted in this process to prevent incorrect capturing and double handling.

In the event where it is not possible to immediately reinstate road marking, the Contractor shall ensure that the travelling speed is reduced and sufficient temporary road studs and construction signs are in place to prevent motorists straddling lanes.

Reinstatement of all road markings on a given road included on this Project Order shall commence only when the Employers Agent Representative is satisfied that the layer passes all quality control requirements and that sufficient time has elapsed to allow the evaporation of some solvents. The markings shall be done using only **hot-melt plastic road marking material (SANS 731-1)**.

C4.A.3 Services Logging

The Contractor shall log all the services as per road chainage, such as water valves, storm-water manholes, foul-sewer manholes, town survey marks (TSM), telephone and optical cable marking and manhole(s) falling in the road reserve.

The logging sheet shall be submitted to the Employers Agent Representative for approval **at least 5 days** prior to the physical commencement of any construction works.

It is also recommended that the eThekweni Municipality Road Rehabilitation site team be consulted in this process to prevent incorrect capturing and double handling.

C4.A.4 Breaking up Existing Layers Operation

- The breaking up of existing asphalt wearing course and/or base will consist of milling out the material and hauling the milled asphalt to be stockpiled at the **Malacca Depot**, located off Legacy Road, Red Hill, Durban North

Once the specified milling depth has been carried out, the Employers Agents Representative shall be notified to inspect the layer, considering:

- Ensure no disturbance to the underlying base
- Avoid the formation of thin asphalt interlayers (Biscuit Layer)
- Milled surfaces shall be swept and blown clean of all loose and deleterious material before the application of any tack coat.

C4.A.5 Paving Operation

The wearing course and/or base shall be reconstructed by way of a paving machine. The type of mix to be utilised is as specified under section 4.2 of this project order.

- The acceptance compaction level of the asphalt layer shall be **93% of the Rice Theoretical Density, i.e. (MTRD)**

Density control and acceptance tests shall be conducted on the applied asphalt layers by nuclear gauge method. The results of such test shall be forwarded to the Employers Agent Representative for approval.

The Contractor shall submit the specified asphalt mix design to the Employers Agent Representative for approval before works commence.

The quality control testing performed on mixes shall be submitted to the Employers Agent Representative for approval.

Trial Section

It is imperative that a trial section be undertaken to ensure the surface being laid complies with riding quality and compaction requirements. **It is therefore vital that an initial section using 25 tonnes of the mix specified be undertaken to ensure that the end product required is achieved.** (Refer to PS 4205.01, 1R - [xxxx](#))

Under no circumstances should any service be covered. Arrangements must be made to expose valves; manhole covers etc. immediately. Failure to comply will result in this branch implementing remedial action at the Contractor's cost, and also directing claims encountered to the Contractor for action.

C4.A.6 Key Joints

Only an experienced artisan shall be responsible for ascertaining the correct position and for cutting key joints to driveway accesses and intersecting roads. The Contractor shall ensure that these joints are such as water ponding and flooding are avoided and the correct geometric alignments are maintained at access and intersections.

Key joints shall not remain unattended for longer than 48hours. After cutting, the joint shall be swept of all loose material and painted with the tack coat. In the event that this time limit is exceeded, the Municipality reserves the right to employ alternative resources to attend to key joints at the Contractor expense

C4.A.7 Sidewalk and Kerb & Channel / Fillet

The re-construction of sidewalk and kerbing and channelling shall be undertaken by an approved subcontractor. The work is to be constructed to specification, with close attention being given to vertical and horizontal alignment and will entail pre-marking the front of channel/fillet line.

This will require the Employers Agent Representative approval of the pre-marking prior to saw cutting. This is to ensure that the horizontal alignment of the road is not hampered

The kerbing detail will be specified by the Employers Agent Representative and kerbings are to be tested randomly for strength. Daily concrete cubes are to be created and cured for testing at the Pavement & Geotechnical Branch or approved private laboratory (SANAS accredited).

C4.A.8 Night work and Overtime

The Municipality will consider proposals for night work provided Contractor is able to supply a Night Work Management Plan demonstrating the following:

- The preservation or improvement of the public and work force safety.
- The maintenance of the visibility level on site at the highest possible level.
- The containment of noise levels and other discomfort within the acceptable limits.
- The completion of all the works within the approved construction programme.
- The preservation or improvement of all the quality requirements.
- The provision of contingency measures to mitigate the limited access to emergency services.
- The provision of alternative measure to remedial actions in eventual cases where services are accidentally damaged during the construction operations.

4.3 **GENERAL CONSTRUCTION REQUIREMENTS**

- i. A detailed program shall be submitted by the contractor prior to commencement of works.
- ii. A traffic accommodation plan is required for each road, prior to construction commencing, and must be updated as and when required in accordance with Section 1500. All signposting shall be in accordance with the South African Road Traffic Signs Manual (SARTSM), volume 2, chapter 13.
- iii. Notice to residents and business entities immediately affected by the rehabilitation works, shall be issued 7 days prior to establishment of equipment/plant.
The Contractor is responsible to keep these residents and entities informed about the works and any resulting inconvenience to them. All such correspondence shall be submitted to the Employer's Agent representative for his approval prior to handing out.

For each road in the Project Order, the Contract Sign Board shall comply with the specifications in the Contract document and installation of a Public Awareness Boards shall be as specified in clause PS1235. The installation shall all occur at least 7 working days prior to the physical commencement of works

- iv. Public awareness boards (in accordance to Annexure C4.2) informing residents of imminent works should be placed on all roads at least 48 hours prior to work commencing.
- v. The contractor is required to submit a health and safety file, including all the appointments, risk assessments, and schedules in accordance with the OHS Act. Every Sub-contractor working for the main contractor is also required to submit a Health and Safety file in accordance with the OHS Act for approval by the Employer's Agent.
- vi. The contractor is required to submit a monthly health and safety audit compiled by an approved health and safety officer.
- vii. It is the responsibility of the contractor to keep the site safe at all times, in the event that road markings cannot be reinstated in time the Employer's Agent may request the use of appropriate methods to guide traffic and maintain safety.
- viii. The contractor is required to submit his record of process control testing regularly as evidence of compliance to specifications (e.g. compaction results, Milling dip sheet records, etc....) to the Employer's Agent for approval.
- ix. The contractor is required to submit a daily site diary sheet highlighting the contractor's plant, Labor, activities, and quantities used daily. The contractor is also required to submit a copy of the delivery notes, tally sheets, etc.... to the Employer's Agent and/or his Representative on a daily basis.
- x. The contractor is required to submit a full time Employment (F.T.E.) forms for all labor on site, including the main and sub-contractors, and link these forms to the payment certificate payment every month.
- xi. Cleaning up shall be undertaken on a daily basis, no heaps of rubble shall be left on the verge for more than 2 days.

4.4 WORKS PROGRAM

The following work method must be considered when drawing up a program.

The roads contained in this project are primarily located in residential areas, where there is a significant number pedestrian traffic and light vehicular movement. Considering that some of these roads serve as access routes to other suburbs or delivery routes to businesses and other facilities, significant traffic during the morning and early afternoon peaks can be expected.

It is recommended that traffic access be controlled during construction with stop and go controls between 8:00 to 16:00 and thereafter open to all. This will require that measures be taken to ensure proper traffic accommodation and protection to all road users.

- The contractor may decide which side to start the construction from and should be done in suitable lengths that will have to be rehabilitated and tested prior to the opening to all users.
- It will be the contractor's responsibility to ensure that prior to work commencing that all testing arrangements have been made.
- Sections where heaving is identified, the Employer's Agent should be called in to inspect and advise on action to be taken (if any) towards rehabilitating the subgrade layer.
- A minimum one lane shall always be kept open to traffic.
- Intersections are also included in the scope of works.
- Care should also be taken to ensure that residents have proper access into and out of their property at all times

4.5 QUALITY ASSURANCE

In this project quality assurance will be insured by means of both scientific and human quality assurance measures. Continuous control testing of the materials and densities must be arranged and documented accordingly by the Contractor.

A dedicated and suitably qualified Site Agent must be employed by the Contractor to oversee construction progress and compile construction records for the purpose of material and construction as-built.

Machinery to be used in this project will be evaluated in order to ensure that it meets the minimum requirements and complies with its relevant specifications.

4.6 HAND OVER

Once the work has been checked and all snags attend to, the road will be accepted and final retention monies owing will be released.

C5 A: SITE INFORMATION

Locality plan for project.

PRO-FORMA TEMPLATE

C6.A: ANNEXURE

**LETTER OF APPOINTMENT
EMPLOYERS AGENT REPRESENTATIVE**

**HUMAN SETTLEMENTS, ENGINEERING & TRANSPORT
ENGINEERING UNIT
ROADS PROVISION DEPARTMENT**

Date: xx/xx/20xx

To: Employer's Agent Representative: *Contract Data Clause 3.3.1*
N Surname

Contract number: 1R- xxxx

Contract description: Annual Contract for the Rehabilitation of roads located within the **specify area** and surrounding areas of the Ethekwini Municipality as and when required for a period of 36 months

Project Order number: xx

Project Order description: Rehabilitation of various roads located in Wards xxxxx

Dear Sir/Madam;

1. In reference to the standard form of contract utilised on the afore-mentioned contract, that is, the General Conditions of Contract, 2015, 3rd edition, hereafter referred to in shortform 'GCC', you are hereby appointed as the Employer's Agent Representative for the stated project order which shall be in effect from the date of signing this agreement until such project completion.

In reference to Clause 3.3.2 of the GCC, the following list of items have been delegated to you, which you shall have full responsibility and authorization, save for where the Employer's Agents written notice and action shall be required.

Functions and duties of the Employer's Agent delegated to the appointed Employer's Agent Rep.

Clause No	Event	Requires EAWA*
1.2.1.2	Notice of change of address	Y
2.4.1	Clarification of ambiguity in or discrepancy between documents	
3.3.1	Notice of Employer's Agent's Representative's appointment and termination	Y
3.3.4	Notice of Employer's Agent's Representative acting on Employer's Agent's behalf	Y
3.3.6	Response to Contractor's request for Employer's Agent's Representative's orders or instructions causing dissatisfaction	
4.3.1	Request for Contractor's proof of compliance with applicable laws	
4.3.2	Request for Contractor's proof of good standing with payments in terms of legislation	
4.5.4	Certification of payments due to the Contractor for Contractor paying for notices and fees	
4.7.1	Instructions for dealing with fossils, etc. on Site	
4.8.2	Instructions for facilities for others	Y
4.9.1	Consent for removal of Construction Equipment from Site	Y
4.10.1	Notice of approval for use of Site for Contractor's employees	

Functions and duties of the Employer's Agent delegated to the appointed Employer's Agent Rep.

Clause No	Event	Requires EAWA*
4.10.2	Instruction requiring Contractor's employee information	
4.11.2	Instruction requiring removal of Contractor's employee from Works	
4.11.2	Notice permitting re-employment of Contractor's employee	
4.12.2	Notice of approval of Construction Manager	Y
5.3.1	Instruction for commencement of executing the Works	
5.6.3	Notice of approval of programme	
5.6.4	Instruction for adjustment of programme	
5.7.1	Notice of rate of progress causing programme to fall behind	Y
5.7.1	Notice of approval of steps taken to expedite progress	Y
5.7.2	Notice permitting work at night	
5.7.3	Request for submission of revised program and cost for acceleration of rate of progress	Y
	Notice of approval of adjustment of Due Completion Date due to acceleration of rate of progress	Y
	Written conditions of agreement for payment of cost of acceleration of rate of progress	Y
5.8.1.1	Conditions and permission for work by Contractor during non-working times	Y
5.9.1	Instructions and drawings on Commencement Date	
5.9.2	Instructions and drawings necessary for proper and adequate construction of the Works	
5.9.3	Instructions and drawings, in response to Contractor's timeous request for instructions and drawings	
5.9.7	Notice of approval of Contractor's designs and details on drawings that provide full details, dimensions and particulars	Y
5.9.7	Consent for departure from Contractor's designs after notice of approval by Employer's Agent	Y
5.11.2	Order for suspension of the Works	Y
5.11.3	Proceeding with Works after suspension	
5.13.2	Notice of reduction in penalty	
5.14.2	List setting out the work to be completed for Completion	
6.3.1	Variation order	Y
6.3.2.1	Contradiction of Contractor's confirmation of a verbal Variation Order	Y
6.4.1	Completed valuation of a Variation Order	
6.4.1.3	Notice of consultation of Employer's Agent with Contractor and Employer on methodology, pro forma and other means for valuation of a Variation Order	
6.4.1.4	Instruction for dayworks as a Variation Order for additional or substituted works	
6.4.2	Delivery notice of valuation of a Variation Order	Y
6.5.1.3	Notice of determination of costs of plant hire rates for Construction Equipment rates for dayworks	
6.5.2	Notice of determination of costs of materials for dayworks	
6.5.3	Approval of statement of costs for Workmen, materials and Construction Equipment used for dayworks	
6.6.1	Order for executing Provisional Sum work	
6.6.3	Order for executing Prime cost work	
6.7.2	Valuation of the Works	
6.7.3	Instruction for Contractor's measurement of work	
	Notice of requirements for Contractor's measurement of work	
6.7.4	Certificate of measurement by Employer's Agent	
6.8.4	Notice of consultation between Employer and Contractor on costs due to changes in legislation	

Functions and duties of the Employer's Agent delegated to the appointed Employer's Agent Rep.

Clause No	Event	Requires EAWA*
6.9.3	Order for steps to be taken for Plant and materials becoming property of Employer	
6.10.1	Monthly payment certificate	
6.10.4	Delivery notice of monthly payment certificate	
6.10.7	Correction of previous payment certificate	
6.10.8	Requirement for further information after issue of Certificate of Completion	
6.10.9	Final payment certificate	
6.11.1	Notice of adjustments to General Items resulting from the total of all Variations exceeding a specified percentage	
7.1.1	Order for removal of unsuitable Construction Equipment	
7.4.1	Instruction to Contractor for providing samples of materials	
7.4.2	Instruction to Contractor for taking and delivering test specimens	
7.4.3	Instruction to Contractor for doing tests	
7.4.5	Reports on tests	
7.5.1	Consent for covering up work	
7.5.2	Authorisation by Employer's Agent for Contractor's delivery of Plant to Site	Y
7.5.3	Notice of testing or examining Plant, materials, excavations or other work	Y
7.5.5	Order for uncovering work	
	Order for making one or more openings	
7.6.1	Order for making good and retesting of Plant	Y
7.6.2	Instruction for further making good after retest failure	
	Acceptance of Plant subject to reduction in Contract Price	
7.6.3	Order for removal of unsuitable materials	Y
	Order for removal and proper reconstruction of work	Y
7.7.1	Order to search for defects	Y
7.8.1	Order for making good of defects	Y
7.9.1	Notification of urgent remedial work	Y
	Notification of urgent emergency-related work	Y
8.2.2.2	Order for repair of damage due to excepted risks	
8.5.1	Instruction to submit a report on an occurrence of damage to property	
	Instruction to submit a report on an occurrence of injury to persons	
	Instruction to submit a report on an occurrence of loss of human life	
9.1.5.1	Certificate of amount payable in respect of General Items upon termination of Contract	
9.1.5.3	Certificate of balance amount payable upon termination of Contract in respect of reasonably incurred expenses in anticipation of completion of Contract	

*The following abbreviations apply to the above table:

EAWA Employer's Agent's Written Action

Y Yes

2. In addition to the contractual duties stated in point number one (1) under this agreement, your additional duties shall include (but not limited) for **Project Management** and as stated in the Standard Operating Procedure for the Road Rehabilitation Branch: -
 - 2.1.1 Plan and manage the day-to-day working of the project at hand,
 - 2.1.2 Report progress on projects by suitable media to management, maintain and update project reporting, and financial reporting,
 - 2.1.3 Plan and arrange visits to existing and new construction sites to manage quality,

environmental and health and safety aspects,

2.1.4 Preparation of concise design briefs for design preparation including budget allowances for works required,

2.1.5 Determine and manage project priorities to ensure effective application of resources to achieve project outcomes, delivery benchmarks, project budget targets,

2.1.6 Prepare, review and evaluate tender submissions for the various Bid Committees,

2.1.7 Review and make recommendations to the Manager and Team Leaders in relation to equipment and resource requirements, to effectively and efficiently deliver projects,

2.1.8 Upon completion of the rehabilitation project (certificate of completion issued to the Contractor), the Project Manager shall within 7 days notify the RSWM Department of the works completion by duly completing the prescribed handover certificate. This certificate is to be signed off by both departments in order to certify that the works have been completed to the required specifications and that the RSWM Department thereafter assumes responsibility for maintaining the asset

Communication and Stakeholder engagement duties include, but not limited to: -

2.2.1 Clearance Letters: Project Manager to communicate with internal departments, external service providers and other stakeholders informing them of the planned works. This is to ensure co-ordination and efficient service delivery. Clearance letters are to distributed at least 2 weeks prior to the project commencement.

2.2.2 Press Releases: Project Manager to inform the media (emails, fax, radio and newspapers) of the location of project, scope of work, project commencement date and estimated completion date. This correspondence is done via the Communications Department. Press releases are to distributed at least 2 weeks prior to the project commencement

2.2.3 Community involvement: Project Manager to introduce the Contractor to the Ward Councillor to source local ward based sub-contractors, local labour and community liaison officers.

2.2.4 Information and complaints: Complaints received for on-going projects or queries regarding past/future projects shall be responded to timeously. The Project Manager will endeavour to respond to all complaints/queries within 48 hours of receipt.

Record Management duties include, but not limited to: -

2.3.1 All project records, data and information shall be electronically stored on the Branch's network drive as stated in the Standard Operating Procedure.

3. You shall note that additional contractual, technical and/or administrative duties as may be needed for successful project operations, shall be delegated to you in line with your employment job description.

4. By signature of this appointment, you agree to the duties and responsibilities as stated herein.

Issued by: <i>Employer's Agent</i>	
Name	L Zwane
Signature	
Date	
Witness name	
Signature of witness	

<i>Employer's Agent Representative</i>	
Name	
Signature	
Date	
Witness name	
Signature of witness	

Annexure 3: Notice to Residents



eThekweni Municipality
Engineering Unit
Roads Provision Department
Road Rehabilitation Branch

Insert Contractor Logo

Attention: The Resident

REHABILITATION OF XXX ROAD FROM XXX ROAD TO XXX ROAD.

CONSTRUCTION PERIOD XX MONTH 20XX TO XX MONTH 20XX

You are hereby notified that eThekweni Municipality's Contractor will shortly be undertaking road rehabilitation works. The sections of road under construction will be controlled using STOP/GO controls. There will be a temporary lane closure. Delays may be experienced and is therefore recommended that alternate routes be considered.

The Contractor will undertake construction works between the hours of 8h00 to 15h30 so as to minimize the inconvenience to the public. We request that the motorists be aware of the signage and follow the directions of the traffic controllers to ensure the safety of public and workers alike.

In the event of rain, mechanical problems or shortage of essential materials, the proposed works may be delayed, and further notification will be issued.

Let's work together for the betterment of our area!!!

Should you have any further enquiries in this regard, you are requested to contact:
Contractor (*Insert Name of Contractor*) – *Insert Name and Telephone number of representative*
eThekweni Municipality – *Insert Name and Telephone number of representative*

Annexure 4: UTFC Forms

1. Quality Assurance: UTFC - Form E1
2. Design Constraints for the proposed UTFC Products - Form E2.

FORM E1: QUALITY ASSURANCE: UTFC

The Quality Assurance Plan to be submitted to the Employers Agent after award shall include the minimum details listed below (where applicable):

1. UTFC MIX

- 1.1 Type/s and percentage/s of natural aggregate/s
- 1.2 Type and percentage of active filler
- 1.3 Type and percentage of bitumen
- 1.4 Type and percentage of modifier in bituminous binder
- 1.5 Ranges of mix proportions for:
 - 1.5.1 9.5mm Stone
 - 1.5.2 Crusher Dust passing the 2.36mm sieve
 - 1.5.3 Filler passing the 0,075mm sieve
- 1.6 Permissible Deviations from Target Grading

2. TACK

- 2.1 Type of basic material (penetration-grade bitumen, emulsion, other) (If emulsion, give type of emulsion and percentage bitumen)
- 2.2 Type and percentage of modifier
- 2.3 Application rate (nett cold bitumen)

3. TESTING (WHICH TESTS, POINT/S OF TESTING, FREQUENCY)

- 3.1 All raw materials used in UTFC mix
- 3.2 UTFC mix
- 3.3 All raw material in tack
- 3.4 Tack
- 3.5 Temperatures
 - 3.5.1 UTFC
 - 3.5.1.1 Modified Binder manufacture
 - 3.5.1.2 Binder at mixing plant
 - 3.5.1.3 Mixing
 - 3.5.1.4 Storage
 - 3.5.1.5 Paving
 - 3.5.2 Tack
 - 3.5.2.1 Manufacture (if applicable)
 - 3.5.2.2 Storage
 - 3.5.2.3 Application
- 3.6 Remedial steps to be taken in event of non-conformance

4. MANUFACTURE, TRANSPORT, CONSTRUCTION**4.1 Types, sizes and capacities of:**

- 4.1.1 Mixing plant and related equipment
- 4.1.2 Cold storage (number and sizes of bins)
- 4.1.3 Hot storage
- 4.1.4 Transport vehicles (number, capacity, thermal protection)
- 4.1.5 Paver/s (including level-control system)
- 4.1.6 Roller/s
- 4.1.7 Other plant/equipment

4.2 Methods proposed for (including procedures to be followed to ensure conformance to specification):

- 4.2.1 Manufacture of binder
- 4.2.2 Storage of binder
- 4.2.3 Storage of aggregates
- 4.2.4 Manufacture of hot mix
- 4.2.5 Storage of hot-mix
- 4.2.6 Transport of hot-mix
- 4.2.7 Manufacture of tack
- 4.2.8 Preparation of surface to receive tack coat and UTF C
- 4.2.9 Application of tack
- 4.2.10 Tipping, paving and rolling of UTF C
- 4.2.11 Manufacturing and construction tolerances (if different from those specified in the Contract Documents)

4.3 Further details regarding paving equipment

- 4.3.1 Type of equipment, e.g. Self-priming paver with hopper and auger system capable of passing the mix over the spray bar, or other.
- 4.3.2 Method and equipment used for thickness and level controls
- 4.3.3 Type of spray bar used for tack application, e.g. built-in, variable-width spray bar or other.

5. PERSONNEL EMPLOYED ON ALL ACTIVITIES AND QUALITY CONTROL**6. ANY OTHER MATTERS WHICH RELATE TO THE QUALITY ASSURANCE PLAN WHICH THE TENDERER CONSIDERS MAY BE IF ASSISTANCE IN TENDER ADJUDICATION**

FORM E2: PERFORMANCE REPORT: UTFC

Note to tenderer:

The tenderer shall enter in the spaces provided below a complete list of Contracts on which he has constructed an ultra-thin friction course (UTFC) surfacing (or similar approved alternative). This information is deemed to be material to the award of the Contract.

EMPLOYER (Name, Telephone no, Fax no.)	CONSULTING ENGINEER (Name, Telephone no, Fax no.)	QUANTITY OF UTFC (m² & tonnes)	VALUE OF UTFC WORK	YEAR COMPLETED

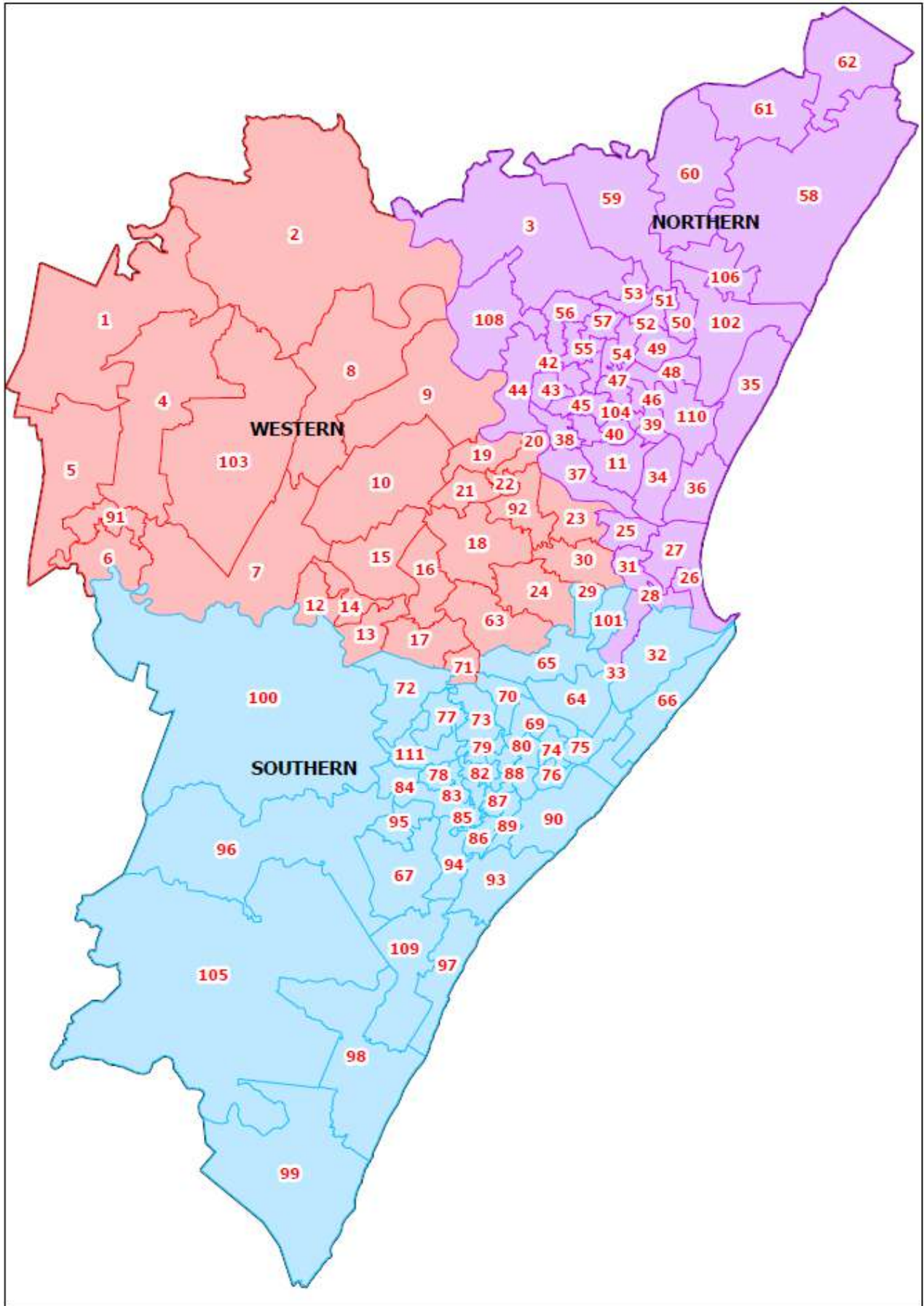
FORM E2: CONSTRAINTS FOR UTFC PRODUCTS AND PROCESSES

The various constraints (if any) applicable to each product/process shall be listed separately.

PRODUCT/PROCESS	CONSTRAINTS

PART C4: SITE INFORMATION

C4.1 LOCALITY PLAN



C4.2 LOCATION OF THE SITE

This contract is limited to eThekweni Western Region - Municipal Ward Numbers 1, 2, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 30, 63, 71, 91, 92 and 103. Detailed site locations of the applicable roads to be rehabilitated shall be specified in the relevant Project Order.

C4.3 TEST RESULTS

To be specified in the Project Order.