

# **SANRAL**

SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LTD



Reg.No.1998/009584/30

**BUILDING SOUTH AFRICA  
THROUGH BETTER ROADS**

## **THE SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LIMITED**

**CONTRACT SANRAL R.342-010-2024/1**

**STRENGTHENING OF NATIONAL ROUTE  
R342 SECTION 1 FROM NGUNI RIVER LODGE  
(KM 14.50) TO PATERSON (KM 25.00)**

### **PROJECT DOCUMENT**

JULY 2023

TENDER DOCUMENT

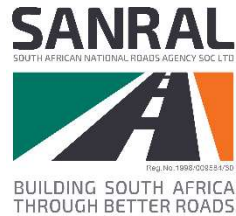
VOLUME 3

BOOK 3 OF 3

PRICING DATA, SCOPE OF WORKS, PROJECT INFORMATION, ANNEXURES

**CHIEF EXECUTIVE OFFICER  
SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LIMITED  
48 TAMBOTIE AVENUE  
VAL DE GRACE  
PRETORIA, 0184**

**NAME OF TENDERER: .....**



## **CONTRACT SANRAL R.342-010-2024/1**

**FOR**

## **STRENGTHENING OF NATIONAL ROUTE R342 SECTION 1 FROM NGUNI RIVER LODGE (KM 14.50) TO PATERSON (KM 25.00)**

## **PROJECT DOCUMENT**

DATE: JULY 2023  
TENDER DOCUMENT  
VOLUME 3  
BOOK 3 OF 3  
PRICING DATA, SCOPE OF WORKS, PROJECT INFORMATION, ANNEXURES

THIS DOCUMENT COMPILED UNDER THE DIRECTION OF THE REGIONAL  
MANAGER  
THE SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LIMITED

The Regional Manager (Southern Region)  
The South African National Roads Agency SOC Ltd  
20 Shorewood Drive  
Bay West  
Gqeberha  
6025



## **LIST OF CONTRACT DOCUMENTS**

The following documents form part of this contract:

- Volume 1: The Conditions of Contract for Construction for Building and Engineering Works Designed by the Employer (1999), published by the Federation Internationale des Ingenieurs-Conseils (FIDIC) which the tenderer shall purchase himself. (See note 1 below).
- Volume 2: The COTO Standard Specifications for Road and Bridge Works for South African Road Authorities (Draft Standard October 2020 edition), issued by the Committee of Transport Officials which the tenderer shall obtain himself. (See Note 2 below).
- Volume 3: The Project Document, containing the tender notice, Conditions of Tender, Tender Data, Returnable Schedules, general and particular conditions of contract, project specifications, Pricing Schedule, Form of offer and Project Information is issued by the Employer (see note 3 below). The Employer's Form of Acceptance and any correspondence from the selected tenderer, performance security-demand guarantee, and all addenda issued during the period of tender will also form part of this volume once a successful tenderer has been appointed.

The conditions of tender are the standard conditions of tender as indicated in Book 1.

Volume 4: The road works drawings.

Volume 5: The structural drawings – Not Applicable.

Volume 6: Materials investigation and utilisation – Not Applicable.

Volume 7: Environmental Management Plan report – Not Applicable.

**Notes to tenderer:**

1. **Volume 1: The Conditions of Contract for Construction for Building and Engineering Works Designed by the Employer (1999)**, published by the Federation Internationale des Ingenieurs-Conseils (FIDIC), is obtainable from CESA, P. O. Box 68482, Bryanston, 2021. Tel: (011) 463 2022 Fax: (011) 463 7383, e-mail: [general@cesa.co.za](mailto:general@cesa.co.za).
2. **Volume 2: The COTO Standard Specifications for Road and Bridge Works for South African Road Authorities (Draft Standard October 2020 edition)** is obtainable from SANRAL and can be downloaded free of charge from the SANRAL's website [www.nra.co.za](http://www.nra.co.za).
3. **Volume 3** is issued at tender stage in electronic format downloaded from the SANRAL's website link.

The link contains the following files:

- The full Project Document in .pdf format (excluding the standard conditions of tender)
- The returnable forms in word format
- The pricing data in Excel format

The Standard Conditions of Tender may be downloaded from the CIDB website as indicated in Book 1.

At contract stage Volume 3 will be a bound signed paper copy containing the following documents:

- Returnable schedules relevant to the project
- Agreements and Contract Data
- Pricing Data
- Scope of Work
- Project Information

4. **SUBMISSION OF TENDER** – Of the contract documents, only the following elements of Volume 3 needs to be submitted:

**VOLUME 3 – ELECTRONIC SUBMISSION**

The following information has to be submitted electronically on flash drive

a) The 1st file in pdf format which contains;

- Scanned copy of Form of Offer (pdf) and printed hardcopy of Form of Offer
- Scanned copies of all returnable schedules and attachments (pdf)
- Scanned copy and printed Summary of Pricing Schedule.

b) The 2nd file in Excel format which contains:

- Completed pricing schedule

For alternative offers the tenderer shall submit the following additional documentation, printed and bound hard copy and electronically in a separate flash drive marked

a) Alternative (followed by the Tenderer name) in a sealed envelope in the following order:

- Form of Offer (signed and scanned as .pdf and state "Alternative Form of Offer" and printed hardcopy of Form of Offer)
- All returnable schedules and attachments and certificates applicable to the alternative offer (signed and scanned as .pdf).

b) Alternative Pricing Schedule (printed Summary of Pricing Schedule and copy in Excel)

- Other relevant information.

<b>TABLE OF CONTENTS</b>		<b>PAGE</b>
<b>PART C2:</b>	<b>PRICING DATA.....</b>	<b>C3-1</b>
<b>PART C3:</b>	<b>SCOPE OF WORKS .....</b>	<b>C3-59</b>
<b>PART C4:</b>	<b>PROJECT INFORMATION .....</b>	<b>C3-236</b>
<b>PART C5:</b>	<b>ANNEXURES .....</b>	<b>C3-298</b>

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## **PART C2: PRICING DATA**

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**PART C2: PRICING DATA**

<b>TABLE OF CONTENTS</b>		<b>PAGE</b>
C2.1	PRICING INSTRUCTIONS.....	C3-3
C2.2	PRICING SCHEDULE (INCORPORATING SBD3).....	C3-5
C2.3	SUMMARY OF PRICING SCHEDULE .....	C3-58

## C2.1 PRICING INSTRUCTIONS

C2.1.1 Measurement and payment shall be in accordance with the relevant provisions of Chapter 1, Section C1.1 of the COTO Standard Specification for Road and Bridge Works for South African Road Authorities (Draft Standard October 2020 edition) or as amended in the Scope of Works.

C2.1.2 The units of measurement described in the Pricing Schedule are metric units. Abbreviations used in the Pricing Schedule are as follows:

%	=	percent
h	=	hour
ha	=	hectare
kg	=	kilogram
kl	=	kilolitre
km	=	kilometre
km-pass	=	kilometre-pass
kPa	=	kilopascal
kW	=	kilowatt
l	=	litre
m	=	metre
mm	=	millimetre
m <sup>2</sup>	=	square metre
m <sup>2</sup> -pass	=	square metre-pass
m <sup>3</sup>	=	cubic metre
m <sup>3</sup> -km	=	cubic metre-kilometre
MN	=	meganewton
MN.m	=	meganewton-metre
MPa	=	megapascal
No.	=	number
Prov sum	=	Provisional sum
PC Sum	=	Prime Cost sum
R/only	=	Rate only
sum	=	lump sum
t	=	ton (1000kg)
W/day	=	Work day

C2.1.3 For the purpose of the Pricing Schedule, the following words shall have the meanings assigned to them:

Unit:	The unit of measurement for each item of work as defined in the COTO Standard Specification for Road and Bridge Works for South African Road Authorities (Draft Standard October 2020 edition).
Quantity:	The number of units of work for each item.
Rate:	The payment per unit of work for which the Service Provider tenders to do the work.
Amount:	The product of the quantity and the rate tendered for an item.

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 Pricing Schedule are based on Acts, Ordinances, Regulations, By-laws, International Standards and National Standards that were published 28 days before the closing date for tenders. (Refer to [www.sabs.co.za](http://www.sabs.co.za) for information standards)

C2.1.6 The prices and rates in the Pricing Schedule are fully inclusive prices for the work described under the items. Such prices and rates cover all costs and expenses that

may be required in and for the execution of the work described in accordance with the provisions of the Scope of Work, and shall cover the cost of all general risks, liabilities and obligations set forth or implied in the Contract Data, as well as overhead charges and profit. These prices will be used as a basis for assessment of payment for additional work that may have to be carried out. The Contractor shall submit to the Engineer within 28 days after the Commencement Date a full breakdown of all rates. The rates are to be clearly referenced to the relevant payitem numbers, with each rate broken down into its labour, materials, plant, fuel, overhead charges and profit components.

- 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 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 Pricing Schedule 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 Pricing Schedule.
- C2.1.10 Reasonable compensation will be received where no payitem appears in the Pricing Schedule in respect of work required in terms of the Contract and which is not covered in any other payitem.
- C2.1.11 The short descriptions of the items of payment given in the Pricing Schedule 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 Pricing Schedule refer to the corresponding item numbers in the COTO Standard Specification for Road and Bridge Works for South African Road Authorities (Draft Standard October 2020 edition). Where a standard COTO payitem is amended or a new payitem added, the item number is preceded by the letter "P" in the Pricing Schedule.
- C2.1.13 The pricing schedules are provided electronically. A printout of the entire completed pricing schedule must be signed and scanned and saved in .pdf format, and an electronic copy of the priced pricing schedule must be saved in Excel format and the printed copy bound. In the event of any discrepancy between the signed .pdf copy, and the electronically submitted copy in Excel format and the printed hard copy, the tender rates in the printed hard copy will govern. The item numbers and description of the printed hard copy document will govern. For all addenda issued relating to the pricing schedule, the item numbers, description and quantities of the issued document will govern.

**C2.2          PRICING SCHEDULE (INCORPORATING SBD3)**



**CONTRACT SANRAL R.342-010-2024/1****SCHEDULE A: ROADWORKS****C1.2 GENERAL REQUIREMENTS AND PROVISIONS**

Item				Description	Unit	Quantity	Rate	Amount	
								R	c
C1.2				GENERAL REQUIREMENTS AND PROVISIONS					
C1.2.1				Environmental Management:					
	C1.2.1.1			Monitoring of compliance with and reporting on the EMP	month	15.0			
C1.2.2				Programming and Reporting:					
	C1.2.2.3			Submission of a Scheme 2 Initial Programme	lump sum	1.0			
	C1.2.2.4			Submission of a Scheme 2 Full Programme	lump sum	1.0			
	C1.2.2.5			Reviewing and updating a Scheme 2 programme every month	month	12.0			
	C1.2.2.6			Preparation and submission of all information and reports specified in the Contract Documentation	month	12.0			
PC1.2.3				Routine road maintenance of existing public roads within the Site of the Works or other public roads outside the Site of the Works which are used as detours:					
	C1.2.3.1			Grass cutting	ha	3.6			
	C1.2.3.2			Drain cleaning	km	1.0			
	C1.2.3.3			Cleaning out culverts	m³	15.0			
	PC1.2.3.4			Collection of rubbish / litter	km	9.0			
	C1.2.3.5			Base patching using crushed stone material stabilised with bitumen emulsion and cement	m³	3.0			
	C1.2.3.6			Base and/or surface patching using cold premixed asphalt	m³	2.0			
	C1.2.3.11			Other road maintenance work ordered by the Engineer	Prov. Sum	1.0	120 000.00	120 000	00
	C1.2.3.12			Handling cost, profit and all other charges in respect of item C1.2.3.11	%	120 000.0			
C1.2.4				Stakeholder liaison	month	15.0			
C1.2.5				Safety:					
	C1.2.5.1			Health and safety plan	lump sum	1.0			
	C1.2.5.2			Implementation of health and safety plan	month	12.0			
PC1.2.7				Road safety audits:					
	C1.2.7.1			Stage 4 work zone traffic management audit	Prov. Sum	1.0	20 000.00	20 000	00
	C1.2.7.2			Handling cost, profit and all other charges in respect of item C1.2.6.1	%	20 000.0			
PC1.2.8				Dayworks:					
	PC1.2.8.1			Personnel:					
		(a)		Unskilled labourer	h	270.0			
		(b)		Semi-skilled labourer	h	200.0			
		(c)		Skilled labourer	h	150.0			
		(d)		Gang leader	h	100.0			
		(e)		Foreman	h	30.0			
Total Carried Forward									

**CONTRACT SANRAL R.342-010-2024/1**  
**SCHEDULE A: ROADWORKS**

## C1.2 GENERAL REQUIREMENTS AND PROVISIONS

[illegible]

**CONTRACT SANRAL R.342-010-2024/1**  
**SCHEDULE A: ROADWORKS**

### C1.3 CONTRACTOR'S SITE ESTABLISHMENT AND GENERAL OBLIGATIONS

[illegible]

**CONTRACT SANRAL R.342-010-2024/1**  
**SCHEDULE A: ROADWORKS**

**C1.4 FACILITIES FOR THE ENGINEER**

Item				Description	Unit	Quantity	Rate	Amount	
								R	c
C1.4				FACILITIES FOR THE ENGINEER					
C1.4.1				Site accommodation:					
	C1.4.1.1			Offices and conference room	m²	75.0			
	C1.4.1.2			Laboratories	m²	150.0			
	C1.4.1.3			Open concrete working floors and verandas	m²	100.0			
	C1.4.1.4			Roofs over open concrete working floors and verandas	m²	100.0			
	C1.4.1.5			Store rooms inside the laboratory	m²	35.0			
	C1.4.1.6			Car ports	number	5.0			
	C1.4.1.7			Ablution units:					
		(a)		Site unit	number	2.0			
		(b)		Laboratory unit	number	2.0			
	C1.4.1.13			Rented housing paid for by the Contractor	Prov. Sum	1.0	1 000 000.00	1 000 000	00
	C1.4.1.14			Contractor's handling costs, profit and all other charges in respect of item C1.4.1.13	%	1 000 000.0			
C1.4.2				Items measured by area:					
	C1.4.2.1			Shelving as specified, complete with brackets	m²	40.0			
	C1.4.2.2			Work benches with a concrete slab top	m²	30.0			
	C1.4.2.3			Work-benches with a wooden top	m²	30.0			
	C1.4.2.4			Constant-temperature baths of concrete and / or plastered brick	m²	20.0			
	C1.4.2.5			Concrete footings and pedestals for laboratory equipment	m²	5.0			
	C1.4.2.7			Venetian blinds	m²	50.0			
	C1.4.2.8			Notice boards	m²	10.0			
	C1.4.2.9			White boards	m²	20.0			
C1.4.3				Items measured by number:					
	C1.4.3.2			Office chair	number	15.0			
	C1.4.3.3			Draughtsman's stool	number	3.0			
	C1.4.3.4			Laboratory high chair	number	5.0			
	C1.4.3.5			Office desk with 3 drawers (at least one lockable drawer)	number	6.0			
	C1.4.3.7			Drawing table	number	3.0			
	C1.4.3.8			Conference table	number	1.0			
	C1.4.3.9			Bookcase	number	3.0			
	C1.4.3.10			Filing cabinet	number	5.0			
	C1.4.3.11			General purpose steel cabinet with shelves	number	3.0			
	C1.4.3.12			Wall mounted pivot plan filing system	number	2.0			
	C1.4.3.13			220 / 250 volt power outlet plug point	number	25.0			
Total Carried Forward									

**CONTRACT SANRAL R.342-010-2024/1**  
**SCHEDULE A: ROADWORKS**

**C1.4 FACILITIES FOR THE ENGINEER**

Item				Description	Unit	Quantity	Rate	Amount	
								R	c
Brought Forward									
C1.4.4	C1.4.3.14			400 / 231 volt 3-phase power outlet plug point	number	3.0			
	C1.4.3.15			Single 1 500 mm, 58 watt fluorescent tube ceiling light	number	15.0			
	C1.4.3.16			Single 1 500 mm, 22 watt LED tube ceiling light	number	5.0			
	C1.4.3.20			Laboratory basin	number	4.0			
	C1.4.3.21			Extractor fan	number	3.0			
	C1.4.3.22			Fume cupboard	number	1.0			
	C1.4.3.23			Fire extinguisher 9,0 kg, dry powder type	number	5.0			
	C1.4.3.24			Air-conditioning unit	number	6.0			
	C1.4.3.25			Heater	number	6.0			
	C1.4.3.28			UPS / Voltage stabiliser	number	5.0			
	C1.4.3.29			A3 / A4 colour printer, copier, scanner	number	1.0			
	C1.4.3.34			Mobile outdoor weather station	number	1.0			
	C1.4.3.36			Measuring wheel	number	1.0			
	C1.4.3.37			First aid kit	number	1.0			
				Prime cost items:					
	C1.4.4.1			Cell phones costs, including pro-rata rentals, for calls made in connection with contract administration	PC Sum	1.0	50 000.00	50 000	00
	C1.4.4.2			Handling costs and profit in respect of item C1.4.4.1	%	50 000.0			
	C1.4.4.5			The provision of internet connectivity and WiFi data for Engineer's site staff	PC Sum	1.0	100 000.00	100 000	00
	C1.4.4.6			Handling costs and profit in respect of item C1.4.4.5	%	100 000.0			
	C1.4.4.7			The provision of paper and ink for a combination colour printer / copier / scanner	PC Sum	1.0	20 000.00	20 000	00
C1.4.4.8			Handling costs and profit in respect of item C1.4.4.7	%	20 000.0				
C1.4.4.9			The provision of a complete 220 / 250 volt single phase electrical power installation, including all poles, insulators, wiring, switchboards, mains connections, meters, etc.	PC Sum	1.0	100 000.00	100 000	00	
C1.4.4.10			Handling costs and profit in respect of item C1.4.4.9	%	100 000.0				
C1.4.4.11			The provision of a complete 440 / 231 volt three phase electrical power installation, including all poles, insulators, wiring, switchboards, mains connections, meters, etc.	PC Sum	1.0	50 000.00	50 000	00	
C1.4.4.12			Handling costs and profit in respect of item C1.4.4.11	%	50 000.0				
C1.4.4.13			Provision of a 440 / 231 volt three phase electricity generator if electricity from a power supply authority is not available on site	PC Sum	1.0	100 000.00	100 000	00	
C1.4.4.14			Handling costs and profit in respect of item C1.4.4.13	%	100 000.0				
Total Carried Forward									

Item				Description	Unit	Quantity	Rate	Amount	
								R	c
Brought Forward									
	C1.4.4.15			The provision of all gas installations required at the site offices, laboratories and at the Engineer's staff accommodation (if required), including gas storage cylinders, tubing, regulators, gas burners and shut-off cocks	PC Sum	1.0	10 000.00	10 000	00
	C1.4.4.16			Handling costs and profit in respect of item C1.4.4.15	%	10 000.0			
C1.4.5				Services at site offices, laboratories and site accommodation:					
	C1.4.5.1			Fixed costs	lump sum	1.0			
	C1.4.5.2			Running costs	month	15.0			
C1.4.7				Site inspection transport:					
	C1.4.7.1			Provision of a bus, mini-bus or combi van for site inspection purposes (specify type and size of vehicle)	per day	15.0			
	C1.4.7.2			Travel on site	km	3 600.0			
PC1.4.8				Site security measures for the Engineer's facilities:					
	C1.4.8.1			Supply and installation of all required security measures at the Engineer's site offices and laboratories	lump sum	1.0			
	C1.4.8.2			Provision of security guards / watchmen and an armed response service at the Engineer's site offices and laboratories	month	15.0			
	PC1.4.8.7			Extra Security Measures	Prov. Sum	1.0	1 000 000.00	1 000 000	00
</									

**CONTRACT SANRAL R.342-010-2024/1**  
**SCHEDULE A: ROADWORKS**

**C1.5 ACCOMMODATION OF TRAFFIC**

Item				Description	Unit	Quantity	Rate	Amount	
								R	c
C1.5				ACCOMMODATION OF TRAFFIC					
C1.5.1				Accommodation of pedestrian and non-motorised traffic:					
	C1.5.1.1			Accommodation of pedestrian and non-motorised traffic	month	12.0			
C1.5.2				Accommodation of vehicular traffic	month	12.0			
C1.5.3				Liaison with traffic authorities	month	12.0			
C1.5.4/ C1.6				CLEARING AND GRUBBING					
	C1.6.1			Clearing					
	C1.6.1.1			Clearing with machines and some hand labour where necessary	ha	1.0			
C1.5.4/ C1.7				LOADING AND HAULING					
	C1.7.1			Loading					
	C1.7.1.1			Loading from stockpile using machines and some hand labour where necessary	m³	400.0			
	C1.7.2			Hauling					
	C1.7.2.1			Hauling material for use in the Works and off-loading it on the site of the Works:					
		(a)		Soil, gravel, crushed stone and pavement layer material	m³ - km	4 000.0			
C1.5.4/ C4.4				Commercial materials identified by the Contractor from commercial, private or other non-commercial suppliers					
	C4.4.2.1			Pavement layer material:					
		(c)		Type G5A material	m³	300.0			
	C4.4.4.1			Cement CEM II 32.5 N	t	50.0			
C1.5.4 / C5.4	C5.4.2			Chemical stabilisation:					
	C5.4.2.1			Chemical stabilisation (200mm thick) of gravel base using G5A material compacted to 97% MDD	m³	1 300.0			
C1.5.4/ C8.1				PRIME COAT					
	C8.1.1			Prime coat:					
	PC8.1.1.6			Conventional bitumen emulsion prime (Colprime E or similar)	litre	5 200.0			
C1.5.4/ C10.1				GENERAL REQUIREMENTS FOR SURFACE TREATMENTS					
	C10.1.22			Bituminous single seal and slurry, including a cover spray if specified:					
	C10.1.22.3			Bituminous single seal with 10mm aggregate and slurry (CAT65 tack coat, Grade A aggregate with Fine slurry fine grade)	m²	6 500.0			
	C10.1.9			Bituminous binder variations:					
	C10.1.9.4			Cationic Spray-grade emulsion (65%)	litre	650.0			
	C10.1.10			Aggregate variation (Grade A):					
	C10.1.10.3			10mm aggregate	m³	10.0			
Total Carried Forward									

Item				Description	Unit	Quantity	Rate	Amount	
								R	c
Brought Forward									
C1.5.6				Removal of temporary deviations	km	0.8			
C1.5.7				Temporary traffic control facilities:					
	C1.5.7.1			Delineators including mounting bases and ballast:					
		(a)		Single sided, reversible left or right (200 mm x 800 mm sides)	number	1 200.0			
		(b)		Double sided, reversible left or right (200 mm x 800 mm sides)	number	2 300.0			
	C1.5.7.2			Traffic cones, minimum height 750 mm	number	200.0			
	C1.5.7.3			Flagmen	man-shift	14 400.0			
	C1.5.7.4			Traffic controllers	man-shift	4 320.0			
	C1.5.7.8			Traffic control stations	month	48.0			
	C1.5.7.9			Cleaning of traffic control facilities	month	12.0			
	PC1.5.7.10			Moveable barriers (Plastic "New Jersey" type)	m	50.0			
C1.5.8				Traffic safety officer	man-month	24.0			
C1.5.9				Traffic safety vehicle	month	12.0			
C1.5.10				Tow trucks:					
	C1.5.10.1			Provision of a tow truck on call for light vehicles weighing less than two tonnes	month	12.0			
	C1.5.10.2			Provision of a tow truck on call for heavy vehicles weighing two tonnes or more	month	12.0			
C1.5.11				Provision of safety equipment for visitors					
	C1.5.11.1			Provision of reflective safety vests for visitors	number	10.0			
	C1.5.11.2			Provision of hard hats for visitors	number	10.0			
C1.5.12				Additional traffic accommodation facilities ordered by the Engineer:					
	C1.5.12.1			Provision of additional traffic accommodation facilities	Prov. Sum	1.0	100 000.00	100 000	00
	C1.5.12.2			Handling cost, profit and all other charges in respect of item C1.5.12.1	%	100 000.0			
C1.5/ C11.6				ROAD SIGNS					
	PC11.6.1			Road signboards with painted or coloured semi-matt background. Symbols, lettering and borders in semi- matt black or in Class I retro-reflective material, where the sign board is constructed from:					
	C11.6.1.8			Regulatory signs, temporary					
		(c)		1200 mm diameter, 1.4 mm thick pre-painted galvanized steel plate, Class III background and symbols	number	100.0			
	C11.6.1.10			Warning signs, temporary					
		(d)		1500 mm size, 1.4 mm thick pre-painted galvanized steel plate, Class III background and symbols	number	55.0			
Total Carried Forward									



Item				Description	Unit	Quantity	Rate	Amount		
								R	c	
Brought Forward										
PC1.5.13	C11.6.1.12			Supplementary plates to temporary regulatory or warning signs, 1.4 mm thick pre-painted galvanized steel plate, Class III background and symbols	m²	40.0				
	PC11.6.1.13			Moveable TW411 and TR104/TR103 barricade/road sign combination (2400mm x 1800mm)	number	12.0				
	PC11.6.1.14			Diagrammatic signs, temporary						
	PC11.6.1.14.1			1200 mm x 1600 mm 1.4 mm thick pre-painted galvanized steel plate, Class I background and symbols	m²	110.0				
				Penalties						
	C1.5.13.1			Fixed penalty per occurrence	number		20 000.0	Rate Only		
	C1.5.13.2			Time related	h		2000.0	Rate Only		
	C1.5/ C11.7				ROAD MARKINGS AND ROAD STUDS					
		C11.7.2			Retro-reflective road marking:					
		C11.7.2.1			White lines broken or unbroken (Type 1 paint)					
		(a)		100 mm wide	km	10.0				
C11.7.7				Road studs						
C11.7.7.3				Temporary road studs compliant to SANS 1442 or 1463 (Class RSA-T)						
		(a)		Bi-directional lenses (all colour combinations)	number	390.0				
C11.7.8				Setting out and premarking the lines (excluding traffic island markings, lettering and symbols)	km	45.0				
C11.7.10			Removal of existing, temporary or final road markings by:							
C11.7.10.1			Sandblasting	m²	150.0					
C11.7.10.3			Overpainting as temporary measure	m²	150.0					
Total Carried Forward To Summary										

## SCHEDULE A: ROADWORKS

## C1.6 CLEARING AND GRUBBING

[illegible]

## SCHEDULE A: ROADWORKS

## C2.1 GENERAL REQUIREMENTS AND TRENCHING FOR SERVICES

[illegible]

**CONTRACT SANRAL R.342-010-2024/1****SCHEDULE A: ROADWORKS****C3.1 DRAINS**

Item				Description	Unit	Quantity	Rate	Amount	
								R	c
C3.1				DRAINS					
C3.1.1				Excavation for open drains:					
	C3.1.1.1			Excavating all material situated within the following depth ranges below the surface level using conventional methods:					
		(a)		0 m to 1,5 m	m³	205.0			
	C3.1.1.2			Extra over sub-item C3.1.1.1 for excavation in hard and boulder material, irrespective of depth	m³	41.0			
C3.1.2				Clearing, shaping and disposal of accumulated sediment in existing unlined open drains					
	C3.1.2.1			Using conventional methods	m³	820.0			
C3.1.3				Excavation, clearing and disposal of accumulated sediment in existing lined drains and drainage systems:					
	C3.1.3.1			Using conventional methods (up to 1,5 m):					
		(b)		Culvert barrels	m³	10.0			
C3.1.4				Excavation and disposal of material for subsoil drainage systems:					
	C3.1.4.1			Excavating in all material situated within the following depth ranges below the surface:					
		(a)		0 m to 1,5 m	m³	136.0			
	C3.1.4.4			Extra over sub-item C3.1.4.1 for excavation in hard and boulder material, irrespective of depth	m³	28.0			
C3.1.5				Impermeable backfilling to subsoil drainage systems:					
	C3.1.5.2			G5 material obtained from commercial sources	m³	11.0			
	C3.1.5.3			Extra over items C3.1.5.1 and C3.1.5.2 for stabilisation with 4,0 % CEM II (32.5) cement	m³	11.0			
C3.1.7				Natural permeable material in subsoil drainage systems (approved crushed stone):					
	C3.1.7.2			Crushed stone obtained from commercial sources:					
		(b)		Coarse grade (20mm aggregate washed clean of fines)	m³	26.0			
C3.1.8				Natural permeable material in subsoil drainage systems (approved natural sand):					
	C3.1.8.2			Natural sand from commercial sources:					
		(c)		Coarse grade (washed clean of fines)	m³	100.0			
C3.1.9				Pipes in subsoil drainage systems:					
	C3.1.9.1			U-PVC pipes and fittings, normal duty, complete with couplings:					
		(a)		100 mm internal dia, perforated or slotted	m	181.0			
		(b)		100 mm internal dia, unperforated	m	10.0			
C3.1.11				Geotextiles (Grade 2)	m²	340.0			
C3.1.13				Concrete outlet structures, manhole boxes, junction boxes and cleaning eyes for subsoil drainage systems:					
Total Carried Forward									

## SCHEDULE A: ROADWORKS

### C3.1 DRAINS

[illegible]

Item				Description	Unit	Quantity	Rate	Amount	
								R	c
C3.2				CULVERTS					
C3.2.1				Excavation for culvert structures:					
	C3.2.1.1			Excavating in all material situated within the following depth ranges below the surface level:					
		(a)		0 m to 1,5 m	m³	230.0			
		(b)		Exceeding 1,5 m and up to 3,0 m	m³	10.0			
		(c)		Etc., in increments of 1,5 m	m³	5.0			
	C3.2.1.4			Extra over sub-item C3.2.1.1 for excavation in hard or boulder material, irrespective of depth	m³	50.0			
C3.2.2				Backfilling:					
	C3.2.2.1			Using the excavated material	m³	80.0			
	C3.2.2.2			Using imported selected material:					
		(a)		From commercial sources (G6)	m³	60.0			
	PC3.2.2.3			Extra over sub-items C3.2.2.1 and C3.2.2.2 for soil cement backfilling:					
		(b)		With dry mixture ( 3 % cement)	m³	140.0			
		(c)		Variation in cement	kg	100.0			
C3.2.3				Concrete pipe culverts:					
	C3.2.3.3			On Class C bedding					
		(a)		450mm dia (Type 100D)	m	20.0			
		(b)		600mm dia (Type 100D)	m	20.0			
C3.2.7				Cast-in-situ concrete and formwork:					
	C3.2.7.2			In complete in situ floor slabs for rectangular culverts, manholes and catchpits including formwork, joints and Class U2 surface finish (class of concrete indicated) (installed at a standard depth of 1,0 m):					
		(a)		Class C25/30-20 concrete (in situ floor slab)	m³	190.0			
	C3.2.7.6			Formwork of concrete under items C3.2.7.3 to 5 above:					
		(a)		Class F1 surface finish (To footings and slabs)	m²	620.0			
		(b)		Class F2 surface finish (To walls)	m²	380.0			
C3.2.8				Concrete backfill or encasement for culverts:					
		(a)		Concrete backfill or encasement for culverts (Class C16/20-37.5)	m³	5.0			
C3.2.10				Reinforcement:					
	C3.2.10.2			High-tensile steel bars	t	4.5			
	C3.2.10.3			Welded steel fabric					
		(a)		Mesh MSF 311	kg	790.0			
		(b)		Mesh MSF 617	kg	780.0			
	C3.2.10.4			Other material:					
		(a)		Dowels for joining old and new concrete	kg	110.0			
Total Carried Forward									

Item				Description	Unit	Quantity	Rate	Amount	
								R	c
Brought Forward									
PC3.2.12				Demolition and removal of existing drainage structures:					
	C3.2.12.1			Unreinforced concrete	m³	36.0			
	C3.2.12.2			Masonry and stone pitching	m³	40.0			
	C3.2.12.3			Reinforced concrete	m³	36.0			
C3.2/ C1.7				LOADING AND HAULING					
	C1.7.1			Loading:					
	C1.7.1.2			Loading from heaps or windrows using machines and/some hand labour where necessary	m³	500.0			
C1.6 / C1.7	C1.7.2			Hauling					
	C1.7.2.2			Hauling material to spoil and off-loading it at a designated spoil or stockpile area:					
		(b)		Soil and gravel material	m³ - km	20 000.0			
C3.2 / C12.5	C12.5.7			Geopipe collectors and weepholes:					
	PC12.5.7.1			75mm diameter U-PVC weephole piping	number	50.0			
C3.2 / C13.4	C13.4.7			No-fines concrete (class NF):					
	C13.4.7.1			Cast in situ:					
		(a)		No fines concrete Class NF 20mm	m³	5.0			
PC3.2.28				Treating surfaces with epoxy resin for joining new to old concrete	litre	20.0			

**CONTRACT SANRAL R.342-010-2024/1****SCHEDULE A: ROADWORKS****C3.3 CONCRETE KERBING AND CHANNELING, ASPHALT BERMS, CHUTES, DOWNPIPES, CONCRETE, STONE PITCHED AND GABION LININGS FOR OPEN DRAINS**

Item				Description	Unit	Quantity	Rate	Amount	
								R	c
C3.3				CONCRETE KERBING AND CHANNELING, ASPHALT BERMS, CHUTES, DOWNPIPES, CONCRETE, STONE PITCHED AND GABION LININGS FOR OPEN DRAINS					
C3.3.1				Concrete kerbing:					
	C3.3.1.1			Prefabricated kerbing:					
		(a)		Kerb as per SANS 927 Figure 7, as per Drawing TR-D-RD-1001-V1	m	1 020.0			
	C3.3.1.2			Cast-in-situ kerbing:					
		(a)		(a) Concrete edge beam (0.3m x 0.3m) as per Drawing 113246-2-CT2	m	250.0			
		(b)		Concrete channel, Type B, as per Drawing TD-D-RD-1001-V1 class 30/20 concrete	m	80.0			
C3.3.6				Concrete chutes (typical designs):					
	C3.3.6.1			Prefabricated chutes as per Drawing TD-D-RD-1002-V1	m	80.0			
C3.3.8				Linings for open drains:					
	C3.3.8.1			Cast in situ concrete lining (Type F, as per Drawing TD-D-RD-1001-V1 class C25/30-20 concrete)	m³	120.0			
	C3.3.8.2			Class U2 surface finish to cast in situ concrete (Type B and Type F)	m²	1 150.0			
	C3.3.8.3			Stone pitched lining (200 mm thickness):					
		(a)		Grouted stone pitching (for concrete lined drain transition ends)	m²	50.0			
C3.3.9				Formwork to cast-in-situ concrete lining for open drains (Class F2 surface finish):					
	C3.3.9.1			To sides with formwork on the internal face only	m²	110.0			
	C3.3.9.3			To ends of slabs	m²	60.0			
C3.3.10				Sealed joints in concrete and stone pitched linings of open drains (10mm Expansion Joint or similar approved as per Drawing TD-D-RD-1001-V1)	m	90.0			
C3.3.13				Polymer film sheeting (0.15mm thick) for concrete-lined open drains	m²	1 000.0			
C3.3.14				Cutting bituminous surfacing and pavement layers for concrete kerbing, channeling or concrete-lined drains	m	460.0			
C3.3.16				Demolition and removal of existing kerbs and/or channel (maximum width of 3.0 m)	m³	5.0			
C3.3/ C1.7				LOADING AND HAULING					
	C1.7.1			Loading:					
	C1.7.1.2			Loading from heaps or windrows using machines and/some hand labour where necessary	m³	5.0			
	C1.7.2			Hauling					
	C1.7.2.2			Hauling material to spoil and off-loading it at a designated spoil or stockpile area:					
Total Carried Forward									



CONTRACT SANRAL R.342-010-2024/1  
SCHEDULE A: ROADWORKS

C3.3 CONCRETE KERBING AND CHANNELING, ASPHALT BERMS, CHUTES, DOWNPIPES, CONCRETE, STONE PITCHED AND GABION LININGS  
FOR OPEN DRAINS

Item				Description	Unit	Quantity	Rate	Amount	
								R	c
Brought Forward									
PC3.3.19		(b)		Boulders and hard material	m³ - km	200.0			
				Inlet, outlet, transition and similar structures (typical designs):					
	PC3.3.19.4			Transition for Type B Concrete Kerbing Reinforced and outlet structure (Class 30/20) as per Drawing TD-D-RD-1002-V1	number	6.0			
	PC3.3.19.5			Transition for Type F Concrete Side Drain Reinforced (Class C25/30-20) as per Drawing TD-D-RD-1007-V1 and outlet structure as per Drawing TD-D-RD-1002-V1	number	2.0			
C3.2				CULVERTS					
C3.3 / 3.2	C3.2.2			Backfilling					
	C3.2.2.1			Using the excavated material	m³	30.0			
	C3.2.2.2			Using imported selected material:					
		(a)		From commercial sources (Type G6)	m³	60.0			
	C3.2.2.3			Extra over sub-items C3.2.2.1 and C3.2.2.2 for soil cement backfilling					
		(b)		With dry mixture (1:12 cement soil)	m³	10.0			
		(c)		Variation in cement	kg	50.0			
									</

## SCHEDULE A: ROADWORKS

## C4.2 CUT MATERIALS

[illegible]

## SCHEDULE A: ROADWORKS

### C4.3 EXISTING ROAD MATERIALS

[illegible]

Item				Description	Unit	Quantity	Rate	Amount	
								R	c
C4.4				COMMERCIAL MATERIALS					
C4.4.2				Commercial materials identified by the Contractor from commercial, private or other non-commercial suppliers:					
	C4.4.2.1			Pavement layer material:					
		(b)		Type G2 material					
		(i)		For km 27.00 to km 36.20	m³	12 500.0			
		(ii)		For km 36.20 to km 36.93	m³	1 300.0			
		(f)		Type G5A material					
		(i)		For DR1995 access at km 34.39	m³	80.0			
		(ii)		For farm access bellmouths	m³	330.0			
		(iii)		For km 36.20 to km 36.93	m³	2 150.0			
		(i)		Type G7 material					
		(i)		For DR1995 access at km 34.39	m³	80.0			
		(q)		Natural or crushed gravel material for the wearing course of an unsealed road					
		(i)		For DR1995 access at km 34.39	m³	30.0			
C4.4.4				Cementitious stabilising agents:					
	C4.4.4.1			Cement					
		(a)		For km 27.00 to km 36.20	t	960.0			
		(b)		For km 36.20 to km 36.93	t	130.0			
C4.4.5				Bituminous stabilising agents:					
	C4.4.5.1			Emulsion stable grade (60% net bitumen)	t	720.0			
C4.4.6				Fillers for bituminous stabilisation					
		(a)		Cement CEM II 32.5 N	t	290.0			
Total Carried Forward To Summary									

## SCHEDULE A: ROADWORKS

## C5.1 ROADBED

Total Carried Forward To Summary

## SCHEDULE A: ROADWORKS

### C5.3 ROAD PAVEMENT LAYERS

[illegible]

Item				Description	Unit	Quantity	Rate	Amount	
								R	c
C5.4				STABILISATION					
C5.4.2				Chemical stabilisation:					
	C5.4.2.1			Chemical stabilisation (150mm thick) of pavement layers (C4 subbase layer) compacted to 96% of MDD					
		(a)		For km 36.2 to km 36.93	m³	2 150.0			
C5.4.5				Cementitious stabilisation agents for pavement layers:					
	C5.4.5.1			Addition of cementitious stabilisation agents for pavement layers:					
		(a)		Cement II 32.5N (for pavement layer C4 km 36.20 to km 36.93)	t	130.0			
C5.4.7				Bituminous stabilisation of pavement layers:					
	C5.4.7.1			Bituminous stabilisation (150mm thick) of payment layers (BSM1 base layer km 27.00 to km 36.20) compacted to 100% of MDD	m³	12 500.0			
C5.4.8				Bituminous stabilisation agent:					
	C5.4.8.2			60 % cationic emulsion	litre	720 000.0			
C5.4.9				Cementitious agent for bituminous stabilisation:					
	C5.4.9.2			Filler for bituminous stabilisation spreading the agent or filler using labour enhanced methods of construction Cement CEM II 32.5 N	t	290.0			
C5.4.11				Curing by covering with the subsequent layer	m²	83 000.0			
C5.4.14				Trial section for a chemically stabilised layer	m³	230.0			
C5.4.15				Trial section for a bituminously stabilised layer (4.1m wide)	m²	1 230.0			
C5.4 / C5.3				ROAD PAVEMENT LAYERS					
	C5.3.11			Riding quality measurements:					
		C5.3.11.3		Using an inertial profilometer	km	37.0			
PC5.3.12				Surface regularity payment adjustments	Prov. Sum	1.0	100 000.00	100 000	00
C5.4 / C5.5				STABILISATION					
	C5.5.21			Finishing the stabilised layer					
	C5.5.21.2			Slush reconstructed section with:					
		(b)		Dilute Emulsion	m²	83 000.0			
Total Carried Forward To Summary									

**CONTRACT SANRAL R.342-010-2024/1**  
**SCHEDULE A: ROADWORKS**

**C5.5 RECONSTRUCTION OF PAVEMENT LAYERS**

Item				Description	Unit	Quantity	Rate	Amount	
								R	c
C5.5				RECONSTRUCTION OF PAVEMENT LAYERS					
C5.5.1				Compiling and implementing M&U plans for the reconstruction of an existing road pavement	number	1.0			
C5.5.4				Sampling of in-situ material for mix design procedure	number	24.0			
C5.5.5				Construction of a trial section using a recycler	m³	164.0			
C5.5.9				Temporarily blading layer material to windrow	m³	8 000.0			
C5.5.12				Removal of surplus material from site	m³	800.0			
C5.5.15				In-situ reconstruction of a pavement layer using a recycler to construct a stabilised subbase layer:					
	C5.5.15.1			Chemically stabilised subbase layer compacted to 97 % of MDD:					
		(a)		Using non-cemented material:					
		(ii)		Compacted to 200mm thick	m³	16 600.0			
C5.5 / C5.4				STABILISATION					
C5.4.5				Cementitious stabilisation agents for pavement layers:					
	C5.4.5.2			Addition of cementitious stabilisation agents for pavement layers and spreading the agent using bags and labour enhancement methods.					
		(a)		Cement (CEM II 32.5 N) for subbase layer C4 km 27 to km 36.2	t	960.0			
C5.5.20				Material shortfall or make-up material:					
	C5.5.20.2			For subbase layer (km27 - km36.2)	m³	5 500.0			
C5.5/ C1.7				LOADING AND HAULING					
C1.7.1				Loading:					
	C1.7.1.1			Loading from stockpile using machines and some hand labour where necessary	m³	5 500.0			
C1.7.2				Hauling:					
	C1.7.2.1			Hauling material for use in the Works and off-loading it on the site of the Works:					
		(a)		Soil, gravel, crushed stone and pavement layer material	m³ - km	440 000.0			
Total Carried Forward To Summary									



## SCHEDULE A: ROADWORKS

### C8.1 PRIME COAT

[illegible]

**CONTRACT SANRAL R.342-010-2024/1****SCHEDULE A: ROADWORKS****C9.1 ASPHALT LAYERS**

Item				Description	Unit	Quantity	Rate	Amount	
								R	c
C9.1				ASPHALT LAYERS					
C9.1.1				Asphalt mix designs:					
	C9.1.1.2			Sand skeletal mixes:					
		(a)		Continuously graded base or surfacing (as defined (NMPS 14mm, grading class 2 with a A-E2 modified binder, Level IB mix design applicable, traffic level ES3, paver laid. Nominal layer thickness 45mm.	lump sum	1.0			
C9.1.2				Construction of trial sections:					
		(a)		Asphalt layers (Continuously graded wearing course. NMPS 14mm with a A-E2 modified binder, 45mm nominal layer thickness, paver laid)	m²	920.0			
C9.1.3				Application of bond coat:					
	C9.1.3.1			Stable – grade 30 % net bitumen emulsion as specified. Applied with a calibrated distributor	litre	5 300.0			
	C9.1.3.2			Applied in restricted areas using a portable pressure sprayer	litre	100.0			
	C9.1.3.3			Applied by hand using brushes on all exposed transverse and longitudinal construction joints	litre	100.0			
C9.1.5				Asphalt surfacing:					
	C9.1.5.1			New construction:					
		(e)		Continuously graded base or surfacing (NMPS 14mm, grading class 2 with a A-E2 modified binder, Level IB mix design applicable, traffic level ES3, paver laid. Nominal layer thickness 45mm)	m²	8 800.0			
C9.1.9				Application of rolled in chippings (10mm nominal size):					
	C9.1.9.2			By hand in restricted areas	m²	8 800.0			
C9.1.10				Variation rates:					
	C9.1.10.1			Bitumen A-E2 modified	t	5.0			
	C9.1.10.2			Aggregate	t	30.0			
	C9.1.10.3			Active filler (lime unless stated in Contract Documentation, or determined with mix design)	t	1.0			
	C9.1.10.5			Rolled-in chippings	t	2.0			
C9.1.13				Coring of asphalt layers:					
	C9.1.13.1			100 mm diameter	number	3.0			
	C9.1.13.2			150 mm diameter	number	10.0			
C9.1.14				Surface regularity testing as described in Clause A9.1.8.4:					
	C9.1.14.1			Establishment of equipment: Inertial laser Profilometer	number	1.0			
	C9.1.14.2			Profiler Surveys utilising equipment as specified - Base layers and surfacing layers	km	3.0			
PC9.1.17				Surface regularity payment adjustments	Prov. Sum	1.0	100 000.00	100 000	00
Total Carried Forward To Summary									

**CONTRACT SANRAL R.342-010-2024/1**
**SCHEDULE A: ROADWORKS**
**C10.1 GENERAL REQUIREMENTS FOR SURFACE TREATMENTS**

Item				Description	Unit	Quantity	Rate	Amount	
								R	c
C10.1				GENERAL REQUIREMENTS FOR SURFACE TREATMENTS					
PC10.1.3				Multiple stone seals including a cover spray, if specified using:					
	C10.1.3.2			20 mm and 7,1 mm aggregate (Grade A aggregate using a S-R2 tack coat, hot applied type S-E1 penetration coat with a 65% cationic spray grade emulsion water diluted 40% cover spray as final binder application) For km 27.00 to km 36.20	m²	83 000.0			
C10.1.9				Bituminous binder variations:					
	C10.1.9.4			Cationic emulsion					
		(a)		65% Spray-grade	litre	8 500.0			
	C10.1.9.6			Non-homogeneous modified binder, S-R2	litre	19 600.0			
	C10.1.9.7			Homogeneous modified binder					
		(a)		For bellmouth areas (70% polymer modified cationic spray grade emulsion SC-E2(t))	litre	270.0			
		(b)		For km 27.00 to km 36.20 (S-E1)	litre	10 700.0			
	C10.1.9.11			Precoating fluid (Colcote S or similar approved)					
		(a)		For km 27.00 to km 36.20 (10mm Armour Seal)	litre	200.0			
		(b)		For km 27.00 to km 36.20 (20/7.1mm Double Seal)	litre	3 100.0			
		(c)		For bellmouth areas	litre	80.0			
C10.1.10				Aggregate variation (grade 1):					
	C10.1.10.2			7,1 mm aggregate (For km 27.00 to km 36.20)	m³	60.0			
	C10.1.10.3			10 mm aggregate (For km 27.00 to km 36.20)	m³	50.0			
	C10.1.10.5			20 mm aggregate					
		(a)		For bellmouth areas	m³	10.0			
		(b)		For km 27.00 to km 36.20	m³	120.0			
C10.1.14				Precoating of aggregate using a frontend loader:					
	C10.1.14.1			Product containing low flashpoint solvent (Colcote S or similar approved)					
		(a)		For bellmouth areas (20mm aggregate)	litre	600.0			
		(b)		For km 27.00 to km 36.20 (10mm aggregate)	litre	8 850.0			
		(c)		For km 27.00 to km 36.20 (20mm aggregate)	litre	14 300.0			
		(d)		For km 27.00 to km 36.20 (7.1mm aggregate)	litre	9 000.0			
C10.1.22				Bituminous single seal and slurry, including a cover spray if specified:					
	C10.1.22.1			Bituminous single seal with 20mm aggregate and first slurry (SC-E2(t) 70% polymer modified cationic spray grade emulsion tack coat, pre-coated grade 1, fine slurry medium grade)					
		(a)		For Bellmouth areas	m²	3 300.0			
Total Carried Forward									

## SCHEDULE A: ROADWORKS

## C10.1 GENERAL REQUIREMENTS FOR SURFACE TREATMENTS

[illegible]

## SCHEDULE A: ROADWORKS

## C11.4 ROAD RESTRAINT SYSTEMS

[illegible]

**CONTRACT SANRAL R.342-010-2024/1**
**SCHEDULE A: ROADWORKS**
**C11.5 FENCING**

Item				Description	Unit	Quantity	Rate	Amount	
								R	c
C11.5				FENCING					
C11.5.1				Supply and erect new fencing material for new fences and for supplementing material in existing fences which are being repaired or removed:					
	C11.5.1.1			Zinc-coated barbed wire (SANS 675)					
		(a)		High tensile grade single strand 3.2 mm x 2.5 mm oval shaped wire, 2.81 mm equivalent dia, fully galvanised as per Drawings TD-R-FG-1003-V1 and TD-R-FG-1005-V1	km	9.5			
	C11.5.1.2			Zinc-coated smooth wire (SANS 675)					
		(a)		4.0 mm dia mild steel straining wire, fully galvanised	km	0.2			
		(b)		3.0 mm dia mild steel straining wire, fully galvanised	km	0.2			
		(c)		2.5 mm dia mild steel tying wire, fully galvanised	km	0.27			
	C11.5.1.3			Diamond mesh	m²	130.0			
	C11.5.1.7			Standards, 2,5kg/m Y-sections:					
		(a)		100 mm dia timber, 2000 mm long as per Drawing TD-R-FG-1003-V1	number	50.0			
		(b)		1850 x 2.5 kg/m "Y" section with holes at 50 mm centres, fully galvanized as per Drawing TD-R-FG-1005-V1	number	6.0			
	C11.5.1.8			Droppers, 0,56 kg/m ridgeback pattern:					
		(a)		136 mm dia timber, 1400 mm long as per Drawing TD-R-FG-1003-V1	number	450.0			
		(b)		Steel droppers 100 mm dia x 0.56 kg/m ridgeback pattern, 1400 mm long as per Drawing TD-R-FG-1005-V1	number	26.0			
	C11.5.1.9			Straining posts, stays and anchors:					
		(a)		Vertical:					
		(i)		Steel straining posts and corner posts 100 mm dia x 3 mm thickness, 2130 mm long as per Drawing TD-R-FG-1005-V1	number	2.0			
		(ii)		Timber straining posts and corner posts 125 mm dia, 2100 mm long as per Drawing TD-R-FG-1003-V1	number	16.0			
		(b)		Inclined:					
		(i)		Steel stays and anchors 60 mm dia x 3 mm thickness, 2130 mm long with base plate as per Drawing TD-R-FG-1005-V1	number	2.0			
		(c)		Horizontal:					
		(i)		Steel cross brace support 60 mm dia x 3 mm thickness, 2400 mm long, bent and flattened ends as per Drawing TD-R-FG-1005-V1	number	1.0			
		(ii)		Timber stays and anchors, 100 mm dia, 2000 mm long as per Drawing TD-R-FG-1003-V1	number	10.0			
C11.5.2				New gates:					
		(a)		3.6 m wide as per Drawing TD-R-FG-1003-V1	number	1.0			
Total Carried Forward									

## SCHEDULE A: ROADWORKS

## C11.5 FENCING

Total Carried Forward To Summary

**CONTRACT SANRAL R.342-010-2024/1**
**SCHEDULE A: ROADWORKS**
**C11.6 ROAD SIGNS**

Item				Description	Unit	Quantity	Rate	Amount	
								R	c
C11.6				ROAD SIGNS					
PC11.6.1				Road signboards with painted or coloured semi-matt background. Symbols, lettering and borders in semi- matt black or in Class I retro-reflective material, where the sign board is constructed from:					
	C11.6.1.4			Prepainted galvanized steel profiles (200mm high chromadek or similar approved panels):					
		(b)		Area exceeding 0,5 m² but not 2,0 m²	m²	6.0			
		(c)		Area exceeding 2,0 m² but not 10 m²	m²	14.0			
	C11.6.1.7			Regulatory signs, permanent:					
		(b)		900mm diameter (prepainted galvanized steel plate chromadek 1,6 mm thick or approved equivalent)	number	5.0			
		(c)		1200mm diameter (prepainted galvanized steel plate chromadek 1,6 mm thick or approved equivalent)	number	30.0			
	PC11.6.1.9			Warning signs, permanent:					
		(d)		1500mm size (prepainted galvanized steel plate chromadek 1,6 mm thick or approved equivalent)	number	30.0			
		(e)		450 mm x 2700 mm (prepainted galvanized steel plate chromadek 1,6 mm thick or approved equivalent)	number	5.0			
	C11.6.1.11			Supplementary plates to permanent regulatory or warning signs (1.6 mm thick pre-painted galvanized steel plate or approved equivalent, Class III background and symbols)	m²	10.0			
C11.6.2				Extra over on item C11.6.1 for using:					
	C11.6.2.1			Background of retro-reflective material:					
		(a)		Class I	m²	12.0			
	C11.6.2.2			Lettering, symbols, numbers, arrows, emblems and borders of retro-reflective material:					
		(a)		Class III	m²	8.0			
C11.6.3				Road sign supports (overhead road sign structures excluded):					
	C11.6.3.2			Timber:					
		(a)		125 mm dia	m	128.0			
		(b)		150 mm dia	m	10.0			
C11.6.4				Kilometre markers:					
	C11.6.4.1			Kilometre markers on galvanised posts as per Drawing TD-R-RS-1401-V1	number	50.0			
C11.6.5				Excavation and backfilling for road sign supports (not applicable to kilometre posts):					
	C11.6.5.2			Excavating soft or intermediate material and backfilling using labour enhanced construction methods	m³	10.0			
	C11.6.5.3			Extra over item C11.6.5.1 and C11.6.5.2 for cement-treated soil backfill	m³	5.0			
Total Carried Forward									



Item				Description	Unit	Quantity	Rate	Amount	
								R	c
Brought Forward									
C11.6.6	C11.6.5.4			Extra over item C11.6.5.1 for hard material excavation	m³	5.0			
				Dismantling, storing and re-erecting road signs with a surface area of:					
C11.6.7	C11.6.6.2			Area exceeding 0,5 m² but not 2,0 m²	m²	5.0			
	C11.6.6.3			Exceeding 2,0 m² but not 10 m²	m²	5.0			
				Dismantling and storing of road signs and overhead signs:					
	C11.6.7.1			Dismantling and storing of road signs with a surface area of:					
C11.6.8		(b)		Area exceeding 0,5 m² but not 2,0 m²	m²	10.0			
		(c)		Exceeding 2,0 m² but not 10 m²	m²	5.0			
				Danger plates at culverts/structures:					
	C11.6.8.2			Size 200 x 800mm (W401/2 on 76 mm x 3.0 mm "D" shapes galvanised mild steel post, 2 m long as per Drawing TD-R-RS-1201-V1)	number	95.0			
C11.6.11				Disposing of overhead road signs:					
	C11.6.11.1			Up to 10 m²	m²	15.0			

**CONTRACT SANRAL R.342-010-2024/1**  
**SCHEDULE A: ROADWORKS**

**C11.7 ROAD MARKINGS AND ROAD STUDS**

Item				Description	Unit	Quantity	Rate	Amount	
								R	c
C11.7				ROAD MARKINGS AND ROAD STUDS					
C11.7.2				Retro-reflective road marking:					
	C11.7.2.1			White lines broken or unbroken (Type 1 paint SANS 731-1)					
		(a)		100 mm wide	km	9.0			
		(b)		150 mm wide	km	2.0			
		(c)		200 mm wide	km	2.0			
	C11.7.2.2			Yellow lines broken or unbroken (Type 1 paint SANS 731-1)					
		(a)		100 mm wide	km	1.0			
		(b)		150 mm wide	km	25.0			
	C11.7.2.4			White lettering and symbols (Type 1 paint SANS 731-1)	m²	200.0			
	C11.7.2.5			Yellow lettering and symbols (Type 1 paint SANS 731-1)	m²	100.0			
	C11.7.2.7			Transverse lines, painted island and arrestor bed markings (any colour) (Type 1 paint SANS 731-1)	m²	100.0			
PC11.7.3				Thermoplastic road marking:					
		(a)		White lines broken or unbroken					
		(i)		100mm wide	km	9.0			
		(ii)		150mm wide	km	2.0			
		(iii)		200mm wide	km	2.0			
		(b)		Yellow lines broken or unbroken (Type 1 paint)					
		(i)		100mm wide	km	1.0			
		(ii)		150mm wide	km	25.0			
		(c)		White lettering and symbols	m²	200.0			
		(d)		Yellow lettering and symbols (Type 1 paint)	m²	100.0			
		(e)		Transverse lines, painted island and arrestor bed markings (any colour)	m²	100.0			
C11.7.5				Variations in rate of application:					
	C11.7.5.1			White paint	litre	40.0			
	C11.7.5.2			Yellow paint	litre	50.0			
	C11.7.5.4			Retro-reflective beads	kg	60.0			
	C11.7.5.5			Thermoplastic material, all colours	kg	80.0			
C11.7.7				Road studs:					
	C11.7.7.2			Permanent road studs compliant to SANS 1463 (class RSA-2)					
		(a)		Bi-directional, white/white	number	250.0			
		(b)		Bi-directional, white/red	number	140.0			
		(c)		Bi-directional, yellow/red	number	830.0			
		(d)		Bi-directional, red/red	number	90.0			
Total Carried Forward									

## SCHEDULE A: ROADWORKS

## C11.7 ROAD MARKINGS AND ROAD STUDS

Total Carried Forward To Summary

**CONTRACT SANRAL R.342-010-2024/1**  
**SCHEDULE A: ROADWORKS**

**C11.8 LANDSCAPING AND PLANTING PLANTS**

Item				Description	Unit	Quantity	Rate	Amount	
								R	c
C11.8				LANDSCAPING AND PLANTING PLANTS					
C11.8.3				Preparing the areas for grassing:					
	C11.8.3.2			Scarifying for loosening topsoil	ha	1.0			
	C11.8.3.3			Topsoiling within the road reserve where the following materials are used:					
		(a)		Topsoil obtained from within the road reserve or borrow areas	m³	1 000.0			
	C11.8.3.5			Providing and applying chemical fertilisers and / or soil-improvement material:					
		(b)		Superphosphate	t	0.4			
		(c)		Limestone ammonium nitrate	t	0.2			
		(d)		2:3:2 (22)	t	0.3			
		(e)		3:2:1 (25)	t	0.2			
		(f)		Agricultural lime	t	0.3			
C11.8.4				Grassing:					
	C11.8.4.3			Hydroseeding:					
		(a)		Providing an approved seed mixture for hydroseeding	kg	60.0			
		(c)		Hydroseeding	ha	1.0			
C11.8.5				Watering the grass when established by topsoiling only	kℓ	1 000.0			
PC11.8.13				Chemical control of vegetation and eradication of weeds					
		(a)		Road reserve with single carriageway (R342 km 27.00 to km 36.93)	number	2.0			
PC11.8.14				Additional chemical control of vegetation and eradication of undesirable vegetation on the instruction of the Engineer					
		(a)		Isolated areas	m²	15 900.0			
		(b)		Dense areas (areas more than 20% infested)	ha	1.0			
PC11.8.15				Eradication of undesirable vegetation, tree felling and cutting branches					
		(a)		Initial eradication (R342 km 27.00 to km 36.93)	lump sum	1.0			
PC11.8.16				Additional tree felling on the instruction of the Engineer					
		(a)		Girth 151 mm to 500 mm	number	50.0			
		(b)		Girth 501 mm to 1000 mm	number	5.0			
		(c)		Girth 1001 mm to 2000 mm	number	3.0			
		(d)		Girth 2001 mm to 4000 mm	number	2.0			
PC11.8.17				Additional eradication of undesirable vegetation on the instruction of the Engineer	ha	2.0			
Total Carried Forward									

## SCHEDULE A: ROADWORKS

## C11.8 LANDSCAPING AND PLANTING PLANTS

Total Carried Forward To Summary

## SCHEDULE A: ROADWORKS

## C11.9 FINISHING THE ROAD AND ROAD RESERVE AND TREATING OLD ROADS

[illegible]

## SCHEDULE A: ROADWORKS

## C14.1 ACCESS FOR BRIDGE REHABILITAION

[illegible]

## SCHEDULE A: ROADWORKS

### C14.3 DEMOLITION AND REMOVAL OF STRUCTURAL CONCRETE AND STEELWORK

Total Carried Forward To Summary



## SCHEDULE A: ROADWORKS

## C14.4 SURFACE AND STRUCTURAL REPAIR OF CONCRETE MEMBERS

[illegible]

## SCHEDULE A: ROADWORKS

#### C14.5 ANCHORING OF REINFORCEMENT, GROUTING AND CRACK INJECTION

Total Carried Forward To Summary

## SCHEDULE A: ROADWORKS

## C14.7 PROTECTIVE COATINGS AND TREATMENTS FOR CONCRETE

[illegible]

**CONTRACT SANRAL R.342-010-2024/1**
**SCHEDULE A: ROADWORKS**
**C14.9 REPAIR AND REPLACEMENT OF ANCILLARY STRUCTURAL ELEMENTS**

Item				Description	Unit	Quantity	Rate	Amount	
								R	c
C14.9				REPAIR AND REPLACEMENT OF ANCILLARY STRUCTURAL ELEMENTS					
C14.9.1				Removal of debris from expansion gaps to provide free movement of deck	m	25.0			
C14.9.2				Clear bridge drainage system (Scuppers)	number	8.0			
C14.9.3				Service and repair of existing joint system:					
	C14.9.3.1			Replace bridge No. B9469 joints with asphaltic plug type joint 300x50mm suitable for 5mm movement include removal of existing as per Drawing 113246-2-CT29					
			(i)	At both abutments	number	22.0			
C14.9.4				Joint terminations as specified on the drawings in:					
	C14.9.4.1			Barriers and Parapets (End treatment for 300mm wide Thorma joint at balustrade including cover plate)	number	4.0			
C14.9.14				Bridge number plates:					
	C14.9.14.2			New number plate					
			(a)	New plated Bridge Number plates as per Drawing TD-S-N-001-V1. Only bridge number no prefix and year (refer Drawing TD-S-N-005-V1 and TD-S-N-006-V1)	number	2.0			
			(b)	New plated Culvert Number plates including concrete mounting blocks for box culverts Type 2 in accordance with Drawing TD-S-N-004-V1)	number	2.0			
C14.9 / C13.2				FALSEWORK, FORMWORK AND CONCRETE FINISH STRUCTURES					
	C13.2.1			Formwork to provide Class F2 surface finish to repair works as describe in series C14	m <sup>2</sup>	3.0			
C14.9 / C13.3				STEEL REINFORCEMENT					
	C13.3.1			Reinforcement for:					
	C13.3.1.1			Structural repair works as describe in Series C14					
			(b)	High-yield-stress-steel bars (hot rolled bars)	t	0.2			
C14.9 / C9.1				ASPHALT LAYERS					
	C9.1.15			Milling of bridge decks and keys adjacent to bridge decks					
	C9.1.15.1			Provision of an appropriate sized milling machine	number	1.0			
	C9.1.15.2			Milling of bridge decks and keys to bridge deck approaches	m <sup>3</sup>	80.0			
	C9.1.3			Application of bond coat					
	C9.1.3.1			Stable-grade 30% net bitumen emulsion as specified. Applied with a calibrated distributor	litre	160.0			
C9.1.8				Surfacing of bridge decks					
	C9.1.8.2			Surfacing (NMPS 14mm, grading class 2 with a A-E2 modified binder, Level IB mix design applicable, traffic level ES3, paver laid. Nominal layer thickness 45mm)	t	200.0			
Total Carried Forward									

## SCHEDULE A: ROADWORKS

## C14.9 REPAIR AND REPLACEMENT OF ANCILLARY STRUCTURAL ELEMENTS

[illegible]

## SCHEDULE A: ROADWORKS

## C20.1 TESTING MATERIALS AND JUDGEMENT OF WORKMANSHIP

[illegible]

**CONTRACT SANRAL R.342-010-2024/1**
**SCHEDULE A: ROADWORKS**

D1000

Item				Description	Unit	Quantity	Rate	Amount	
								R	c
D1000				TRAINING, COACHING, GUIDANCE, MENTORING AND ASSISTANCE					
D10.01				Target Group Participation					
		(a)		Contract Participation Performance bonus	PC Sum	1.0	600 000.00	600 000	00
D10.02				Stakeholder and Community Liaison and Social Facilitation					
		(a)		Cost of liaison, social facilitation and PLC support	PC Sum	1.0	400 000.00	400 000	00
		(b)		Handling cost and profit in respect of sub-item D10.02(a)	%	400 000.0			
D10.03				Tender Process for Targeted Enterprises					
		(a)		Contractor's charge for the management and execution of the Targeted Enterprise procurement process:					
		(i)		Procurement process for the totality of all tenders concluded for the appointment of Targeted Enterprise subcontractors of CIDB 1 and 2 contractor grading	number	10.0			
		(ii)		Procurement process for the totality of all tenders concluded for the appointment of Targeted Enterprise subcontractors of CIDB 3 and 4 contractor grading	number	10.0			
		(iv)		Procurement process for the totality of all tenders concluded for the appointment of Targeted Enterprise suppliers	number	10.0			
		(b)		Targeted Enterprise Procurement Coordinator	month	12.0			
D10.04				Responsibilities of the Contractor towards Targeted Enterprises					
		(a)		Contractor's establishment, management, management support, assistance, coaching, guidance, mentoring and supervision of Targeted Enterprises	month	12.0			
		(b)		Targeted Enterprise Construction Manager	Person.M onth	12.0			
		(c)		Targeted Enterprise Construction Manager	Person.M onth	40.0			
D10.05				Construction Works by Targeted Enterprises					
		(a)		Payments associated with the construction works carried out by Targeted Enterprise subcontractors of CIDB 1 and 2 contractor grading designation appointed in terms of Section D	Prov. Sum	1.0	5 000 000.00	5 000 000	00
		(b)		Handling costs and profit in respect of payment associated with sub-item D10.05(a)	%	5 000 000.0			
		(c)		Fluctuation between the main contractor's rates and that of the Targeted Enterprise subcontractors	lump sum	1.0			
		(d)		Preliminary and General Obligations of Targeted Enterprise sub-contractors appointed in terms of Section D	lump sum	1.0			
D10.06				Training, coaching, guidance, mentoring and assistance					
		(a)		Training Costs					
Total Carried Forward									

## SCHEDULE A: ROADWORKS

D1000

[illegible]



**CONTRACT SANRAL R.342-010-2024/1**  
**SCHEDULE A: ROADWORKS**

**SUMMARY OF SECTIONS IN SCHEDULE A**

Section	Description	Amount (Rand)
C1.2	GENERAL REQUIREMENTS AND PROVISIONS	.....
C1.3	CONTRACTOR'S SITE ESTABLISHMENT AND GENERAL OBLIGATIONS	.....
C1.4	FACILITIES FOR THE ENGINEER	.....
C1.5	ACCOMMODATION OF TRAFFIC	.....
C1.6	CLEARING AND GRUBBING	.....
C2.1	GENERAL REQUIREMENTS AND TRENCHING FOR SERVICES	.....
C3.1	DRAINS	.....
C3.2	CULVERTS	.....
C3.3	CONCRETE KERBING AND CHANNELING, ASPHALT BERMS, CHUTES, DOWNPIPES, CONCRETE, STONE PITCHED AND GABION LININGS FOR OPEN DRAINS	.....
C4.2	CUT MATERIALS	.....
C4.3	EXISTING ROAD MATERIALS	.....
C4.4	COMMERCIAL MATERIALS	.....
C5.1	ROADBED	.....
C5.3	ROAD PAVEMENT LAYERS	.....
C5.4	STABILISATION	.....
C5.5	RECONSTRUCTION OF PAVEMENT LAYERS	.....
C8.1	PRIME COAT	.....
C9.1	ASPHALT LAYERS	.....
C10.1	GENERAL REQUIREMENTS FOR SURFACE TREATMENTS	.....
C11.4	ROAD RESTRAINT SYSTEMS	.....
C11.5	FENCING	.....
C11.6	ROAD SIGNS	.....
C11.7	ROAD MARKINGS AND ROAD STUDS	.....
C11.8	LANDSCAPING AND PLANTING PLANTS	.....
C11.9	FINISHING THE ROAD AND ROAD RESERVE AND TREATING OLD ROADS	.....
C14.1	ACCESS FOR BRIDGE REHABILITATION	.....
C14.3	DEMOLITION AND REMOVAL OF STRUCTURAL CONCRETE AND STEELWORK	.....
C14.4	SURFACE AND STRUCTURAL REPAIR OF CONCRETE MEMBERS	.....
C14.5	ANCHORING OF REINFORCEMENT, GROUTING AND CRACK INJECTION	.....
C14.7	PROTECTIVE COATINGS AND TREATMENTS FOR CONCRETE	.....
C14.9	REPAIR AND REPLACEMENT OF ANCILLARY STRUCTURAL ELEMENTS	.....
C20.1	TESTING MATERIALS AND JUDGEMENT OF WORKMANSHIP	.....
D1000		.....
Total Carried Forward To Summary Of Schedules		.....

**CONTRACT SANRAL R.342-010-2024**
**SCHEDULE B: PEDESTRIAN WALKWAY**
**PEDESTRIAN WALKWAY**

Item				Description	Unit	Quantity	Rate	Amount	
								R	c
C1.6				Clearing and Grubbing					
	C1.6.1.1			Clearing with machines and some hand labour where necessary	ha	0.1			
C1.7				Loading and Hauling					
	C 1.7.2.2			Hauling material to spoil and off-loading it at a designated spoil or stockpile area:					
				(b) Soil and gravel material	m³ - km	400.0			
C3.3				CONCRETE KERBING AND CHANNELLING					
C3.3.1				Concrete kerbing:					
	C3.3.1.1			Prefabricated kerbing					
		(a)		Prefabricated E1 edging as per SANS 927 Figure 12, as per Drawing 113246-2-CT2					
			(i)	1.0 m and up to 4 m radius in short lengths of 0.3 m	m	10.0			
			(ii)	Over 20m radius and straight in lengths of 1.0 m	m	1 600.0			
C4.2				CUT MATERIALS					
C4.2.9				Excavate material to spoil in sites designated by the Contractor, material obtained from					
	C4.2.9.1			Soft excavation, overburden and unsuitable material					
		(a)		Sidewalk	m³	260.0			
C4.4				COMMERCIAL MATERIALS					
C4.4.2				Commercial materials identified by the Contractor from commercial, private or other non-commercial suppliers					
	C4.4.2.1			Pavement layer material:					
		(c)		Type G5A material	m³	110.0			
C5.1				ROADBED					
C5.1.1				Roadbed construction and compaction:					
	C5.1.1.1			Compaction of in-situ material to 90% of MDD	m³	126.0			
	C5.1.1.6			Compaction of in-situ sand roadbed to 100% of MDD	m³	126.0			
C5.3				ROAD PAVEMENT LAYERS					
C5.3.2				Construction of pavement layers					
	C5.3.2.1			Construction of layers using conventional construction methods:					
		(i)		Lower subbase gravel layer (unstabilised), 75mm thickness) compacted to 95 % of MDD	m³	110.0			
C13.2				FALSEWORK, FORMWORK AND CONCRETE FINISH					
	C13.2.2			Vertical formwork to provide:					
		(i)		Class F2 surface finish to the ends of the walkway panels	m²	50.0			
Total Carried Forward									

## SCHEDULE B: PEDESTRIAN WALKWAY

## PEDESTRIAN WALKWAY

Item				Description	Unit	Quantity	Rate	Amount	
								R	c
Brought Forward									
C13.4				CONCRETE					
C13.4.1				Cast in situ concrete (non-structural)					
	C13.4.1.1			Strength concrete (class C):					
		(a)		Class C20/16-20 concrete for walkway 75 mm thick (150 mm thick across vehicle accesses) cast in alternate panels 1.8 m wide and 2.5 m long with a class U2 surface finish	m³ - km	120.0			
C13.7				JOINTS					
C13.7.1				Expansion joints:					
	C13.7.1.1			10 mm Expansion Joint or similar approved	m	150.0			
Total Carried Forward To Summary									

**CONTRACT SANRAL R.342-010-2024**  
**SCHEDULE B: PEDESTRIAN WALKWAY**

**SUMMARY OF SECTIONS IN SCHEDULE B**

Section	Description	Amount (Rand)
1	PEDESTRIAN WALKWAY	.....
Total Carried Forward To Summary Of Schedules		

C2.3 SUMMARY OF PRICING SCHEDULE

Schedule	Description	Amount R
A	SCHEDULE A: ROAD CONSTRUCTION	
B	SCHEDULE B: PEDESTRIAN WALKWAY	
SUBTOTAL A		
VAT	VALUE ADDED TAX (15%)	
TOTAL CARRIED TO C1.1.1: FORM OF OFFER		

SIGNED BY TENDERER.....

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## **PART C3: SCOPE OF WORKS**

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## **PART C3: SCOPE OF WORKS**

<b>TABLE OF CONTENTS</b>	<b>PAGE</b>
<b>SECTION A1: STANDARD AMENDMENTS ISSUED BY COTO .....</b>	<b>C3-61</b>
<b>SECTION A2: PROJECT SPECIFICATION AMENDMENTS TO THE COTO STANDARD</b>	
<b>SPECIFICATIONS .....</b>	<b>C3-62</b>
<b>SECTION B: SPECIFICATION DATA.....</b>	<b>C3-104</b>
<b>SECTION C: ENVIRONMENTAL MANAGEMENT PLAN.....</b>	<b>C3-134</b>
<b>SECTION D: STAKEHOLDER AND COMMUNITY LIAISON, AND TARGETED</b>	
<b>LABOUR AND TARGETED ENTERPRISES UTILISATION AND</b>	
<b>DEVELOPMENT .....</b>	<b>C3-156</b>
<b>SECTION E: REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY</b>	
<b>ACT AND REGULATIONS .....</b>	<b>C3-198</b>

SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LIMITED

CONTRACT SANRAL R.342-010-2024/1  
FOR STRENGTHENING OF NATIONAL ROUTE R342 SECTION 1 FROM NGUNI RIVER LODGE  
(KM 14.50) TO PATERSON (KM 25.00)

**SECTION A1: STANDARD AMENDMENTS ISSUED BY COTO**

**Notes to tenderer:**

- 1. The Standard Specifications for Road and Bridge Works for South African Road Authorities (Draft Standard October 2020 edition) prepared by the Committee of Transport Officials, (COTO), as amended, shall apply to this contract. The amendments are those issued by COTO and reproduced in Section A1, together with additional amendments as set out in Section A2 and Project specific Specification Data as set out in Section B.**

As at 1 July 2023 no amendments have been issued by COTO.



CONTRACT SANRAL R.342-010-2024/1  
FOR STRENGTHENING OF NATIONAL ROUTE R342 SECTION 1 FROM NGUNI RIVER LODGE  
(KM 14.50) TO PATERSON (KM 25.00)

**SECTION A2: PROJECT SPECIFICATION AMENDMENTS TO THE COTO STANDARD SPECIFICATIONS**

**Notes to tenderer:**

1. This Section A2 contains amendments to the Standard Specification, including additional clauses, amendment to clauses or deletion of clauses and specifications, required for this particular contract. Where the Standard Specifications allow a choice to be specified in the Contract Documentation or Project Specifications, between alternative materials or methods of construction, and for additional requirements to be specified to suit a particular contract, these selections are not made in this Section A2. Details of such alternatives or additional requirements applicable to this contract are contained in Section B: Specification Data. Section B also contains project specific sections for Sections C, D and E.
2. The number of each clause and each payment item in this part of the project specifications follows the numbering format of the standard specifications.

**TABLE OF CONTENTS****PAGE**

<b>COTO CHAPTER 1: GENERAL.....</b>	<b>C3-64</b>
<b>COTO CHAPTER 2: SERVICES .....</b>	<b>C3-73</b>
<b>COTO CHAPTER 3: DRAINAGE .....</b>	<b>C3-74</b>
<b>COTO CHAPTER 4: EARTHWORKS AND PAVEMENT LAYERS: MATERIALS .....</b>	<b>C3-76</b>
<b>COTO CHAPTER 5: EARTHWORKS AND PAVEMENT LAYERS: CONSTRUCTION .....</b>	<b>C3-78</b>
<b>COTO CHAPTER 6: CONCRETE LAYERS .....</b>	<b>C3-80</b>
<b>COTO CHAPTER 7: MAINTENANCE AND REPAIR OF CONCRETE LAYERS .....</b>	<b>C3-81</b>
<b>COTO CHAPTER 8: PRETREATMENT AND REPAIR OF EXISTING LAYERS .....</b>	<b>C3-82</b>
<b>COTO CHAPTER 9: ASPHALT LAYERS.....</b>	<b>C3-83</b>
<b>COTO CHAPTER 10: SURFACE TREATMENTS .....</b>	<b>C3-86</b>
<b>COTO CHAPTER 11: ANCILLARY ROAD WORKS.....</b>	<b>C3-88</b>
<b>COTO CHAPTER 12: GEOTECHNICAL APPLICATIONS .....</b>	<b>C3-97</b>
<b>COTO CHAPTER 13: STRUCTURES.....</b>	<b>C3-100</b>
<b>COTO CHAPTER 14: REPAIR AND REHABILITATION OF STRUCTURES .....</b>	<b>C3-101</b>
<b>COTO CHAPTER 20: QUALITY ASSURANCE .....</b>	<b>C3-102</b>

## **COTO CHAPTER 1: GENERAL**

### **SECTION 1.1: GENERAL PREAMBLE**

#### **PART A: SPECIFICATIONS**

##### **A1.1.2 DEFINITIONS**

*Replace the Definition for "Site / Site of the Works" with the following:*

"Site / Site of the Works - shall mean the entire road reserve (both new and existing), inclusive of road junctions and property accesses, required for construction of the Works as defined by the limits of construction given in the Contract Documentation. It shall also include areas within statutory building lines where work has to be carried out and any additional lengths of road required for the placement of advanced warning road signs and/or traffic accommodation measures beyond the limits of construction as shown on the drawings. The Site shall also include areas outside of the road reserve required for Construction camps, Engineer's site facilities, Borrow pit areas or quarry areas, haulage and access roads, temporary deviations, storage areas, spoil areas and stockpile areas. The exact extent of the limits of the construction will be verified once the Site is handed over to the Contractor."

#### **PART C: MEASUREMENT AND PAYMENT**

##### **C1.1.3 PAYMENT**

###### **C1.1.3.5 Payment for materials on the Site**

*In the last sentence of the 1<sup>st</sup> paragraph, delete the following:*

" , or, in the case of crushed stone which has not been purchased but has been produced on the site, at 80% of a fair evaluation of such crushed material".

*Add the following new subclauses:*

###### **"C1.1.3.9 Reduced payments for substandard work**

Where provision for reduced payments for sub-standard work is made in the Contract Documentation, acceptance of reduce payment for substandard work may be accepted by the Engineer subject to prior approval by the Employer.

###### **C1.1.3.10 Procurement of sub-services and omitted rates (Second tier procurement)**

Second tier procurement include the procurement of any work where either the particulars of the work is not scheduled and priced, or where the process of procurement of the sub-service provider is specified elsewhere in the contract specification. It includes the procurement of work where rates have been omitted or where allowance for the work is made under a Provisional sum or Prime sum item or where allowance for the work is made under a Provisional sum or Prime sum item but the particulars of the work is not scheduled, or where work is instructed under clause 13[Variations and Adjustments] or where work is to be performed by Targeted Enterprises.

The following procurement methods is to be followed as appropriate:

- a) **Where the particulars of the work is not scheduled but existing rates for similar work exist in the contract and the work can therefore be executed by the contractor or his sub-contractor at the existing contract rates.**

No separate procurement process is required. The work is to be quantified and scheduled utilising existing rates and approved through the Works Authorisation process.

- b) **Where the payment calculation is based on a formula specified in the contract document, or**

**where the payment rate is pre-determined or fixed by the client.**

No separate procurement process is required. The work is to be quantified and approved through the Works Authorisation process.

- c) **Where the supplier is not selected by the contractor and actual cost is reimbursable and/or no procurement process is possible.**

No separate procurement process is required. The work is invoiced by supplier on completion and approved through the Works Authorisation process at the end of the contract.

- d) **Where there are omitted items as part of the existing scheduled scope of work and no existing rates for similar work exist in the contract, or where there are no existing rates for the materials to be supplied and suitable rates for material to be determined.**

A proposal for a new rate shall be submitted by the contractor and evaluated by the engineer, by comparing with either adjusted relevant rates in the contract, or by comparing with similar rates on similar contracts, or by comparing three informal quotes to substantiate the rate. The new agreed rate is approved through the Works Authorisation process.

- e) **Where the particulars of the work is not scheduled and the estimated cost of the work (including VAT and excluding Contract Price Adjustment) is equal or less than R1,000,000.00 and there are no existing rates for similar work and the contractor's proposal submitted in terms of FIDIC Variation 13.1 is not accepted and the work is to be performed by a sub-contractor.**

A minimum of three quotations shall be obtained from Targeted Enterprises (as defined in Section D1000). The following is the minimum requirements for this process:

- Prequalification for BEE level 1 or 2 and EME or QSE (Approval to deviate must be granted by the Employer, based on market research)
- Quotation to include form of quotation, CSD registration, CIDB (where applicable),

A Works Authorisation shall be approved prior to execution of the work.

- f) **Where the particulars of the work is not scheduled and the estimated cost of the work is more than R1,000,000.00 (including VAT and excluding Contract Price Adjustment) and there are no existing rates for similar work and the contractor's proposal submitted in terms of FIDIC Variation 13.1 is not accepted and the work is to be performed by a sub-contractor.**

The work is to be procured through a tender process. The following is the minimum requirements for this process:

- Prequalification for BEE level 1 or 2 and EME or QSE (Approval to deviate must be granted by the Employer, based on market research)
- Tenders to close at the relevant site offices at a specific date and time
- Tender documents to include form of Offer, CSD registration, Tax compliance, CIDB (where applicable), SBD1, SBD 4, SBD 6.2, BEE certificate, Form A2.2
- Tenders to be evaluated on price and preference
- Evaluation by contractor for review by engineer

A Works Authorisation shall be approved prior to execution of the work.

- g) **Where the particulars of the work is identified by the contractor to be performed by subcontractors who are Targeted Enterprises to form part of the specified Contract Participation Goals for Targeted Enterprises.**

The work is to be procured as per the process specified in clause D1007.

- h) **Where the work is unforeseen, urgent and the relevant procurement method as indicated above will result in a delay to the contract and payment for a claim for extension of time and/or cost, or where the above procurement methods are not applicable or cannot fully be complied with.**

The Employer will determine the most appropriate procurement process to be followed and approved through the Works Authorisation process.”

## **SECTION 1.2: GENERAL REQUIREMENTS AND PROVISIONS**

### **PART A: SPECIFICATIONS**

#### **A1.2.3 GENERAL**

##### **A1.2.3.15 Routine maintenance**

*Add the following new paragraphs:*

"The Contractor's responsibility for routine maintenance on this contract is indicated in the Contract Documentation."

The backfilling for patching shall be done as indicated in the Contract Documentation.

The riding quality of gravel deviations shall comply with the requirements indicated in the Contract Documentation."

*Add the following new subclause after A1.2.3.23:*

##### **"A1.2.3.24 Reference Manuals, other specifications and test methods**

In various chapters of this Standard Specification, reference is made to Manuals, other specifications and test methods. If not otherwise indicated in the Contract Documentation, the latest published Manual, other specification and test methods at time of close of tender will apply. Any changes to be implemented on a project as a result of revisions to manuals, other specifications and test methods, will be handled in terms of the Conditions of Contract.

Certain TRH and TMH documents are published as Sabita Manuals/TRH or Sabita Manuals/TMH publications. Where reference is made to the TRH or TMH document, it shall be read as referring to the latest version of the Sabita Manual/TRH publication or Sabita Manual/TMH publication, respectively."

#### **A1.2.7 EXECUTION OF THE WORKS**

##### **A1.2.7.1 Programme of work**

###### **a) General**

*Add the following new paragraphs:*

"The contractor shall note that the examination of a road with a view to rehabilitation is normally undertaken a considerable period of time before the commencement of the contract, and that conditions may subsequently change. The engineer will make further examinations during the period of contract, and, depending on the results of such examinations, the quantities of any items of work may be drastically increased or decreased.

The contractor shall base his initial programme for road rehabilitation on the scope of the work as described in the project specifications on the quantities contained in the Pricing Schedule (Part C2)."

### **PART C: MEASUREMENT AND PAYMENT**

#### **(ii) Items that will not be measured separately**

*Replace the wording of item 8 with the following:*

"8. The design of all temporary work and the construction of all temporary work, unless otherwise indicated in the Contract Documentation."

Item	Unit
<b>C1.2.3</b>	<b>Routine road maintenance of existing public roads within the Site of the Works or other public roads outside the Site of the Works which are used as detours</b>

*In the wording of item C1.2.3.4 in the second sentence add the words "for the full duration of the contract period" after the words "haul distance" at the end of the sentence.*

Item	Unit
<b>C1.2.7</b>	<b>Road safety audits</b>

*In the wording of item C1.2.7.2, replace "C1.2.6.1" with "C1.2.7.1".*

*In the wording of item C1.2.7.4, replace "C1.2.6.3" with "C1.2.7.3".*

*In the 4<sup>th</sup> paragraph of the item description, replace "C1.2.7.2" with "C1.2.7.3".*

*Add the following new sub pay item:*

Item	Description	Unit
<b>C1.2.8</b>	<b>Dayworks</b>	
C1.2.8.1	Personnel	

*Add the following:*

"(g) Flagman..... hour"

*In the first line of the payment paragraph replace "C1.2.8.1(f)" with "PC1.2.8.1(g)"*

*Add the following new pay items:*

Item	Unit
<b>C1.2.10</b>	<b>Dispute Adjudication Board (DAB)</b>
C1.2.10.1	Employer's contribution to DAB (50%) .....prime cost (PC) sum

The unit of measurement for item C1.2.10.1 is the prime cost sum. Payment of the prime cost sum shall be in terms of Fidic Clause 13.5 for 50% of the amounts invoiced from the appointed DAB. No sum for overhead charges and profit in terms of Fidic Clause 13.5(ii) is payable for this item.

Item	Unit
<b>C1.2.11</b>	<b>Media releases and public relations</b>

- (a) Media releases and public relations .....Prime Cost (PC Sum)
- (b) Handling costs and profits in respect of subitem C1.2.11(a) .....Percentage (%)

The Prime Cost sum is provided to cover costs related to public notices as instructed by the Engineer.

The tendered percentage for subitem (b) shall include full compensation for the handling costs and profit of the contractor in connection with subitem (a)."

## SECTION 1.3: CONTRACTOR'S SITE ESTABLISHMENT AND GENERAL OBLIGATIONS

### PART C: MEASUREMENT AND PAYMENT

Item	Unit
------	------

#### C1.3.1 The Contractor's general obligations

*Delete subitem C1.3.1.3 and replace with the following:*

"C1.3.1.3 Time related obligations:  
a) Mobilisation period ..... month  
b) Execution of the works ..... month"

*Add the following pay subitems:*

"C1.3.1.4 Suspension Cost  
a) De-establishment ..... Number  
b) Re-establishment ..... Number  
c) Suspension period ..... month  
d) Engineer's cost ..... prime cost sum (PC) sum

*Under the heading "Item C1.3.1.3", delete the 2<sup>nd</sup> paragraph and replace with the following:*

"The contract rate shall include full compensation for that part of the Contractor's general obligations which are mainly a function of construction time. The contract rate shall be deemed to include, leasing costs, hire costs or cost of ownership per month for Contractor's Equipment. The contract rate will be paid monthly, pro rata for parts of a month, from the Commencement Date in terms of the Contract Documentation until the end of the Mobilisation Period for item C1.3.1.3(a). For item C1.3.1.3(b) the contract rate will be paid monthly, pro rata for parts of a month, from the end of Mobilisation Period until the end of the original Contract Period specified for completion of the Works."

*Add the following new paragraphs:*

#### "Item C1.3.1.4

The rates tendered under subitem C1.3.1.4 shall represent full compensation for all Costs for Suspension of Work and all Costs during Suspension of Works period, and no other Costs (including other monthly costs) shall be payable.

Payment of subitems C1.3.1.4(a) and C1.3.1.4(b) shall be made for the number of de-establishments and re-establishments of all Personnel and Goods (Contractor's Equipment, Materials, Plant and Temporary Works) as instructed by the Engineer. Payment of subitems C1.3.1.4(a) and C1.3.1.4(b) shall not apply during the Mobilisation Period.

Payment of subitem C1.3.1.4(c) shall be made monthly, pro rata for parts of a month, from the date on which the Contractor has suspended progress of all of the Works in terms of Conditions of Contract clause 8.8 and commenced with de-establishment of the site, until permission or instruction to proceed in terms of Conditions of Contract clause 8.12 is given. Payment of subitem C1.3.1.4(c) shall not apply during the Mobilisation Period.

The Prime Sum in subitem C1.3.1.4(d) is provided to cover the cost of the Engineer during the period of suspension of the works. The amounts certified by the Employer shall be made to the Engineer, within 30 days of it being certified by the Employer."



## SECTION 1.4: FACILITIES FOR THE ENGINEER

### PART C: MEASUREMENT AND PAYMENT

Item	Unit
------	------

<b>C1.4.8</b>	<b>Site security measures for the Engineer's facilities:</b>
---------------	--

*Add the following new subitem:*

"C1.4.8.7	Extra Security Measures.....Provisional Sum (Prov Sum)
-----------	--

The provisional sum allowed under item C1.4.8.7 shall cover for the provision of extra security measures that may be ordered by the Engineer. The provisional sum shall be paid in accordance with the provisions of the Contract Documentation."

## SECTION 1.5: ACCOMMODATION OF TRAFFIC

### PART A: SPECIFICATIONS

#### A1.5.7 EXECUTION OF THE WORKS

##### A1.5.7.10 Construction of temporary deviations

###### a) General

*Delete the last paragraph and replace with the following:* "The proposed location, layout, temporary drainage, earthworks, pavement layers, surfacing and ancillary works details of all temporary deviations, including the signage and road marking required, shall be agreed with the Engineer before construction of any temporary deviation commences."

###### b) Drainage works for temporary deviations

*In the 2<sup>nd</sup> paragraph in the 1<sup>st</sup> sentence delete "specified" and replace with: "approved".*

### PART C: MEASUREMENT AND PAYMENT

Item	Unit
------	------

#### C1.5.4 Construction of temporary deviations

*In the last sentence of the item description, after the words "...include full compensation for the", add the following: "design and the".*

*Add the following pay subitems:*

Item	Unit
------	------

"C1.5.7.10 Moveable barriers (Plastic "New Jersey" type) .....	metre (m)
--	-----------

The unit of measurement for items C1.5.7.10 shall be the metre of each moveable barriers provided and shall include initial erection."

*Add the following new pay item*

#### "C1.5.13 Penalties

C1.5.13.1 Fixed penalty per occurrence.....	number
---	--------

C1.5.13.2 Time related penalty.....	number"
-------------------------------------	---------

In subitem C1.5.13.1 a fixed penalty of R20 000.00 per occurrence shall be deducted for each and every occurrence of non-compliance with any of the requirements of section 1.5 of the standard specifications and Section 1.5 of the project specifications.

In addition in subitem C1.5.13.2, a time-related penalty of R2 000.00 per hour over and above the fixed penalty in subitem C1.5.13.1 shall be deducted for non-compliance to rectify any defects in the accommodation of traffic within reasonable time after the engineer has given an instruction to this effect. The Engineer's instruction shall state the time in hours for re-instatement of the defects. Should the Contractor fail to adhere to the instruction, the time-related penalty will be applied from the time the instruction was given."

**SECTION 1.6: CLEARING AND GRUBBING**

**PART C: MEASUREMENT AND PAYMENT**

- (iii) **Items to be measured and paid for using items specified elsewhere in the specifications**

*In Table C1.6-1 for the Preparation of topsoil stockpile sites activity, delete reference to "Chapter 11" and replace with "Chapter 4".*

*Add the following new payment item:*

<b>"Item</b>	<b>Unit</b>
<b>C1.6.11      Trimming material (debris and vegetation) build up on verge of shoulder (state type) .....</b>	<b>square metre (m<sup>2</sup>)</b>

The unit of measurement shall be the square metre of shoulder area cleared of vegetation as directed by the Engineer.

The tendered rate shall include full compensation for all the work necessary for clearing the shoulder surface by skimming all vegetation/debris build up, loading, transporting (1.0 km free-haul) and disposing of the removed materials and all other incidentals to clear the shoulder and allow water to drain freely off the road surface."

## **COTO CHAPTER 2: SERVICES**

There are no amendments to this Chapter.

**COTO CHAPTER 3: DRAINAGE**

**SECTION 3.2: CULVERTS**

**PART C: MEASUREMENT AND PAYMENT**

Item	Description	Unit
------	-------------	------

**C3.2.2 Backfilling**

C3.2.2.3 Extra over sub-items C3.2.2.1 and C3.2.2.2 for soil cement backfilling

*In sub-item (a), delete "of 3% cement".*

*In sub-item (b), delete "of 3% cement".*

Item	Description	Unit
------	-------------	------

**C3.2.13 Removing and relaying existing culverts**

*In the 2<sup>nd</sup> paragraph of the item description, delete the wording:  
"transporting for a haul distance within 5,0 km without additional payment,"  
and replace with the following:  
"transporting over a distance of less than and up to 1,0 km,"*

*Replace item C3.2.12 with the following:*

Item	Unit
------	------

**"C3.2.12 Demolition and removal of existing drainage structures  
(specify type) ..... cubic metre (m<sup>3</sup>)"**

The unit of measurement shall be the cubic metre (m<sup>3</sup>) of material measured in situ before demolition or excavation.

The tendered rate shall include full compensation for breaking up the existing concrete or reinforced concrete, removal from site to an approved spoil site, clearing the excavation of all loose debris.

Loading and hauling, where applicable, including a haul of 1,0 km, shall be measured and paid under Section C1.7 of Chapter 1.

*Add the following new payment item:*

Item	Unit
------	------

**"C3.2.28 Treating surfaces with epoxy resin for joining new to old  
concrete ..... cubic metre (m<sup>3</sup>)"**

The unit of measurement shall be the litre of epoxy resin compound used at the specified rate of application.

The tendered rate shall include full compensation for providing and applying the epoxy-resin compound."

**SECTION 3.3: CONCRETE KERBING AND CHANNELING, ASPHALT BERMS, CHUTES, DOWNPIPES, CONCRETE, STONE PITCHED AND GABION LININGS FOR OPEN DRAINS/CULVERTS**

**PART C: MEASUREMENT AND PAYMENT**

*Add the following new pay items:*

<b>Item</b>	<b>Description</b>	<b>Unit</b>
<b>C3.3.19</b>	<b>Inlet, outlet, transition, and similar structures (typical designs):</b>	
C3.3.19.1	Inlet structures, for downpipes down fill side slopes complete as shown on the drawings, class C25/30-20 concrete, single from one side only (L = 2,3 m) .....	Number
C3.3.19.2	Outlet structures for downpipes down fill side slopes complete with prefabricated reinforced-concrete blocks, class C25/30-20 concrete, complete as shown on the drawings .....	Number
C3.3.19.3	Side drain and outlet structure to median, class C25/30-20 concrete, complete as shown on the drawings (specify type) .....	Number
C3.3.19.4	Transition for Type B Concrete Kerbing Reinforced and outlet structure (Class 30/20) as per Drawing TD-D-RD-1002-V1 .....	Number
C3.3.19.5	Transition for Type F Concrete Side Drain Reinforced (Class C25/30-20) as per Drawing TD-D-RD-1007-V1 and outlet structure as per Drawing TD-D-RD-1002-V1 .....	Number

The unit of measurement and payment shall be the number of completed units of each type of structure constructed, and payment shall include full compensation for all formwork, concrete, excavation, trimming and backfilling, including such accessories as grids, etc, as may be specified on the typical drawings."

**COTO CHAPTER 4: EARTHWORKS AND PAVEMENT LAYERS: MATERIALS**

**SECTION 4.1: BORROW MATERIALS**

**PART A: SPECIFICATIONS**

**A4.1.5 MATERIALS**

**A4.1.5.6 Requirements for types G7 to G9 materials for the pavement layers**

*In Table A4.1.5-3 in the MAXIMUM PARTICLE SIZE row in the G7 material column amend point (ii) to read as follows:*

“(ii) Crushed material: 75mm.”

**SECTION 4.4: COMMERCIAL MATERIALS**

**PART A: SPECIFICATIONS**

**A4.4.7 EXECUTION OF THE WORKS**

**A4.4.7.1 Selection (design) of the stabilising agent content**

**c) Cementitious stabilising agent for chemical stabilisation**

**Step 2: Determine the Initial Consumption of Stabiliser (ICS) of the material.**

*Add the following after the 1<sup>st</sup> paragraph:*

“The ICS shall be determined for more than one stabilizer agent and the stabilizer agent to be utilized in Step 3 shall be selected by the Engineer based on the ICS results.”



## COTO CHAPTER 5: EARTHWORKS AND PAVEMENT LAYERS: CONSTRUCTION

### SECTION 5.3: ROAD PAVEMENT LAYERS

#### PART A: SPECIFICATION

#### A5.3.8 WORKMANSHIP

##### A5.3.8.4 Construction tolerances for pavement layers

*Add the following as a new sub-clause:*

##### “f) Surface texture

The maximum volumetric texture depth (measured as described in SANS 3001-BT11) of the base, shall be as specified in Table A5.3.8-7, for the different seal types to be placed on the base.

**Table A5.3.8-7: Maximum texture of base**

Surfacing type	Max texture depth of the base
Single seal with 10 mm aggregate	0,8
Single seal with 10 mm aggregate (with cover spray)	1,0
Single seal with 14 mm aggregate	0,8
Single seal with 14 mm aggregate (with cover spray)	1,5
Single seal with 14 mm aggregate (with Bitumen rubber)	1,2
Double seal with 10 mm aggregate and sand	1,0
Double seal with 14 mm aggregate and sand	1,5
Cape Seal with 10 mm aggregate and one layer of slurry	1,5
Cape Seal with 14 mm aggregate and one layer of slurry	2,0
Cape Seal with 20 mm aggregate and two layers of slurry	2,5
Double seal with 14 mm aggregate and a layer of 7 mm aggregate	1,5
Double seal with 14 mm aggregate and a layer of 5 mm aggregate	1,5
Double seal with 20 mm aggregate and a layer of 10 mm aggregate	2,0
Double seal with 20 mm aggregate and a layer of 7 mm aggregate	2,0
Double seal with 20 mm aggregate and two layers of 7 mm aggregate	1,5
Other surfacing type (as indicated in the Contract Documentation)	As specified in the Contract Documentation”

##### A5.3.8.5 Surface regularity

*Add the following to the 1<sup>st</sup> paragraph:*

“The surface regularity shall be assessed on the final prepared layer after all excess fines have been swept off the surface.”

##### c) By using a profiler

*In the paragraph following Table A3.5.8--6, delete the following: " for payment items \*\*\* \_\_\_\_\_", and replace with the following: "for payment items as specified in the Contract Documentation".*

**PART C: MEASUREMENT AND PAYMENT**

<b>Item</b>	<b>Description</b>	<b>Unit</b>
<b>C5.3.12</b>	<b>Surface regularity payment adjustments ... Provisional Sum (Prov Sum)</b>	

*Replace the first sentence under the payment item with the following:*

“The unit of measurement shall be the cumulative monetary value of each 100 m section of the completed base layer as measured and paid under the items as specified in Part C3, Section B of the Contract Documentation, multiplied by the applicable payment adjustment factor obtained from Table A5.3.8-6.”

## **COTO CHAPTER 6: CONCRETE LAYERS**

There are no amendments to this Chapter.

## **COTO CHAPTER 7:     MAINTENANCE AND REPAIR OF CONCRETE LAYERS**

There are no amendments to this Chapter.

## COTO CHAPTER 8: PRETREATMENT AND REPAIR OF EXISTING LAYERS

### SECTION 8.1: PRIME COAT

#### PART A: SPECIFICATION

##### A8.1.5 MATERIALS

###### A8.1.5.1 Bituminous material

*In Table A8.1.5-1 Delete “the excavated area” in the table caption and heading.*

*Add the following subclause:*

###### “a) Conventional bitumen emulsion prime (quick drying)

Conventional bitumen emulsion prime shall be a non-flammable, low viscosity emulsion prime with reduced drying time complying with the following:

**Table A8.1.5-2: Conventional bitumen emulsion prime properties**

Emulsion Properties	Specification	Test method
Water content % m/m	40 - 46	ASTM D244
Saybolt Furol Viscosity @ 50°C SFs	10 - 35	ASTM D4402
Residue on sieving g/100 ml		
Particles > 710 µm	< 0.10	SANS 4001-BT4:2014
Particles > 150 µm	< 0.25	SANS 4001-BT4:2014
Particle charge	Positive	SANS 4001-BT4:2014

Conventional bitumen emulsion prime shall be applied at a minimum road surface temperature of 10°C and rising.“

##### A8.1.8 WORKMANSHIP

###### A8.1.8.2 Testing

*Replace the last sentence of the 1<sup>st</sup> paragraph with the following: “Unless agreed in advance and in writing, the Contractor shall only spray when the Engineer’s representative is present.”*

#### PART C: MEASUREMENT AND PAYMENT

*Add the following new payment subitem:*

Item	Description	Unit
C8.1.1	Prime coat:	
C8.1.1.6	Conventional bitumen emulsion prime (quick drying).....litre”	

##### A8.1.8 WORKMANSHIP

###### A8.1.8.2 Testing

*Replace the last sentence of the 1<sup>st</sup> paragraph with the following: “Unless agreed in advance and in writing, the Contractor shall only spray when the Engineer’s representative is present.”*

**COTO CHAPTER 9: ASPHALT LAYERS**

**SECTION 9.1: ASPHALT LAYERS**

**PART A: SPECIFICATION**

**A9.1.3 GENERAL**

**A9.1.3.4 Weather limitations**

*In the first paragraph of this clause which reads “Asphalt may be mixed and placed....”:*

*Replace “6°C” with “10°C and insert the word “air” before the word “temperature” in the first bullet point.*

*Replace “10°C” with “14°C” in the second bullet point.*

*Replace “10°C” with “14°C” in the third bullet point.*

*In the second paragraph of this clause which reads “With falling air temperature....” replace “6°C” with “10°C”.*

*Insert the following new paragraph under the second paragraph:*

“No bituminous material or asphalt shall be placed when the road temperature, immediately prior to commencing with the application of bituminous materials, is below, or in the opinion of the Engineer, is likely to fall below 15 °C.”

**A9.1.5 MATERIALS**

**A9.1.5.4 Aggregates**

**a) Aggregate properties**

*In the 1<sup>st</sup> paragraph, delete the 2<sup>nd</sup> sentence: “Coarse and fine aggregate shall be clean and free from decomposed materials, vegetable matter or any other deleterious substances, and shall meet the requirements listed in Table A9.1.5-1 below unless otherwise specifically stated in the Contract Documentation.”, and replace with the following:*

“Coarse and fine aggregate shall be clean from excess dust and free from decomposed materials, vegetable matter and any other deleterious substances such as clay lumps and organic matter and shall meet the requirements listed in Table A9.1.5-1 below unless otherwise specifically stated in the Contract Documentation.”.

**A9.1.8 WORKMANSHIP**

**A9.1.8.4 Surface regularity**

**a) Measured using inertial laser profilometers**

*In the 6<sup>th</sup> paragraph add the following prior to “The applicable Full Payment Bracket ...”:*

“For the Asphalt Base the values in Payment Bracket 6 in Table A9.1.8-3 shall be applied as the payment adjustment factors for the Asphalt Base on the contract or section, and for the Asphalt Surfacing”.

*In the 6<sup>th</sup> paragraph add the following after “...assessment of the base as per Clause A5.3.8.5c) of Chapter 5 for granular bases”:*

*“, and this clause A9.1.8.4a) for Asphalt bases.”*

*In the 7<sup>th</sup> paragraph, delete: “under 1”.*

*Add the following after the 8<sup>th</sup> paragraph:*

“Where the asphalt surfacing is placed on a surface, other than a granular or asphalt base, constructed by the Contractor through mill and replace or patching, the surface regularity of the replaced or patched surface shall be measured before the surfacing is placed. Should the IRI values per 100m section so determined be better than the IRI values of the original surfacing for the particular 100m section, the measured values shall be used for the  $IRI_{b Ave}$  in the above calculation. Should the IRI values per 100m section so determined be worse than the IRI values of the original surfacing for the particular 100m section, the IRI values of the original surfacing shall be used for the  $IRI_{b Ave}$  in the above calculation.”

*In the 9<sup>th</sup> paragraph, delete: “surfacing”.*

*For Table A9.1.8-3, delete “surfacing” in the heading and add the following additional Payment Bracket to Table A9.1.8-3*

<b>“Target <math>IRI_{100m Ave}</math> (m/km)”</b>	<b>Payment Bracket 9</b>
< 0.80	1.050
0.81 to 0.90	1.050
0.91 to 1.00	1.050
1.01 to 1.10	1.050
1.11 to 1.20	1.050
1.21 to 1.30	1.050
1.31 to 1.40	1.050
1.41 to 1.50	1.050
1.51 to 1.60	1.050
1.61 to 1.70	1.025
1.71 to 1.80	1.010
1.81 to 1.90	1.000
1.91 to 2.00	0,990
2.01 to 2.10	0,975
2.11 to 2.20	0,955
2.21 to 2.30	0,930
2.31 to 2.40	0,900
2.41 to 2.50	0.865
>2.51	Reject”

**PART C: MEASUREMENT AND PAYMENT**

<b>Item</b>	<b>Description</b>	<b>Unit</b>
<b>C9.1.9</b>	<b>Application of rolled-in chippings (State nominal size)</b>	

*Delete the 1<sup>st</sup> paragraph of the item description: "The unit of measurement shall be the ton of specified size of rolled-in chippings applied at the approved application rate, measured loose in hauling vehicles. The tendered rate shall include full compensation for the procuring, furnishing, pre-coating, spreading and rolling in of the chippings and for any additional costs resulting from the construction of the asphalt surfacing with rolled-in chippings.", and replace with the following:*

*"The unit of measurement shall be the square metre of specified size of rolled-in chippings applied at the approved application rate. The tendered rate shall include full compensation for the procuring, furnishing, pre-coating, spreading and rolling in of the chippings and for any additional costs resulting from the construction of the asphalt surfacing with rolled-in chippings."*

*Add the following new payment item:*

<b>Item</b>	<b>Description</b>	<b>Unit</b>
<b>C9.1.17</b>	<b>Surface regularity payment adjustments ..... Provisional Sum (Prov Sum)</b>	

The unit of measurement shall be the cumulative monetary value of each 100 m section of the completed asphalt layer as measured and paid under item C9.1.5, multiplied by the applicable payment adjustment factor obtained from Table A9.1.8-3."



## **COTO CHAPTER 10: SURFACE TREATMENTS**

### **SECTION 10.1: GENERAL REQUIREMENTS FOR SURFACE TREATMENTS**

#### **PART A: SPECIFICATION**

##### **A10.1.3 GENERAL**

###### **A10.1.3.2 Weather limitations**

*Delete the 1<sup>st</sup> sentence of the 2<sup>nd</sup> paragraph, and replace with the following:*  
“No seal work will be allowed in the Seal Embargo Period defined in the Contract Documentation, unless otherwise specified in the Contract Documentation.”.

###### **A10.1.3.14 Nominal rates of application for tender purposes**

*In the 1<sup>st</sup> sentence of the 2<sup>nd</sup> paragraph, after the wording: “...used in the various types of seals”, add the following: “,as specified in the Contract Documentation”.*

###### **e) Nominal binder application and aggregate spread rates for Cape seals (Slurry component)**

*In Table A10.1.3-7 in the last row of the 1<sup>st</sup> column, delete “1” and replace with “10”.*

###### **g) Cover sprays**

*Replace the 1<sup>st</sup> paragraph with the following: “The nominal application rate of a diluted emulsion cover spray (50/50) as specified, shall for tender purposes be 0,8 l/m<sup>2</sup> residual cold bitumen.”.*

##### **A10.1.5 MATERIALS**

###### **A10.1.5.7 Precoating fluid**

*Add the following new paragraph: “The precoating fluid shall be a low viscosity bitumen-based product containing petroleum cutters and a chemical adhesion agent. It shall comply with the specifications as provided in the SABITA Manual 30: Requirements for stone precoating fluids.”.*

##### **A10.1.6 CONSTRUCTION EQUIPMENT**

###### **A10.1.6.1 Binder distributor**

*In the last paragraph replace the 1<sup>st</sup> sentence with the following: “The transverse distribution of spray flares shall be field verified according to SANS 3001-BT25 and Clause A20.1.5.9 of Chapter 20 and by visual observations to ensure a uniform transverse distribution of binder.”.*

###### **A10.1.6.2 Chip spreaders**

*In the last paragraph delete the 2<sup>nd</sup> bullet and replace with the following:*  
“- of spreading Grade C aggregate, Graded aggregate and Sand- or Grit seals.”.

#### **PART C: MEASUREMENT AND PAYMENT**

<b>Item</b>	<b>Description</b>	<b>Unit</b>
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###### **C10.1.3 Multiple stone seals including a cover spray, if specified using:**

*Replace the 1<sup>st</sup> sentence of the 2<sup>nd</sup> paragraph of the item description, with the following:*  
“The nominal rates for multiple stone seals indicated in A10.1.3.14(b) and for cover sprays indicated in A10.1.3.14(g), shall apply.

###### **C10.1.4 Embargo period effects**

*In the 1<sup>st</sup> paragraph of the item description, delete reference to: “C10.1.6.1”, and replace with: “C10.1.4.1”.*

*In the 2<sup>nd</sup> paragraph of the item description, delete reference to: “C10.1.6.2”, and replace with: “C10.1.4.2”.*

**C10.1.11     Application of cover spray**

*In the 2<sup>nd</sup> paragraph of the item description, delete reference to: “A10.1.3.15”, and replace with: “A10.1.3.14”.*

**C10.1.12     Application of cover spray by hand**

*In the 2<sup>nd</sup> paragraph of the item description, delete reference to: “A10.1.3.15”, and replace with: “A10.1.3.14”.*

**COTO CHAPTER 11: ANCILLARY ROAD WORKS**

**SECTION 11.4: ROAD RESTRAINT SYSTEMS**

**PART A: SPECIFICATION**

**A11.4.1 SCOPE**

*Delete the last paragraph, and replace with the following:*

“Moveable vehicle restraint systems required for traffic accommodation during construction and truck mounted attenuators are also specified in Clauses A1.5.6.1, A1.5.6.3 and A1.5.7.11 of Chapter 1.”.

**PART C: MEASUREMENT AND PAYMENT**

*Add the following new sub payment*

Item	Unit
<b>C11.4.1 Erecting of guardrails at 3,81 m spacing</b>	
<b>C11.4.1.1 Complete galvanized system compliant to SANS 1350:</b>	
(e) Bridge balustrade (as per Drawing 113246-CT29 fixed to balustrade with through bolts).....	metre(m)

Item	Unit
<b>C11.4.2 Performance based vehicle restraint systems</b>	

*Where the Concrete barrier system is utilised as temporary restraint systems for Traffic Accommodation and scheduled under C1.5 in the Pricing Schedule, the unit of measure shall be metre.month.*

## SECTION 11.6: ROAD SIGNS

### PART A: SPECIFICATION

#### A11.6.7 EXECUTION OF THE WORKS

##### A11.6.7.5 Erecting road signs

##### b) Excavation and backfilling

*In the 1<sup>st</sup> sentence of the 2<sup>nd</sup> paragraph, before "Section A13.4 of Chapter 13", add the following:*

*"Section A13.2, Section A13.3 and".*

### PART C: MEASUREMENT AND PAYMENT

Item	Unit
------	------

**C11.6.1 Road signboards with painted or coloured semi-matt background. Symbols, lettering and borders in semi- matt black or in Class I retro-reflective material, where the sign board is constructed from:**

*Add the following new sub payment item under C11.6.1.9:*

(e) 450 mm x 2700 mm size (signboard material, background and symbol retro-reflective class indicated) .....number (No)

*Add the following new sub pay item:*

"C11.6.1.13 Moveable barricade/road sign combination (signboard material, background, symbol retro-reflective class and size indicated)..... number (No)

The unit of measurement for item C11.6.1.13 shall be the number of moveable barricades, complete with road signs provided.

The tendered rate for item C11.6.1.13 shall include full compensation for providing and erecting each moveable barricade and signs and shall also include full compensation for moving the barricade as and when required.

*Add the following new pay item:*

##### **C11.6.1.14 Diagrammatic signs, temporary:**

**C11.6.1.14.1 Road signs (state type and mounting) ..... square metre (m<sup>2</sup>)**

The unit of measurement shall be the square metre of sign face, measured on the face of each item provided.

The tendered rate for all the sub items shall include full compensation for the provision, maintenance, first erection on site as applicable, and final removal from site when no longer required. The rates tendered shall include full compensation for any posts, stands, supports, ballasting, excavation and backfilling required.

The tendered rates for the items shall also include full compensation for their maintenance and the replacement of items which have become unserviceable due to normal wear and tear. The replacement of items damaged by the public shall be payable at the tendered rates. 75 % of the tariff will be payable when the items have been provided and erected, and 25 % when finally removed from the site."

**SECTION 11.7: ROAD MARKINGS AND ROAD STUDS**

**PART A: SPECIFICATION**

**A11.7.5 MATERIALS**

**A11.7.5.2 Materials**

**a) Marking materials**

(iii) *Thermoplastic road marking material*

*In the 4<sup>th</sup> paragraph, delete “mcd/m<sup>2</sup>.lux” and replace with “mcd/m<sup>2</sup>/lux”.*

**PART C: MEASUREMENT AND PAYMENT**

**Item**

**Unit**

**C11.7.3 Thermoplastic road marking**

*Amend the retro-reflective luminance unit to be “mcd/m<sup>2</sup>/lux”.*

## **SECTION 11.8: LANDSCAPING AND PLANTING PLANTS**

### **PART A: SPECIFICATION**

#### **A11.8.7 EXECUTION OF THE WORKS**

*Add the following subclauses:*

##### **A11.8.7.8 CHEMICAL CONTROL OF VEGETATION AND ERADICATION OF UNDESIRABLE VEGETATION**

###### **(a) Execution of work**

The eradication of undesired vegetation (as described in C11.8.13) and control of vegetation growth shall be executed during the period when the vegetation to be killed, is growing strongly.

The Contractor's attention is drawn to the requirement that herbicides may only be applied by duly registered, competent Contractors in possession of an AVCASA certificate. Proof of such registration shall be furnished on demand to the Engineer.

The registered Contractor shall be at the site of application at all times during spraying and ensure that no damage is caused to other plants inside or adjacent to the treated areas as a consequence of the application of herbicides.

Application shall not be carried out in high winds or wet weather.

The following herbicides may not be used:

- Agents of an explosive, flammable, volatile or corrosive nature
- Sodium chlorate
- Volatile low hormone type herbicides
- Agents which are not registered in the Republic of South Africa

The Contractor shall state the brand names of the herbicides, on which the tendered rate is based, which shall be subject to the approval of the Engineer, prior to the application thereof.

The agent shall be guaranteed to kill at least 90% of the unwanted growth with one application and shall have a residual effect, which controls the growth of such vegetation effectively.

The herbicide should be strictly applied at the rate recommended by the manufacturer.

###### **(a) Control of vegetation growth**

Subject to written approval by the Engineer beforehand, spraying shall be executed in the following designated areas:

- (i) Shoulder weedspray shall involve the spraying of a 300 mm wide strip of herbicide, 100 mm of which will be on the surfaced shoulder and 200 mm on the gravel shoulder.
- (ii) Vegetation under guard-rails shall be controlled by spraying under the guard-rail to a minimum width of 500 mm;
- (iii) Openings, cracks and joints between the road pavement and concrete as well as between paving stones and concrete blocks;
- (iv) Up to a minimum distance around the poles at kilometre markers, road signs and guard-rail posts;

- (v) Between the road reserve fence and a neighbouring solid wall. Here the Contractor may use only contact herbicides which are absorbed by the leaves and which do not have a detrimental effect on the soil;
- (vi) On block paved areas adjacent to concrete median barriers or steel guard-rails. These areas may have slopes to 1:1 grades.
- (vii) On joints and cracks of concrete drainage channels.

The type of herbicide to be used, the correct spray rates, the method of application and when applied shall be as specified in the Project Specifications.

**(b) The Eradication of undesirable vegetation**

The eradication of declared and undesirable vegetation shall take place in the road reserve during the contract period over the whole length of the sections of road involved, and may include localised patches of noxious weeds, invader plants and other undesired vegetation.

Felled tree stumps must be treated with a herbicide immediately after cutting to prevent regrowth.

The Contractor shall ensure that no damage whatsoever is caused to any plants inside or adjacent to the areas treated as a consequence of the application of the herbicides, either during or after application. This also includes areas outside the road reserve.

The type of weedkiller to be used, the correct application rates and when applied shall be as specified and according to the manufacturer's instructions and approved by the Engineer.

**(b) Acceptance Criteria**

Eradication of undesired vegetation shall be carried out as specified and to the satisfaction of the Engineer. The herbicide shall be applied at the correct rate to prevent re-growth and the application confined to the undesired vegetation.

Areas shall be left neat and tidy and all vegetation cuttings removed unless otherwise instructed.

**(c) Equipment**

Vegetation shall be eradicated using knapsacks or portable weedspray machines.

It is important that the equipment be in good working condition. The equipment shall distribute the herbicide evenly without spilling. The nozzle shall be able to move close to the ground in order to prevent mist spray blowing away and killing plants which have to be maintained. The equipment shall also be safe for the workers as well as for the travelling public.

**A11.8.7.9 REMOVAL OF UNDESIRABLE VEGETATION: PHYSICAL ERADICATION**

**(a) Execution of work**

**(i) Removal of undesirable vegetation**

The Contractor shall remove all noxious weeds, invader plants and other undesirable vegetation in the first two months of the contract period. Additional clearing may be ordered by the Engineer should the need be determined.

All noxious weeds, invader plants and other undesirable vegetation shall be removed by uprooting and by cutting brush with suitable equipment such as brush cutters, chainsaws or bowsaws.

The sight distance of all signs must be kept clear of all noxious weeds, invader plants, trees and other undesirable vegetation.

For the purposes of this Clause, undesirable plant growth shall include, but not limited to all declared species as listed in category 1 and 2 of the Conservation of Agricultural Resources Act. This list will alter between provinces and note must be taken of this when determining the species to be eradicated. Undesirable plants will not only be those listed under category 1 and 2 but will also include those deemed to be invasive within any identified area or region.

Vegetation growing within 200 mm of the road pavement in the case of grassed shoulders shall also be considered as undesirable vegetation growth.

Specific areas requiring to be treated in this manner shall be specified or indicated on the drawings.

All branches and stems shall be cut into manageable sizes for loading and transporting purposes. The removed vegetation shall then be disposed of in a manner approved by the Engineer.

In areas where vegetation has grown out of control, the Contractor shall clear the vegetation by cutting and removal to the designated dumpsite.

The vegetation shall be cut to a height of 50 mm – 100 mm measured above the surrounding ground level, and removed from the site to a dump site approved by the Engineer. The cut faces shall be painted with approved herbicide to prevent re-growth.

(ii) Tree felling

Tree felling will be executed on those trees not included under C11.8.15 (a). Only those trees as indicated by the Engineer on site shall be cut and removed.

Care shall be taken not to damage overhead services, buildings, structures and fences during the tree felling operations. Guide ropes shall be fixed as high up the tree trunk as possible to ensure that, when strain is exerted on the ropes, the tree drops in the correct position.

A wedge approximately 500 mm above ground shall first be cut from the front face of the tree trunk in the direction of fall and while exerting strain on the guide ropes, a horizontal cut on the back face opposite the wedge shall be made.

The remaining stump shall be cut as low down to the ground as possible and herbicide painted on the cut face to prevent re-growth. The felled tree shall be cut in manageable sections for loading and transporting purposes.

**(b) Acceptance Criteria**

Eradication of undesirable vegetation shall be carried out as prescribed and to the satisfaction of the Engineer.

Areas shall be left neat and tidy and all vegetation cuttings removed unless other means of disposal are agreed with by the Engineer.”



#### A11.8.7.10 SEARCH AND RESCUE OF SPECIES OF SPECIAL CONCERN

A number of species of special concern (SSCs) have been identified as occurring in the contract road reserve. Prior to commencement of any work which requires the clearing, cutting or removal of any vegetation in the road reserve a search and rescue operation shall be carried out to identify and remove any SSCs. The work shall be carried out by a suitably experienced subcontractor approved by the Engineer. The search and rescue work shall be overseen by a suitably qualified and experienced individual approved by the Engineer. The Contractor shall allow sufficient time in his construction programme for the search and rescue subcontractor to be appointed and the work carried out.

The rescued plants shall be replanted by the search and rescue subcontractor in nearby reserves and/or areas of similar habitat as agreed by the Engineer.

Payment for the search and rescue operation shall be made through a prime-cost sum under item C11.8.18.

#### PART C: MEASUREMENT AND PAYMENT

Item	Unit
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*Add the following payitems:*

##### C11.8.13 Chemical control of vegetation and eradication of weeds

- (a) Road reserve with single carriageway  
(R342 km 27.00 to km 36.93).....number (no)

The unit of measurement shall be the number of times control of vegetation and eradication of weeds per section as specified is carried out and shall include full compensation for all labour, equipment and material required for control of vegetation and eradication of weeds as specified in the specifications or drawings.

The Contractor is to assess the number of different types of places where application of chemicals will be required and to make provision accordingly for the fluctuating chemical demand per section of road.

The tendered rate shall include full compensation for the supply of chemicals, equipment and labour for the spraying of the chemical liquids in accordance with the manufacturer's specifications.

The tendered rates shall be fully inclusive of any costs arising from restricted working conditions due to the nature of the site or traffic flow.

Payment will be made as follows:

- a) 60% will be payable when visible results are obtained.
- b) The remaining 40% will be payable when at least 90% of the treated vegetation has been controlled in the opinion of the Engineer.

Item	Unit
------	------

##### C11.8.14 Additional chemical control of vegetation and eradication of undesirable vegetation on instruction from the Engineer

- (a) Isolated Areas .....square metre (m<sup>2</sup>)
- (b) Dense areas (areas more than 20% infested)..... hectare (ha)

The unit of measurement for sub-item C11.8.14 (a) shall be the square metre of additional control of weeds and shall include full compensation for all labour, equipment and material required for control of vegetation and eradication of weeds.

The unit of measurement for sub-item C11.8.14 (b) shall be the hectare of additional control of vegetation and eradication of weeds. The areas will be measured by dense hectare (the percentage of infestation per hectare). For payment the rate per hectare will be that multiplied by the percentage infestation. The tendered rate shall also include full compensation for all labour, equipment and material required for control of vegetation and eradication of weeds.

The Contractor is to assess the number of different types of places where application of chemicals will be required and to make provision accordingly for the fluctuating chemical demand per section of road.

The tendered rate shall include full compensation for the supply of chemicals, equipment and labour for the spraying of the chemical liquids in accordance with the manufacturer's specifications.

The tendered rates shall be fully inclusive of any costs arising from restricted working conditions due to the nature of the site or traffic flow.

Payment will be made as follows:

- a) 60% will be payable when visible results are obtained.
- b) The remaining 40% will be payable when at least 90% of the treated vegetation has been controlled in the opinion of the Engineer.

Item	Unit
<b>C11.8.15</b>	<b>Eradication of undesirable vegetation, tree felling and cutting branches</b>

- (a) Initial eradication  
(R342 km 27.00 to km 36.93).....lump sum

The lump sum tendered for sub-item C11.8.15 (a) is for full compensation of the initial eradication of undesirable vegetation, tree felling and cutting branches as specified.

The tendered rates shall include full compensation for all labour and equipment necessary for the cutting of vegetation to a height of 50 mm – 100 mm measured above the surrounding ground level, cutting of trees and branches including cutting trunks and branches into manageable sizes and painting all cut faces with herbicide where necessary, loading, off-loading and spreading and hauling to an approved dump site.

Item	Unit
<b>C11.8.16</b>	<b>Additional tree felling on instruction from the Engineer</b>

- (a) Girth 151 mm to 500 mm .....Number (No.)
- (b) Girth 501 mm to 1 000 mm.....Number (No.)
- (c) Girth 1001 mm to 2 000 mm.....Number (No.)
- (d) Girth 2001 mm to 4 000 mm.....Number (No.)

The unit of measurement shall be the number of trees felled within the above girth ranges measured at 1.0 m above ground as ordered by the Engineer after the initial eradication covered by item C11.8.15 is complete.

The tendered rates shall include full compensation for providing all plant, equipment and labour required for cutting down trees, including cutting trunks and branches into manageable sizes for transporting purposes, and painting the cut faces with herbicide where required, and for loading the material.

Item	Unit
<b>C11.8.17 Additional eradication of undesired vegetation ordered by the Engineer .....</b>	hectare (ha)

The unit of measurement shall be the hectare of additional eradication of undesired vegetation. The areas will be measured by dense hectare (the percentage of infestation per hectare). For payment the rate per hectare will be multiplied by the percentage infestation. The tendered rate shall also include full compensation for all labour and equipment necessary for the cutting of vegetation to a height of 50 mm – 100 mm measured above the surrounding ground level, cutting of trees and branches including cutting trunks and branches into manageable sizes and painting all cut faces with herbicide where necessary, loading, off-loading and spreading and hauling to an approved dump site."

Item	Unit
<b>C11.8.18 Search and rescue operation for species of special concern</b>	
(a) Search and rescue operations .....	Prime Cost (PC Sum)
(b) Handling costs and profits in respect of subitem B58.17(a).....	Percentage (%)

The prime cost item shall be paid in accordance with the provisions of sub-clause 13.5 of the FIDIC Conditions of Contract. The tendered percentage is a percentage of the amount actually spent under the prime-cost item, which shall include full compensation for the profit in connection with providing the specified service.

The prime cost sum shall cover all the costs associated with the search and rescue operation including the identification, removal, replanting and, as may be required, maintenance of replanted vegetation of all species of special concern as well as the costs of the suitably qualified and experienced individual who shall oversee the work."

**COTO CHAPTER 12: GEOTECHNICAL APPLICATIONS**

**SECTION 12.5: SHOTCRETE**

**PART C: MEASUREMENT AND PAYMENT**

Item	Unit
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**C12.5.7 Geopipe collectors and weepholes:**

*Replace subitem item C12.5.7.1 with:*

"C12.5.7.1 75 mm diameter U-PVC weephole piping (specify length and class) .....	number (No.)"
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## **SECTION 12.11: GEOSYNTHETICS**

### **PART A: SPECIFICATION**

## **SECTION 12.11: GEOSYNTHETICS**

### **PART A: SPECIFICATION**

#### **A12.11.5 MATERIALS**

*Add the following Clauses:*

##### **"A12.11.5.4 Composition and manufacturing**

The geotextile shall be a synthetic polymer material manufactured in a continuous permeable homogeneous sheet (in rolls) by one of the following methods:

- woven
- non-woven, mechanically bonded (continuous fibre spunbonded, needle-punched)
- non-woven, chemically bonded
- combination of woven and non-woven.

The synthetic polymer shall be one or more of the following:

- polyester
- polypropylene
- polyethylene.

On account of the temperature and moisture susceptibility of polyamide, this synthetic product is not considered acceptable.

##### **A12.11.5.5 Classification**

Geotextiles shall be classified into the following main grades according to typical usage.

- |          |   |
|----------|---|
| Grade 1: | Very good installation conditions, e.g. subsurface drains with relatively smooth trench walls, small to medium size filter stone (10 mm to 20 mm) dumped from the edge of a shallow drain, and where careful handling of the geotextile is expected.  |
| Grade 2: | Normal installation conditions, not as good as Grade 1, e.g. larger subsurface drains with rough trench walls, large size filter stone (37,5 mm) dumped from a height onto the geotextile-lined drain, and where normal handling of geotextile is expected.   |
| Grade 3: | Adverse conditions, e.g. foundation drainage, gabions and gabion mattresses, light rock protection, rock fills and light separation of materials, separation and reinforcement of fill layers, light river protection works, and where rough handling of the geotextile is expected.                                    |
| Grade 4: | Adverse conditions where strength is more important than permeability, e.g. foundation drainage, gabions and gabion mattresses, rock protection, earth encapsulation, separation and reinforcement of fill and rockfill layers, heavier river protection works, and where rough handling of the geotextile is expected. |
| Grade 5: | As for Grade 4 but where additional strength is required, e.g. in heavy separation, earth and rock encapsulation, river protection works and shore revetment works.   |
| Grade 6: | As for Grade 5 but where maximum strength is required and where permeability will be relatively unimportant.  |

Grade 7: As for Grade 6 but where maximum strength is required, for example in reinforcement of earth fills and reinforcement for Mechanically Stabilized Earth (MSE) retaining walls.

The minimum requirements for each grade are listed below in Table A12.11.5-1. Under normal circumstances Grades 1, 2, 3, 4 and 5 will be specified while Grade 6 will be specified in special cases where maximum strength is required by special design considerations.

The various grades and the corresponding typical usage above shall be regarded as a guideline only. The actual grade of geotextile to be used on the work will be as stated in the Pricing Schedules as required by the Engineer.

#### A12.11.5.6 Properties

The various grades of geotextile as classified above shall comply with the general requirements as listed below in Table A12.11.5-1.

TABLE A12.11.5-1: GRADES OF GEOTEXTILES

PROPERTIES	LIMITING VALUES*							Test Method
	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	
Thickness	As specified by the manufacturer							
Mass per unit area (nominal) g/m <sup>2</sup>	100	140	200	240	300	500	750	SANS 9864
Tensile strength (minimum) kN/m	6	9	13	18	25	30	50	SANS 1525
Puncture resistance (minimum) kN (Static puncture (CBR) test)	1	1,5	2,5	3	4	5	7	SANS 12236
Penetration resistance (maximum) mm (Dynamic perforation (cone drop) test)	35	30	25	18	16	10	7	SANS 13433
Normal throughflow (minimum) litre/s/m <sup>2</sup> (Cross plane permeability test, normal to plane, without load, constant 50 mm head)	170	120	90	80	60	40	20	SANS 11058

Note:

\*The values given in the table shall apply to all geotextiles, irrespective of the type of material used.

#### A12.11.5.7 Testing

The tests to be carried out on geotextiles, as indicated in Table A12.11.5-1, relate to the material and the method of manufacture and are used mainly to ascertain that the correct grade of geotextile is supplied, and that the material is equivalent in quality to that selected and specified for use on the Works. The Contractor will be required, at the request of the Engineer, to submit a certificate by an approved laboratory to prove compliance with the specified qualities without additional cost to the Employer."

## **COTO CHAPTER 13: STRUCTURES**

There are no amendments to this Chapter.

## **COTO CHAPTER 14: REPAIR AND REHABILITATION OF STRUCTURES**

There are no amendments to this Chapter.



## **COTO CHAPTER 20: QUALITY ASSURANCE**

### **SECTION 20.1: TESTING MATERIALS AND JUDGEMENT OF WORKMANSHIP**

#### **PART A: SPECIFICATION**

##### **A20.1.2 DEFINITIONS**

###### **Independent site laboratory**

*In the definition of “Independent site laboratory”, add the following:*

“Independent Site laboratory in COTO is equivalent to the combined laboratory in the Employer documentation”

##### **A20.1.3 TESTING METHODS**

###### **A20.1.3.6 Classifying the tests for costing and payment purposes**

###### **b) Special test**

*Replace the first sentence of this subclause with the following:*

“Special tests that have to be conducted by the Contractor only at the specific request of the Engineer for acceptance control purposes include the following:”

*Add the following paragraph at the end of this subclause:*

“Special acceptance control tests shall include any tests that cannot be carried out by the Independent site laboratory as procured by the Employer for the Contract. The special acceptance control tests shall include, but not be limited to, the tests indicated in Clause A20.1.6. Special acceptance control tests that have to be conducted by the Contractor at the specific request of the Engineer shall be carried out in accordance with the test methods and at the approved laboratory or testing authority as agreed by the Engineer.”

##### **A20.1.4 PUBLISHED TEST METHODS**

###### **A20.1.4.8 Testing of asphalt**

*Add the following new paragraph:*

“Sabita Manual 39: Laboratory Testing Protocols for Binders and Asphalt, shall be implemented together with the asphalt tests listed.”

*Delete reference to: “Sabita Manual 35 for Design and Use of Asphalt in Road Pavements: Determining the Richness Modulus of EME asphalt mixes.”  
and replace with “Sabita Manual 33 for Design Procedure for High Modulus Asphalt (EME): Determining the Richness Modulus of EME asphalt mixes.”*

##### **A20.1.7 ACCEPTANCE CONTROL BY STATISTICAL JUDGEMENT PRINCIPLES**

###### **A20.1.7.2 Taking samples**

###### **a) Stratified random sampling**

*Add the following new paragraph:*

“Where the SARDS Laboratory module is used, the sampling locations must be as per the software. The Engineer may specify additional sampling locations.”

###### **b) Minimum samples per lot**

*Add the following new paragraph:*

“Where the SARDS Laboratory module is used, the number of samples per lot must be as per the software, as a minimum. The Engineer may specify additional numbers of samples. The Number of samples must be sufficient to meet the requirements of TMH5.”

**PART C: MEASUREMENT AND PAYMENT**

**C20.1.5 Financial contribution for an independent site laboratory**

*Delete reference to: “/commercial” .*

## **SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LIMITED**

CONTRACT SANRAL R.342-010-2024/1

FOR STRENGTHENING OF NATIONAL ROUTE R342 SECTION 1 FROM NGUNI RIVER LODGE  
(KM 14.50) TO PATERSON (KM 25.00)

### **SECTION B: SPECIFICATION DATA**

#### **Notes to tenderer:**

1. In certain clauses, the Standard Specifications allow a choice to be specified in the Contract Documentation or 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 Section B: Specification Data.
2. The number of each clause and each payment item in this part of the project specifications follows the numbering format of the COTO standard specifications. Where, however, a clause has been amended under Section A2, the clause number is prefixed with a "P" in this Section.

**COTO CHAPTER 1: GENERAL**

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
1			GENERAL	
	A1.1		GENERAL PREAMBLE	
		PA1.1.2	DEFINITIONS	
			Conditions of Contract	The Conditions of Contract for Construction for Building and Engineering Works designed by the Employer as published by the International Federation of Consulting Engineers First Edition 1999, shall apply.
			Site / Site of the Works	The limits of construction is provided in Part C4: Project Information in clause C4.1 and on the Key Plan drawing 113246-2-CT 1.
	C1.1		GENERAL PREAMBLE	
	A1.2		GENERAL REQUIREMENTS AND PROVISIONS	
		A1.2.3	GENERAL	
			A1.2.3.3 Environmental management	The requirements of the Environmental Officer is indicated in Section C.
			A1.2.3.4 Extension of time for delays caused by rainfall	
			c) Method 3 (Critical path method without consequential delays)	Method 3 (Critical path method without consequential delays) is specified. The value of "N" is 14 for the 12 month period to complete the works (contract time for completion excluding the Mobilisation Period). In calculations of payment for approved extensions of time granted for delays caused by rainfall, payment will be made utilising the applicable payment items for which the unit of measurement is "month" but excluding payment items with negative rates and non-applicable payment items such as pay item C1.3.1.4.
			A1.2.3.5 Handing-over of the Site of the Works	The conditions for handing-over of the Site of the Works are as follows: a) Sequence The entire Site of the Works is to be handed over to the Contractor as stated in the Form of Acceptance. b) Temporary deviations <b>Km 36.20 to km 36.93: Widening of the road prism and providing a pedestrian walkway:</b> The existing 7.2 m cross section of this section of the road will be upgraded and widened to provide a 9.2 m surfaced width. To safely accommodate traffic without affecting traffic on National Route 10, the upgrade of this portion will require the construction of a temporary bypass. Refer to C4.1.2.2 of Part C4.

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA												
				<p>c) Half or partial width sections Refer to A1.5.7.3.</p> <p>d) Contract kilometre distances All references in Volumes 3 and 4 and the pricing schedule to kilometre distances are based on a contract kilometre distance system which varies from SANRAL's current road kilometre system, see referencing table on layout drawings. The contract kilometre system will be used for construction purposes but the SANRAL kilometre system will be used for all as-built records.</p>												
			<b>A1.2.3.6 Health and Safety</b>	Upon award, as requirement of the work permit application, the Contractor will be required to provide a breakdown of the amounts under payment item C1.2.5 or other payment items allowed for his health and safety obligations as provided in Appendix 15 of Part C4.												
			<b>A1.2.3.9 Monthly reports</b>	Other information to be included in monthly progress reports are as follows: a) Information as required in terms of Conditions of Contract Clause 4.21												
			<b>A1.2.3.10 Notices, signs and advertisements</b>	Details of the contract sign board is provided in Drawing TD-R-RS-1300-V1.												
			<b>A1.2.3.12 Ownership of assets and disposal of non-usable assets</b>	<p>The Non-usable assets to be disposed by the Contractor is listed in the following disposal plan:</p> <p>Disposal plan</p> <table><tr><th>Asset description</th><th>Estimated quantity</th><th>Disposal requirement</th></tr><tr><td>Guardrails (excluding rails)</td><td>510 m</td><td>To be disposed of by Contractor</td></tr><tr><td>Road signs</td><td>40 No. signs on single post (W and R series) 40 m² of guidance signs</td><td>To be disposed of by Contractor</td></tr><tr><td>Bituminous surfacing</td><td>3810m³</td><td>To be re-used or disposed of by Contractor</td></tr></table>	Asset description	Estimated quantity	Disposal requirement	Guardrails (excluding rails)	510 m	To be disposed of by Contractor	Road signs	40 No. signs on single post (W and R series) 40 m² of guidance signs	To be disposed of by Contractor	Bituminous surfacing	3810m³	To be re-used or disposed of by Contractor
Asset description	Estimated quantity	Disposal requirement														
Guardrails (excluding rails)	510 m	To be disposed of by Contractor														
Road signs	40 No. signs on single post (W and R series) 40 m² of guidance signs	To be disposed of by Contractor														
Bituminous surfacing	3810m³	To be re-used or disposed of by Contractor														
			<b>A1.2.3.13 Prevention of damage to nearby properties and services</b>	No structures that could be affected by excessive ground vibrations have been identified.												
			<b>PA1.2.3.15 Routine maintenance</b>	<p>The Contractor shall be responsible for all the routine maintenance responsibilities</p> <p>The Contractor shall take over the specified maintenance responsibility on the date of Access to site.</p>												

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
				The backfilling for patching shall be done in accordance with the requirements of Chapter 8.
			<b>A1.2.3.18 Stakeholder liaison</b>	Additional requirements related to structured engagement with project Stakeholders and affected Communities, as well as guidance on the selection and the enhanced utilisation and development of Targeted Labour and Targeted Enterprises is provided in Section D1000.
			<b>A1.2.3.20 Road safety audits</b>	A Work zone traffic management audit shall be carried out.
			<b>A1.2.3.21 Water</b>	The Lower Sunday's River Water Use Association have indicated that they will allow the Contractor to draw water from the irrigation canal located at km 6.06 subject to the Contractor submitting an application to the Association and paying the relevant fees. Refer to Appendix 7 in Part C4.
			<b>A1.2.3.22 Wayleaves/Agreements and Permits</b>	The Contractor shall be responsible for applying for any wayleaves.
		<b>A1.2.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>PA1.2.7.1 Programme of work</b>	
			<b>a) General</b>	<p>A scheme 2 programme shall apply.</p> <p>The contract programme shall take in to account the following:</p> <p><b>Embargo periods:</b> Seal work using bitumen rubber or hot applied binder shall not be permitted from 1st June to 15th September.</p> <p><b>Traffic Accommodation</b> No construction activities where road width is limited or traffic lanes are reduced, such that stop-go traffic accommodation is required, shall be allowed during:</p> <ul style="list-style-type: none"> <li>• The Christmas shut-down (between December and January).</li> <li>• The Easter long weekend (inclusive of the Thursday before, and the Tuesday after Easter Friday).</li> </ul> <p><b>Other</b></p> <ol style="list-style-type: none"> <li>1. Search and rescue operation for the whole road reserve in order to remove all species of special concern to be done prior to the start of any bush clearing or grass cutting. Refer to clause A11.8.3.3.</li> </ol>

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
				2. Bush clearing, grass cutting, trimming material (debris and vegetation) and removal of build-up on verge of shoulder shall be completed within the first 4 months from commencement of the works, i.e. after the mobilisation period. (but after the search and rescue operation noted in 1).
			<b>b) Scheme 2</b>	The programme shall be drawn up or be compatible with Microsoft Projects. No additional schedules, other than required in terms of Conditions of Contract Clause 8.3 are required.
			<b>A1.2.7.4 Work on, over, under or adjacent to utilities</b>	Refer to Chapter 2.1 clause A2.1.3 regarding services adjacent to or affected by the works.
	<b>A1.3</b>		<b>CONTRACTOR'S SITE ESTABLISHMENT AND GENERAL OBLIGATIONS</b>	
		<b>A1.3.3</b>	<b>GENERAL</b>	
			<b>A1.3.3.1 Construction camps</b>	Areas for camp establishment etc are to be identified by the Contractor.
	<b>A1.4</b>		<b>FACILITIES FOR THE ENGINEER</b>	
		<b>A1.4.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A1.4.7.3 Services</b>	
			<b>b) Water, electricity and gas</b>	UPS / Voltage stabiliser/s are to be provided with minimum capacity of 1kVA. Payment shall be under pay item C1.4.3.28.  A back-up generator or generators shall be provided to ensure that, particularly during critical test periods, there is a continuous supply to the offices and laboratory to ensure the proper functioning of all equipment. Payment shall be under pay items C1.4.4.13.
			<b>A1.4.7.6 Site inspection transport</b>	The vehicle shall have an engine capacity of at least 2000 cm <sup>3</sup> with at least 8 seats and be equipped with air-conditioning.
	<b>A1.5</b>		<b>ACCOMMODATION OF TRAFFIC</b>	
		<b>A1.5.3</b>	<b>GENERAL</b>	
			<b>A1.5.3.2 General requirements</b>	Traffic will be accommodated in half widths for majority of the route (refer to accommodation of Traffic (AoT) layout drawings.
		<b>A1.5.6</b>	<b>CONSTRUCTION EQUIPMENT</b>	
			<b>A1.5.6.2 Illuminated traffic signs and safety devices</b>	
			<b>d) Sign mounted flashing lights</b>	Flashing lights shall be in accordance with the latest SARTSM specification.

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
		<b>A1.5.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A1.5.7.3 Accommodation of traffic where the road is constructed in half or partial widths</b>	<p>The Contractor shall ensure that half-width traffic accommodation complies with the following:</p> <ul style="list-style-type: none"> <li>• The Contractor shall submit a plan of work indicating closure lengths and work zones for approval by the Engineer.</li> <li>• During the Contractor's annual shutdown period between December and January, the Contractor shall maintain two-way traffic within the contract limits.</li> <li>• The minimum clear roadway width during half width construction is 4.0 m, with a minimum surfaced lane width of 3.0 m.</li> <li>• The location of traffic control devices shall be such that adequate sight stopping distances are attained. Steep grades sharp curves are to be avoided for their approach and location.</li> <li>• To discourage attempts to overtake in a single lane situation, the maximum lane width shall be 4.0 m and the positioning of delineators and barriers shall be adjusted to achieve this.</li> <li>• The maximum length of half width construction (lane closure) is 4 km, but the Contractor should assess the achievable production for a days work and may only close the length which is required in terms of the planned production.</li> <li>• The minimum gap between two consecutive half-width working areas is 3 km.</li> <li>• A maximum of two half-width day-night closures affecting traffic will be allowed at a specific time. In addition to this, a single daytime shoulder closure of 2 km long, at which two-way traffic can be safely accommodated, will be permitted.</li> <li>• Where delineators are used to channel the traffic, they shall, at the end of a day's work, be relocated to just beyond the edge of surfacing to provide the full road width to overnight traffic.</li> </ul>
			<b>A1.5.7.10 Construction of temporary deviations</b>	
			<b>d) Earthworks and pavement layers for temporary deviations</b>	<p>The process to construct the temporary deviation between km 36.20 and km 36.93 shall be as follows:</p>



CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
				<p>Rework the floor of the excavation (roadbed preparation) by ripping and recompacting to 93% (100% for sand) of MDD.</p> <p>Using material imported from commercial sources, construct a 200 mm stabilized C4 base (G5A) layer compacted to 97% of MDD.</p>
			<b>e) Surfacing of temporary deviations</b>	A 10 mm single seal and slurry (armour seal) surfacing will be constructed.
	<b>A1.7</b>		<b>LOADING AND HAULING</b>	
		<b>A1.7.7</b>	<b>EXECUTION OF THE WORKS</b>	The Contractor must provide the Engineer with the certified carrying capacity of each vehicle before any construction materials can be transported.

**COTO CHAPTER 2: SERVICES**

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA																								
2			SERVICES																									
	A2.1		GENERAL REQUIREMENTS AND TRENCHING FOR SERVICES																									
		A2.1.1	SCOPE																									
		A2.1.3	GENERAL																									
			A2.1.3.2 Location, identification, protection and relocation of existing services																									
			b) Location of existing services	<div>The table below lists all known services on the site. Those requiring removal, realignment or temporary replacement are indicated within the table with an asterisk.</div> <table><tr><th>Chainage</th><th>Position</th><th>Service type</th><th>Action</th></tr><tr><td>km 27.00 – 36.93 (full contract length)</td><td>LHS inside road reserve fence. Refer to plan and longitudinal section drawings</td><td>Telkom O/H</td><td>Protect</td></tr><tr><td>km 36.18 – 36.93</td><td>RHS inside road reserve fence. Refer to plan and longitudinal section drawings</td><td>Eskom O/H</td><td>Protect</td></tr><tr><td>km 36.44</td><td>LHS inside road reserve fence. Refer to plan and longitudinal section drawings</td><td>Sewer manhole</td><td>Protect</td></tr><tr><td>km 36.58</td><td>LHS inside road reserve fence. Refer to plan and longitudinal section drawings</td><td>Sewer manhole</td><td>Protect</td></tr><tr><td>km 36.58</td><td>RHS inside road reserve fence. Refer to plan and longitudinal section drawings</td><td>Sewer manhole</td><td>Protect</td></tr></table>	Chainage	Position	Service type	Action	km 27.00 – 36.93 (full contract length)	LHS inside road reserve fence. Refer to plan and longitudinal section drawings	Telkom O/H	Protect	km 36.18 – 36.93	RHS inside road reserve fence. Refer to plan and longitudinal section drawings	Eskom O/H	Protect	km 36.44	LHS inside road reserve fence. Refer to plan and longitudinal section drawings	Sewer manhole	Protect	km 36.58	LHS inside road reserve fence. Refer to plan and longitudinal section drawings	Sewer manhole	Protect	km 36.58	RHS inside road reserve fence. Refer to plan and longitudinal section drawings	Sewer manhole	Protect
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CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA																							
				<table><tr><td>km 36.60</td><td>RHS inside road reserve fence. Refer to plan and longitudinal section drawings</td><td>Fire hydrant</td><td>Protect</td></tr><tr><td>km 36.62</td><td>RHS inside road reserve fence. Refer to plan and longitudinal section drawings</td><td>Electric box</td><td>Protect</td></tr><tr><td>km 36.68</td><td>RHS inside road reserve fence. Refer to plan and longitudinal section drawings</td><td>Sewer manhole</td><td>Protect</td></tr><tr><td>km 36.74</td><td>RHS inside road reserve fence. Refer to plan and longitudinal section drawings</td><td>Sewer manhole</td><td>Protect</td></tr><tr><td>km 36.76</td><td>LHS inside road reserve fence. Refer to plan and longitudinal section drawings</td><td>Power meter box</td><td>Protect</td></tr></table>				km 36.60	RHS inside road reserve fence. Refer to plan and longitudinal section drawings	Fire hydrant	Protect	km 36.62	RHS inside road reserve fence. Refer to plan and longitudinal section drawings	Electric box	Protect	km 36.68	RHS inside road reserve fence. Refer to plan and longitudinal section drawings	Sewer manhole	Protect	km 36.74	RHS inside road reserve fence. Refer to plan and longitudinal section drawings	Sewer manhole	Protect	km 36.76	LHS inside road reserve fence. Refer to plan and longitudinal section drawings	Power meter box	Protect
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km 36.76	LHS inside road reserve fence. Refer to plan and longitudinal section drawings	Power meter box	Protect																								
			d) Protection of services																								
			(ii) Protection	Refer to clause A2.1.3.2.																							

**COTO CHAPTER 3: DRAINAGE**

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
3			<b>DRAINAGE</b>	
	<b>A3.1</b>		<b>DRAINS</b>	
		<b>A3.1.5</b>	<b>MATERIALS</b>	
			<b>A3.1.5.2 Subsoil Drainage Materials</b> <b>a) Pipes</b>	U-PVC pipes and fittings, normal duty, complete with couplings: <ul style="list-style-type: none"> <li>• 110mm internal dia, perforated</li> <li>• 110mm internal dia, unperforated</li> </ul>
		<b>A3.1.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A3.1.7.4 Subsoil drainage</b> <b>a) Construction of subsoil drainage systems</b>	
			<i>(ii) With polymer film lining to trenches for subsoil drainage systems</i>	Refer to DWG No. TD-D-SD-1001-V1, TD-D-SD-1002-V1 and TD-D-SD-1003-V1 for details.
			<b>A3.1.7.5 Manholes, outlet structures and cleaning eyes</b>	Refer to DWG No. TD-D-SD-1001-V1, TD-D-SD-1002-V1 and TD-D-SD-1003-V1 for details.
	<b>A3.3</b>		<b>CONCRETE KERBING AND CHANNELING, ASPHALT BERMS, CHUTES, DOWNPIPES, AS WELL AS CONCRETE, STONE PITCHED AND GABION LININGS FOR OPEN DRAINS</b>	
		<b>A3.3.5</b>	<b>MATERIALS</b>	
			<b>A3.3.5.2 Drainage structure materials</b>	
			<b>d) Joint sealant</b>	Refer to DWG No. TD-D-RD-1001-V1 for details.

**COTO CHAPTER 4: EARTHWORKS AND PAVEMENT LAYERS: MATERIALS**

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
<b>4</b>			<b>EARTHWORKS AND PAVEMENT LAYERS: MATERIALS</b>	
	<b>A4.3</b>		<b>EXISTING ROAD MATERIALS</b>	
		<b>A4.3.3</b>	<b>GENERAL</b>	
			<b>A4.3.3.1 Employer identified existing road materials</b>	The results of laboratory tests and trial pits for the existing road materials carried out during the design stage are included in Section C4.12 under Part C4 Site Information of the Contract Documentation.
		<b>A4.3.5</b>	<b>MATERIALS</b>	
			<b>A4.3.5.3 Bituminous Seal surfacings</b>	Milled existing bituminous surfacing (wearing course and BTB) material is to be re-used or spoiled.
		<b>A4.3.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A4.3.7.4 Milling</b>	Refer to clause A5.5.3.7.
			<b>A4.3.7.7 Excavation of crushed stone, macadam, cemented and gravel materials</b>	A part time excavation controller with 5 years suitable experience is required.

**COTO CHAPTER 5: EARTHWORKS AND PAVEMENT LAYERS: CONSTRUCTION**

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
5			<b>EARTHWORKS AND PAVEMENT LAYERS: CONSTRUCTION</b>	
	<b>A5.1</b>		<b>ROADBED</b>	
		<b>A5.1.3</b>	<b>GENERAL</b>	
			<b>A5.1.3.1 Roadbed material Investigation</b>	The results of laboratory tests and trial pits for the existing road materials carried out during the design stage are included in Section C4.12 under Part C4 Site Information of the Contract Documentation.
		<b>A5.1.5</b>	<b>MATERIALS</b>	
			<b>A5.1.5.2 Topsoil</b>	Topsoil shall only be obtained from within the road prism.
		<b>A5.1.7</b>	<b>EXECUTION OF WORKS</b>	
			<b>A5.1.7.1 Clearing and grubbing</b>	Material obtained from clearing and grubbing shall be stockpiled, or disposed of, at the sites as agreed by the Engineer.
			<b>A5.1.7.3 Normal roadbed treatment</b>	
			<b>a) Construction overview</b>	The method of compacting the roadbed and fill material as part of normal roadbed treatment shall be either compaction to 93% of MDD or roller-pass compaction as instructed by the Engineer in advance.
			<b>c) Percentage of Max Dry density (MDD)</b>	Roadbed material that is classified as being suitable for use in-situ shall be compacted to a minimum of 93% of MDD.
	<b>A5.3</b>		<b>ROAD PAVEMENT LAYERS</b>	
		<b>A5.3.3</b>	<b>GENERAL</b>	
			<b>A5.3.3.4 Compaction of pavement layer material</b>	The pavement layer thicknesses, levels, shapes and cross-sections shall be as indicated in Part C4 clause C4.1 and as shown on the drawings. The pavement layer densities shall be as indicated in clause C5.3.5.2.
			<b>A5.3.3.7 Joints between pavement layers</b>	
			<b>a) Location of joints</b>	The final position, dimensions and details of any joints required shall be as agreed by the Engineer.
		<b>A5.3.5</b>	<b>MATERIALS</b>	
			<b>A5.3.5.1 Material information</b>	The material properties for each pavement layer shall be as indicated in Part C4 clause C4.1 and as shown on the drawings.

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
			<b>A5.3.5.2 Pavement Layer thickness and compaction requirements</b>	
			<b>a) Pavement layer thickness requirements</b>	The pavement layer thicknesses shall be as indicated in Part C4 clause C4.1 and as shown on the drawings.
			<b>b) Gravel and soil pavement layer compaction requirements (G4B to G9 material)</b>	The pavement layer compaction densities shall be amended as follows for this Contract:  <b>DR1995 ACCESS AT km 34.39</b> Upper selected layer - 95% of MDD (if sand is used 100% of MDD shall apply). Gravel wearing course layer compacted to 95% of MDD.
			<b>c) Crushed stone pavement layer compaction requirements (G1 to G4A and G5A material)</b>	<b>For km 36.20 to 36.93:</b> Base layer - 88% of AD.  <b>For km 27 to 36.20</b> Subbase layer - 96 % of MDD for chemically stabilised layers. BSM1 layer compacted to 100% of MDD.  <b>For km 36.20 to 36.93</b> Subbase layer - 96 % of MDD for chemically stabilised layers.  <b>DR1995 ACCESS AT km 34.39</b> Subbase layer - 96 % of MDD for chemically stabilised layers.  <b>For FARM ACCESS BELLMOUTHS</b> Base layer - 96% of MDD.
		<b>A5.3.7</b>	<b>EXECUTION OF WORKS</b>	
			<b>d) With grader and specialised equipment</b>	To ensure thorough mixing in a transverse direction when using a recycler, cross-mixing of the material shall be required on this Contract unless otherwise agreed by the Engineer. This requirement shall be applicable to gravel or crushed stone materials.
		<b>A5.3.8</b>	<b>WORKMANSHIP</b>	
			<b>PA5.3.8.5 Surface regularity</b>	Surface regularity, or riding quality of the base layer, shall be assessed by using a profiler.
			<b>c) By using a profiler</b>	Adjustment to the payment for the base will be calculated by multiplying the full payment value for each 100m section, for payment items C5.3.2.1(y), by the

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
				payment adjustment factor derived from Table A5.3.8-6.
	<b>A5.4</b>		<b>STABILISATION</b>	
		<b>A5.4.5</b>	<b>MATERIALS</b>	
			<b>b) Cementitious pre-treatment of material before stabilization</b>	The stabilising agent for the C4 subbase layers will be class CEM II / B-L 32.5 N cement. The nominal stabiliser content is 2.5%.
			<b>A5.4.5.4: Bituminous stabilising agents</b>	For the BSM 1 layer, the nominal content is 2.5% emulsion and 1% cement.
		<b>A5.4.6</b>	<b>CONSTRUCTION EQUIPMENT</b>	Where water curing is specified, compiler must also specify whether side-spraying tankers travelling off the layer is to be used.
		<b>A5.4.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A5.4.7.3 Chemical pre-treatment and stabilization</b>	
			<b>b) Applying the cementitious agent by hand</b>	The spreading of the cementitious agent shall be done by hand on this Contract.
			<b>e) Applying and mixing in the cementitious agent using a recycler</b>	Mixing in the cementitious binder for the subbase layers shall be done by using a recycler on this Contract. The full width of the top of the subbase layers shall be mixed by the recycler.
			<b>A5.4.7.7: Protection and curing of chemically stabilised layers</b>	
			<b>b) Damp protective layer curing</b>	The damp protective layer curing method shall apply to this Contract.
	<b>A5.5</b>		<b>RECONSTRUCTION OF PAVEMENT LAYERS</b>	
		<b>A5.5.2</b>	<b>DEFINITIONS</b>	
			<b>Rehabilitation</b>	Refer to Section Part C4.1 of Part C4 – Site Information.
			<b>Uniform pavement sections</b>	The full length of the existing road shall be considered to be a single uniform section for pavement reconstruction purposes.
		<b>A5.5.3</b>	<b>GENERAL</b>	
			<b>A5.5.3.2 Material selection</b>	The utilisation of material from existing pavements shall be as indicated in Part C4 clause C4.1.
		<b>A5.5.4</b>	<b>DESIGN BY THE CONTRACTOR / PERFORMANCE BASED SYSTEMS</b>	
		<b>A5.5.5</b>	<b>MATERIALS</b>	
			<b>A5.5.5.1 Existing crushed stone pavement materials</b>	The utilisation of crushed stone pavement materials from existing



CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
				<p>pavements shall be as indicated in Part C4 clause C4.1.</p> <p>The subbase layer shall be compacted to a minimum of 96% of MDD.</p>
			<b>A5.5.5.5 Materials shortfall and make-up material</b>	The details of the materials to make up for any shortfalls are indicated in Part C4 clause C4.1.
		<b>A.5.5.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A5.5.7.4 In situ pavement layer reconstruction preparation</b>	
			<b>c) Pre-milling the seal or asphalt surfacing</b>	All the existing bituminous seal surfacing material (wearing course (30mm thick and BTB: 40-250 mm thick) is to be milled off and re-used or spoiled.
			<b>e) Pre-pulverising existing pavement layer material</b>	No pre-pulverisation of existing pavement layer material is required.
	<b>C5.5</b>		<b>RECONSTRUCTION OF PAVEMENT LAYERS PART C: MEASUREMENT AND PAYMENT</b>	
		<b>C5.5.5</b>	<b>Construction of a trial section using a recycler</b>	The trial section shall be carried out across the full width and depth of the subbase layer as indicated in Part C4 clause C4.1.
		<b>C5.5.20</b>	<b>Material shortfall or make-up material</b>	The quantity of make-up material required on the instruction of the Engineer will be determined by way of cross-sections unless the Engineer agrees that the quantity shall be taken as 70 % of the loose volume measured in the haulage trucks.

**COTO CHAPTER 8: PRETREATMENT AND REPAIR OF EXISTING LAYERS**

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA						
8			PRETREATMENT AND REPAIR OF EXISTING LAYERS							
	A8.1		PRIME COAT							
		A8.1.3	GENERAL							
			A8.1.3.1 Weather limitations	The limiting moisture contents for treated layers before priming shall be less than 50% of the optimum moisture content determined according to SANS 3001 No GR30 in the upper 50mm of the layer.						
		A8.1.5	MATERIALS							
			PA8.1.5.1 Bituminous material	The priming material shall be one of the following as specified in Part C: Measurement and Payment: C8.1.1.6 Conventional bitumen emulsion prime (quick drying).						
	A8.8		PATCHING AND EDGE BREAK REPAIR							
		A8.8.5	MATERIALS							
			A8.8.5.3 Backfill material							
			Table A8.8.5-2: Backfill material	<table><tr><th>Backfill material</th><th>Specification</th></tr><tr><td>G5A (topping up of BTB Patches)</td><td rowspan="3">In accordance with the relevant Standard Specifications.</td></tr><tr><td>Base patching using crushed stone material stabilised with bitumen emulsion and cement.</td></tr><tr><td>Base and/or surface patching using cold premixed asphalt.</td></tr></table>	Backfill material	Specification	G5A (topping up of BTB Patches)	In accordance with the relevant Standard Specifications.	Base patching using crushed stone material stabilised with bitumen emulsion and cement.	Base and/or surface patching using cold premixed asphalt.
Backfill material	Specification									
G5A (topping up of BTB Patches)	In accordance with the relevant Standard Specifications.									
Base patching using crushed stone material stabilised with bitumen emulsion and cement.										
Base and/or surface patching using cold premixed asphalt.										

**COTO CHAPTER 9: ASPHALT LAYERS**

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
9			<b>ASPHALT LAYERS</b>	
	<b>A9.1</b>		<b>ASPHALT LAYERS</b>	
		<b>A9.1.2</b>	<b>DEFINITIONS</b>	
			<b>Asphalt mix types</b>	Wearing course: Sand skeletal mix - continuously graded, as defined (NMPS 14mm, grading class 2 with a A-E2 modified binder, Level IB mix design applicable, traffic level ES3, paver laid. Nominal layer thickness 45mm.
			<b>Aggregate</b>	Aggregate shall be class 1, except for the crusher dust which may be class 2.
		<b>A9.1.3</b>	<b>GENERAL</b>	
			<b>A9.1.3.4 Weather limitations</b>	<p>The following wind and temperature conditions shall be applicable to paving on this Contract:</p> <p>The following wind and minimum air temperature conditions shall be applicable:</p> <ul style="list-style-type: none"> <li>• 10°C and rising for layers paved &gt; 30 mm thick with an allowable wind velocity of less than 25 km/h.</li> <li>• 14 °C and rising for layers paved &gt; 30 mm thick with an allowable wind velocity of less than 55 km/h.</li> <li>• 14 °C and rising for layers paved =&lt; 30 mm thick with an allowable wind velocity of less than 25 km/h.</li> </ul> <p>With falling air temperature, paving shall cease when the air temperature reaches 10 °C regardless of the wind velocity and may not be restarted before the temperature is definitely rising.</p> <p>No bituminous material or asphalt shall be placed when the road temperature, immediately prior to commencing with the application of bituminous materials, is below, or in the opinion of the Engineer, is likely to fall below 15 °C.</p>
		<b>A9.1.4</b>	<b>DESIGN BY THE CONTRACTOR</b>	
			<b>A9.1.4.1 Mix Designs</b>	Refer to A9.1.2: Asphalt mix types.
			<b>A9.1.4.2 Mix design requirements</b>	Refer to A9.1.2: Asphalt mix types.
		<b>A9.1.5</b>	<b>MATERIALS</b>	
			<b>A9.1.5.2 Bituminous binders for asphalt mixes</b>	Wearing course: Class A-E2 modified binder.
			<b>A9.1.5.3 Bitumen bond coat</b>	Stable-grade 30 % emulsion shall be used.
			<b>PA9.1.5.4 Aggregates</b>	
			<b>a) Aggregate Properties</b>	<p><b>Rapid degradation of aggregate</b></p> <p>The Ethylene Glycol Durability Index for the coarse aggregate, tested according to SANS 3001-AG14 shall be &lt; 3.</p>

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
			<b>A9.1.5.5 Fillers</b>	For tender purposes the active filler shall be hydrated lime.
			<b>A9.1.5.8 Mix properties</b>	Refer to A9.1.2: Asphalt mix types.
		<b>A9.1.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A9.1.7.5 Bond coat</b>	Before any paving commences, the bond coat shall have fully broken (cured) to the satisfaction of the Engineer.
		<b>A9.1.8</b>	<b>WORKMANSHIP</b>	
			<b>A9.1.8.8 Sampling</b>	
			<b>b) Coring of completed layers</b>	The Contractor shall provide suitable coring machines capable of cutting 100mm or 150mm diameter cores from the completed asphalt layers.

**COTO CHAPTER 10: SURFACE TREATMENTS**

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
10			<b>SURFACE TREATMENTS</b>	
	A10.1		<b>GENERAL REQUIREMENTS FOR SURFACE TREATMENTS</b>	
		A10.1.3	<b>GENERAL</b>	
			<b>PA10.1.3.2 Weather limitations</b>	Seal work using bitumen rubber or hot applied binder shall not be permitted from 1st June to 15th September.
			<b>A10.1.3.14 Nominal rates of application for tender purposes</b>	<p>The following Seal types are to be utilised:</p> <p>(i) Temporary Bypass (km 36.20 to 36.93) 10 mm single seal and slurry (armour seal) surfacing.</p> <p>(ii) Final Seal: km 27 to km 36.20 20/7mm double seal using a bitumen-rubber (S-R2) tack coat and a S-E1 binder penetration coat. The seal will be completed with an application of a 65% cationic spray-grade emulsion (diluted with 40% water) cover spray as the final binder application.</p>
		A10.1.5	<b>MATERIALS</b>	
			<b>A10.1.5.10 Single sized aggregate</b>	
			<b>a) Grading</b>	The Aggregate Grade is indicated in the Pricing Schedule

**COTO CHAPTER 11: ANCILLARY ROAD WORKS**

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
11			<b>ANCILLARY ROAD WORKS</b>	
	A11.1		<b>PITCHING, STONework, CAST IN SITU CONCRETE FOR PROTECTION AGAINST EROSION</b>	
		A11.1.5	<b>MATERIALS</b>	
			<b>A11.1.5.6 Geotextiles</b>	Grade 3 Geotextile shall be used.
	A11.4		<b>ROAD RESTRAINT SYSTEMS</b>	
		PA11.4.1	<b>SCOPE</b>	Prior to assembly the gabion material shall be opened out flat on the ground and stretched to remove all kinks and bends. The gabion boxes shall then be assembled individually by raising the sides, ends and diaphragms, ensuring that all creases are in the correct position and that the tops of all four (4) sides are even. The four (4) corners of the gabion boxes shall be laced first, followed by the edges of the internal diaphragms to the sides. Lacing shall commence at the top of the box by twisting the end of the lacing wire around the selvedge. It shall then be passed round the two (2) edges being joined, through each mesh in turn and securely tied off at the bottom. The ends of all lacing wire shall be turned to the inside of the box on completion of each lacing operation.
		A11.4.5	<b>MATERIALS</b>	
			<b>A11.4.5.2 Materials</b>	
			<b>c) Guardrail posts</b>	Timber posts and spacer blocks shall be treated in accordance with SANS 10005 with creosote that complies with SANS 616.
	A11.5		<b>FENCING</b>	
		A11.5.5	<b>MATERIALS</b>	
			<b>A11.5.5.2 Straining posts, stays, standards and droppers</b>	Timber posts, stays, standards and droppers shall be treated in accordance with SANS 10005 with creosote that complies with SANS 616.
	A11.6		<b>ROAD SIGNS</b>	
		A11.6.7	<b>EXECUTION OF THE WORKS</b>	
			<b>PA11.6.7.5 Erecting road signs</b>	
			<b>a) Position</b>	The positions of the road signs are indicated on the drawings in Volume 4.
	A11.7		<b>ROAD MARKINGS AND ROAD STUDS</b>	
		A11.7.5	<b>MATERIALS</b>	
			<b>PA11.7.5.2 Materials</b>	

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA														
			a) Marking materials															
			(ii) Retro-reflective road marking	Road marking paint shall be Type 1 as per SANS 731-1 for solvent borne paint.														
			(iii) Thermoplastic road marking material	All road markings shall be reapplied with thermoplastic road marking material before end of the defects notification period.														
			b) Road studs	Permanent road studs compliant with SANS 1463 (Class RSA-2), bi-directional as per item C11.7.7.2 shall be used.														
	A11.8		LANDSCAPING AND PLANTING PLANTS															
		A11.8.5	MATERIALS															
			A11.8.5.2 Materials															
			b) Fertiliser/soil-improvement material	<div>The type of fertilisers shall be as follows:</div> <table><thead><tr><th>Type</th><th>Application rate</th></tr></thead><tbody><tr><td>2:3:2(30)</td><td>300 kg/ha</td></tr><tr><td>Super phosphate</td><td>400 kg/ha</td></tr><tr><td>Limestone ammonium nitrate</td><td>150 kg/ha</td></tr><tr><td>3:2:1</td><td>200 kg/ha</td></tr><tr><td>Agricultural lime</td><td>300 kg/ha</td></tr><tr><td><b>Total</b></td><td>1400 kg/ha</td></tr></tbody></table>	Type	Application rate	2:3:2(30)	300 kg/ha	Super phosphate	400 kg/ha	Limestone ammonium nitrate	150 kg/ha	3:2:1	200 kg/ha	Agricultural lime	300 kg/ha	<b>Total</b>	1400 kg/ha
Type	Application rate																	
2:3:2(30)	300 kg/ha																	
Super phosphate	400 kg/ha																	
Limestone ammonium nitrate	150 kg/ha																	
3:2:1	200 kg/ha																	
Agricultural lime	300 kg/ha																	
<b>Total</b>	1400 kg/ha																	
			d) Grass seeds	<div>The grass seed mixture shall be as follows:</div> <table><tbody><tr><td>(1) Cynodon dactylon</td><td>20 kg/ha</td></tr><tr><td>(2) Eragrostis Curvula</td><td>5 kg/ha</td></tr><tr><td>(3) Lolium Multiflorum</td><td>25 kg/ha</td></tr><tr><td>(4) Eragrostid Teff</td><td>10 kg/ha</td></tr><tr><td><b>Total</b></td><td>60 kg/ha”</td></tr></tbody></table>	(1) Cynodon dactylon	20 kg/ha	(2) Eragrostis Curvula	5 kg/ha	(3) Lolium Multiflorum	25 kg/ha	(4) Eragrostid Teff	10 kg/ha	<b>Total</b>	60 kg/ha”				
(1) Cynodon dactylon	20 kg/ha																	
(2) Eragrostis Curvula	5 kg/ha																	
(3) Lolium Multiflorum	25 kg/ha																	
(4) Eragrostid Teff	10 kg/ha																	
<b>Total</b>	60 kg/ha”																	
		A11.8.7	EXECUTION OF THE WORKS															
			A11.8.7.8	A search and rescue operation for the whole road reserve in order to remove all species of special concern to be done prior to the start of any bush clearing or grass cutting.														

**COTO CHAPTER 12: GEOTECHNICAL APPLICATIONS**

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
	A12.11		GEOSYNTHETICS	
		A12.11.5	MATERIALS	
			A12.11.5.1 General	
			A12.11.3.1 Use of geosynthetics	The geotextiles used for subsoil drains on this Contract shall be Grade 2 and shall satisfy the criteria for this grade of geotextile as given in Table A12.11.5-1.



**COTO CHAPTER 13: STRUCTURES**

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
<b>13</b>			<b>STRUCTURES</b>	
	<b>A13.7</b>		<b>JOINTS</b>	
		<b>A13.7.3</b>	<b>GENERAL</b>	
			<b>A13.7.3.1 Method Statements</b>	<p>The Contractor shall supply the Engineer with method statements for each facet of the work at least 21 days before the intended start of construction.</p> <p>No part of the permanent works shall commence without the Engineer's approval.</p>
			<b>A13.7.3.2 Hold points and approvals</b>	No part of the permanent works shall commence without the Engineer's approval.
		<b>A13.7.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A13.7.7.1 Filled and unfilled joints</b>	
			<b>d) Concrete nosings forming the edges of expansion joints shall be constructed as follows</b>	<p>Breaking out of existing joint systems to be deep enough to accommodate the new joint system.</p> <p>Concrete nosing repairs with suitable quick-set cement grout and grouted reinforcement bars as approved by the Engineer.</p> <p>Temporary closing of joint recess permitted for traffic after curing of cement grout for nosing repairs.</p>
			<b>A13.7.7.2 Asphaltic plug proprietary type expansion joint systems</b>	Replace joints with Agrément South Africa certified 300 x 50mm asphaltic plug type joints as indicated on the drawings. Ensure proper joint termination in balustrades with non-metallic cover plates at balustrades.
	<b>D13.7</b>		<b>JOINTS</b>	
		<b>D13.7.3</b>	<b>PERFORMANCE GUARANTEE REQUIREMENTS</b>	
			<b>D13.7.3.2 Performance specifications</b>	Comply to Agrément requirements with identification plate installed at parapet with 15 year warranty and provide Performance Specifications details.
	<b>A13.8</b>		<b>ANCILLARY STRUCTURAL ELEMENTS</b>	
		<b>A13.8.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A13.8.7.1 Barriers, parapets, railings and sidewalks</b>	
			<b>d) Numbers for structures</b>	

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
			<i>(i) Number plates</i>	Install structure numbers as per SANRAL Typical details (TD-S-N-001 to 006) on concrete pedestal: B9469 at KM 32.89 C4407 at KM 31.86

**COTO CHAPTER 14: REPAIR AND REHABILITATION OF STRUCTURES**

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
14			<b>REPAIR AND REHABILITATION OF STRUCTURES</b>	
	<b>A14.1</b>		<b>ACCESS FOR BRIDGE REHABILITATION</b>	
		<b>A14.1.3</b>	<b>GENERAL</b>	<p>Suitable traffic accommodation as per details on drawings to be in place for work on parapets and joints.</p> <p>No work on Bridge No. B9469 at km 32.89 on R342 requires any rail occupation / authorisation by the rail authority. All work will therefore be done within the road reserve.</p>
	<b>A14.3</b>		<b>DEMOLITION AND REMOVAL OF STRUCTURAL CONCRETE AND STEELWORK</b>	
		<b>A14.3.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A14.3.7.1 Sequence of execution</b>	All damaged concrete for removal to be indicated/identify by the Engineer.
			<b>A14.3.7.4 Removal of concrete from structural elements</b>	
			<b>a) Cutting back concrete to a new finished surface</b>	Saw cutting on perimeter of concrete to remove, preventing feathered edges.
			<b>b) Cutting back concrete to expose reinforcement</b>	All exposed reinforcement to protect with anti-corrosion paint.
	<b>A14.4</b>		<b>SURFACE AND STRUCTURAL REPAIR OF CONCRETE MEMBERS</b>	
		<b>A14.4.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A14.4.7.3 Batching and Mixing</b>	
			<b>d) Proprietary cementitious repair compounds</b>	Mixing as per manufacturers requirements.
	<b>A14.5</b>		<b>ANCHORING OF REINFORCEMENT, GROUTING AND CRACK INJECTION</b>	
		<b>A14.5.5</b>	<b>MATERIALS</b>	
			<b>A14.5.5.1 Anchoring adhesive</b>	Anchoring adhesive to be suitable for cracked concrete.
	<b>A14.7</b>		<b>PROTECTIVE COATINGS AND TREATMENTS FOR CONCRETE</b>	
		<b>A14.7.7</b>	<b>EXECUTION OF THE WORKS</b>	

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
			<b>A14.7.7.4 Protective surface treatment</b>	Refer to Drawing 113246-CT 29.
	<b>A14.9</b>		<b>REPAIR AND REPLACEMENT OF ANCILLARY STRUCTURAL ELEMENTS</b>	
		<b>A14.9.3</b>	<b>GENERAL</b>	Accommodation of traffic during any repair work on the joints to be according to the details on the drawings.
		<b>A14.9.7</b>	<b>EXECUTION OF THE WORKS</b>	
			<b>A14.9.7.3 Repair of expansion joints</b>	Replacement of joint neoprene sealing strip to be compatible with existing joint system.

**COTO CHAPTER 20: QUALITY ASSURANCE**

CH	SEC	CL	SUB-CLAUSE	SPECIFICATION DATA
20			QUALITY ASSURANCE	
	A20.1		TESTING MATERIALS AND JUDGEMENT OF WORKMANSHIP	
		A20.1.3	TESTING METHODS	
			A20.1.3.3 The Costs of Testing	
			a) Material and workmanship for quality control	Testing will be undertaken by an independent site laboratory as indicated under A20.1.3.3 a)(i)3.
			A20.1.7.5 Assessment Methods	
			d) Application of Judgement Plan B	
			(vii) Asphalt base or surfacing: Specification limits for –	
			1. Relative compaction	<p>The following shall apply to the compaction of the wearing course asphalt on this Contract:</p> <p>The compaction shall be measured using the maximum voidless density as determined by SANS 3001-AS11 (maximum voidless density (MVD) or Rice's density).</p> <p>The lower (Ls) and upper (L's) specification limits shall be as follows:</p> <p>Ls = 93.5% of maximum voidless density (MVD)  L's = 96 % of maximum voidless density (MVD)</p>

## **SANRAL STANDARD SPECIFICATION SECTIONS**

SECTION	CL	SUB-CLAUSE	SPECIFICATION DATA
SECTION C		ENVIRONMENTAL MANAGEMENT PLAN	
	C1004	ADMINISTRATION OF ENVIRONMENTAL OBLIGATIONS	
		(d) The Designated / Dedicated Environmental Officer (DEO)	DEO means: Designated Environmental Officer.
SECTION D		STAKEHOLDER AND COMMUNITY LIAISON AND TARGETED LABOUR AND TARGETED ENTERPRISES UTILISATION AND DEVELOPMENT	
	D1002	DEFINITIONS AND APPLICABLE LEGISLATION	
		D1002.01 Definitions	
		(r) Target Area(s)	For Targeted Labour: Sundays River Valley Local Municipality.
		(w) Targeted Labour	Target Group for Targeted Labour: a. black designated groups (As per latest PPPFA Regulations); b. black people; c. women; d. people with disabilities
	D1003	TARGET GROUP PARTICIPATION	
		D1003.04 Contract Participation Goal (CPG)	
		CPG for Targeted Labour:	Minimum of 8% of the Final Contract Value by the end of the contract to Targeted Labour Targeted Labour appointed for the Community Development work shall not contribute towards the CPG for Targeted Labour. The Final Contract Value is defined in clause D1003.04
		Targeted Labour minimum contributions by the following Target Groups:	
		a. black designated groups; (i) Black people who are youth	30% of targeted labour value
		(ii) Black people who are persons with disabilities	0.3% of targeted labour value
		b. Black women;	30% of targeted labour value

		<b>CPG for Targeted Enterprise</b>	Minimum percentage of the greater of either 40% or the C1.1.1 Form of Offer stated percentage, of the Final Contract Value by the end of the contract to Targeted Enterprises.  The Final Contract Value for purposes of this clause, is defined in clause D1003.04.
		Targeted Enterprise minimum contribution by the following Target Groups:	
		i) Targeted Enterprise with ≥51% ownership by Youth	Minimum of 5% of the Final Contract Value
		ii) Targeted Enterprise with ≥51% ownership by Women	Minimum of 5% of the Final Contract Value
		iii) Targeted Enterprise with ≥51% ownership by Military veterans	Minimum of 1% of the Final Contract Value
		iv) Targeted Enterprise with ≥51% ownership by Disabled persons (Differently abled)	Minimum of 0.5% of the Final Contract Value
		v) Targeted Enterprise with CIDB 1 or 2 grading	Minimum of 2% of the Final Contract Value
		vi) Targeted Enterprise with CIDB 3 or 4 grading	Minimum of 2% of the Final Contract Value
	<b>D1008</b>	<b>WORK SUITABLE FOR EXECUTION BY TARGETED ENTERPRISES</b>	As per clause D1009 in Part C3 Section D.
<b>SECTION E</b>		<b>REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS</b>	
	<b>E1018</b>	<b>PROJECT SPECIFIC CONSTRUCTION REQUIREMENTS</b>	As per clause E1018 in Part C3 Section E.



SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LIMITED

CONTRACT SANRAL R.342-010-2024/1  
FOR STRENGTHENING OF NATIONAL ROUTE R342 SECTION 1 FROM NGUNI RIVER LODGE  
(KM 14.50) TO PATERSON (KM 25.00)

**SECTION C: ENVIRONMENTAL MANAGEMENT PLAN**

## SECTION C: ENVIRONMENTAL MANAGEMENT PLAN

TABLE OF CONTENTS	PAGE
C1001 SCOPE .....	C3-136
C1002 DEFINITIONS.....	C3-136
C1003 LEGAL REQUIREMENTS .....	C3-137
C1004 ADMINISTRATION OF ENVIRONMENTAL OBLIGATIONS.....	C3-139
C1005 TRAINING .....	C3-140
C1006 ACTIVITIES/ASPECTS CAUSING IMPACTS.....	C3-141
C1007 ENVIRONMENTAL MANAGEMENT OF CONSTRUCTION ACTIVITIES.....	C3-144
C1008 AREAS OF SPECIFIC IMPORTANCE .....	C3-151
C1009 REHABILITATION .....	C3-151
C1010 RECORD KEEPING.....	C3-152
C1011 COMPLIANCE AND PENALTIES .....	C3-152
C1012 PROJECT SPECIFIC CONDITIONS .....	C3-152

## C1001 SCOPE

The South African National Roads Agency SOC Limited (SANRAL) recognises environmental management as a key component of road infrastructure development and as part of its Environmental Sustainability Framework has developed this Environmental Management Plan (EMP) as a tool for continual improvement in environmental performance.

This EMP prescribes the methods by which proper environmental controls are to be implemented by the Contractor for construction and maintenance projects. The duration over which the Contractor's controls shall be in place cover the construction period of the project as well as the limited time after contract completion defined by the Conditions of Contract for Construction for Building and Engineering Works Designed by SANRAL published by the Federation Internationale des Ingenieurs-Conseils (FIDIC) as the Defects Notification Period (maintenance period).

The provisions of this EMP are binding on the Contractor during the life of the contract. They are to be read in conjunction with all the documents that comprise the suite of documents for this contract, particularly the conditions of any environmental authorisation and associated site-specific Environmental Management Programme (EMPr). In the event that any conflict occurs between the terms of the EMP and the project specifications or environmental authorisation, the terms herein shall be subordinate.

The EMP is a dynamic document subject to similar influences and changes as are brought by variations to the provisions of the project specification. Any changes to the EMP and/or environmental authorisation cannot occur without being submitted to SANRAL who will manage the process of amending the EMP.

The EMP identifies the following:

- Relevant parties and their responsibilities;
- Construction activities that will impact on the environment;
- Specifications with which the Contractor shall comply in order to protect the environment from the identified impacts; and
- Actions that shall be taken in the event of non-compliance.

## C1002 DEFINITIONS

**Alien Vegetation:** undesirable plant growth which includes but is not limited to all declared category 1 and 2 listed invader species as set out in the Conservation of Agricultural Resources Act (CARA), 1983 and the National Environmental Management: Biodiversity Act (Act No. 10 of 2004). Other vegetation deemed to be alien are those plant species that show the potential to occupy in number, any area within the defined construction area and which are declared to be undesirable.

**Construction Activity:** any action taken by the Contractor, his sub-contractors, suppliers or personnel during the construction process as defined in the contract documents.

**Environment:** the surroundings within which the contract exists and comprises land, water, atmosphere, micro-organisms, plant and animal life (including humans) in any part or combination thereof as well as any physical, chemical, aesthetic or cultural inter-relationship among and between them.

**Environmental Aspect:** any component of a contractor's construction activity that is likely to interact with the environment.

**Environmental authorisation:** a written statement from a Competent Authority, with the general and specific conditions and the EMPr recording its approval of an application for a planned undertaking that triggers listed activities in the Environmental Impact Assessment (EIA) regulations of the National Environmental Management Act (NEMA).

**Environmental Impact:** any change to the environment, whether desirable or undesirable, that will result from the effect of a construction activity. An impact may be the direct or indirect consequence of a construction activity.

**Environmental Impact Assessment (EIA):** a systematic process of identifying, assessing and reporting environmental impacts associated with an activity and includes basic assessment and scoping and environmental impact reporting.

**Environmental Management Plan:** An Environmental Management Plan (EMP) is an environmental management tool used to ensure that adverse impacts of the construction and operation and decommissioning of a project are prevented and/or minimised, and that the positive benefits are enhanced.

**Environmental Management Programme (EMPr):** A project-specific Environmental Management Plan approved by a competent authority through an environmental impact assessment process.

**Road Reserve:** a corridor of land, defined by co-ordinates and/or proclamation, within which the road, including access intersections or interchanges, is situated. A road reserve may, or may not, be bounded by a fence.

**Site;** the site is defined in the FIDIC Conditions of Contract and in the scope of works. It is bound by the limits of construction as shown in the drawings or the title of the project and extends to also include the following:

- Areas outside the construction zones where accommodation of traffic is placed;
- All borrowpits defined in the applications approved by the Department of Mineral Resources (DMR);
- All haul roads constructed by the Contractor for purposes of access;
- Any non-adjacent sites specified in the contract documentation;
- The Contractor's and his subcontractors' camp sites.

For the purposes of this EMP, the site includes areas outside of, but adjacent to, the road reserve that may be affected by construction activities.

**Spoil material:** is material that is unsuitable for construction of the road pavement and for which no other useful purpose can be found in additional works on the project (e.g. for the provision of protection berms). Such material requires spoiling at convenient areas to be identified by the Engineer and/or Contractor within the Site. Spoil material does not require removal to a designated landfill site unless it contains identifiable hazardous contaminants.

## **C1003 LEGAL REQUIREMENTS**

### **(a) General**

Construction shall be according to the best industry practices, as identified in the project documents. This EMP, which forms an integral part of the contract documents, informs the Contractor as to his duties in the fulfilment of the project objectives, with particular reference to the prevention and mitigation of environmental impacts caused by construction activities associated with the project. The Contractor should note that obligations imposed by the EMP are legally binding in terms of this contract. In the event that any rights and obligations contained in this EMP contradict those specified in the standard or project specifications then the latter shall prevail.

### **(b) Statutory and other applicable legislation**

The Contractor is deemed to have made himself conversant with all legislation pertaining to the environment, including provincial and local government ordinances, which may be applicable to the contract.

Major environmental legislation, as amended from time to time, includes but is not limited to the following:

(i) Conservation of Agricultural Resources Act (Act No. 43 of 1983)

This act provides for control over the utilisation of the natural agricultural resources of South Africa in order to promote the conservation of soil, water sources and vegetation, as well as combating weeds and invader plants.

(ii) The Constitution (Act 6 of 1996)

The Constitution states that everyone has the right to an environment that is not harmful to their health or well-being, and to have the environment protected through reasonable legislative and other measures to prevent pollution and ecological degradation; promote conservation and ensure ecologically sustainable development and use of natural resources.

(iii) Mineral and Petroleum Resources Development Act (Act No. 28 of 2002)

This act makes provision for equitable access to, and sustainable development of, minerals and petroleum resources.

(iv) National Environmental Management Act (NEMA), (Act No. 107 of 1998)

This act supports the Bill of Rights within the Constitution and highlights principles of sustainable development including preservation of ecosystems and biological diversity and avoidance, minimisation and remediation of pollution and environmental degradation. It also sets the stage for the EIA Regulations.

(v) National Environmental Management: Air Quality Act (Act No. 39 of 2004)

This act provides reasonable measures for the prevention of pollution and ecological degradation; and provides for specific air quality measures; for national norms and standards regulating air quality monitoring, management and control by all spheres of government.

(vi) National Environmental Management: Biodiversity Act (Act No. 10 of 2004)

This act makes provisions to accomplish the objectives of the United Nations' Convention on Biological Diversity. SANRAL may be required to apply for permits to conduct certain listed activities which, together with the listed threatened or protected species, may be identified by the Minister.

Section 73 (3) of this act empowers a competent authority to direct a person to take steps to remedy any harm to biodiversity resulting from the actions of that person or as a result of occurrence of listed invasive species occurring on land on which that person is the owner. Thus SANRAL may be directed to remedy harm caused by listed invasive species.

(vii) National Environmental Management: Protected Areas Act (Act No. 57 of 2003)

This act provides for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity, natural landscapes and seascapes.

(viii) National Environmental Management: Waste Act (Act No. 59 of 2008)

This act aims to regulate waste management practices through provision of national norms and standards, specific waste measures, licensing and control of waste activities, remediation of contaminated land as well as providing for compliance and law enforcement.

(ix) National Forests Act (Act No. 84 of 1998)

This act makes provision for promoting the sustainable management and development of forests, and for the protection of certain forests and trees for environmental, economic, educational, recreational, cultural, health and spiritual purposes.

(x) National Heritage Resources Act (Act No. 25 of 1999)

This act provides for an integrated and interactive system for identification, assessment and management of South Africa's heritage resources, and empowers civil society to nurture and conserve their heritage resources.

(xi) National Water Act (Act No. 36 of 1998)

This act makes provision for the protection of surface water and groundwater and their sustainable management for the prevention and remediation of the effects of pollution, as well as for the management of emergency situations.

(xii) The South African National Roads Agency Limited and National Roads Act (Act No. 7 of 1998)

This Act makes provision for a National Roads Agency for the Republic to manage and control the Republic's national roads system and take charge, amongst others, of the development, maintenance and rehabilitation of national roads within the framework of government policy.

#### **C1004 ADMINISTRATION OF ENVIRONMENTAL OBLIGATIONS**

Copies of this EMP shall be kept at the site office and must be distributed to all senior contract personnel who shall familiarise themselves with its contents.

Implementation of this EMP requires the involvement of several stakeholders, each fulfilling a different but vital role as outlined herein, to ensure sound environmental management during the construction phase of a project.

**(a) SANRAL**

SANRAL and anyone acting on SANRAL's behalf is accountable for the potential environmental impacts of any activities that are undertaken and is responsible for managing these impacts.

**(b) The Engineer**

The Engineer has been appointed by, and acts for, SANRAL as its on-site implementing agent and carries the responsibility to ensure that the Contractor undertakes its construction activities in such a way that SANRAL's environmental responsibilities are not compromised.

The Engineer will, within seven days of receiving a contractor's request for approval of a nominated Designated Environmental Officer (DEO), approve, reject or call for more information on the nomination. The Engineer will be responsible for issuing instructions to the DEO where environmental considerations call for action to be taken.

If in the opinion of the Engineer the DEO is not fulfilling his/her duties in terms of this EMP, the Engineer may, after discussion and agreement with SANRAL, exercise his powers under FIDIC general conditions of contract and instruct replacement of the DEO in writing and with stated reasons.

**(c) The Contractor**

The Contractor is responsible for project delivery in accordance with the prescribed specifications, among which this EMP shall be included.

The Contractor shall receive and implement any instruction issued by the Engineer relating to compliance with the EMP including the removal of personnel or equipment.

Compliance with the provisions contained herein or any condition imposed by the environmental approvals shall become the responsibility of the Contractor through an approved Designated Environmental Officer (DEO). The Contractor shall nominate a person from among his site personnel to fulfil this function and submit to the Engineer for his approval the *curriculum vitae* of the proposed DEO. This request for approval shall be given, in writing, at least fourteen days before the commencement of any construction activity clearly setting out reasons for the nomination, and with sufficient detail to enable the Engineer to make a decision.

**(d) The Designated/Dedicated Environmental Officer (DEO)**

Once a nominated representative of the Contractor has been approved, he/she shall become the DEO and shall be the responsible person for ensuring that the provisions of this EMP are complied with during the life of the contract. The DEO shall submit regular written reports to the Engineer, but not less frequently than once a month.

The DEO may undertake other construction duties unless Section B: Specification Data, prescribes this position as 'Full-time' or 'dedicated' as opposed to the standard position being 'designated'. However, the DEO's environmental duties shall hold primacy over other contractual duties and the Engineer has the authority to instruct the Contractor to reduce the DEO's other duties or to replace the DEO if, in the Engineer's opinion, he/she is not fulfilling his/her duties in terms of the requirements of this EMP. Such instruction will be in writing clearly setting out the reasons why a replacement is required.

As a minimum the DEO shall have an accredited National Qualifications Framework (NQF) level 6 qualification in environmental or natural sciences or equivalent and a minimum of 2 years' experience in a similar role in construction or other environmental regulatory field.

In addition to the compliance duties relating to EMP the DEO shall also provide full cooperation whenever the Contractor is subjected to environmental audits.

**(e) Environmental Control Officer (ECO)**

The Environmental Control Officer (ECO) is an independent environmental specialist appointed by SANRAL or the Engineer to objectively and regularly monitor the Contractor's compliance with the conditions of the authorisations issued for the project and the approved EMP (that is this EMP augmented with specifics of the project). These are external audits and the regularity is determined by the environmental authorisations.

**C1005 TRAINING**

**(a) Qualifications**

The (DEO) shall have the minimum qualifications as prescribed above and must be conversant with all legislation pertaining to the environment applicable to the contract. He/she must be appropriately trained in environmental management and possess the skills necessary to impart environmental management skills to all personnel involved in the contract.

The Contractor shall ensure that adequate environmental training takes place. All employees shall have been given an induction presentation on environmental awareness. Where possible, the presentation needs to be conducted in the language of the employees.

**(b) Content**

Apart from induction environmental training should, as a minimum, include the course content below and no induction or course should be given until the Engineer has been afforded the opportunity to appraise it and provide comment.

- (i) The importance of conformance with all environmental policies and the consequences of departure from standard operating procedures;
- (ii) Environmental impacts, actual or potential, caused by work activities, prevention measures to avoid them and mitigation measures when they occur;
- (iii) Work force roles and responsibilities in achieving conformance with the environmental policy and procedures, including emergency preparedness and response requirements;
- (iv) The environmental benefits of improved personnel performance and
- (v) Consequences of non- compliance

**(c) Induction**

In the case of permanent staff the Contractor shall provide evidence that such induction courses have been presented. In the case of new staff (including contract labour) the Contractor shall inform the Engineer when and how he intends concluding his environmental training obligations.

**C1006 ACTIVITIES/ASPECTS CAUSING IMPACTS**

Typical environmental aspects and impacts associated with road construction are listed in Table 1: Aspects and Impacts Associated with Road Construction. Actual impacts will differ from project to project and, therefore, so may the mitigation measures employed. The most common aspects and impacts are addressed separately, and typical avoidance and/or mitigation measures described. The list and descriptions are not by any means exhaustive, and they shall be used for guideline purposes only.

**Table 1: Aspects and Impacts Associated with Road Construction**

Aspect	Potential Impact
Waste generation/storage	Water pollution; nuisance; visual impact
Water use and stormwater discharge	Change in flow regime and/or reduction in downstream availability; soil erosion: water pollution
Vehicle use and maintenance	Air pollution; noise
Chemical/fuel storage	Water/air/soil pollution; health impacts; accidents e.g. spills, fire
Site clearing; earthworks; layer-works; seal works	Change in landform; impact on heritage resources; noise; soil erosion; air pollution
River bridges; installing drainage structures	Water pollution; impact on river flows; noise
Land acquisition	Loss of land and/or livelihood; change in land use;
Acquisition of building material from borrow pits	Change in landform and use

**(a) General approach**

The role of the DEO cannot be underestimated and once approved he/she shall be on the site at all times, and before the Contractor begins each construction activity, he/she shall give to the Engineer a written statement setting out the following:

- (i) The type of construction activity about to be started.
- (ii) Locality where the activity will take place.
- (iii) Identification of the environmental aspects and impacts that might result from the activity.



- (iv) The methodology of impact prevention for each activity or aspect.
- (v) The methodology of impact containment for each activity or aspect.
- (vi) Identification of the emergency/disaster potential for each activity (if any) and the reaction procedures necessary to mitigate impact severity.
- (vii) Treatment and continued maintenance of impacted environment.

The Contractor shall programme his work in such a way that each cause and effect of a construction activity is also identified, and the activity planned so as to prevent any impact from happening and shall demonstrate that he is capable of carrying out any repair and reinstatement of the damaged environment. These requirements shall be concurrent with the time constraints to produce method statements for each construction activity in compliance with the provisions of these project specifications.

The Contractor shall provide such information in advance of any or all construction activities provided that new submissions shall be given to the Engineer whenever there is a change or variation to the original.

The Engineer may provide comment on the methodology and procedures proposed by the DEO, but he shall not be responsible for the Contractor's chosen measures of impact mitigation and emergency/disaster management systems. However, the Contractor shall demonstrate at inception and at least once during the contract that the approved measures and procedures function properly.

#### **(b) Spillages**

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 a spillage, the Contractor shall be liable to arrange for professional service providers to clear the affected area.

Responsibility for spill containment and treatment (whether hazardous or not) lies with the Contractor. The individual causing a spill, or who discovers a spill, must report the incident to his/her DEO or to the Engineer. The DEO will assess the situation in consultation with the Engineer and act as required. In all cases, the immediate response shall be to contain the spill. The exact treatment of polluted soil/water shall be determined by the Contractor in consultation with the DEO and the Engineer. Areas cleared of hazardous waste shall be re-vegetated according to the Engineer's instructions.

Should water downstream of the spill be polluted, and fauna and flora show signs of deterioration or death, specialist hydrological or ecological advice will be sought for appropriate treatment and remedial procedures to be followed. The requirement for such input shall be agreed with the Engineer. The costs of containment and rehabilitation shall be for the Contractor's account, including the costs of specialist input as well as the sampling and testing of the water quality upstream and downstream of the spill. Water quality sampling and testing, and further treatment shall continue until upstream and downstream results correspond with each other.

#### **(c) Water use and control**

The Contractor's use of water shall take into consideration that it is a scarce commodity and shall be optimised. Authorisation shall be obtained from the Department of Water and Sanitation (DWS) before water is drawn from streams or new boreholes developed.

The Contractor shall also ensure that any stream deviations or diversions are undertaken in such a manner that the impact on the environment is minimised. Method statements shall be submitted to the Engineer for comment, detailing how the work will be undertaken, what risks are foreseen and what measures will be employed to minimise such risks. Notwithstanding any comments by the Engineer, no work on stream deviations or diversions shall be undertaken in accordance with GN 509 in GG 40229 of 26 August 2016 - General Authorisation in terms of Section

39 of the National Water Act, 1998 (Act No. 36 Of 1998) for Water Uses as defined in sections 21(c) and (i) .

The quality, quantity and flow direction of any surface water runoff shall be established prior to disturbing any area for construction purposes. Cognisance shall be taken of these aspects and incorporated into the planning of all construction activities. Before a site is developed or expanded, it shall be established how this development or expansion will affect the drainage pattern. Recognised water users/receivers shall not be adversely affected by the expansion or re-development. No water source shall be polluted in any way due to proposed changes.

Streams, rivers, pans, wetlands, dams, and their catchments shall be protected from erosion and flooding by dredging, daylighting, removal of debris and vegetation, etc. These shall also 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.

The Contractor shall submit to the Engineer his proposals for prevention, containment and rehabilitation measures against environmental damage of the identified water and drainage systems that occur on the site. Consideration shall be given to the placement of sedimentation ponds or barriers where the soils are of a dispersive nature or where toxic fluids are used in the construction process. The sedimentation ponds must be large enough to contain runoff so that they function properly under heavy rain conditions up to 1:5 year severity.

The Contractor shall submit to the Engineer the results of the baseline water quality test taken above and below the site of the proposed activity, and thereafter monthly testing results or at the frequency as may be specified by the Water Use Licence/General Authorisation, where applicable. No taking-over can be authorised until the water quality is shown to be at pre-construction levels or better.

**(d) Vegetation management**

The Contractor shall be responsible for the management of vegetation by protection of indigenous vegetation, especially identified protected species, and the prevention of alien vegetation germinating in areas disturbed by road construction activities within and outside the road reserve. This includes, for example, service roads, stockpile areas, stop/go facilities, windrows and wherever material generated for or from road construction has been stored temporarily. This responsibility shall continue for the duration of the defects notification period. The project specification may instruct the removal of CARA and/or NEMBA-listed category 1 and 2 alien species and planting of specified indigenous species.

**(e) Dust control**

Dust caused by construction activities shall be controlled by appropriate means and applied at sufficient frequency so as not to cause nuisance to adjacent habitation or affect farming activities or natural vegetation. Vegetation cover should also be kept for as long as possible to reduce the area of exposed surfaces. Dust emissions from batching and screening plants shall be subject to the relevant legislation and shall be the subject of inspection by the relevant authorities.

**(f) Noise control**

The Contractor shall endeavour to keep noise generating activities to a minimum. Noises that could cause a major disturbance, for instance blasting and crushing activities, should only be carried out during the hours prescribed by the conditions of contract (i.e. normal hours). Should such noise generating activities have to occur at any time outside normal hours the people in the vicinity of the noise-generating activity shall be warned about the noise well in advance and the activities kept to a minimum. Relevant legislation shall also be taken into consideration, and any practical mitigation measures adopted. No noise generating activity outside of normal hours, regardless of its proximity to residences, can take place without

application to the Engineer for approval. The application shall be accompanied by the noise containment measures proposed.

**(g) Energy consumption**

The Contractor shall take into consideration the impacts of high energy consumption, both from a cost and emissions point of view. Energy use shall be minimised, and where possible, alternative energy sources such as solar utilised.

Furthermore, the Contractor shall measure and keep records of the consumption of carbon units his chosen method of construction produces in the execution of his programme. In conjunction with the Engineer who will provide complete cooperation, a month by month output shall be compiled and efforts made to see how these outputs can be curtailed and reduced.

**C1007 ENVIRONMENTAL MANAGEMENT OF CONSTRUCTION ACTIVITIES**

The Contractor shall undertake “good housekeeping” practices during construction as stated in the COTO Standard Specifications for Roads and Bridges and the FIDIC conditions of contract. This will help avoid disputes on responsibility and allow for the smooth running of the contract as a whole. Good housekeeping extends beyond the wise practice of construction methods that leaves production in a safe state from the ravages of weather to include the care for and preservation of the environment within which the site is situated.

The construction activities addressed below shall become part of the Contractor's obligations regarding his programme of work and incorporated into the required method statements for workmanship and quality control.

**a) Site establishment**

**i) Site Plan**

The site refers to an area with defined limits on which the project is located. The Contractor shall establish his construction camps, offices, workshops, staff accommodation and testing facilities on the site in a manner that does not adversely affect the environment. However, before any site establishment can begin, the Contractor shall submit to the ECO for his comments and to the Engineer for his approval, plans of the exact location, extent and construction details of these facilities and the impact mitigation measures the Contractor proposes to put in place.

The plans shall detail the locality as well as the layout of the waste management facilities for litter, kitchen refuse, sewage and workshop-derived effluents. The site offices should not be sited in close proximity to steep areas, as this will increase soil erosion. Preferred locations would be flat areas along the route. If the route traverses water courses, streams and rivers, it is recommended that the offices, and in particular the ablution facilities, aggregate stockpiles, spoil areas and hazardous material stockpiles are located as far away as possible from any water course. No camp establishment, including satellite camps, can be placed within 150 metres of an identified watercourse unless the Contractor has applied to DWS and received authorisation to do so. Regardless of the chosen site, the Contractor's intended mitigation measures shall be indicated on the plan. The site plan shall have been submitted and approved before establishment commences. Detailed, electronic colour photographs shall be taken of the proposed site before any clearing may commence. These records are to be kept by the ECO and the Engineer for consultation during rehabilitation of the site in order that rehabilitation is, as a minimum, done to a standard similar to pre-construction activities.

ii) Vegetation

The Contractor has a responsibility to inform his staff of the need to be vigilant against any practice that will have a harmful effect on vegetation.

The natural vegetation encountered on the site is to be conserved and left as intact as possible. Vegetation planted at the site shall be indigenous and in accordance with instructions issued by the Engineer. Only trees and shrubs directly affected by the works, and such others as may be indicated by the Engineer in writing, may be felled or cleared. In wooded areas where natural vegetation has been cleared out of necessity, the same species of indigenous trees as were occurring shall be re-established. Protected trees may not be removed without a permit from the Department of Forestry, Fisheries and Environment.

Contravention of a notice of listed protected tree species under the National Forests Act, 1998 is regarded as a first category offence that may result in a fine or imprisonment for a period up to three years, or to both a fine and imprisonment. The DEO must be conversant with the latest gazette of declared protected trees.

Rehabilitation shall be undertaken using only indigenous tree, shrub and grass species. Special attention shall be given to any search and rescue operation identified during the environmental assessment process and any removal to an on-site nursery for continuous nurturing and protection and later replanting.

Any proclaimed weed or alien species that propagates during the contract period shall be cleared by hand before seeding.

Fires shall only be allowed in facilities or equipment specially constructed for this purpose. The need for a firebreak shall be determined in consultation with the Engineer and the relevant authorities, and if required a firebreak shall be cleared and maintained around the perimeter of the camp and office sites.

iii) Water management

Water for human consumption shall be available at the site offices and at other convenient locations on site.

All effluent water from the camp/office sites shall be disposed of in a properly designed and constructed system, situated so as not to adversely affect water sources (streams, rivers, pans, dams etc.). Only domestic type wastewater shall be allowed to enter this system.

iv) Heating and cooking fuel

The Contractor shall provide adequate facilities for his staff so that they are not encouraged to supplement their comforts on site by accessing what can be taken from the natural surroundings. The Contractor shall ensure that energy sources are available at all times for construction and supervision personnel for heating and cooking purposes.

**b) Sewage management**

Particular reference in the site establishment plan shall be given to the treatment of sewage generated at the site offices, site laboratory and staff accommodation and at all localities on the site where there will be a concentration of labour. Sanitary arrangements should be to the satisfaction of the Engineer, the local authorities and legal requirements.

Safe and effective sewage treatment will require one of the following sewage handling methods: septic tanks and soak-aways, dry-composting toilets such as "enviro loos", or the use of chemical toilets which are supplied and maintained by a specialist service provider. The type of sewage management will depend on the

geology of the area selected, the duration of the contract and proximity (availability) of providers of chemical toilets. Should a soak-away system be used, it shall not be closer than 800 metres from any natural water course or water retention system. The waste material generated from these facilities shall be serviced on a regular basis. The positioning of the chemical toilets shall be done in consultation with the Engineer. Should a soak-away system be used, it shall not be closer than 800 metres from any natural water course or water retention system and shall be approved by the Engineer in consultation with the ECO.

Toilets and latrines shall be easily accessible and shall be positioned within walking distance from wherever employees are employed on the works. Use of the veld for this purpose shall not, under any circumstances, be allowed.

Outside toilets shall be provided with locks and doors and shall be secured to prevent them from blowing over. The toilets shall also be placed outside areas susceptible to flooding. The Contractor shall arrange for regular emptying of toilets and shall be entirely responsible for enforcing their use and for maintaining such latrines in a clean, orderly and sanitary condition to the satisfaction of the Engineer.

**c) Waste management**

The Contractor's intended methods for waste management shall be outlined and implemented at the outset of the contract and shall be to the satisfaction of the Engineer. A waste inventory shall be drawn up of all waste streams that will possibly be generated by the site/project and an integrated approach shall be taken to its management. Records shall be kept of all waste disposed. Opportunities for avoiding, reducing, reusing and recycling of materials should be identified upfront, as should constraints for their implementation. All personnel shall be instructed to dispose of all waste in the proper manner.

i) Solid waste

Solid waste shall be stored in an appointed area in covered, tip-proof metal drums or similar container for collection and disposal. Disposal of solid waste shall be at a licensed landfill site or at a site approved by the relevant authority in the event that an existing operating landfill site is not within reasonable distance from the project area. No waste shall be burned or buried at or near the project area.

ii) Litter

No littering by construction workers shall be allowed and particular emphasis on litter control measures shall apply at stop/go facilities.

During the construction period, the various contractors' facilities shall be maintained in a neat and tidy condition and the site shall be kept free of litter. At all places of work the Contractor shall provide litter collection facilities for later safe disposal at approved sites.

iii) Hazardous waste

Hazardous waste such as oils shall be disposed of at an approved landfill site and proof of such disposal kept by the Contractor. Special care shall be taken to avoid spillage of bitumen products such as binders or pre-coating fluid to avoid water-soluble phenols from entering the ground or contaminating surface water.

Under no circumstances shall the spoiling of bituminous products on the site, over embankments, in borrow pits or any burying, be allowed. Unused or rejected bituminous products shall be returned to the supplier's production plant. Any spillage of bituminous products shall be attended to immediately and affected areas shall be promptly reinstated to the satisfaction of the Engineer.

iv) Construction and demolition waste

The opportunity for recycling and reuse of construction and demolition waste as fill for road embankments, land reclamation and drainage control must first be explored and take priority before the option of declaring these materials a 'waste'.

The Contractor is encouraged to actively engage with authorities and landowners adjacent to the site and identify where such materials can be usefully deployed to repair existing environmentally damaged areas such as erosion dongas.

d) **Control at the workshop**

The Contractor's management and maintenance of his plant and machinery will be monitored according to the criteria given below.

i) Hazardous Material Storage

Petrochemicals, oils and identified hazardous substances shall only be stored under controlled conditions. All hazardous materials such as bitumen binders shall be stored in a secured, appointed area that is suitably fenced, bunded and has restricted entry. Storage of bituminous products shall only take place using suitable containers to the approval of the ECO and the Engineer.

The Contractor shall provide proof to the Engineer that relevant authorisation to store such substances has been obtained from the relevant authority. In addition, hazard signs indicating the nature of the stored materials shall be displayed on the storage facility or containment structure. Before containment or storage facilities can be erected, the Contractor shall furnish the Engineer with details of the preventative measures he proposes to install in order to mitigate pollution of the surrounding environment from leaks or spillage. The preferred method shall be a concrete floor that is bunded. Any deviation from the method will require proof from the relevant authority that the alternative method proposed is acceptable to that authority. The proposals shall also indicate the emergency procedures in the event of misuse or spillage that will negatively affect an individual or the environment.

ii) Fuel and gas storage

The Contractor shall take cognisance of the limits set by legislation for the storage of fuels and acquire the necessary authorisation for storage capacity beyond these. An adequate bund wall, 110% of volume, shall be provided for fuel and diesel areas to accommodate any leakage spillage or overflow of these substances. The area inside the bund wall shall be lined with an impervious lining to prevent infiltration of the fuel into the soil. Any leakage, spillage or overflow of fuel shall be attended to without delay.

Gas welding cylinders and LPG cylinders shall be stored chained in a secure, well-ventilated area exterior to any building wall.

iv) Oil and lubricant waste

Used oil, lubricants and cleaning materials from the maintenance of vehicles and machinery shall be collected in a holding tank and sent back to the supplier. Water and oil should be separated in an oil trap. Oils collected in this manner, shall be retained in a safe holding tank and removed from site by a specialist oil recycling company for disposal at approved waste disposal sites for toxic/hazardous materials. Oil collected by a mobile servicing unit shall be stored in the service unit's sludge tank and discharged into the safe holding tank for collection by a specialist oil recycling company.

Drip trays shall be used to collect any lubricants or fuel spilled where any vehicle and machinery are repaired or refuelled. The lubricants and fuel collected shall be handled as specified above.

All used filter materials shall be stored in a secure bin for disposal off site. Any contaminated soil shall be removed and replaced. Soils contaminated by oils and lubricants shall be collected and disposed of at a facility designated by the local authority to accept contaminated materials.

**e) Clearing the site**

In all areas where the Contractor intends to or is required to clear the natural vegetation and soil, either within the road reserve, or at designated or instructed areas outside the road reserve, a plan of action shall first be submitted to the Engineer for his approval. Working areas shall be clearly defined and demarcated on site to minimise the construction footprint. 'No-go- areas' and other sensitive areas shall also be clearly demarcated on site, and staff must be made aware of them.

The plan of action shall contain a photographic record and chainage/land reference of the areas to be disturbed. This shall be submitted to the Engineer for his records before any disturbance/stockpiling may occur. The record shall be comprehensive and clear, allowing for easy identification during inspections.

**f) Soil management**

**i) Topsoil**

Topsoil shall be removed from all areas where physical disturbance of the surface will occur and shall be stored and adequately protected. The contract will provide for the stripping and stockpiling of topsoil from the site for later re-use. Topsoil is the natural soil covering, including all the vegetation and organic matter. Depth may vary at each site. The areas to be cleared of topsoil shall include all storage areas. All topsoil stockpiles and windrows shall be maintained throughout the contract period in a weed-free condition. Weeds appearing on the stockpiled or windrowed topsoil shall be removed by hand. Soils contaminated by hazardous substances shall be disposed of at an approved waste disposal site. The topsoil stockpiles shall be stored, shaped and sited in such a way that they do not interfere with the flow of water to cause damming or erosion, or itself be eroded by the action of water.

The Contractor shall ensure that no topsoil is lost due to erosion – either by wind or water. Areas to be top-soiled and grassed shall be done so systematically to allow for quick cover and reduction in the chance of heavy topsoil losses due to unusual weather patterns. The Contractor's programme shall clearly show the proposed rate of progress of the application of topsoil and grassing. The Contractor shall be held responsible for the replacement, at his own cost, for any unnecessary loss of topsoil due to his failure to work according to the progress plan approved by the Engineer. The Contractor's responsibility shall also extend to the clearing of drainage or water systems within and beyond the boundaries of the road reserve that may have been affected by such negligence.

**ii) Subsoil**

The subsoil is the layer of soil immediately beneath the topsoil. It shall be removed, to a depth instructed by the Engineer, and if not used for road building it shall be stored and maintained separately from the topsoil so that neither stockpile is contaminated by the other. This soil shall be used for rehabilitation purposes by first spreading it over the excavated slopes without interfering with or contaminating the stockpiled topsoil.

Whilst in stockpile it shall be maintained free from erosion and weed infestation in the same way as for topsoil stockpile maintenance.

**g) Earthworks and layerworks**

This section includes all construction activities that involve the mining of all materials, and their subsequent placement, stockpile, spoil, treatment or batching, for use in the permanent works, or temporary works in the case of deviations. Before any stripping prior to the commencement of construction, the Contractor shall have complied with the requirements of this EMP. In addition, the Contractor shall take cognisance of the requirements set out below.

i) Quarries and borrow pits

The Contractor's attention is drawn to the requirement of the Department of Mineral Resources, that before entry into any quarry or borrow pit, an Environmental Authorisation for the establishment, operation and closure of a quarry or borrow pit shall have been approved by the Department where applicable. It is the responsibility of the Contractor to ensure that he is in possession of the authorisation prior to entry into the quarry or borrow pit. The conditions imposed by the relevant authorisation are legally binding on the Contractor and may be more extensive and explicit than the requirements of this specification. In the event of any conflict occurring between the requirements of the specific authorisation and this EMP, the former shall apply.

ii) Excavation, hauling and placement

The Contractor shall provide the ECO and the Engineer with detailed plans of his intended construction processes prior to starting any cut or fill or layer. The plans shall detail measures by which the impacts of pollution (noise, dust, litter, fuel, oil and sewage), erosion, vegetation destruction and deformation of landscape will be prevented, contained and rehabilitated. Particular attention shall also be given to the impact that such activities will have on the adjacent built environment. The Contractor shall demonstrate his "good housekeeping", particularly with respect to closure at the end of every day so that the site is left in a safe condition.

iii) Spoil sites

The Contractor shall be responsible for the safe siting, operation, maintenance and closure of any spoil site he uses during the contract period, including the defects notification period. This shall include existing spoil sites that are being re-entered. Before spoil sites may be used proposals for their locality, intended method of operation, maintenance and rehabilitation shall be given to the ECO for his/her comments and to the Engineer for his approval. The location of these spoil sites shall have signed approval from the affected landowner before submission to the ECO and the Engineer. No spoil site shall be located within 50m of any watercourse. A photographic record shall be kept of all spoil sites for monitoring purposes. This includes before the site is used and after re-vegetation.

The use of approved spoil sites for the disposal of any waste shall be prohibited. Spoil sites will be shaped to fit the natural topography. Depending on availability these sites shall receive a minimum of 75mm topsoil and be grassed with the recommended seed mixture. Appropriate grassing measures to minimise soil erosion shall be undertaken by the Contractor. This may include both strip and full sodding. The Contractor may motivate to the Engineer for other acceptable stabilising methods. The Engineer may only approve a completed spoil site at the end of the defects notification period upon receipt from the Contractor of a landowner's clearance notice.

iv) Stockpiles

The Contractor shall plan his activities so that materials excavated from borrow pits and cuttings, in so far as possible, can be transported direct to and placed at the point where it is to be used. However, should temporary



stockpiling become necessary, the areas for the stockpiling of excavated and imported material shall be indicated and demarcated on the site plan submitted in writing to the Engineer for his approval. The Contractor's proposed measures for prevention of environmental damage, containment and subsequent rehabilitation shall also be submitted.

The areas chosen shall have no naturally occurring indigenous trees and shrubs present that may be damaged during operations. Care shall be taken to preserve all vegetation in the immediate area of these temporary stockpiles. During the life of the stockpiles the Contractor shall at all times ensure that they are positioned and sloped to create the least visual impact, constructed and maintained so as to avoid erosion of the material and contamination of surrounding environment and kept free from all alien/undesirable vegetation.

After the stockpiled material has been removed, the site shall be re-instated to its original condition. No foreign material generated/deposited during construction shall remain on site. Areas affected by stockpiling shall be landscaped, top soiled, grassed and maintained at the Contractor's cost until clearance from the Engineer and the landowner is received.

Material milled from the existing road surface that is temporarily stockpiled in areas approved by the Engineer within the road reserve, shall be subject to the same condition as other stockpiled materials. Excess materials from windrows, in situ milling or any leftover material from road construction activities may not be swept off the road and left unless specifically instructed to do so in the contract documentation or under instruction from the Engineer.

The ECO shall comment on and the Engineer shall approve the areas for stockpiling and disposal of construction rubble before any operation commences and shall approve their closure only when they have been satisfactorily rehabilitated.

v) Blasting activities

Wherever blasting activity is required on the site (including quarries and/or borrow pits) the Contractor shall rigorously adhere to the relevant statutes and regulations that control the use of explosives.

**h) On site plant**

i) Crusher, screening plants and concrete batching plants

Crushing plants and concrete batching plants, whether sited inside or outside of defined quarry or borrow pit areas, shall be subject to the requirements of the applicable industrial legislation that governs gas and dust emissions into the atmosphere. Such sites will be the subject of regular inspections by the relative authorities during the life of the project. In addition, the selection, entry onto, operation, maintenance, closure and rehabilitation of such sites shall be the same as for those under section C1007(g)(i) of this EMP, with the exception that the Contractor shall provide additional measures to prevent, contain and rehabilitate against environmental damage from toxic/hazardous substances. In this regard the Contractor shall provide plans that take into account such additional measures as concrete floors, bunded storage facilities, linings to drainage channels and settlement dams. Ultimate approval of these measures shall be from the relevant authority, as shall approval of closure. The Engineer will assist the Contractor in his applications to the relevant authority.

Screening activities shall be undertaken so that dust and noise is minimised. This can be done by carefully choosing the site for the activity, and by using slightly damp material.

Effluent from concrete batch plants and crusher plants shall be reused where possible or treated in a suitable designated sedimentation dam to the legally

required standards to prevent surface and groundwater pollution. The designs of such a facility should be submitted to the Engineer for approval.

ii) Asphalt Plant

Asphalt plants shall be subject to the applicable legislation that governs establishment and operation of batching plants. The Contractor shall be responsible to obtain the necessary permit from the relevant authority.

Operation of the plant shall conform to the same requirements as for a crushing plant or concrete batching plant under C1007(h)(i) above.

**C1008 AREAS OF SPECIFIC IMPORTANCE**

Any area, as determined and identified within the project documents as sensitive or of special interest within the site shall be treated according to the express instructions contained in these specifications or the specific environmental authorisation, as well as the approved EMPr. The Contractor may offer alternative solutions to the Engineer in writing should he consider that construction will be affected in any way by the hindrance of the designated sensitive area or feature. However, the overriding principle is that such defined areas requiring protection should not be changed. Every effort to identify such areas within the site will have been made prior to the project going out to tender. The discovery of other sites with archaeological or historical interest that have not been identified shall receive ad hoc treatment.

**a) Archaeological sites**

If an artefact on site is uncovered, work in the immediate vicinity shall be stopped immediately. The Contractor shall take reasonable precautions to prevent any person from removing or damaging any such article and shall immediately upon discovery thereof inform the Engineer of such discovery. The South African Heritage Resource Agency (SAHRA) is to be contacted, and a SAHRA-registered archaeological consultant may undertake the necessary work involved in confirming the find and advising on how it should be preserved or removed. Work may only resume once clearance is given in writing by the archaeologist. (Read with FIDIC condition of contract clause 4.24)

If a grave or midden is uncovered on site then all work in the immediate vicinity of the graves/middens shall be stopped, and the Engineer informed of the discovery. The South African Heritage Resource Agency and the South African Police Services (SAPS) should be contacted and in the case of graves, arrangements made for an undertaker to carry out exhumation and reburial. The undertaker will, together with SAHRA, be responsible for attempts to contact family of the deceased and for the place where the exhumed remains can be re-interred.

**C1009 REHABILITATION**

The Contractor shall be responsible for the re-establishment of grass within the road reserve boundaries for all areas disturbed during construction. This includes, for example, service roads, stockpile areas, stop/go facilities, windrows and wherever material generated for, or from, construction has to be stored temporarily, and designated or instructed areas outside the road reserve. It also includes the area where site offices were erected which may require rehabilitation at the end of the contract. All construction material, including concrete slabs and barbecue (braai) areas shall be removed from the site on completion of the contract unless written approval from the relevant landowner demonstrates it is to be left in place.

Responsibility for re-establishment of vegetation shall extend until expiry of the defects notification period. However, SANRAL reserves the right to continue holding retention monies (or not releasing guarantees in lieu of retention) depending upon the state of cover at the end of the defects notification period. Such extension may continue until closure of the relevant quarry or borrow pit has been secured,

Rehabilitation of affected areas should be undertaken as early as possible when the relevant activities are done in order to reduce further environmental damage. All re-vegetation should be undertaken using indigenous vegetation. The standard of rehabilitation should be to the satisfaction of the Engineer and the relevant authorities. The Department of Minerals Resources will only issue closure certificates for borrow pits and quarries when they are satisfied with the rehabilitation undertaken. It should also be noted that in some cases there is a requirement for a final environmental audit covering the extent of the project.

**C1010 RECORD KEEPING**

The Engineer and the DEO will continuously monitor the Contractor's adherence to the approved impact prevention procedures and the DEO shall submit regular written reports to the ECO and to the Engineer at least once a month. The DEO will report the environmental compliance performance of the project at regular site meeting. The Engineer shall issue to the Contractor a notice of non-compliance whenever transgressions are observed. The DEO shall document the nature and magnitude of the non-compliance in a designated register, the action taken to discontinue the non-compliance, the action taken to mitigate its effects and the results of the actions. The non-compliance shall be documented and reported to the Engineer in the monthly report.

Copies of all authorisations shall be kept on site and made available for inspection by visiting officials from SANRAL, relevant authorities or internal/external auditors.

**C1011 COMPLIANCE AND PENALTIES**

The Contractor shall act immediately when a notice of non-compliance is received and correct whatever is the cause for the issuing of the notice. Complaints received regarding activities on the construction site pertaining to the environment shall be recorded in a dedicated register and the response noted with the date and action taken. This record shall be submitted with the monthly reports and an oral report given at the monthly site meetings.

Any non-compliance/omissions with the procedures in this EMP, environmental authorisations and the approved EMPr constitute a breach of the Conditions of Contract. Regulatory financial penalties imposed on SANRAL shall be passed onto the defaulting parties.

**C1012 PROJECT SPECIFIC CONDITIONS**

Refer to Chapter 11.8 regarding the search and rescue operation.

**TABLE 7/1: MECHANISMS THAT CAUSE ENVIRONMENTAL IMPACTS DURING CONSTRUCTION ACTIVITIES**

Chapter	Contents	Environmental Impacts				
		Pollution Type	Deformation of Landscape	Soil erosion	Alien Vegetation	Sensitive Areas
1.3	Camp Establishment	Waste treatment Hazardous waste Water supply Spillage Storage	Selection of site Preserve indigenous vegetation Preserve topsoil	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil Management of weeds	None Identified
1.4	Housing, Offices and laboratories	Waste treatment Hazardous waste Water supply Spillage Storage Noise/lights	Selection of site Preserve indigenous vegetation Preserve topsoil Demarcate sensitive areas	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil Management of weeds	None Identified
1.5	Accommodation of Traffic	Waste treatment Hazardous waste Water supply Spillage Storage Noise/lights Dust control	Selection of site Preserve indigenous vegetation Preserve topsoil Demarcate sensitive areas Maintenance of windrows	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil Management of weeds	None Identified
1.6	Overhaul	Spillage Storage Noise/lights Dust control Exhaust fumes Washing waste	Turning circles Parking areas	Restrict access to sensitive areas	Protection of indigenous vegetation Preserve topsoil	None Identified
1.7	Clearing and grubbing	Waste treatment Hazardous waste Water supply Noise /lights Dust control	Selection of site Preserve indigenous vegetation Preserve topsoil	Selection of site Preserve indigenous vegetation Preserve topsoil	Protection of indigenous vegetation Preserve topsoil	None Identified
3.0	Drainage	Waste treatment Hazardous waste Water supply Spillage	Selection of site Preserve indigenous vegetation Preserve topsoil	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil Management of weeds	None Identified

Chapter	Contents	Environmental Impacts				
		Pollution Type	Deformation of Landscape	Soil erosion	Alien Vegetation	Sensitive Areas
		Storage				
4.0 and 5.0	Borrow pits	Waste treatment Hazardous waste Water supply Spillage Storage	Selection of site Preserve indigenous vegetation Preserve topsoil	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil Management of weeds	None Identified
4.0 and 5.0	Stockpiling	Waste treatment Hazardous waste Water supply Spillage Storage	Selection of site Preserve indigenous vegetation Preserve topsoil	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil Management of weeds	None Identified
4.0 and 5.0	Mass Earthworks	Waste treatment Hazardous waste Water supply Spillage Storage	Selection of site Preserve indigenous vegetation Preserve topsoil	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil Management of weeds	None Identified
4.0 and 5.0	Pavement layers	Waste treatment Hazardous waste Water supply Spillage Storage Noise / lights Dust control	Selection of site Preserve indigenous vegetation Preserve topsoil Demarcate sensitive areas Maintenance of windrows	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil Management of weeds	None Identified
9.0+10.0	Asphalt works / sealing operations	Waste treatment Hazardous waste Water supply Spillage Storage Noise / lights	Selection of site Preserve indigenous vegetation Preserve topsoil Turning circles Parking areas	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil	None Identified

Chapter	Contents	<b>Environmental Impacts</b>				
		<b>Pollution Type</b>	<b>Deformation of Landscape</b>	<b>Soil erosion</b>	<b>Alien Vegetation</b>	<b>Sensitive Areas</b>
		Dust control Smoke control Storage of materials				
11.0	Ancillary roadworks	Waste treatment Hazardous waste Water supply Spillage Storage	Selection of site Preserve indigenous vegetation Preserve topsoil	Selection of site Preserve indigenous vegetation Preserve topsoil	Preserve indigenous vegetation Preserve topsoil Management of weeds	None Identified

SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LIMITED

CONTRACT SANRAL R.342-010-2024/1

FOR STRENGTHENING OF NATIONAL ROUTE R342 SECTION 1 FROM NGUNI RIVER LODGE  
(KM 14.50) TO PATERSON (KM 25.00)

**SECTION D: STAKEHOLDER AND COMMUNITY LIAISON, AND TARGETED LABOUR  
AND TARGETED ENTERPRISES UTILISATION AND DEVELOPMENT**

**SECTION D: STAKEHOLDER AND COMMUNITY LIAISON, AND TARGETED LABOUR AND TARGETED ENTERPRISES UTILISATION AND DEVELOPMENT**

<b>TABLE OF CONTENTS</b>	<b>PAGE</b>
D1001 SCOPE .....	C3-158
D1002 DEFINITIONS AND APPLICABLE LEGISLATION .....	C3-158
D1003 TARGET GROUP PARTICIPATION .....	C3-163
D1004 STAKEHOLDER AND COMMUNITY LIAISON AND SOCIAL FACILITATION ...	C3-167
D1005 MOBILISATION PERIOD .....	C3-172
D1006 THE ROLE OF THE ENGINEER.....	C3-174
<del>D1007 TENDER PROCESS FOR TARGETED ENTERPRISES .....</del>	<del>C3-175</del>
D1008 GENERAL RESPONSIBILITIES OF THE CONTRACTOR TOWARDS TARGETED ENTERPRISES.....	C3-184
D1009 WORK SUITABLE FOR EXECUTION BY TARGETED ENTERPRISES .....	C3-187
D1010 TRAINING, COACHING, GUIDANCE, MENTORING AND ASSISTANCE .....	C3-188
D1011 LABOUR ENHANCED CONSTRUCTION .....	C3-193
D1012 COMMUNITY DEVELOPMENT .....	C3-193
D1013 MEASUREMENT AND PAYMENT .....	C3-193



## **D1001 SCOPE**

Section D of the Specifications describes the structured engagement with project Stakeholders and affected Communities to the project. It also guides the selection and the enhanced utilisation and development of Targeted Labour and Targeted Enterprises.

### **D1001.01 Employer's Fourteen Point Plan**

The scope of the work described in this Section D of the Specifications shall be based on the Employer's 14 principles for project liaison, sub-contracting and labour sourcing in all SANRAL projects, which are stipulated below:

1. Establish project liaison committees (PLCs) in each project to create a platform for project liaison, works execution, sub-contracting and employment facilitation.
2. SANRAL to chair PLCs and provide secretarial support. Representation to comprise: SANRAL; contractor; consultant; business representatives; traditional representatives; provincial and municipal government representatives (not politicians); community representatives; and any other critical local stakeholder that may be deemed necessary by the PLC.
3. Project Liaison Officer (PLO) selection to be done under the auspices of the PLC.
4. Definition of a target area (sometimes referred to as a local area or traffic area) to be done under the auspices of the PLC.
5. Setup a database of contractors and suppliers (and consultants where relevant) to be done under the auspices of the PLC. The final database to be signed off by the PLC.
6. Setup of database of local labour for the target area to be done under the auspices of the PLC. The final list to be signed off by the PLC. An agreed system of labour selection from the database is to be agreed at the PLC.
7. Handover of signed-off databases for subcontracting and labour to contractor for open tender process and recruitment respectively done by the PLC.
8. Tender to be conducted by contractor using government principles (e.g. public opening of received bids, announcement of bidders and prices). Tabling of winning bidders in the PLC.
9. Appeals on the tender process to be escalated to SANRAL for an independent review.
10. Capability assessments of contractors and suppliers to be done under auspices of the PLC prior to tender stage, to identify any deficiencies in skills and experience. For labour, skills assessments are to be done at recruitment stage.
11. Contractor development support and training to be coordinated and conducted, ahead under the auspices of the PLC, prior to project commencement.
12. Identification of works areas that are deliverable by local service providers, and areas where capabilities are not available locally. All works areas where capabilities are not available locally shall be imported and locals will be given an opportunity to learn.
13. Formal contracting arrangements to be ensured for all projects.
14. Communication to be streamlined through the PLC and used to manage expectations of local business and communities.

These principles must be applied to facilitate better project level liaison with project Stakeholders and affected Communities. In addition, these principles serve to ensure communication and transparency in the execution of the Works and to facilitate inclusivity in the allocation of projects to benefit black business and local communities.

## **D1002 DEFINITIONS AND APPLICABLE LEGISLATION**

The definitions and legislation listed below informs the requirements of this Section D of the Specifications for Stakeholder and Community Liaison, Targeted Labour employment and Targeted Enterprise subcontracting.

### **D1002.01 Definitions**

Unless inconsistent with the context, in these Specifications, the following words, terms or expressions shall have the meanings hereby assigned to them:

**a) Business Coaching**

Business coaching establishes an atmosphere of mutual trust, respect, responsibility and accountability to motivate the emerging business owner and his team. To that end, the business coach must conduct an ethical and competent practice, based on appropriate professional experience and business knowledge.

**b) Community<sup>1</sup>**

South African Citizens, as defined in terms of the South African Citizenship Act, 1995 (Act 88 of 1995), who permanently reside within the Target and Project Area(s) of the project.

**c) Contract Participation**

A process by which the Employer implements Government's objectives by setting targets to enhance Targeted Labour and Targeted Enterprises' utilisation and development, which the Contractor shall achieve as a minimum.

**d) Contract Participation Goal (CPG)<sup>2</sup>**

- i) In the case of Targeted Enterprises, including manufacturers and suppliers, the amount equal to the value of goods, services and works for which the principal Contractor contracts to engage Targeted Enterprises in the performance of the Contract, expressed as a percentage of the tender value excluding escalation, contingency and value added tax associated with the targeting strategy that is identified in the Specification Data; or
- ii) In the case of Targeted Labour:
  - a. the sum of the wages and allowances, for which the principal Contractor, Sub-contractor or Targeted Enterprises contract to engage Targeted Labour in the performance of the Contract, expressed as a percentage of the contract amount associated with the targeting strategy that is identified in the Specification Data; or
  - b. the amount equal to the person days worked for which the principal Contractor, Subcontractors or Targeted Enterprises contract to engage Targeted Labour expressed as a percentage of the total person days worked associated with the targeting strategy that is identified in the Specification Data.

**e) Contract Participation Goal Plan (CPG Plan)**

The plan which outlines how the Contractor intends to achieve the various CPG targets as stated in the Contract Data and includes the detail of the Targeted Enterprise work programme, as well as the contents and value of the work packages. See Appendix 10 for the CPG Plan format.

**f) Contract Participation Performance (CPP)**

The measure of the Contractor's progress in achieving the CPG.

**g) Contract Skills Development Goals (CSDG)<sup>3</sup>**

The number of hours or head count of skills development opportunities that a Contractor contracts to provide in relation to work directly related to the contract or order up to:

- i) completion in the case of a professional service contract;
- ii) the end of the service period in the case of a service contract; and

<sup>1</sup> CIDB Standard for Contract Participation Goals for Targeting Enterprises and Labour through Construction Work Contracts, 31 October 2017, as adapted from SANS 10845, Suite for Construction Procurement, 2015.

<sup>2</sup> Adapted from the CIDB Standard for Contract Participation Goals for Targeting Enterprises and Labour through Construction Work Contracts, 31 October 2017, as adapted from SANS 10845-5:2015 and SANS 10845-8:2015, Suite for Construction Procurement, 2015.

<sup>3</sup> CIDB Standard for Developing Skills through Infrastructure Contracts, July 2020 (or latest version).

- iii) practical completion in the case of an engineering and construction works contract.

**h) Designated Group<sup>4</sup>**

Unless otherwise permissible in terms of procurement regulations or the PPPFA, “Designated Group” means:

- i) black designated groups;
- ii) black people;
- iii) women;
- iv) people with disabilities; or
- v) small enterprises, as defined in Section 1 of the National Small Enterprise Act, 1996 (Act No. 102 of 1996);

**i) 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 help, advice and direction 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.

**j) Labour**

Persons:

- i) who are employed by the Contractor or a Subcontractor in the performance of the Contract; and
- ii) who resides in the Target and Project Area(s); and
- iii) whose monthly earnings are derived from hours worked for a fixed hourly rate which is adjusted from time to time by legislation (as a statutory minimum) and the Contractor’s or Subcontractor’s employment policies;
- iv) but who are not Targeted Labour as stated in the Specification Data.

The personnel employed by the suppliers of goods and material are not defined as “Labour” for the purposes of this Contract.

**k) Mentoring**

Mentoring is a professional relationship in which an experienced businessperson assists another by giving advice and imparting their knowledge in developing special skills and knowledge that will enhance the less experienced businessperson’s professional and personal growth. The objective is to equip the emerging business owner and his team to improve their decision-making skills, being focussed and make positive progress quickly.

**l) Mobilisation Period**

The period from the Commencement Date, which includes the establishment of a presence in the Project Area for the purpose of developing a CPG Plan, developing a Training and Skills Development Programme, and subcontracting of the initial Targeted Enterprise subcontracts, up to just before the commencement of the Temporary Works (Access to Site), which period (duration) is stated in the Contract Data.

**m) Project Area**

The area through which the road under construction traverse or which is adjacent to and/or in proximity to project operations.

Based on market research and/or resources and skills audits, Project Areas other than defined above may be identified where preference would be given to Targeted Enterprises for subcontracting opportunities.

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<sup>4</sup> Government Gazette N. 40553, 20 January 2017.

**n) Project Liaison Committee (PLC)<sup>5</sup>**

The Committee that represents the Employer, Engineer, Contractor, project Stakeholders and the Communities affected by the project. It is important to note that:

- i) elected and/or nominated political office bearers shall not be members of the PLC.
- ii) The Engineer and Contractor becomes members of the PLC on their appointment and participate in the Committee within the scope of their respective roles and responsibilities.

**o) Project Liaison Officer (PLO)<sup>6</sup>**

The person who acts as the liaison officer for the project. The PLO facilitates the selection of Targeted Labour to be employed by the Contractor and attends to the day to day project, Stakeholder, and Community matters that impact on the parties to the PLC.

**p) Stakeholders<sup>7</sup>**

Any Stakeholder listed in the Employer's Communication Policy who is affected by the Employer's operations in the Project Area(s) and/or who has an interest or concern in the project, either as a decision maker, participant or affected party and may include, amongst others, the following entities:

- i) Relevant Provincial departments;
- ii) Relevant Municipal departments;
- iii) Traditional authorities;
- iv) Community interest groups;
- v) Organised youth representation;
- vi) Organised women representation;
- vii) Organised disabled people representation;
- viii) Other structured community groups such as religion, education, farming, etc.
- ix) Local transport industry forums, e.g. Bus and taxi;
- x) Business sector forums;
- xi) Road user forums;
- xii) Environmental interest groups;
- xiii) Road safety interest groups;
- xiv) Any other recognised relevant and representative structure.

**q) Subcontractor**

An entity appointed by the Contractor to execute a portion of the Works as defined in the Conditions of Contract.

**r) Target Area**

The geographic area defined in the Specification Data for Targeted Labour and which typically are:

- i) one or more Provinces;
- ii) one or more Metropolitan or District Municipalities;
- iii) one or more Local Municipalities;
- iv) one or more Wards that are predominantly located within the Project Area;
- v) one or more of the areas listed in the definition of Designated Groups.

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<sup>5</sup> CIDB Standard for Minimum Requirements for Engaging Contractors and Sub-Contractors on construction Works Contracts, 31 October 2017.

<sup>6</sup> CIDB Standard for Minimum Requirements for Engaging Contractors and Sub-Contractors on construction Works Contracts, 31 October 2017; CLO definition.

<sup>7</sup> Derived from SANRAL communication Policy, March 2018.

**s) Targeted Enterprise<sup>8</sup>**

A Targeted Enterprise is an entity to which the Contractor subcontracts a percentage of the contract value as a condition of contract and which is:

- i) an EME or QSE which is at least 51% owned by black people; or
- ii) an EME or QSE which is at least 51% owned by black people who are youth; or
- iii) an EME or QSE which is at least 51% owned by black people who are women; or
- iv) an EME or QSE which is at least 51% owned by black people with disabilities; or
- v) an EME or QSE which is at least 51% owned by black people who are military veterans; or
- vi) an EME or QSE which is 51% owned by black people living in rural or underdeveloped areas or townships; or
- vii) a cooperative which is at least 51% owned by black people; or
- viii) an EME or QSE

In addition, Targeted Enterprises must be:

- a. CIDB registered where applicable;
- b. tax compliant prior to award of the subcontract; and
- c. COIDA compliant prior to award of the subcontract.

**t) Targeted Enterprise Construction Manager (TE Construction Manager)**

The full-time staff member or sub-service provider appointed by the Contractor to develop, implement and monitor the training, development and support of Targeted Labour and Targeted Enterprises. The TE Construction Manager also mentors, guides and coaches the Targeted Enterprises.

**u) Targeted Enterprise Procurement Coordinator (TE Procurement Coordinator)**

The staff member or sub-service provider appointed by the Contractor to facilitate the procurement of Targeted Enterprise subcontractors.

**v) Target Group**

It is a group of entities and/or persons selected from the Designated Group as defined in the Preferential Procurement Policy Framework Act Regulations, 2017, and may include both Targeted Enterprises and Targeted Labour.

**w) Targeted Labour<sup>9</sup>**

Persons:

- i) who are employed by the Contractor or a Subcontractor (including Targeted Enterprise Subcontractors) in the performance of the Contract; and
- ii) whose monthly earnings are derived from hours worked for a fixed hourly rate which is adjusted from time to time by legislation (as a statutory minimum) and the Contractor's or Subcontractor's employment policies; and
- iii) permanently reside in the Target Area(s) or who are recognized as being residents of the Target Area(s) based on identification and association with, and recognition by, the residents of the Target Area(s); and
- iv) who are stated as being Targeted Labour in the Specification Data.

**x) Trainee Targeted Enterprise**

A Targeted Enterprise as defined in paragraph s) above but which is selected and subcontracted as a Trainee in terms of the Community Development Component associated with the project.

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<sup>8</sup> Preferential Procurement Framework Act, Act no 5 of 2000.

<sup>9</sup> SANS 10845-7:2015, definition 2.12

**y) Training**

Training refers to the process of teaching a Trainee, usually in a classroom or simulated work environment situation where principles, theory, knowledge and skills are taught, and demonstrations are given. Assignments are set to ensure that the Trainee can apply what has been taught. Training is done by a specialist in the subject, and who is qualified and accredited to train. The objective is to improve the competency of the Trainee.

**z) Training and Skills Development Programme**

The programme which outlines how the Contractor intends to achieve the CSDG targets, as per Part C3, Section D1010 and in line with the CIDB Standard for Developing Skills through Infrastructure Contracts, August 2013, by applying the various training methods described in Part C3, Section D1010.

**D1002.02 Applicable Legislation, Regulations and Standards**

The following Acts, as amended from time to time, are predominant amongst those which apply to the Construction Industry and are listed here for reference purposes only:

- a) The Constitution of South Africa;
- b) Public Finance Management Act, 1999 (Act No. 1 of 1999);
- c) Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000) and its regulations;
- d) Construction Industry Development Board Act, 2000 (Act No. 38 of 2000);
- e) Broad-Based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003);
- f) The South African National Roads Agency Limited and National Roads Act, 1998 (Act No. 7 of 1998);
- g) The Skills Development Act, 1998 (Act No. 97 of 1998); and
- h) The amended Construction Sector Codes published in Notice 931 of 2017 of Government Gazette No. 41287 on 1 December 2017 by the Department of Trade and Industry.

The following Standards and Practice Notes, as amended from time to time, are applicable in terms of Targeted Labour and Targeted Enterprises and are used fully or portions thereof in this Section D of the Specifications:

- i) SANS 10845: 2015, Parts 5, 7 and 8; and
- ii) CIDB Standard for Contract Participation Goals for Targeted Enterprises and Labour through Construction Works Contracts, 31 October 2017.

**D1003 TARGET GROUP PARTICIPATION**

This part of Section D of the Specifications describes the Employer's requirements for the establishment of Target Group databases from which participants in the project will be selected for employment and subcontracting.

It also describes the measurement of, and penalties or bonus to be applied, with respect to the CPG as defined in the Specification Data.

**D1003.01 Objectives of Target Group Participation**

Amongst others, the key objectives of Government are to extend economic opportunities and build entrepreneurial capacity in rural and underdeveloped areas and townships by:

- a) optimising the utilisation of local resources in the Project Area;
- b) developing these local resources in the execution of the project; and
- c) maximising the amount of funds retained within the Project Area.

To give effect to these objectives the Contractor shall, over the full duration of the contract, from site establishment up to the completion of the works:

- i) employ Targeted Labour from the Target Area(s) as stated in the Specification Data; and
- ii) subcontract Targeted Enterprises as stated in the Specification Data; and

- iii) give preference to Targeted Enterprises which are from rural and underdeveloped areas and townships within the Project Area(s).

#### **D1003.02 Targeted Labour Database**

A Targeted Labour Database shall be compiled by the PLO, under the auspices of the PLC and with the inputs of the Department of Labour, for the Target Area(s) as stated in the Specification Data. Once the Database has been signed off by the PLC, it shall be utilised to facilitate the selection of Targeted Labour as per the resources and skills required by the Contractor during the different construction stages.

The Targeted Labour Database shall be updated as and when required and as agreed with the PLC to reflect new employment seekers in the labour market.

Only Labour recruited from the Targeted Labour Database will be measured for Contract Participation Performance (CPP).

#### **D1003.03 Targeted Enterprise Database**

The Contractor shall, under the auspices of the PLC, compile a Targeted Enterprise Database from which Targeted Enterprises shall be subcontracted to construct portions of the work as described in this part of Section D of the Specifications.

##### **a) Market Analysis and Resources and Skills Audit**

Following a market analysis and a resources and skills audit of Targeted Enterprises in the Project Area, the Contractor shall apply the CPG Target Group criteria in the Specification Data to compile a **preliminary** Targeted Enterprise Database.

To inform the market analysis and resources and skills audit, the Contractor shall use the National Treasury's Central Supplier Database (CSD) which can be obtained from the Employer, as well as the CIDB contractor database.

##### **b) Call for an Expression of Interest**

In addition to the CSD and the CIDB database, the Contractor shall call for an expression of interest from Targeted Enterprises in the Project Area. The call for an expression of interest shall outline the anticipated eligibility, functionality, preference and compliance criteria, as well as the anticipated Works content.

##### **c) Preliminary Targeted Enterprise Database**

Based on the information obtained from the CSD, CIDB and the call for an expression of interest, the Contractor shall compile a Preliminary Targeted Enterprise Database.

The purposes of the Preliminary Targeted Enterprise Database are:

- i) for the Contractor to determine if the required resources and skills to execute the identified Targeted Enterprise work packages are available in the Project Area(s);
- ii) for the PLC to verify that Targeted Enterprises on the Preliminary Targeted Enterprise Database are authentic in terms of the Specification Data and other Database criteria agreed with the Contractor, and
- iii) for the PLC to alert prospective Targeted Enterprises that are not on the Preliminary Database of the opportunity.

Based on the market analysis and resources and skills audit, and the information obtained from the call for an expression of interest, additional criteria for the Preliminary Targeted Enterprise Database may be agreed between the Contractor and the PLC to ensure Target Group participation as intended by the Employer.

#### d) Final Targeted Enterprise Database

Once the Preliminary Targeted Enterprise Database has been accepted by the PLC, the Contractor shall invite Targeted Enterprises to tender for the Targeted Enterprise work packages. The Preliminary Targeted Enterprise Database shall remain a "live database" until the day of tender closure when a print-out of the CSD, based on the Database criteria, shall become the **Final** Targeted Enterprise Database for the tender and shall be signed off by the PLC.

Any Targeted Enterprise may respond to the invitation to tender, but preference shall be given to those Targeted Enterprises that satisfy the tender criteria.

The Targeted Enterprise Database shall be updated at every instance that a new subcontract tender or group of similar subcontract tenders are to be let for Targeted Enterprise work packages.

Targeted Enterprises within the Project Area shall be encouraged and assisted to register on the CSD and to become compliant with all other statutory requirements.

#### D1003.04 Contract Participation Goal (CPG)

The CPG is the monetary value of the participation targets set by the Employer for Targeted Labour and Targeted Enterprises expressed as a percentage of the Final Contract Value. The participation targets comprise of the following:

% Targeted Labour (TL<sub>Total%</sub>) = the sum of the % Targeted Labour employed by the Contractor, Subcontractors and Targeted Enterprises.

% Targeted Enterprises (TE<sub>Total%</sub>) = the % Targeted Enterprises, including the % Targeted Labour employed by Targeted Enterprises.

While the individual participation targets, i.e. TL<sub>Total%</sub> and TE<sub>Total%</sub> must be met, the total CPG (CPG<sub>Total</sub>) is not the sum thereof, but are calculated as follows:

CPG<sub>Total</sub> = Final Contract Value x [TL<sub>Total%</sub> + (TE<sub>Total%</sub> - Targeted Labour employed by the Targeted Enterprises))

where

The Final Contract Value is the total value of the Contractor's final certified work measured at the date of issue of the Taking-Over Certificate. The Final Contract Value includes the value of all scheduled items (Cumulative amount of Pricing Schedule) and extra work, but excludes Community Development Work and any Contract Price Adjustment and adjustments for reduced payments, Rise and Fall, Retention Money, Penalties and VAT.

The Contractor shall strive to distribute and implement the participation targets and opportunities equally and continuously over the duration of the Contract. Where the Contractor deems such an equal and continuous distribution of the participation targets to be unachievable, he shall provide reasons and motivate it clearly in the preliminary CPG Plan submitted with the tender document.

The value of the Provisional Sum scheduled under item D10.05 will not necessarily make up the full value of the work required to meet the minimum target set by the Employer for Targeted Enterprises. It is the Contractor's responsibility to assess the work required to meet the targets and, if necessary, to engage additional Targeted Enterprises to execute work on the Contract as well to ensure that the minimum targets are achieved.



## **D1003.05 Contract Participation Performance (CPP)**

The CPP is the monetary value of the Contractor's actual progress towards achievement of the CPG calculated as follows:

$$\begin{aligned}\text{CPP} &= \text{CPG}_{\text{Actual}} \\ &= \text{total monetary value (excluding VAT) of Targeted Labour employed by the Contractor} + \text{total monetary value (excluding VAT) of Targeted Enterprises contribution, including Targeted Labour employed by the Targeted Enterprises.}\end{aligned}$$

The Contractor's CPP shall be monitored monthly to determine the extent to which it is striving to achieve the CPG. The basis of monitoring shall be a comparison of the actual expenditure on Targeted Labour and Targeted Enterprises with the planned expenditure for Targeted Labour and Targeted Enterprises as per the accepted CPG Plan. Monthly returns, in the format required by the Employer, shall be submitted by the Contractor with each interim Payment Certificate.

To assist in the measurement of the CPP the Contractor shall include the envisaged CPG programme in its initial contract programme which is to be submitted within 28 days after the date of the commencement meeting. The CPG programme shall be updated in the accepted construction programme on acceptance of the CPG plan and with every subsequent revision.

As an incentive to encourage the Contractor to exceed the CPG, a bonus is offered, measured as follows:

### **a) CPP Bonus**

$$\text{The bonus} = 0.05 \times (\text{CPP} - \text{CPG}_{\text{Total}})$$

Any bonus due (or portion thereof) shall be calculated on the Final Contract Value (as defined in D1003.04). No bonus shall apply if either the Targeted Labour, Targeted Enterprises and/or any individual sub-targets for Target Groups are not reached.

### **b) CPP Penalties**

Conversely, failure to reach either the CPG or any individual Target Group targets shall render the Contractor liable for a penalty as prescribed in clause 8.7 of the FIDIC Conditions of Contract unless there are compelling reasons why the target or sub-targets could not be achieved. Penalties for Targeted Labour and for Targeted Enterprises shall be calculated as follows:

$$\text{Penalty Targeted Labour} = 0.15 \times ((\text{TL} - \text{TG}) + \text{Sum} (\text{TL}_n - \text{TG}_n) - 1.2 \times \text{L dp})$$

Where:

$n$	=	Each lowest order subgroup of Targeted Labour stipulated in the Specification Data.
TL	=	Monetary value of the Targeted Labour calculated at the percentage stipulated in the Specification Data applied to the Final Contract Value (as defined in D1003.04).
TG	=	Cumulative monetary value of Targeted Labour employed on the contract by the Contractor and all Subcontractors.
L dp	=	Cumulative monetary value of Black Disabled Persons employed on the Contract by the Contractor and all Subcontractors.
$(\text{TL}_n - \text{TG}_n)$	=	The monetary values calculated unless if any calculated value is negative, then it shall be a zero value.

$$\text{Penalty Targeted Enterprises} = 1.0 \times ((\text{TE} - \text{TGE}) + \text{Sum} (\text{TE}_n - \text{TGE}_n) - 1.2 \times \text{TE mv} - 1.2 \times \text{TE dp})$$

Where:

$n$	=	Each lowest order subgroup of Targeted Enterprise stipulated in the Contract Data.
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TE	=	Monetary value (excluding VAT) of Targeted Enterprises calculated at the percentage stipulated in the Specification Data applied to the Final Contract Value (as defined in D1003.04)
TGE	=	Cumulative monetary value (excluding VAT) by Targeted Enterprises subcontracted to the contract by the Contractor and 50% of the cumulative monetary value (excluding VAT) by Targeted Enterprise suppliers of goods and/or services.
TE mv	=	Cumulative monetary value (excluding VAT) by Targeted Enterprises being majority owned by black Military Veterans, subcontracted to the Contract by the Contractor.
TE dp	=	Cumulative monetary value (excluding VAT) by Targeted Enterprises being majority owned by black Disabled Persons, subcontracted to the Contract by the Contractor.
$(TE_n - TGE_n)$	=	The monetary values calculated unless if any calculated value is negative, then it shall be a zero value.

The total Penalty value shall be the sum of the Targeted Labour and Targeted Enterprises Penalty values unless the total Penalty value is negative then it shall be a zero value.

Interim penalty valuations, based on the accepted CPG Plan, should be calculated to interim Payment Certificate values (excluding VAT) to establish the anticipated outcome, and to plan corrective actions for non-adherence to the CPG Plan.

Interim penalty valuations shall not be applied to the interim certificate value, but the Contractor shall by notice be placed on terms to correct as prescribed in subclause 15.1 of the FIDIC Conditions of Contract. Failure to correct will lead to an Employer's Claim in terms of subclause 2.5 of the FIDIC Conditions of Contract.

Any Penalty payable shall be calculated on, and applied to, the Final Contract Value (as defined in D1003.04).

#### **D1003.06 Accredited Registration**

The CPP for Targeted Enterprises shall only be accepted if the respective Targeted Enterprises comply fully with the definition of a Targeted Enterprise, and documentary evidence to support the claim lodged with the Engineer before the work, goods or service may be considered as having been performed by a Targeted Enterprise. The responsibility for producing evidence of the respective documentation shall rest with the Contractor.

The Contractor shall assume responsibility for the compilation and maintenance of comprehensive records detailing each Targeted Enterprise's progress.

#### **D1003.07 Contractor's Responsibility**

In terms of the Conditions of Contract, all Targeted Labour recruitment and employment and Targeted Enterprises subcontracting, as well as its associated risks, shall remain the sole responsibility of the Contractor.

The Employer's CPG requirements, and the compulsory utilisation of project specific Targeted Labour and Targeted Enterprises databases, shall not relieve the Contractor of its obligations under the Contract and shall not attract any liability to the Employer.

### **D1004 STAKEHOLDER AND COMMUNITY LIAISON AND SOCIAL FACILITATION**

This part of Section D of the Specifications describes the Employer's requirements with respect to Stakeholder and Community liaison and social facilitation. It also describes the roles and responsibilities of the Project Liaison Committee (PLC) and the Project Liaison Officer (PLO).

#### **D1004.01 Purpose of Stakeholder and Community Liaison**

To give effect to the need for transparency and inclusion in the process of delivering services, the Contractor shall liaise with the project Stakeholders and affected Communities for the duration of the Contract's life cycle. This shall be achieved through structured engagement with the PLC which was established by the Employer for this purpose.

Appendix 11 - SANRAL Project Liaison Committee Guidelines, is included in Part C4 of the Contract for ease of reference.

#### **D1004.02 Contractor's Responsibilities in Stakeholder and Community Liaison**

The Contractor shall have the following general responsibilities in the Stakeholder and Community liaison process:

- a) Stakeholder and Community engagement shall be executed based on the Employer's social facilitation principles and processes described in this Section D of the Specifications.
- b) The Contractor shall make use of the PLC as the official communication channel and utilise it to facilitate harmonious relationships, with project Stakeholders and affected Communities.
- c) PLC members, to which the Contractor is a party, shall be held accountable to disseminate project information discussed at the PLC meetings to the entities that they represent.
- d) As a party to the PLC, the Contractor shall delegate from among his site personnel a responsible person to participate in the PLC and its business.
- e) The Contractor shall provide the PLC with any assistance and information that it requires to execute its duties, which amongst others, include training, providing a meeting venue on site, provide Target Group reports, etc.

It is important to note that in terms of the Conditions of Contract, all Targeted Labour recruitment and employment, and Targeted Enterprises' selection and sub-contracting, as well as its associated risks, shall remain the sole responsibility of the Contractor.

The Contractor shall take cognisance of the Employer's "Checklist for PLCs and PLOs", attached as Appendix 12, which shall be provided to the Contractor by the Engineer. While the Employer holds its own staff accountable for the deliverables listed in the checklist, the Contractor and the Engineer shall assist the Employer in accomplishing the deliverables.

The Employer's assistance in establishing a PLC and providing a PLO to the Contractor, shall not relieve the Contractor of its obligations under the Contract and shall not attract any liability to the Employer.

#### **D1004.03 Project Liaison Committee (PLC)**

The PLC is the official communication channel through which the Employer, Engineer, Contractor and project Stakeholders and affected Communities communicates on project matters. This platform is also used to communicate the impact that the project has or may have on project Stakeholders and the affected Communities. This part of Section D of the Specifications describes the general processes pertaining to the PLC, as well as its role and responsibilities.

##### **a) Establishment of the PLC**

A PLC has either been established prior to commencement of the Contract or shall be established as soon as possible by the Employer. The PLC consists of the Employer, Engineer, Contractor and representatives of project Stakeholders and affected Communities.

PLC meetings shall be chaired by the Employer which will typically be the Employer's Project Manager or a staff member with decision-making delegation. The Engineer's staff shall provide a secretarial service to take minutes of PLC meetings.

Secretarial support other than taking minutes at PLC meetings shall be provided by the PLO.

**b) Duties of the PLC**

The SANRAL Project Liaison Committee Guidelines requires of the PLC to execute specific duties during the design and construction phases of the project.

In the execution of their duties, members of the PLC shall adhere to the undertakings listed below and the Contractor shall inform the Engineer of any transgression of these undertakings. Members of the PLC shall:

- 1) have no private or business interests in any of the subcontract tenders tabled to the PLC or considered in this contract.
- 2) shall recuse themselves from discussions that deal with a subcontract tender if any other member is of the opinion that a member's participation in deliberations, which is rightly or wrongly construed as improper or irregular, may lead to the award of a subcontract to a tenderer known to the member or to the member itself.
- 3) recuse themselves from the operations of the PLC following a situation as described in paragraph 2) above and shall cease to be a PLC member for this contract.
- 4) during the process neither deliberately favoured nor prejudiced a person or tenderer, as intended or contemplated in treasury Regulation 16, A8.3 (a), (b) & (c).
- 5) accept that all information, documentation and decisions regarding any matter serving before the PLC are confidential and undertake not to communicate decisions or discussions of PLC meetings to external or internal parties unless so directed and approved by the Project Manager

Some of the PLC's duties during the design and construction stages overlap and hence, for completeness, a description of the PLC's duties in both project stages is provided here.

The PLC shall execute the following duties:

**i) Project Design Stage**

- a. Meet as often as required to discuss and resolve the project's design stage matters which are of interest or concern to the parties to the PLC.
- b. Peruse the SANRAL Project Liaison Committee Guidelines and agree on the duties of, and procedures to be followed by, the PLC to fulfil its duties.  
**Note:** The principles of the Guidelines shall not be amended, but duties and procedures may be altered to be project specific and to improve the functionality of the PLC.
- c. Act in accordance to the agreed terms of reference for the PLC.
- d. Inform the Employer of any training that project Stakeholder and affected Community representatives of the PLC require to execute their duties.
- e. Assist the Engineer to source suitable candidates, based on the Employer's qualifying criteria, for the position of PLO.
- f. Observe and verify that the qualifying criteria and procedures applied by the Engineer to select and employ the PLO were executed in a fair and transparent manner and were within the prescripts of the relevant labour legislation and regulations.
- g. Assist the Engineer to identify the project's Target and Project Area(s), from which Targeted Labour and Targeted Enterprises could be employed and subcontracted respectively.
- h. Assist the Engineer to identify the project's Target Groups for inclusion in the Tender Documents and sign off the identified Target Groups.

ii) Project Construction Stage

- a. Meet formally prior to the Employer's monthly site meeting, or as may be required, to discuss and resolve project matters, which are of interest or concern to the parties to the PLC.
- b. Assist the Contractor to establish the selection criteria and process to employ Targeted Labour.
- c. Assist the Contractor to identify the eligibility, functionality, preference and compliance criteria to select and subcontract Targeted Enterprises.
- d. Sign off the Databases compiled by the PLO and the Contractor from which Targeted Labour will be selected and employed and Targeted Enterprises will be subcontracted respectively.
- e. Verify that the criteria and methodologies applied by the Contractor to select and employ Targeted Labour and subcontract Targeted Enterprises are executed in a fair and transparent manner and are within Government legislation and regulations and the Employer's Policies.
- f. Verify that the conditions of employment and the conditions of subcontracting, in the employment of Targeted Labour and subcontracting of Targeted Enterprises are applied in a fair and transparent manner and according to the Employer's employment and subcontracting requirements.
- g. Make recommendations to the Contractor on the training needs, eligibility criteria and selection criteria for the provision of training to Targeted Labour, Targeted Enterprises, Designated Groups, project Stakeholders and the affected Communities.
- h. Verify that training and skills development programmes, which the Contractor committed to, are implemented and executed as approved and intended.
- i. Inform the entities whom they represent of any project matters which the respective parties to the PLC wishes to communicate with each other.
- j. Inform the entities whom they represent of any project matters that are impacting or may impact, either positively or negatively, on the respective parties to the PLC.
- k. Inform the Contractor of Stakeholder and/or Community requests and/or needs which could possibly be addressed within the project's Scope of Work.
- l. Inform the Employer, Engineer and Contractor of any road safety concerns within the Project Area(s) and advise them of possible mitigating measures and/or road safety programs that will be most suitable for acceptance by the affected Communities to promote road safety.
- m. Agree on a dispute resolution mechanism to resolve any disputes that may arise between the parties to the PLC.
- n. Assist parties to the PLC to liaise with their respective entities to resolve any disputes amongst the parties which may occur due to the project.

**D1004.04 Project Liaison Officer (PLO)**

The PLO facilitates the selection and employment of Targeted Labour and coordinates communication between the members of the PLC to address the day to day project, Stakeholder, and Community matters that impact on the parties represented in the PLC.

**a) Appointment of the PLO**

The PLO is appointed by the Engineer under the auspices of the PLC and in accordance to the Employer's criteria for a PLO.

Although the PLO predominantly provides social facilitation support to the Contractor, the PLO shall report to the Engineer or his delegated representative, e.g. the Resident Engineer.

**b) Duties of the PLO**

The SANRAL Project Liaison Committee Guidelines requires of the PLO to execute specific duties during the design and construction phases of the project. These duties include the following:

- (i) Except for taking the minutes of PLC meetings, which is a duty of the Engineer, the PLO shall provide a secretariat function to the PLC which includes, amongst others, the following:
  - a. Schedule meetings;
  - b. Compile meeting agendas;
  - c. Compile document packages for meetings;
  - d. Distribute minutes of meetings;
  - e. Assist representatives of project Stakeholders and affected Community to formulate their communication to the PLC in writing;
  - f. Distribute written communication between the parties to the PLC;
  - g. Keep records of all PLC correspondence and documentation; and
  - h. Provide any other reasonable secretariat function required by the PLC.
- (ii) Attend all PLC meetings to report on the day to day project, Stakeholder and Community matters that impact on the parties to the PLC.
- (iii) Attend all monthly project site meetings to report on the day to day project, Stakeholder and Community matters that impact on the parties to the PLC.
- (iv) Attend any other meetings related to the project and in which any of the project Stakeholders, affected Communities, Targeted Labour and Targeted Enterprises are involved.
- (v) Maintain a full-time presence on site to monitor and address the day to day project, Stakeholder and Community matters that impact on the parties to the PLC.
- (vi) Maintain a full-time presence on site to assist the parties to the PLC in the day to day liaison with each other.
- (vii) Assist the Engineer and the Contractor to disseminate information to PLC members such as:
  - a. the basic Scope of the Works and how it will affect the Community;
  - b. the project programme and regular progress updates;
  - c. the anticipated employment and subcontracting opportunities;
  - d. the project programme as it pertains to the employment of Targeted Labour and subcontracting of Targeted Enterprises;
  - e. Occupational Health and Safety precautions; and
  - f. any other information relevant to project Stakeholders and the affected Communities.
- (viii) Be well acquainted with the contractual requirements as it pertains to Targeted Labour employment and training.
- (ix) Assist the PLC to establish and agree the criteria to be followed when selecting and employing Targeted Labour.
- (x) Assist the Engineer and the Contractor in their resources and skills audits by providing a coordinating function between the Engineer, the Contractor, project Stakeholders, and the affected Communities.
- (xi) Ensure that Targeted Labour databases are compiled based on the agreed eligibility and selection criteria and that it is updated as and when required.
- (xii) Coordinate the selection and employment of Targeted Labour based on the agreed eligibility and selection criteria and based on the Contractor's labour and skills requirements.
- (xiii) Ensure that each Targeted Labourer enters into an employment contract which adheres to current and relevant Labour legislation.
- (xiv) Ensure that each Targeted Labourer understands the conditions of his/her employment contract with an emphasis on the employment start date, end date and wages payable.
- (xv) Identify and inform the Contractor of any relevant training required by the Targeted Labour.
- (xvi) Attend all disciplinary proceedings to ensure that hearings are fair and conducted in accordance to the current and relevant Labour legislation.
- (xvii) Be proactive in identifying project Stakeholder and affected Communities' (including Targeted Labour and/or Targeted Enterprise Subcontractor), requirements, disputes, unrest, strikes, etc. and bring it to the attention of the PLC.

- (xviii) Assist the parties to the PLC to resolve any disputes, which may occur due to the project.
- (xix) Other than the document records to be kept as mentioned above, keep record of all other documents and processes pertaining to the employment of Targeted Labour.
- (xx) Produce and submit a monthly report to the PLC on PLC and other meetings attended by the PLO, as well as on Targeted Labour employment, and project Stakeholder, affected Community and any other project matters that impact on the parties to the PLC.

## **D1005 MOBILISATION PERIOD**

The Mobilisation Period starts at the Commencement Date, which includes the establishment of a presence in the Project Area for the purpose of developing a CPG Plan, developing a Training and Skills Development Programme and subcontracting of the initial Targeted Enterprise subcontracts and ends just prior to the Commencement of the Temporary Works (Access to Site). Its duration is defined in the Contract Data.

Access to site for the Commencement of the Temporary Works shall only be issued once the CPG Plan has been accepted and the initial Targeted Enterprise subcontracts have been let.

### **D1005.01 Purpose of the Mobilisation Period**

The Mobilisation Period was introduced as an aid to the Contractor to:

- a) become acquainted with the Stakeholder and Community liaison requirements of the Contract as prescribed in this Section D;
- b) allow for the Contractor's planning to obtain the CPG as required in the Specification Data;
- c) allow for the Contractor's planning to obtain the Contract Skills Development Goals (CSDG) as required in this Section D, clause D1010,
- d) follow the processes prescribed in this Section D to employ the initially required Targeted Labour and enter into the first subcontracts with Targeted Enterprises; and
- e) provide the training required by Targeted Labour and Targeted Enterprises to commence with the construction of the Works.

### **D1005.02 Duties of the Contractor**

During the Mobilisation Period, the Contractor shall execute the following duties:

#### **a) Compile a CPG Plan**

The Contractor shall compile an acceptable CPG Plan, which sets out how he intends to achieve the various CPG targets as stated in the Specification Data. The Contractor shall distribute and implement the participation targets and Targeted Enterprise work opportunities equally and continuously over the duration of the Contract, i.e. from site establishment to completion of the Works. Where the Contractor deems such an equal and continuous distribution of the participation targets to be unachievable, he shall provide reasons and motivate it clearly in the CPG Plan.

The CPG Plan shall provide the detail of the Targeted Enterprise work programme, as well as the contents and value of the work packages. See Appendix 10 for the CPG Plan format.

The Targeted Enterprise work programme shall be in line with the Works Programme and once the CPG Plan has been accepted by the Engineer, it shall be captured in the Works Programme.

The Mobilisation Period shall only be concluded once the CPG Plan has been accepted by, and all the duties above have been executed to the satisfaction of, the Engineer after consultation with the Employer.

The Employer and the Engineer shall monitor progress and adherence to the CPG Plan in the same manner as they would monitor the Works Programme.

**b) Compile a Training and Skills Development Plan**

The Contractor shall compile an acceptable Training and Skills Development Plan, which sets out how he intends to achieve the various CSDG targets as per the Contract Documentation, Part C3, Section D1010 and in line with the CIDB Standard for Developing Skills through Infrastructure Contracts August 2013.

The Training and Skills Development Plan shall provide the detail of the training methods selected for implementation as described in clause D1010.05 and shall include an execution programme for acceptance by the Engineer, which shall demonstrate its correlation with the Works Programme.

The Mobilisation Period shall only be concluded once the Training and Skills Development Plan has been accepted by the Engineer after consultation with the Employer.

The Employer and the Engineer shall monitor progress and adherence to the Training and Skills Development Plan in the same manner as they would monitor the Works Programme.

**c) Subcontracting of Targeted Enterprises**

During the Mobilisation Period the Contractor shall execute the following duties w.r.t. the subcontracting of Targeted Enterprises:

- i) Liaise with the Employer, Engineer and PLC to structure and finalise the work packages to be subcontracted to Targeted Enterprises.
- ii) Liaise with the Employer, Engineer and PLC to determine the Targeted Enterprise Database criteria for the subcontracting of Targeted Enterprises.
- iii) Compile the Targeted Enterprise Database(s) for sign off by the PLC.
- iv) Undertake a skills audit of the Targeted Enterprises which appear on the Targeted Enterprise Database(s).
- v) Based on the skills audit, and in consultation with the PLC, identify the pre-tender training requirements of Targeted Enterprises.
- vi) Provide an opportunity to Targeted Enterprises to receive the identified pre-tender training.
- vii) Tender the initial work packages and subcontract the first group of Targeted Enterprises for commencement of the Works.

**d) Employment of Targeted Labour**

During the Mobilisation Period the Contractor shall execute the following duties w.r.t. the employment of Targeted Labour:

- i) Liaise with the PLC and the PLO on the compiled Targeted Labour Database(s) for the employment of Targeted Labour.
- ii) Undertake a skills audit of the Targeted Labour which appear on the Targeted Labour Database(s).
- iii) Based on the skills audit, and in consultation with the PLC, identify the training requirements of Targeted Labour to enhance their employability.
- iv) Provide an opportunity to eligible Targeted Labour to receive the identified training to enhance their employability.
- v) Select and appoint the first group of Targeted Labour for commencement of the Works.

**e) Training Requirements**

The Contractor will not be able to address all the training requirements identified for Targeted Labour and Targeted Enterprises during the Mobilisation Period and it is accepted that training will take place over the duration of the Contract.

The training provided to both Targeted Enterprises and Targeted Labour during the Mobilisation Period shall focus on the activities and/or skills required for the



commencement of the Works and shall include the mandatory Occupational Health and Safety training.

## **D1006 THE ROLE OF THE ENGINEER**

The role and responsibilities of the Engineer are clearly described in the Conditions of Contract. This section elaborates on the Engineer's duties with respect to Stakeholder and Community Liaison, Targeted Labour Employment and Targeted Enterprise subcontracting.

Together with the Employer and the Contractor, the Engineer is also a party to the PLC and hence, is co-responsible for successful project Stakeholder and Community liaison.

In addition, the Engineer shall play a supporting role to the Contractor in the successful implementation of the Employer's Targeted Labour and Targeted Enterprise utilisation and development goals.

### **D1006.01 Duties During the Design Phase**

During the design phase, the Engineer undertook a preliminary skills and resources audit of the Targeted Enterprises in the Project Area. The purpose of the audit was to:

- a) obtain an understanding of the Community's skills, both academically and occupationally;
- b) obtain an understanding of the resources within the Community, i.e. Targeted Enterprise availability and capabilities;
- c) establish the CPG targets for Targeted Enterprises and Targeted Labour for inclusion of the Specification Data; and
- d) identify tender and other relevant training to be offered to Targeted Enterprises and Targeted Labour to prepare them for tendering and to enhance their employability.

### **D1006.02 Duties During the Construction Phase**

To implement the Employer's Targeted Labour and Targeted Enterprise goals, the Engineer shall provide support to the Contractor by executing the following duties:

#### **a) Targeted Enterprise Subcontracting**

- i) Make recommendations to the Contractor in identifying and structuring the work packages to be subcontracted to Targeted Enterprises and approve the scope and extent of the work packages.
- ii) Verify that the Targeted Enterprise Database(s) has been updated prior to the letting of every new set of subcontracts.
- iii) Approve tender procedures, tender documents, tender submission requirements and adjudication processes for the subcontracting of Targeted Enterprises.
- iv) Review all tender adjudication reports and monitor that the criteria and procedures applied by the Contractor to subcontract Targeted Enterprises are executed in a fair and transparent manner and are within the Employer's and Government's Supply Chain Management Policies.
- v) Verify that subcontract agreements and the conditions of subcontracting with Targeted Enterprises are fair and transparent and within the prescripts of the Contract requirements.
- vi) Monitor the management of Targeted Enterprise subcontracts and ensure that conditions such as the application of penalties, the termination of contracts, etc. are applied in a fair and transparent manner and within the prescripts of the agreement.

#### **b) Targeted Labour Employment**

- i) Verify that the Labour Database(s) from which Targeted Labour will be employed is updated prior to every new Labour intake.

- ii) Monitor that the criteria and procedures applied by the Contractor to employ Targeted Labour are executed in a fair and transparent manner and is within the Contract requirements.
- iii) Monitor that the conditions of employment of Targeted Labour are applied in a fair and transparent manner and within the prescripts of the current and relevant Labour legislation.

**c) Target Group Training Requirements**

- i) Make recommendations to the Contractor in identifying the training requirements of Targeted Labour and Targeted Enterprises and approve the proposed training programmes.
- ii) Monitor that training programmes and support programmes, which the Contractor committed to, are implemented and executed as intended.

**~~D1007 TENDER PROCESS FOR TARGETED ENTERPRISES~~**

~~While the Contractor may utilise service providers, sub-contractors and suppliers of its choice and selected via its own internal processes, for the subcontracting of Targeted Enterprises based on the Employer's Contract Participation Goals, the Contractor shall follow the prescripts of this Section D.~~

**~~D1007.01 Targeted Enterprise (TE) Procurement Coordinator~~**

~~The Contractor shall appoint a TE Procurement Coordinator to facilitate the subcontracting of work to Targeted Enterprises as defined in the Specification Data. For Contracts with a value of less than R 100 million the Contractor may appoint a TE Procurement Coordinator from its site staff. For Contracts with a value of more than R 100 million the Contractor shall employ or subcontract a dedicated TE Procurement Coordinator, whose sole responsibility will be the management of Targeted Enterprise procurement and sub-contracting matters.~~

~~The TE Procurement Coordinator shall be knowledgeable of, and have experience in, the management of road construction and ancillary works, National Treasury supply chain management legislation and regulations, and stakeholder relations management.~~

~~Under the auspices of the PLC, the TE Procurement Coordinator shall conduct the tender processes and procedures for Targeted Enterprise subcontracting as prescribed in this Section D and shall adhere to the Employer's and Government's Supply Chain Management Policies and requirements as set out in the Contract Documentation. Part C3, Section D.~~

**~~D1007.02 Procedures for Targeted Enterprises Subcontracting~~**

~~The Contractor shall utilise the Employer's proforma tender and contract document for Targeted Enterprise subcontracting. The proforma subcontract document is attached as Appendix 11 and an electronic version will be provided to the Contractor on award.~~

~~The identification and application of the eligibility and functionality criteria, and conducting the tender processes and procedures for subcontracting include, amongst others, the following tasks:~~

**~~a) Tender Preparation~~**

- ~~i) Compile preliminary list of subcontracting work packages~~

~~Based on the Specification Data and the Scope of the Works, the Contractor shall compile a preliminary list of the work packages (scope of work and number of packages) that are anticipated to be subcontracted to Targeted Enterprises.~~

~~The Contractor shall refer to the construction activities that have been identified as being suitable for construction by Targeted Enterprises as listed in Section D1009 of these Project Specifications, and to any other construction~~

activities which are required to execute the Works in terms of this Contract, to determine how to unbundle or package subcontracts for Targeted Enterprises.

ii) ~~Conduct a market analysis and resources and skills audit~~

~~Based on the preliminary list of work packages, the Contractor shall conduct a market analysis and resources and skills audits to determine the availability of the required resources and skills in the Project Area to execute the anticipated subcontractor work packages. The Contractor shall consult the following databases as a minimum:~~

- ~~a. Construction Industry Development Board (CIDB)'s contractor database (not applicable to suppliers and non-construction services).~~
- ~~b. National Treasury's Central Supplier Database (CSD) to be obtained from the Employer.~~

iii) ~~Call for an expression of interest~~

~~In addition to consulting the CIDB contractor database and National Treasury's CSD, the Contractor shall call for an expression of interest, which shall be published in newspapers and at locations as agreed by the PLC.~~

~~For each group of work packages, the call for an expression of interest shall outline:~~

- ~~a. evaluation and selection criteria such as eligibility, preference and functionality.~~
- ~~b. compliance requirements such as CSD and CIDB registration, tax clearance and COID.~~
- ~~c. the anticipated scope of the works to be undertaken.~~

iv) ~~Establish a Targeted Enterprise Helpdesk~~

~~Other than informing the Contractor's market analysis and resources and skills audits, the purpose of the call for an expression of interest is to alert Targeted Enterprises of the subcontracting opportunities and inform them of the anticipated eligibility, preference and functionality criteria, as well as of the compliance requirements.~~

~~The Contractor shall enhance the readiness of Targeted Enterprises to participate in the subcontracting opportunities by establishing a helpdesk at a suitable and easily accessible location in the Project Area.~~

~~The Contractor shall provide guidance to Targeted Enterprises in getting their statutory requirements in order in anticipation of the subcontracting opportunities. The helpdesk shall assist with, or provide guidance in, registering with the CSD and the CIDB, obtaining tax clearance and COID compliance and any other relevant qualifying requirements.~~

v) ~~Compile Preliminary Targeted Enterprise Database~~

~~Based on the CPG targets listed in the Specification Data and the information obtained from the activities described in paragraphs ii) and iii) above, the Contractor shall compile a Preliminary Targeted Enterprise Database.~~

~~In compiling the preliminary Targeted Enterprise Database, the Contractor must bear in mind that the bench mark for an adequate number of tenderers to ensure a competitive tender process is ten (10) tenderers that are able to achieve the functionality threshold during the tender evaluation.~~

vi) ~~Identify Targeted Enterprises, Target Groups and Project Area(s)~~

~~Based on the CPG targets listed in the Specification Data and the Preliminary Targeted Enterprise Database, the Contractor shall identify the:~~

- ~~a. Targeted Enterprises (CIDB grades and types); and~~

- ~~b. Designated Groups (woman, youth, etc.) which are anticipated to benefit from the subcontracting opportunities; and~~
- ~~c. Project Area(s) from which Targeted Enterprises will be given preference for subcontracting opportunities.~~

~~vii) Compile a Contract Participation Goal (CPG) Plan~~

~~The Contractor shall utilise all the information gathered from the activities described in the paragraphs above to compile an acceptable CPG Plan. The plan shall contain:~~

- ~~a. a list of work packages (scope of work and number of packages) to be subcontracted to Targeted Enterprises;~~
- ~~b. procurement, award and execution dates for the work packages, distributed over the duration of the Works Contract (from site establishment to completion of the Works) to ensure continuous work opportunities;~~
- ~~c. the preliminary Targeted Enterprise Database(s) for each work package;~~
- ~~d. the Targeted Enterprises (CIDB grades and types) and Designated Groups (woman, youth, etc.) which are to benefit from the subcontracting opportunities;~~
- ~~e. the Project Area(s) from which Targeted Enterprises will be given preference for subcontracting opportunities; and~~
- ~~f. the tender evaluation and selection criteria for the respective work packages.~~

~~viii) Acceptance of the CPG Plan~~

~~The Contractor shall submit the CPG Plan to the Engineer for acceptance after which it shall be tabled to the PLC for their information.~~

~~The Contractor shall ensure that the tender requirements and the outcome of different tendering scenarios are explained to the PLC, specifically with respect to the outcomes of evaluating:~~

- ~~a. Eligibility criteria;~~
- ~~b. Functionality structuring and scenarios;~~
- ~~c. Price and Preference;~~
- ~~d. Compliance requirements; and~~
- ~~e. Negotiation processes (if applicable).~~

~~If required, the Contractor shall make amendments to the CPG Plan based on the Engineer's instructions.~~

~~ix) Compile tender documents~~

~~The Contractor shall compile the tender documents for each Targeted Enterprise subcontract work package and shall utilise the Employer's proforma document for Targeted Enterprise subcontracting (see Appendix 11).~~

~~In compiling the subcontract tender documents, the Contractor shall include in each tender document relevant Conditions of Tender and the FIDIC subcontract agreement. The Contractor shall compile each subcontract tender document in a manner that facilitates the achievement of all objectives and principles pertaining to the development of the Targeted Enterprises.~~

~~The draft subcontract tender documents shall be approved by the Engineer before letting the tender.~~

## **~~b) Tender Process~~**

### **~~i) Advertise the subcontract packages~~**

~~The Contractor shall advertise and invite tenders from Targeted Enterprises for the respective subcontract packages. Advertisements shall be placed in local newspapers, on community notice boards, on SANRAL's electronic supply development desk portal (<https://sanralesdd.co.za>), and any other place or medium as agreed with the PLC.~~

~~If the Employer has a pro-forma Tender Notice available, the Contractor shall use this document.~~

### **~~ii) Conduct a tender briefing and tender training session~~**

~~For each group of subcontract packages, the Contractor shall conduct a compulsory briefing session to explain the tender process, the evaluation and selection criteria and the scope of the works to the Targeted Enterprises.~~

~~An Attendance Register shall be completed by all attendees and Minutes shall be taken during the briefing session. The Minutes of the briefing session shall be distributed to all attendees as an Addendum to the Tender Documents.~~

~~The Contractor shall conduct a "how to complete a tender document" training session as a component of the tender briefing to interested Targeted Enterprises. The level of detail and hence the duration of the training session shall be informed by the findings of the resources and skills audit conducted during the Tender Preparation Phase.~~

~~The Contractor shall engage with the Employer's Regional Transformation Officer on the Employer's SMME Pre tender Training and Development Programme and utilise this programme if it is available at the time in the Project Area. The Regional Transformation Officer's contact details are provided in the Specification Data:~~

~~Notes of this training session shall be distributed to all attendees of the briefing session as an Addendum to the Tender Documents, irrespective if they have attended the training session or not.~~

~~A separate Attendance Register shall be completed for the training session for future reference.~~

### **~~iii) Minimum tender submission documents~~**

~~It shall be a condition of tender that Targeted Enterprises include in their tender submissions the following documentation (if applicable, based on the subcontract type e.g. construction, supply or services):~~

- ~~a. Proof of the Tenderer's B-BBEE contributor level.~~
- ~~b. Proof that the Tenderer is an EME or QSE entity.~~
- ~~c. Proof that the Tenderer is registered on National Treasury's CSD.~~
- ~~d. Proof of the Tenderer's locality (address registered with the CIPC).~~
- ~~e. Proof that the Tenderer is registered with the CIDB in the required grading and class (not applicable to suppliers).~~
- ~~f. Proof that the Tenderer is compliant with the COID Act.~~
- ~~g. Proof that the Tenderer is tax compliant.~~

### **~~iv) Tender closure and opening of tenders~~**

~~Tenders for the subcontract packages shall close at a stipulated time and date. Tenders shall be submitted to the Contractor in the format and at the address prescribed by the Contractor in the subcontract Tender Data.~~

~~The tender opening shall be conducted by the Contractor who shall publicly announce and record the names of all bidders and their tender prices.~~

v) ~~Finalise Targeted Enterprise Database~~

~~The purposes of the preliminary Targeted Enterprise Database are described in paragraph (a)(v) of the Tender Preparation phase above of which one is to alert Targeted Enterprises to assess their readiness to participate in the project's subcontractor opportunities.~~

~~The period between the Contractor's call for an expression of interest and the date of closure of the relevant subcontract tender allows for prospective Tenderers to become compliant to the database criteria. The preliminary database is thus a "live" database until the date of tender closure.~~

~~On the date of tender closure, the Contractor shall request the Employer to print out a list from National Treasury's CSD, of entities that adheres to the Targeted Enterprise Database criteria. This list shall become the Final Targeted Enterprise Database for relevant subcontract tender and shall be submitted to the PLC for sign-off.~~

c) ~~Tender Evaluation~~

~~The Contractor shall evaluate the tenders and it shall be a condition of tender that tenders will only be accepted from Targeted Enterprises that fully comply with the definition of a Targeted Enterprise as described in this Section D.~~

~~The Contractor shall evaluate the tenders based on (1) Eligibility, (2) Functionality, (3) Price and Preference, and (4) Compliance.~~

i) ~~Stage 1 – Eligibility~~

~~Tenderers shall be checked for their eligibility to tender for the advertised subcontract packages based on the following eligibility criteria:~~

- ~~a. Proof that the Tenderer is registered with the CIDB (if applicable).~~
- ~~b. Proof that the Tenderer is registered on National Treasury's CSD~~
- ~~c. Proof that the Tenderer is registered with the CIPC.~~
- ~~d. The Tenderer's B-BBEE contributor level; and~~
- ~~e. Proof that the Tenderer is an EME or a QSE.~~
- ~~f. Proof that the Tenderer falls within one or more of the designated groups as per the Specification Data (if applicable).~~

~~Eligible Tenderers shall be further evaluated against the functionality criteria.~~

ii) ~~Stage 2 – Functionality~~

~~No Targeted Enterprise may be prohibited from responding to the invitation to tender, however, preference shall be given to those Targeted Enterprises that adheres to the tender criteria which, amongst others, shall be measured by means of a functionality evaluation.~~

~~To ensure Targeted Enterprise participation as it is intended by the Employer and as defined in the Specification Data, Functionality shall be scored based on the type of subcontract package, e.g. construction or the supply of goods or services and at least three (3) or more of the criteria listed below shall be applied.~~

~~The points allocated for the listed criteria shall be clearly demonstrated to tenderers as a matrix in the tender document. The functionality matrixes provided in the Employer's proforma document for Targeted Enterprise subcontracting (Appendix 11) shall be applied to evaluate the functionality of Tenderers.~~

~~Tenderers must score a minimum of 75% for functionality and Tenderers that do not obtain the threshold shall not be evaluated further.~~

a. ~~Locality~~

~~For lower CIDB grade packages, the points allocated for Locality typically has a higher weighting in the total evaluation points but shall not be more than 65% of the total evaluation points.~~

~~Points scored shall be based on the Targeted Enterprise's registered address with the CIPC.~~

i. ~~If the Targeted Enterprise is more than twelve (12) months old and the company address:~~

~~(a) was changed with the CIPC in the twelve (12) months prior to the tender advertisement; or~~

~~(b) does not correlate with the company address recorded on the CSD,~~

~~the Targeted Enterprise shall provide additional proof of its address in the twelve (12) months preceding the tender advertisement date and that the address is current by submitting the following:~~

~~(i) for urban areas:~~

~~1. signed lease agreement confirming occupation in the preceding twelve (12) months; or~~

~~2. mortgage statement confirming ownership in the preceding twelve (12) months; and~~

~~3. a current utility bill (not older than three (3) months) confirming that occupation is current; or~~

~~(ii) for semi urban and rural areas~~

~~1. an affidavit from the relevant ward councillor or traditional authority, signed and stamped by a registered commissioner of oaths, which confirms that the business has been operating from the said address in the preceding twelve (12) months.~~

ii. ~~If Targeted Enterprise is less than twelve (12) months old and the company address:~~

~~a. was changed with the CIPC in the twelve (12) months prior to the tender advertisement; or~~

~~b. does not correlate with the company address recorded on the CSD,~~

~~the oldest registered address on either the CIPC or the CSD will be accepted as the Targeted Enterprise's address for the purpose of scoring locality points.~~

iii. ~~If the Targeted Enterprise intends to operate from a branch office for the purpose of the anticipated subcontract, the same additional proof that the company has been operating from the branch office in the twelve (12) months prior to the tender advertisement date must be provided as listed in the paragraphs above.~~

iv. ~~If the above additional proof of address cannot be provided, locality points shall be awarded based on the tenderer's address registered with the CIPC in the twelve months prior to the tender advertisement date.~~

b. ~~Equipment~~

~~For lower CIDB grade packages, the points allocated for Equipment typically has a lower weighting in the total evaluation points.~~

~~The combined points allocated for Equipment and Experience shall not be more than 35% of the total evaluation points.~~

~~c. Experience~~

~~For lower CIDB grade packages, the points allocated for Experience typically has a lower weighting in the total evaluation points.~~

~~The combined points allocated for Equipment and Experience shall not be more than 35% of the total evaluation points.~~

~~d. CIDB grade and class~~

~~The points allocated for CIDB grade and class shall not be more than 35% of the total evaluation points.~~

~~CIDB grade and class shall not be used as an evaluation criterion for packages pertaining to the supply of material, goods and/or services.~~

~~e. Project Specific Designated Groups; e.g. woman, youth, etc.~~

~~In addition to the eligibility criteria for preferential procurement functionality points may also be allocated for the following Designated Groups:~~

- ~~i. Tenderer is 51%+ owned by black people who are youth.~~
- ~~ii. Tenderer is 51%+ owned by black people who are women.~~
- ~~iii. Tenderer is 51%+ owned by black people with disabilities.~~
- ~~iv. Tenderer is 51%+ owned by black people who are military veterans.~~

~~The points allocated for Designated Groups shall not be more than 15% of the total evaluation points.~~

~~One, two or three of the Designated Groups listed above may be selected to count towards the score for Designated Groups.~~

~~If any one of the Designated Groups listed above is already an eligibility criterion, it must not be included as a functionality criterion as well.~~

~~The inclusion of any of the Designated Groups listed above shall be based on the Contractor's Resources and Skills Audit.~~

~~Youth and veterans may not be selected together.~~

~~iii) Stage 3 – Price and Preference~~

~~Tenderers that obtained the minimum threshold for functionality shall be further evaluated on their Price and Preference submissions, i.e.:~~

- ~~a. Price = 80 / 90 %~~
- ~~b. Preference = 20 / 10 %~~

~~The highest scoring tenderer for each subcontract package shall be checked for compliance.~~

~~The Contractor shall state in the tender advertisement and in the tender documents that only one subcontract package shall be awarded to an entity at any one time for this project, meaning that a Targeted Enterprise may be awarded a work package and on conclusion thereof may be awarded a subsequent work package, but more than one work package may not be awarded simultaneously for this project.~~

~~If a tenderer tendered for more than one subcontract package and scored the highest points in more than one package, the Contractor shall award to the tenderer the work package that has the most economic benefit to the Employer.~~



iv) ~~Stage 4 – Compliance Check~~

~~The highest scoring tenderer for each subcontract package shall be checked for compliance with respect to the following criteria:~~

- ~~a. Proof that the Tenderer is compliant with the COID Act (excl. CIDB 1 and 2 subcontractors).~~
- ~~b. Proof that the Tenderer is tax compliant.~~

~~If the highest scoring tenderer fails to meet any of the compliance criteria, he will be given seven (7) calendar days to become compliant.~~

~~If the highest scoring tenderer fails to submit the requested compliance information in the required timeframe, he shall be deemed non-compliant and the evaluator shall check the second highest tenderer for compliance. This process is repeated until a compliant tenderer has been identified.~~

**d) ~~Appoint successful Targeted Enterprises~~**

i) ~~Table the Tender Report to the PLC~~

~~The Contractor shall present the Tender Report for each subcontract package to the Employer and the Engineer and thereafter table it to the PLC prior to award of the subcontract.~~

ii) ~~Negotiating tender sum and/or rates with Targeted Enterprises~~

a. ~~Rates~~

~~If the Contractor choose to include work for which he has tendered rates in the subcontract package and the tenderer who scored the highest points tendered higher rates than that of the Contractor, the Contractor may negotiate rates and the final sum with the tenderer.~~

~~If the Contractor fails to negotiate a reasonable tender sum or rates with the tenderer, he may:~~

- ~~i. approach the second highest points scoring, compliant tenderer for negotiation. This process may be repeated up to the third highest points scoring compliant tenderer, where after the package shall be retendered. The Contractor shall be limited to negotiate down to 25% above his own rates (this process must be clearly explained prior to negotiation, when the tender report is tabled to the PLC); or~~
- ~~ii. accept the highest points scoring tenderer's higher rates and total sum and remunerate the sub-contractor at the sub-contractor's tendered rates from the lump sum which the Contractor has tendered for the fluctuation between the Contractor's rates and that of the Targeted Enterprise sub-contractors.~~

b. ~~Provisional Sum~~

~~If the Employer has provided a provisional sum for the work items in the subcontract package, the Contractor shall report on the feasibility of the highest point scoring compliant tenderer's tender rates and tender sum to the Employer and the Engineer.~~

- ~~i. If the highest points scoring compliant tenderer's rates and tender sum are deemed market related by the Engineer, the Contractor shall obtain the Employer's approval to utilise the provisional sum provided for the work items.~~
- ~~ii. If the highest points scoring compliant tenderer's rates and tender sum are deemed not market related and the Employer does not approve the utilisation of the relevant provisional sum, the Contractor may negotiate with the tenderer for market related rates and tender sum.~~

- iii. ~~If the Contractor fails to negotiate market related rates and a tender sum with the tenderer, he may:~~
  - ~~(a) approach the next highest point scoring, compliant tenderer for negotiation. This process may be repeated up to the third highest points scoring compliant tenderer, where after the package shall be retendered; or~~
  - ~~(b) accept the highest points scoring tenderer's rates and total sum and remunerate the sub-contractor from the lump sum which the Contractor has tendered for the fluctuation between the Contractor's rates and that of the Targeted Enterprise sub-contractors. The Contractor shall not pay rates or tender sums that are more than 15% higher than what are deemed market related by the Engineer.~~

iii) ~~Low tender sums submitted by Targeted Enterprises~~

~~The Contractor shall report to the Employer and the Engineer on the feasibility of tendered rates, sums or provisional sums of tenderers who tendered exceptionally low. Exceptionally low rates, sums or provisional sums are those that are more than ten percent (10%) less than what the Contractor tendered or, in the case of a provisional sum, what is deemed market related by the Engineer.~~

- ~~a. If the tendered rates, sums or provisional sums of those tenderers who tendered exceptionally low are deemed by the Engineer to still be feasible, the Contractor may continue to include these tenders in his tender evaluation.~~
- ~~b. If the tendered rates, sums or provisional sums of those tenderers who tendered exceptionally low are deemed by the Engineer to not be feasible, the Contractor may disqualify these tenders from his tender evaluation.~~

~~The Employer strongly discourages the appointment of Targeted Enterprises that did not tender feasible rates, sums or provisional sums. If all prices submitted are deemed exceptionally low by the Engineer, the subcontract package shall be retendered.~~

~~The consequences of exceptionally low prices must be clearly outlined in the Tender Report and clearly explained to the PLC prior to award or retendering of the subcontract packages.~~

iv) ~~Payment to the Contractor~~

- ~~a. The Employer shall not remunerate the Contractor, other than what have been provided for in the payment items, for accepting higher tender sums tendered by Targeted Enterprises.~~
- ~~b. If the Contractor accepts tender sums that are higher than what have been provided for in the Contractor's tendered rates or the Employer's provisional and/or prime cost sums, the costs shall be paid by the Contractor from the lump sum which he tendered for the fluctuation between the Contractor's rates and that of the Targeted Enterprise sub-contractors.~~

v) ~~Entering the Subcontract Agreement~~

~~The Contractor's TE Procurement Coordinator shall assist successful Targeted Enterprises to enter into a subcontract agreement with the Contractor as described in this Specifications.~~

**D1008 GENERAL RESPONSIBILITIES OF THE CONTRACTOR TOWARDS TARGETED ENTERPRISES**

The Contractor shall have the responsibilities described in this Section, D1008, towards all Targeted Enterprises subcontracted in terms of the CPG as stated in the Specification Data.

**D1008.01 Targeted Enterprise (TE) Construction Manager**

The Contractor shall appoint a dedicated TE Construction Manager whose sole responsibility shall be to assist the Contractor with the execution of his responsibilities towards Targeted Enterprises and Target Groups as prescribed in this Section D, with an emphasis on D1008 and D1010.

Amongst others, the TE Construction Manager shall facilitate the training, mentoring, development and support of Targeted Enterprises as per the Contractor's approved Training and Skills Development Programme (see Section D1010).

**a) TE Construction Manager's Qualifications and Experience**

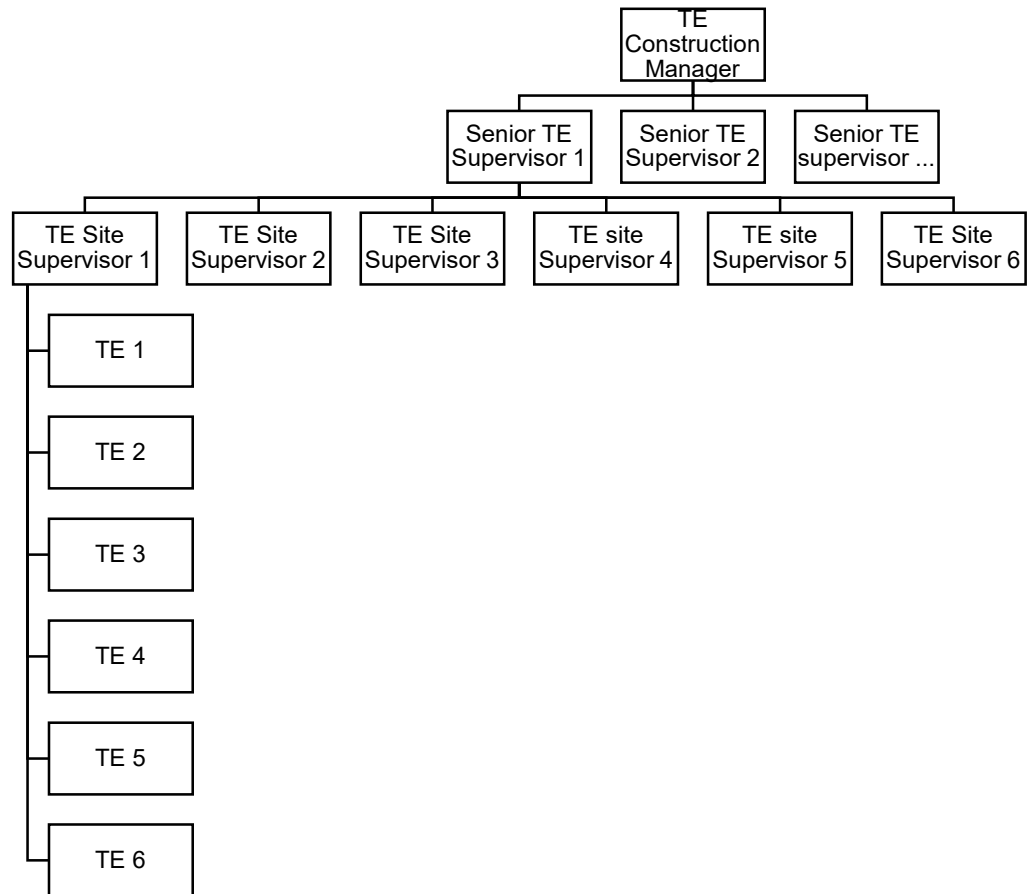
The TE Construction Manager shall have, as a minimum, a National Diploma: Management of Civil Engineering Construction Processes (NQF Level 5) or an equivalent qualification.

The TE Construction Manager shall have at least 5 years' experience as a Site Agent, managing construction processes in the fields of roads maintenance, new roads construction, roads rehabilitation, roads structures, etc. In addition, he shall have ample knowledge of, and experience in, the requirements of training and mentoring in the road construction environment.

**b) TE Construction Manager's Team**

The TE Construction Manager shall have on his team one (1) TE Site Supervisor for every six (6) Targeted Enterprises which are in their respective construction phases and one (1) Senior TE Supervisor for every six (6) TE Site Supervisors.

The qualifications and/or experience of TE Site Supervisors and Senior TE Supervisors shall be relevant and of a suitable level to enable them to supervise the level of Targeted Enterprise and the specific works under construction. Below is an indicative organogram of the TE Construction Manager and his team.



#### **D1008.02 General Obligations**

The Contractor shall, with the assistance of the TE Construction Manager, comply with the following general obligations:

- a) Assist the Targeted Enterprises in instituting a quality assurance system;
- b) Provide adequate training, coaching, guidance, mentoring and any other identified and approved assistance to Targeted Enterprises;
- c) Provide support and any other identified and approved assistance to ensure that the Targeted Enterprises meet their obligations and commitments with respect to their subcontracts, and
- d) Ensure that the CPG objectives are achieved.

#### **D1008.03 Subcontract Agreements**

The Contractor shall conclude subcontract agreements with each subcontracted Targeted Enterprise. The subcontract agreement shall be the FIDIC subcontract agreement and shall be in accordance with the provisions of amended sub-clause 4.4 of the Conditions of Contract and shall be consistent with the terms and conditions of this Contract.

##### **a) Special Conditions of Contract**

The following Special Conditions of Contract shall be included in the subcontract agreement:

- i) The Targeted Enterprise's entitlement to receive the training contemplated in this Contract;
- ii) The Targeted Enterprise's obligation to participate and co-operate in the training provided for in this Contract;
- iii) The allowable sources from which Labour may be drawn in terms of the Contract;
- iv) The terms and conditions relating to the recruitment, employment and remuneration of Labour engaged on the Contract;
- v) The training to be provided to the Targeted Enterprise's workforce;
- vi) The terms and conditions related to payment of the Targeted Enterprise;

- vii) Sanctions in the event of failure by the Targeted Enterprise to comply with the terms and conditions of the subcontract agreement; and
- viii) Dispute avoidance and resolution procedures.

Further Special Conditions of Contract shall only be included into the subcontract agreement once approved by the Engineer.

**b) Monitoring of Subcontract Agreements by the PLC**

The proforma subcontract agreement for each group of work packages shall be tabled to the PLC for their information. Special Conditions of Contract, in addition to those listed in (a) above shall be developed under the auspices of the PLC.

The PLC may at any stage during the Contract request proof that subcontract agreements were entered into with the subcontracted Targeted Enterprises. The PLC may also request insight into the Conditions of Subcontract and Subcontract Data.

To protect Targeted Enterprises' competitive advantage and/or tender strategy, only the subcontract agreement shall be available to the PLC for perusal and not the pricing structure and/or Schedule of Quantities.

A copy of each subcontract agreement shall be filed with the Engineer after confirming that it is in accordance with the provisions of this Contract.

**D1008.04 Payment of Targeted Enterprises**

Targeted Enterprises shall be paid the rates and/or provisional sums which they have tendered, or which have been negotiated as described in this Section D of the Specifications.

**a) Payment of Provisional and General Obligations**

Provision shall be made in the subcontract agreement for the Targeted Enterprise's preliminary and general obligations (P&Gs), which shall be calculated as a minimum of 15% of the value of the scheduled subcontract work items.

Where the Contractor's subcontract work is not paid from a provisional sum, the P&Gs of the Targeted Enterprise shall be paid from the lump sum tendered by the Contractor for the P&Gs of Targeted Enterprises.

P&Gs shall be paid to Targeted Enterprises as per Section C1.3.1 of the COTO specification payment items, i.e.:

- i) C1.3.1.1 paid in 3 instalments of 50%, 35% and 15%;
- ii) C1.3.1.2 paid as a percentage of the total value progressively per certificate;
- iii) C1.3.1.3 paid monthly for the sub-contractor's contract duration.

**D1008.05 Quality of Work and Performance of Targeted Enterprises**

**a) Ensuring Quality of Work and Performance**

The Contractor's TE Construction Manager shall closely monitor and supervise all Targeted Enterprises and shall train, coach, guide, mentor and assist each Targeted Enterprise 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 by the Contractor shall be commensurate with the level of subcontract applicable and shall be directed at enabling the Targeted Enterprise to achieve the successful execution and completion of its subcontract.

**b) Failure by the Targeted Enterprise to Comply**

If the Targeted Enterprise, in the opinion of the Engineer, fails to comply with any of the criteria listed below, the Engineer shall issue a written warning to the Contractor stating all the areas of non-compliance. A copy of the letter of warning shall be forwarded to the Employer. The criteria are as follows:

- i) Deliver acceptable standard of work as set out in the specifications;
- ii) Progress in accordance with the time constraints in the subcontract agreement;
- iii) Punctual and full payment of the workforce and suppliers;
- iv) Site safety; and
- v) Accommodation of traffic.

**c) Assist the Targeted Enterprise to Make Good**

The Contractor shall give reasonable warning to the Targeted Enterprise when any contravention of the terms and conditions of the subcontract agreement has occurred or appears likely to occur. The Contractor shall, whenever feasible, give the Targeted Enterprise reasonable opportunity to make good any such contravention, or to avoid such contravention, and shall render all reasonable assistance to the Targeted Enterprise in this regard.

**D1008.06 Dispute Avoidance and Resolution Procedures**

When any disputes arise, the Contractor shall explain fully to the Targeted Enterprise that such actions are provided for in the subcontract agreement. If such action is contemplated, it shall be discussed with the Engineer and tabled to the PLC before any action is taken.

The Targeted Enterprise shall have 21 calendar days from the date of receipt of the letter of warning by the Contractor to address and rectify the issues raised by the Engineer, except for issues pertaining to Site Safety and Accommodation of Traffic, 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 Targeted Enterprise to comply with a deadline, will be sufficient grounds for the Contractor to apply a penalty or terminate the subcontract agreement provided that the Employer and the Engineer are satisfied that the Contractor has made every effort to correct the performance of the Targeted Enterprise.

The Targeted Enterprise shall have the right to dispute any ruling given or deemed to have been given by the Contractor or the Engineer. Provided that, unless the Targeted Enterprise shall, within 21 calendar 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.

**D1009 WORK SUITABLE FOR EXECUTION BY TARGETED ENTERPRISES**

To assist the Contractor in achieving his CPG, the following work items have been identified as being suitable for execution by Targeted Enterprises:

- a) Erection and maintenance of the Contractor's camp site
- b) Clearing and grubbing.
- c) Removal of trees.
- d) Provision of traffic control facilities.
- e) Management of traffic control facilities and traffic safety as part of the accommodation of traffic.
- f) Construction and clearing of drains.
- g) Installation of prefabricated culverts including inlet and outlet structures.
- h) Concrete channelling and concrete linings for open drains.
- i) Construction of concrete paving, kerbs and channels.
- j) Construction of small concrete and other structures.
- k) Construction of concrete walkways.

- l) Erection of guardrails.
- m) Landscaping.
- n) Fencing.
- o) Road signs.
- p) Road markings.
- q) Finishing the road and road reserve.
- r) Site Security Services.
- s) Haulage of materials
- t) Supply of plant.
- u) Supply of fuel.
- v) Transport of labour

From the above work items, the following have been identified as suitable for execution by CIDB CE1 and CE2 Targeted Enterprises:

- a. Fencing
- b. Guardrails
- c. Road signs
- d. Side drains.
- e. Clearing and grubbing.
- f. Construction and clearing of drains.
- g. Any other work identified by the Employer to be executed in the Target Area.

The work to be carried out by Targeted Enterprises is not limited to the work listed above and the Contractor may need to engage Targeted Enterprises on other aspects of the Works to achieve the CPG.

A Provisional Sum for the work by CIDB 1 and 2 Targeted Enterprise sub-contractors is allowed under pay item D10.05.

## **D1010 TRAINING, COACHING, GUIDANCE, MENTORING AND ASSISTANCE**

The Contractor shall under the auspices of the PLC develop a Training and Skills Development Programme which shall be managed by the Contractor's TE Construction Manager.

### **D1010.01 Purpose of the Training and Skills 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 Labour and Targeted Enterprises 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 the Contractor provide adequate training, coaching, guidance, mentoring and assistance to the Targeted Labour and Targeted Enterprises to ensure skills development within the Construction Industry.

### **D1010.02 Skills Audit and Analysis**

Prior to developing the Training and Skills Development Programme(s), the Contractor shall conduct a skills audit and analysis of its own employees and those of its Subcontractors to determine their levels of education, existing qualifications, and skills sets. The outcome of the skills audit and analysis shall be used to develop a Training and Skills Development Programme(s) that will benefit both the employee and the Construction Industry at large.

Included in the skills audit and analysis shall be a separate section, analysing the education, qualifications and skills sets of the Targeted Enterprise's owners and supervisors subcontracted by the Contractor to develop a Training and Skills Development Programme that will develop and improve the ability of small business owners and their supervisory staff to better manage their enterprises.

### **D1010.03 Developing the Training and Skills Development Programme**

The Employer shall be involved in the decision making and quality control pertaining to the development and implementation of the Training and Skills Development Programme facilitated through this Contract.

The Employer has no service agreement or memorandum of understanding with any education and training quality assurance body and, therefore, does not function as the “Employer” as defined under any three-party-agreement between the Trainee, the Training Provider and the Employer.

However, the Employer requires similar outcomes to that of formal learnership programmes and the Contractor shall structure a Training and Skills Development Programme in a manner that permits continued access to further learning and qualifications within a defined programme.

The complete Training and Skills Development Programme shall be developed during the Mobilisation Period, accepted by the Engineer after consultation with the Employer and tabled to the PLC for their information before any training commence.

#### **D1010.04 The Training Service Provider**

While the Contractor’s TE Construction Manager will manage the Training, Development and Support Programme and mentor Targeted Enterprise subcontractors from a practical point of view, the Contractor shall subcontract a Training Service Provider to implement the theoretical training components of the Programme by applying the Employer’s Supply Chain Management Policy for second tier procurement.

##### **a) Accreditation of the Training Service Provider**

The Training Service Provider entity shall be accredited, and have in its employ Practitioners, Assessors and Moderators whom are registered, with the Construction Education Training Authority (CETA). Proof of accreditation and registration shall be current, valid and list the NQF levels and Unit Standards for which the entity and its staff are accredited.

##### **b) Qualifications and Experience of the Training Service Provider**

The training and competency levels required of the Training Service Provider and his staff are outlined in the table below:

**TABLE D1010/1: QUALIFICATIONS FOR TRAINING STAFF**

<b>Designation</b>	<b>Title and Unit Standard No.</b>	<b>NQF Level</b>	<b>Credit</b>
Practitioner	Train the trainer; No 7384	4	16
Assessor	Conduct outcome base assessment; No 115753	5	15
Moderator	Conduct moderation of outcome-based assessment; No 115759	6	10

In addition to the above qualifications, and in keeping with current CETA practical experience requirements for registration as a Practitioner, NQF Level 4 Unit Standards shall only be presented by Practitioners with NQF Level 5 (one level up) credentials.

The Employer further requires that Assessors and Moderators shall have at least 5 years’ experience as a Site Agent, managing construction processes in the fields of roads maintenance, new roads construction, roads rehabilitation and structures.

Elective Unit Standards are typically more vocational orientated and may require specialist input. It is thus not a requirement that individual Practitioners and Assessors shall have all the necessary skills for all the different categories of Unit Standards. The Training Service Provider may and shall therefore, when necessary,



appoint Practitioners and Assessors on an ad hoc basis with the levels of experience which are required for the Unit Standards to be presented.

#### **D1010.05 Training and Skills Development Programme: General Requirements**

The Training and Skills Development Programme shall consist of Learnerships that include multiple, but related Unit Standards which are (1) relevant to the Works to be constructed, (2) aimed at achieving the skills development objectives of the Programme, and (3) lead towards a formal qualification in the Construction Industry.

Learnerships shall include both the theoretical and practical components of each Unit Standard and shall be in accordance with the various laws and regulations contained in the South African Qualification Authority (SAQA) statutes.

##### **a) Training Programme: Requirements and Considerations**

The Skills Audit and Analysis shall inform the Contractor of every employee's Recognised Prior Learning (RPL) skills and competencies, which shall be taken into consideration in the development of the Training and Skills Development Programme so that the RPL skills and competencies, together with the Training Programme Unit Standards offerings, will lead to a full Learnership outcome and hence a formal qualification.

It is recognised that the Training and Skills Development Programme may consist of several Unit Standards but totalling insufficient credits for a full Learnership qualification. Nevertheless, the competencies and credits achieved in the Programme shall contribute to a full Learnership by a later acquisition of the outstanding Unit Standards required for the full Learnership.

The Training and Skills Development Programme shall be structured in a manner to prioritise those Unit Standards that will equip Trainees with the minimum skills required to become economically involved in the execution of the Works as soon as possible.

The Training Service Provider shall apply the SAQA Learnership criteria of which the basic elements are listed below to demonstrate the Employer's requirements:

- i) Minimum credits for qualification;
- ii) Fundamental Unit Standards and credit values;
- iii) Core Unit Standards and credit values;
- iv) Elective Units Standards and credit values;
- v) Assumption that NQF Level 3 literacy, numeracy, and computer competencies exist;
- vi) RPL processes;
- vii) Exit level outcomes.

The above criteria are not exhaustive, and the Training Service Provider shall apply the systems and processes required by the relevant SAQA and other related legislation pertinent to training. The Training Service Provider shall regularly consult the SAQA website ([www.saqa.org.za](http://www.saqa.org.za)) to ensure that the most current Unit Standards are presented. In the event of any conflict, the legislated requirements shall apply.

While structuring the Learnership offerings, the Training Service Provider shall distinguish between the levels of learning required. The bulk of the training shall focus on NQF Levels 4 and 3. NQF Level 5 training is not anticipated but may be suitable for qualifying staff of established small contractors. The qualification titles for the respective NQF Levels are:

- a. NQF Level 3 National Certificate: Construction Roadworks.
- b. NQF Level 4 National Certificate: Supervision of Construction Processes
- c. NQF Level 4 National Certificate: Business Management
- d. NQF Level 5 National Diploma: Management of Civil Engineering Construction Processes

It may be necessary to include additional Core Unit Standards, e.g. “Tendering” or “Entrepreneurship” as an additional Unit Standard for NQF Level 4, to achieve the Contract’s development objectives. The identification of any additional Unit Standards shall be discussed with the Engineer and shall not be implemented without prior approval.

Before qualifying, Trainees will be expected to demonstrate competence in a practical situation that integrates the assessment of all specific outcomes, for all Unit Standards in the Learnership Programme.

All training shall take place within normal working hours, or as agreed with the trainees.

#### **b) Selection of Trainees**

To complete a Learnership successfully requires minimum literacy and numeracy competencies as defined by SAQA. The Training Service Provider shall utilise the skills audit and analysis and conduct additional skills analysis to benchmark the literacy and numeracy levels of employees and Subcontractors. This information shall guide the Training Service Provider in formulating the Trainee selection methodology(ies) and process(es). The Training Service Provider shall make provision for:

- i) baseline assessments, e.g. conducting RPL enquiries and tests; and
- ii) a gap skills programme consisting of Fundamental Unit Standards, to facilitate the selection process.

Trainees identified as having already acquired some tertiary training, particularly in the field of Civil Engineering, may be suitable for a specialised Trainee programme or a higher NQF Level programme. The Training and Skills Development Programme shall, therefore, make provision for Trainees with a variety of competency levels and shall make provision for different levels of training.

It should be noted that where this section refers to the selection and training of Trainees, any person, employed by any national, provincial or local authority, being it full time or part time, is expressly excluded from being considered for this training.

#### **c) Learning Material**

Learning material is required for each Unit Standard. This learning material is the equivalent of prescribed textbooks for other qualifications. Each Trainee shall receive a copy of the learning material to learn the contents and to use it as a reference source after obtaining the qualification.

The SAQA Unit Standard curriculums define the contents of the learning material. The learning material shall not only comply with the SAQA and CETA guidelines but shall be technically and practically aligned to road construction and/or road maintenance. Any input from a subject matter expert required to ensure the appropriateness of learning material contents shall be included in the Training Service Provider’s costs.

The requirements to be addressed in learning material as outlined by the SAQA Unit Standard curriculums are, amongst others, the following:

- i) purpose of the Unit Standard;
- ii) specific outcomes (typically 4 per Unit Standard);
- iii) assessment criteria (typically 4 per specific outcome);
- iv) range as is defined for each specific outcome;
- v) critical cross-field outcomes for the Unit Standard;
- vi) Unit Standard essential embedded knowledge.

#### **d) Student Experiential Training or Learnerships or Internships**

The Employer may deploy students to the construction site to obtain experiential training. The Contractor shall provide experiential training to these students in

accordance with the relevant academic institution's requirements, which is typically a university, a university of technology, or a TVET.

The Contractor shall also provide students with all the tools (including appropriate information technology hardware and software) and site office space necessary to carry out engineering work as if they were the Contractor's own permanent staff.

Reporting on training progress of each student shall be compiled according to the formats and intervals set by the relevant academic institution.

**(e) Keeping of Records**

The Training Service Provider shall keep comprehensive records of the training provided to each Trainee and shall ensure that Trainees' successful completion of successive Unit Standards are entered onto the national SAQA database. After the successful completion of generic skills courses, each Trainee shall be issued with a certificate indicating the course contents as proof of attendance and completion. The Contractor shall keep a register of certificates issued. Whenever required, the Contractor shall provide copies of such records to the Engineer.

**(f) Generic Skills Training**

Generic skills shall be taught where the need has been identified and approved by the Employer and the Engineer.

The Contractor shall make representation to the Employer and the Engineer, who shall approve candidates that should attend such courses as they deem appropriate. Those selected shall receive formal generic skills training in a programmed and progressive manner. The PLC may also identify a need for generic skills training.

Typical training programmes could comprise some or all of the following modules:

- i) Basic hygiene and HIV/AIDS awareness;
- ii) Road safety;
- iii) Basic management of the environment;
- iv) Tourism awareness and opportunities;
- v) Managing personal finance;
- vi) Adult Basic Education and Training (ABET);
- vii) Community based training programmes (e.g. knitting, computer skills, plant/machine operator, etc.).

All generic skills training shall be accredited by the relevant Sector Education and Training Authority (SETA) and shall be provided with accredited entities and/or individuals.

**(g) Community Training**

Community training shall be taught where the need has been identified.

Affected Communities may submit their training needs to the PLC for consideration and inclusion into the Training and Skills Development Programme. While considering the training needs of the affected Communities, the Engineer shall inform the PLC of the Contract's training limitations, as well as of the training that could be undertaken through the Contract. Trainees from the Community shall be identified through the Community structures, but under the auspices of the PLC. Trainees selected from the Community shall receive formal skills training in a programmed and progressive manner in compliance with subclause D1010.04. Priority shall be given to training that will equip Community members with skills that will enhance their employability.

All community skills training shall be accredited by the relevant Sector Education and Training Authority (SETA) and shall be provided with accredited entities and/or individuals.

**(h) Training Facilities**

The Contractor shall be responsible for providing everything necessary to offer the various training workshops and modules including:

- i) a suitable venue with sufficient furniture, lighting and power,
- ii) all necessary stationery consumables and study material,
- iii) transport for attendees.

**D1011 LABOUR ENHANCED CONSTRUCTION**

The Contractor's attention is drawn to the fact that it is an objective of the Contract to maximise the labour content of certain operations or portions thereof. In this regard, where the specified work allows for a choice between mechanical or labour-enhanced means, the former should generally be kept to the practical minimum.

Before commencing with any labour enhanced operations the Contractor shall discuss his intentions with the Engineer and shall submit to the Engineer on a monthly basis, daily labour returns indicating the numbers of temporary personnel employed on the Works and the activities on which they were engaged.

It should be noted that activities that are conventionally done by labour methods, e.g. gabions, shall not qualify under this section.

**D1012 COMMUNITY DEVELOPMENT**

**D1012.01 Corporate Social Investment (CSI)**

The Contractor shall demonstrate its willingness to actively participate in the social development initiatives for local Communities affected by the Contract. To this end, the Contractor shall provide details of CSI initiatives it will actively pursue under Form D9: Corporate Social Investment. The Employer will evaluate the CSI initiatives as part of the tender evaluation under "*other objective criteria*" of the Preferential Procurement Policy Framework Act, 2000.

**D1013 MEASUREMENT AND PAYMENT**

Item	Unit
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<b>D10.01</b>	<b>Target Group Participation</b>
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(a)	Contract Participation Performance bonus	Prime Cost (PC) Sum
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The prime cost sum for item D10.01(a) shall cover any CPP bonus due as specified in clause D1003.05. The prime cost sum shall be expended in accordance with clause 13.5 of the FIDIC Conditions of Contract.

**Note:**

No separate payment shall be made for any costs incurred by the Contractor, whether direct or indirect, for his efforts in accomplishing the specified requirements, and which are not recoverable from the pay-items allowed. Such costs shall be deemed to have been included in the rate offered under pay sub-item C1.3.1.3 Contractor's Establishment on Site and General Obligations: Time Related Obligations.

Item	Unit
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<b>D10.02</b>	<b>Stakeholder and Community Liaison and Social Facilitation</b>
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(a)	Cost of liaison, social facilitation and PLC support	Prime Cost (PC) Sum
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(b)	Handling cost and profit in respect of sub-item D10.02(a)	Percentage (%)
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The prime cost sum for item D10.02(a) shall cover the direct costs incurred by attending members of the PLC. The rate of compensation shall be fair and agreed by the Engineer in accordance with clause 13.5 of the FIDIC Conditions of Contract. The tendered percentage for sub-item D10.02(b) shall include full compensation for all handling costs and profit of the Contractor associated with sub-item D10.02(a).

The liaison with, and assistance provided by the Contractor to the PLC to perform its duties shall not be paid from the prime cost sum. The Contractor's costs to liaise with the PLC and render such assistance shall be deemed to have been included in its rate offered for pay sub-item C1.3.1.3 Contractor's Establishment on Site and General Obligations: Time Related Obligations.

Item	Unit
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#### **D10.03 Tender Process for Targeted Enterprises**

(a)	Contractor's charge for the management and execution of the Targeted Enterprise procurement process:	
(i)	Procurement process for the totality of all tenders concluded for the appointment of Targeted Enterprise subcontractors of CIDB 1 and 2 contractor grading	Number (No)
(ii)	Procurement process for the totality of all tenders concluded for the appointment of Targeted Enterprise subcontractors of CIDB 3 and 4 contractor grading	Number (No)
(iii)	Procurement process for the totality of all tenders concluded for the appointment of Targeted Enterprise subcontractors of CIDB 5 and higher contractor grading	Number (No)
(iv)	Procurement process for the totality of all tenders concluded for the appointment of Targeted Enterprise suppliers	Number (No)
(b)	Targeted Enterprise Procurement Coordinator	Month

The unit of measurement for item D10.03(a) shall be the number of individual subcontract agreements concluded with Targeted Enterprise sub-contractors and suppliers in accordance with the procurement process described in this Section D.

The tendered monthly rate for subitem D10.03(b) shall include full compensation for the provision of the relevant personnel on a full-time basis to carry out the requirements in terms of subitem D10.03(a) and the full contents of this Section D.

Each tendered rate shall be in full compensation for the management and execution of the Targeted Enterprise procurement process in the relevant CIDB contractor grading designation scheduled, including for the appointment of a TE Procurement Coordinator (if required), the pre-tender training of eligible Targeted Enterprises, the compilation, printing, binding and issue of the tender documents for each tender, for the advertising of each tender, for the provision of the venue and the conducting of each compulsory briefing session for tenderers, for the conducting of each tender opening process, for the adjudication of the tenders received for each tender, for the preparation of each tender adjudication report and the review thereof in conjunction with the Employer, Engineer and the PLC, for the award of each tender and for the conclusion of the subcontract agreement with each successful Targeted Enterprise tenderer, and any other relevant requirement described in this Section D.

Item	Unit
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#### **D10.04 Responsibilities of the Contractor towards Targeted Enterprises**

C3-194

(a)	Contractor's establishment, management, management support, assistance, coaching, guidance, mentoring and supervision of Targeted Enterprises	Month
(b)	Targeted Enterprise Construction Manager	Person Month
(c)	Targeted Enterprise Site Supervisors	Person Month

The tendered monthly rate for subitem D10.04(a) shall include full compensation for the registration of all the subcontract agreements and the management of all the Targeted Enterprise subcontracts, including for the provision of the necessary management, support, coaching, guidance, mentoring and supervision of the Targeted Enterprise subcontractors.

The tendered monthly rate for subitems D10.04(b) and (c) shall include full compensation for the provision of the relevant personnel on a full-time basis to carry out the requirements in terms of subitem D10.04(a) and the full contents of this Section D.

<b>Item</b>	<b>Unit</b>
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**D10.05 Construction Works by Targeted Enterprises**

(a)	Payments associated with the construction works carried out by Targeted Enterprise subcontractors of CIDB 1 and 2 contractor grading designation appointed in terms of Section D	Provisional (Prov) Sum
(b)	Handling costs and profit in respect of payment associated with sub-item D10.05(a)	Percentage (%)
(c)	Fluctuation between the main contractor's rates and that of the Targeted Enterprise subcontractors	Lump Sum (LS)
(d)	Preliminary and General Obligations of Targeted Enterprise sub-contractors appointed in terms of Section D	Lump Sum (LS)

Expenditure under subitems D10.05(a) shall be in accordance with clause 13.5 of the FIDIC Conditions of Contract.

The provisional sum for subitem D10.05(a) is provided to cover the cost of the construction works, including preliminary and general obligations carried out by the Targeted Enterprise subcontractors of CIDB 1 and 2 contractor grading designation as certified by the Engineer, in separate payments for each Targeted Enterprise in accordance with Section D. Expenditure under subitem D10.05(a) shall be limited to the provisional sum amount stated in the Pricing Schedule. Construction works by Targeted Enterprise subcontractors of CIDB 1 and 2 contractor grading designation exceeding the provisional sum amount shall be measured for payment from the applicable work items in the Contractor's pricing schedule.

The tendered percentage for subitem D10.05(b) is the percentage of the amount actually spent under subitem D10.05(a) and shall include full compensation for the Contractor's handling costs, profit or any other costs associated with the work conducted by the Targeted Enterprise subcontractors, which are not provided for in other pay items.

The Lump Sum tendered under item D10.05(c) is for fluctuation of the Targeted Enterprise subcontractor rates in excess of the contractor's tendered rates, for work not paid under items D10.05(a). Payment of the lump sum shall be on a prorata basis to provide compensation for the fluctuation between the tendered rates of the Main Contractor and that of the Targeted Enterprise subcontractors until the lump sum is depleted. Any costs incurred due to fluctuation in tendered rates in excess of that tendered for under item D10.05(c) will be for

the Contractor's account. Item D10.05(c) is applicable where the Target Enterprise subcontractor's tender amount is higher than the Main Contractor's tender amount. The lump sum will cover the fluctuation for all the tendered rates of the subcontractors.

The Lump Sum tendered under item D10.05(d) is for the Preliminary and General Obligations of Targeted Enterprise sub-contractors (excluding CIDB 1 and 2 contractor grading designation paid from the Provisional Sum). Payment of the lump sum shall be on a prorata basis to provide compensation for the P&Gs of Targeted Enterprise sub-contractors until the lump sum is depleted. Any costs incurred for the P&Gs of Targeted Enterprise sub-contractors in excess of that tendered for under item D10.05(d) will be for the contractor's account.

Item	Unit
<b>D10.06 Training, coaching, guidance, mentoring and assistance</b>	
(a) Training Costs	
(i) Accredited NQF training	Provisional (Prov) Sum
(ii) Accredited generic skills training	Provisional (Prov) Sum
(iii) Community skills training	Provisional (Prov) Sum
(iv) Handling cost and profit in respect of subitems D10.06(a)(i), (ii) and (iii)	Percentage (%)
(b) Student experiential training	
(i) Student stipends	Prime Cost (PC) Sum
(ii) Provision of experiential training	Person Month
(c) Other costs during training	Provisional (Prov) Sum
(d) Training venue	Lump Sum (LS)

The provisional sums under sub-items D10.06(a) shall be paid in accordance with the provisions of sub-clause 13.5 of the FIDIC Conditions of Contract. The provisional sums shall include all charges for the provision and delivery of the service including an accredited Training Service Provider (if required), learning material and any other requirement as described in sub-clause D1010.

The rate tendered under sub-item D10.06(a)(iv) shall be deemed to cover all costs required to organise accredited trainers to provide training and shall include the Contractor's handling cost, profit, record keeping, reporting and all other costs associated with sub-items D10.06(a)(i), (ii), and (iii).

The prime cost sum under sub-item D10.06(b)(i) shall be paid in accordance with the provisions of sub-clause 13.5 of the FIDIC Conditions of Contract. The prime cost sum shall cover the monthly stipend as prescribed by the Employer to be paid to students receiving experiential training.

The unit of measurement for sub-item D10.06(b)(ii) shall be the person-month, with prorata payments made for partial months for training provided based on 23 work days per month.

The rate tendered under sub-item D10.06(b)(ii) shall include full compensation for the Contractor to provide training to the students provided by the Employer inclusive of all costs to communicate with the Employer and any other body or organisation in respect of work assigned to the students. The rate tendered shall include telephone calls and charges, stationery and information technology hardware, software, connection or licence costs and lost production, profits and all other incidentals as well as all administrative and overhead costs.

The provisional sum under pay item D10.06(c) shall be paid in accordance with the provisions of sub-clause 13.5 of the FIDIC Conditions of Contract. The provisional sum shall cover the Contractor's costs for payment of wages of employed trainees attending training courses during working hours, for the provision of meals to trainees, for provision

of transport and for all other incidentals required for the trainees and approved by the Engineer. No mark-up is payable to the Contractor under this item.

The unit of measurement for pay item D10.06(d), shall be the lump sum. The sum tendered shall include full compensation for the provision of the training venue, for all necessary lighting, power, furniture, stationery, consumables and study material and all other costs necessary to maintain the venue for the duration of the contract. Payment of the lump sum shall be made in two instalments as follows:

- a) The first instalment, 75% of the lump sum, shall be paid after the Contractor has met all his obligations regarding the provision of the training venue as specified.
- b) The second and final instalment, 25% of the lump sum, shall be paid after the provision of all the accredited training as specified in the document.

No payment, nor prorata payment, shall be made for trainees that, once selected, do not attend or only partially complete structured training courses. The Contractor's own staff may attend the courses provided. However, such attendants from the Contractor's staff shall not be considered for measurement and payment purposes unless they also qualify as Targeted Labour.



SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LIMITED

CONTRACT SANRAL R.342-010-2024/1

FOR STRENGTHENING OF NATIONAL ROUTE R342 SECTION 1 FROM NGUNI RIVER LODGE  
(KM 14.50) TO PATERSON (KM 25.00)

**SECTION E: REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT  
AND REGULATIONS**

**Note to tenderer:**

**Wherever reference is made in this section of the Scope of Works to contractor this is the equivalent of the *principal contractor* in the Occupational Health and Safety Act and Regulations. Similarly, reference to subcontractors is equivalent to *other contractors*.**

## **SECTION E: REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS**

<b>TABLE OF CONTENTS</b>	<b>PAGE</b>
E1001 SCOPE .....	C3-200
E1002 DEFINITIONS AND ABBREVIATIONS .....	C3-200
E1003 HEALTH AND SAFETY POLICY .....	C3-203
E1004 ROLES AND RESPONSIBILITIES .....	C3-203
E1005 HSE TRAINING AND COMPETENCE .....	C3-203
E1006 APPLICATION FOR CONSTRUCTION WORK PERMIT .....	C3-204
E1007 DUTIES.....	C3-204
E1008 MANAGEMENT AND SUPERVISION .....	C3-205
E1009 RISK MANAGEMENT .....	C3-205
E1010 LEGAL COMPLIANCE AND DOCUMENT CONTROL .....	C3-207
E1011 OPERATIONAL INTEGRITY .....	C3-209
E1012 OCCUPATIONAL HEALTH AND HYGIENE .....	C3-210
E1013 WASTE MANAGEMENT .....	C3-211
E1014 HAZARDOUS SUBSTANCE MANAGEMENT .....	C3-211
E1015 CONTRACTORS.....	C3-212
E1016 DESIGNING FOR HEALTH, SAFETY AND THE ENVIRONMENT .....	C3-215
E1017 INCIDENT MANAGEMENT .....	C3-216
E1018 PROJECT SPECIFIC CONSTRUCTION REQUIREMENTS .....	C3-217

## E1001 SCOPE

The Occupational Health and Safety Act, Act 85 of 1993 (OHS Act) and its Regulations together with SANS Codes set out minimum standards with regards to Occupational Health and Safety. The South African National Roads Agency SOC Limited (SANRAL), has developed this Occupational Health and Safety Specifications with these minimum standards in mind and in certain aspects the requirements of SANRAL exceeds the minimum legal requirements to follow best practices and to ensure a healthy and safe workplace for all.

SANRAL in no way assumes The Principal Contractors legal liabilities and responsibilities. The Principal Contractor is and remains accountable for the quality and execution of his health and safety program for his employees. This Health and Safety Specification reflects minimum legal and SANRAL requirements and should not be construed as all encompassing.

It is realized that The Principal Contractor have its own Health and Safety Management system and safe work practices. The intention of this Health and Safety Specification is not to change The Principal Contractors Health and Safety management system, but for The Principal Contractor to use its current Health and Safety management system to draw up a project specific Health and Safety plan according to these specifications as well as to legally comply with the any applicable Regulations under the OHS Act and incorporated Standards.

It is the responsibility of the Principal Contractor and other Contractors to make themselves conversant and comply with the requirements and conditions contained in the various legislation pertaining to their profession and scope of works at all times.

This specification is not exhaustive of all duties imposed by the OHS Act and its Regulations, governing the duties and obligations, of a Designer, Principal Contractor and Contractor performing duties in terms of an agreement with the client (SANRAL). These duties are fully described in the OHS Act and its Regulations and it is the duty of every Designer, Principal Contractor and Contractor to acquaint themselves therewith before commencing work.

This specification is compiled to ensure that the Principal Contractor and any other Contractors working for SANRAL directly or through a Principal Contractor, are aware of the Occupational Health and Safety requirements when working on a SANRAL contract, as well as to make them aware of their legal liabilities and responsibilities as per the Occupational Health & Safety Act, Act 85 of 1993, and its Regulations.

Words used herein in the singular shall be deemed to include the plural and male shall include female and vice versa unless the context otherwise requires.

## E1002 DEFINITIONS AND ABBREVIATIONS

**Assessment** – An opinion or a judgment about someone or something that has been thought about very carefully.

**At-risk behavior** – Conduct that unnecessarily increases the likelihood of an injury or incident.

**Audit** – A systematic and documented review of the effectiveness of implementation of processes, programs and procedures, based on general process criteria.

**Baseline risk assessment:** This is the initial assessment of risk in a workplace. It is a broad assessment and includes all activities taking place on site but does not include risk control measures or safeguards.

**Client** – Any organization or person for whom construction work is performed. For the purpose of this document, the client is the South African National Roads Agency SOC Limited, also identified in the contract document as the Employer.

**Competence** – A combination of attributes such as knowledge, training, experience and qualifications to assure successful performance.

**Competent Person** – Means a person who has in respect of the work or task to be performed the 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 Qualification Framework Act, 2000 (Act No. 67 of 2000), those qualifications and that training must be regarded as the required qualifications and training; and is familiar with the Act and with the applicable regulations made under the Act.

**Consequence** – Outcome or impact of an event.

**Continual Improvement** – A recurring process of enhancing performance to achieve consistent improvements in overall performance.

**Contractor** – An employer as defined in section 1 of the OHS Act, who performs construction work and includes Principal Contractors and Sub-Contractors.

**Construction Work** – any work in connection with:

- The construction, erection, alteration, renovation, repair, demolition or dismantling of or addition to a building or any similar structure; or
- The construction, erection, maintenance, demolition or dismantling of any bridge, dam, canal, road, railway, runway, sewer or water reticulation system; or the moving of earth, clearing of land, the making of excavation, piling, or any similar civil engineering structure or type of work.

**Corrective Action** – An action taken to eliminate the cause of a detected non-conformity or other undesirable situation.

**Construction Regulations (CR)** – Construction Regulations, GNR. 84 of 2014

**Critical equipment** – A piece of equipment or a structure whose failure to perform to design specification, has the potential to result in a major accident event.

**Design** – in relation to any structure, includes drawings, calculations, design details and specifications.

**Designer** –

- a) competent person who:
  - Prepares a design;
  - Checks and approves a design;
  - Arranges for a person at work under his or her control to prepare a design, including an employee of that person where he or she is the employer; or
  - Designs temporary work, including its components;
- b) an architect or engineer contributing to, or having overall responsibility for a design;
- c) a building services engineer designing details for fixed plant;
- d) a surveyor specifying articles or drawing up specifications;
- e) a contractor carrying out design work as part of a design and building project; or
- f) an interior designer, shop fitter or landscape architect.

**DMR** – Driven Machinery Regulations, GNR. 295 of 26 February 1988

**Documents** – Structured units of recorded information and its supporting medium (paper or electronic). Most records are documents, but not all documents are records. A document becomes a record when it is part of a business transaction, is kept as evidence of that transaction and is managed within a record-keeping system.

**EIR** – Electrical Installation Regulations, GNR. 242 of 6 March 2009

**Emergency** – An abnormal occurrence that pose a threat to the safety or health of employees, customers, or local communities, or which can cause damage to assets or the environment.

**Employee** – An individual who is employed by or works for an Employer and who receives or is entitled to receive any remuneration or who works under the direction or supervision of an employer or any other person.

**Employer** – Any person who employs or provides work for any person and remunerates that person or expressly or tacitly undertakes to remunerates him but excludes a labour broker as defined in section 1(1) of the Labour Relations Act, 1956 (Act No. 28 of 1956). The South African National Roads Agency SOC Limited, also identified in the contract document as the Employer.

**EMR** – Electrical Machinery Regulations, GNR. 250 of 25 March 2011

**Environment** – The surroundings or conditions in which a person, animal or plant lives or operates, including air, water, land, natural resources and habitats.

**Epidemic Disease** - An *epidemic* disease is one affecting many persons at the same time and spreading from person to person in a locality where the disease is not permanently prevalent. The World Health Organization (WHO) further specifies *epidemic* as occurring at the level of a region or community.

**Excavation work** – The making of any man-made cavity, trench, pit or depression formed by cutting, digging or scooping

**GAR** – General Administrative Regulations, GNR. 929 of 25 June 2003

**GMR** – General Machinery Regulations, GNR. 1521 of 5 August 1988

**GSR** – General Safety Regulations, GNR. 1031 of 30 May 1986

**Harm** – A significant and or long-lasting adverse effect on people, the environment or the community.

**Hazard** – A source, situation or act with a potential for harm in terms of human injury or ill health.

**Health and Safety File** – Means a file, or other record in permanent form, containing the information in writing as required by the Construction Regulations, GNR. 84 of 7 February 2014, Section 7(1)(b).

**Health and Safety Plan** – Means a project specific documented plan in accordance with the client's health and safety specifications, as required by the Construction Regulations, GNR. 84 of 7 February 2014, Section 7(1)(a).

**Health and Safety Specification** – Means a project specific document prepared by the client pertaining to all health and safety requirements related to construction work, as required by the Construction Regulations, GNR. 84 of 7 February 2014, Section 5(1)(b).

**HSE** – Health, Safety and Environment. Commonly used in the format HSE.

**Incident** – Work-related events (including accidents which give rise to injury, ill health, fatality or emergencies) that have resulted in, or has the potential to result in adverse consequences to people, the environment, property, reputation or a combination of these.

**Likelihood** – A description of probability or frequency, in relation to the chance that something will occur.

**Lost Time Injury (LTI)** – When a person is injured during the execution of his/her duties and as a result of the injury is unable to perform his/her regular duties for one full shift or more on the day following the day on which the injury has incurred, whether a scheduled work day or not(weekend).

**Management System** – Management processes and documentation that collectively provide a systematic framework for ensuring that tasks are performed safely, correctly, consistently and effectively to achieve a specified outcome and to drive continual improvement in performance.

**Mandatory** – An agent, contractor or sub-contractor for work, but without derogating from his status in his own right as an employer or a user.

**MSDS** – Material Safety Data Sheet

**Near Hit / Near Miss** – Any occurrence or situation which had the potential for adverse consequences to people, the environment, property, reputation or a combination of these.

**Non-conformance** – Any deviation from work standards, practices, procedures, regulations that could either directly or indirectly lead to injury or illness, property damage, damage to the environment or a combination of these.

**OHS Act** – Occupational Health & Safety Act, 85 of 1993

**Pandemic Disease** - a *pandemic* disease is an *epidemic* disease that has spread over a large area, that is, it is prevalent throughout an entire country, continent, or the whole world.

**Policy** – Statement by an organization of its intentions and principles in relation to its overall performance which provides a framework for action and for the setting of its objectives and targets.

**PPE** – Personal Protective Equipment

**Preventive Action** – An action implemented to eliminate the cause of a potential non-conformity or other undesirable potential situation.

**Principal Contractor** – An employer appointed by the client to perform construction work and who is in overall control and management of a part of or the whole construction site.

**Procedure** – A specific documented way to carry out an activity or a process.

**Records** – Recorded information, in any form that is kept as evidence. Records include monitoring results, evidence of training, audits, inspections and calibration reports.

**Risk Assessment** – A process of evaluating the risk(s) arising from hazards taking into account the adequacy of any existing controls and deciding whether or not the risk(s) is acceptable.

**Risk Management** – The ongoing treatment of risks through the application of management policies, processes, procedures and risk control measures.

**Risk** – A combination of the likelihood of an occurrence of a hazardous event or exposure and the severity of injury or ill health that can be caused by the event or exposure.

**Root Cause** – The cause of the incident that, when rectified, will prevent the recurrence of not just incidents with those exact circumstances, but others with similar causes.

**SACPCMP** – South African Council for Project and Construction Management Professions

**SANRAL** - South African National Roads Agency SOC Limited

**Supplier** – A person or company that supplies material or equipment to a contractor on a construction site but does not physically carry out construction work on the construction site.

**The Act** – The Occupational Health and Safety Act No. 85 of 1993

**The Site** – The area where work is carried out for SANRAL as defined on the front page of this document.

**WAH** – Acronym for Working at Heights.

## **E1003 HEALTH AND SAFETY POLICY**

Contractors are expected to have their own written Health and Safety Policy. The policy should declare their attitude and approach to the health, safety and welfare of their employees and others. The policy should include a description of the company and provision must be made to review the policy annually and the CEO or Managing Director must sign and date the policy to indicate his commitment to ensuring the health and safety of his employees, as per Section 7 of the OHS Act.

## **E1004 ROLES AND RESPONSIBILITIES**

Every Contractor is considered to be an employer in his own right and shall comply with all legal requirements pertaining to an employer, which include the responsibility to provide as far as reasonably practicable a safe and healthy working environment for his employees, as per Section 8 of the OHS Act.

In conjunction with Section 8 of the OHS Act, all employees on the project are responsible for their own health and safety as well as the safety of persons who may be affected by their acts, as per Section 14 of the OHS Act. It is the responsibility of each employee to ensure that he acts in a safe manner before and during work is carried out.

The Principal Contractor shall ensure that where required by the OHS Act and Regulations, competent employees are appointed in writing. These appointments must be project/contract specific and specific to the tasks that will be performed. Every appointment must display the duties of the person appointed and training certificates from a registered training provider must be attached to such appointment (where applicable). A list of possible appointments can be found in clause E1010 below.

## **E1005 HSE TRAINING AND COMPETENCE**

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 qualifications and training must be regarded as the required qualifications and training and employees must have attended courses of the aforementioned nature to be considered competent in the task.

All employees that forms part of the construction work must be trained and competent. Employees formally appointed to perform a certain duty must be in possession of a training certificate (where applicable), received from a registered training provider. All employees must as a minimum have received site specific safety induction training and must receive daily safe task instruction training (DSTI) before any work commences and thereafter on a daily basis.

### **a) Training Needs**

There shall be a system in place to determine the training requirements of each individual, based on the tasks that the employee will perform as well as to ensure the health and safety of fellow employees and the public. Special attention should be given to employees who are new hires, new to the task or have combined responsibilities.

### **b) Basic Safe Work Training (Induction Training)**

Every contractor shall ensure that his employees are inducted into his own company Health and Safety System as well as basic safe work training (HSE Induction Training). The Principal

Contractor shall ensure that his, all his Contractor's employees and visitors are inducted on the specific site safety procedures.

A Daily Safe Task Instruction (DSTI) must be conducted on site with all employees involved in the project. The DSTI must be carried out each day before work commences and proof thereof must be available on site. Each work crew may conduct their own specific DSTI to discuss the hazards, risks and control measures associated with their task for the day.

Where two or more contractors or work crews work in the same area, they should have a combined DSTI to ensure they know of the additional hazards the other contractor or work crew will introduce to their operations and what precautions to put in place.

The Principal Contractor shall have evidence that employees have been trained on the relevant procedures prior to and during the project duration. The evidence will be in a form of attendance register.

c) Formal Training

All qualifications for which there are SAQA registered training courses, must be regarded as the minimum required qualifications and training. To be deemed "competent" an employee must have received training at a registered training provider, the training course must be registered and if there is an assessment, the employee must have been found competent after the assessment. A person cannot be deemed competent after awareness training only.

The Principal Contractor shall ensure that his employees, as well as the employees of any contractors that may be used, have received appropriate training for the type of work that will be performed, e.g. First Aid, Flag Man, Mobile Plant Operator, Working at Heights, Risk Assessment training etc.

d) Records

Record of all training shall be kept by the employer and shall be readily available. Records shall make provision for refresher training where applicable. Where an employee is legally appointed with certain duties and responsibilities a copy of the training certificate must be attached to the appointment.

## **E1006 APPLICATION FOR CONSTRUCTION WORK PERMIT**

The appointed Health and Safety Agent on behalf of the client and according to Construction Regulation, 2014 Section 3 will apply for a construction work permit at least 30 days before construction work is started, if the intended construction work will:

- exceed 365 days AND will involve more than 3 600 person days of construction work; or
- if the tender value limit is a CIDB grade 7, 8 or 9.

If approved, the provincial director will issue a construction work permit in writing to perform construction work within 30 days of receiving the application and assign a site-specific number for the construction site. It is the intention of SANRAL to apply for a construction work permit as soon as The Principal Contractor is appointed and his Health and Safety Plan is received, in order to minimize construction delays.

The site-specific construction work permit number must be conspicuously displayed at the main entrance to the site and a copy of the construction work permit must be kept in the principal contractor's health and safety file for inspection purposes.

## **E1007 DUTIES**

Various duties are imposed on the client, designer, principal contractor and other contractors by the Construction Regulation, 2014, Sections 5, 6 & 7. SANRAL will comply and carry out the required duties as contemplated in Section 5 of the Construction Regulations, 2014 and it is expected from the designer and every contractor to make themselves conversant with the requirements and duties imposed on them and to ensure that they comply with the requirements of section 6 & 7 at all times.

## **E1008      MANAGEMENT AND SUPERVISION**

The Principal Contractor shall ensure that the project is managed safely, and legal compliance is ensured at all times.

A full-time competent person must be appointed as a Construction Manager to manage all construction work, including health and safety compliance. The construction manager may not be appointed to manage more than one single construction site. An Alternate Construction Manager must be appointed, to carry out the duties in the absence of the Construction Manager.

The construction manager must appoint construction supervisors responsible for construction activities and ensuring occupation health and safety on the construction site.

The Principal Contractor must appoint a full-time construction health and safety officer, who is registered with the SACPCMP, to assist in the control of health and safety aspects on site.

If the Construction Health and Safety Officer is replaced the principal contractor is required to submit the following documentation for approval by the Client and appointed Pr. CHSA at least two weeks before:

- 1.Applicant CV
- 2.Applicant Competency
- 3.SACPCMP Good standing Certificate
- 4.Annexure 1 (If applicant is approved)

The Annexure 1 (Application for a permit to do construction work) must be amended and signed by the Principal Contractor reflecting the for newly appointed CHSO.

The above documentation must be submitted to the Appointed Health and Safety Agent for resubmission to the Department of Employment and Labour.

Failure to do so will be considered a serious offence and penalties /stoppage of site will apply.

## **E1009      RISK MANAGEMENT**

The Principal Contractor must follow a formal risk-based approach to ensure hazard control measures are implemented to an acceptable reasonable practical level. The Principal Contractor and his employees shall be responsible to ensure all hazards pertaining to his scope of activity are proactively identified, the risks assessed and appropriately eliminated or minimized and managed on an ongoing basis. Risk assessments shall also identify possible and potential environmental, health and hygiene issues pertaining to each hazard with potential exposures and limits.

### **a)      Risk Assessment**

#### **i)      Hazard Identification and Risk Assessment (Construction Regulation 9)**

The Principal Contractor shall, before the commencement of any construction work or work associated with the aforesaid construction work and during such work, conduct a risk assessment by a competent person, appointed in writing and the risk assessment so produced shall form part of the OH&S plan and be implemented and maintained as contemplated in Construction Regulation 9(1). Competence is a factor of training, knowledge, experience and/or appropriate qualifications.

The risk assessment shall include, as far as is reasonably practicable, at least:

- The task or task step
- the identification hazards to which persons may be exposed to during the task or task step;
- The analysis and evaluation of the risks associated to the hazards identified, inclusive of a residual risk rating methodology. The method to be used is not prescribed;



- a documented plan of safe work procedures, to mitigate, reduce or control those residual risks that have been identified as unacceptably high, by means of the rating system;
- a monitoring plan;
- a review plan, inclusive of dates to be adhered to; and
- Ergonomic related risks are to be analysed, evaluated and addressed as part of the process.

Based on the risk assessments, The Principal Contractor shall develop a set of site-specific OH&S rules that shall be applied to regulate the OH&S aspects of the construction. The risk assessments, together with the site-specific OH&S rules shall be submitted to the Employer before construction on site commences. SANRAL has conducted a Baseline Risk Assessment as per clause E1009 (b) below, which must be used by The Principal Contractor to develop task specific risk assessments before work commences. This does not mean that all possible Risk Assessments must be attended to before work commences, but that all relevant Risk Assessments receive the necessary attention as the contract progresses, and this is the responsibility of The Principal Contractor.

All variations to the scope of work shall similarly be subjected to a risk assessment process.

ii) Risk Assessment Monitoring

The Principal Contractor shall ensure that a monitoring plan for all risk assessments are in place. Risk assessments must be monitored to ensure effectiveness and employee understanding. The monitoring of risk assessments shall be formal, and records thereof shall be available for audit purposes.

iii) Review of Risk Assessment

The Principal Contractor shall review the hazard identification, risk assessments and standard safe working procedures:

- prior to any work activity commencement,
- where changes are affected to the design and construction that result in a change to the risk profile,
- when an incident has occurred, or
- at least quarterly.

The Principal Contractor shall provide the Employer, sub-contractors and all other concerned parties with copies of any changes, alterations or amendments as contemplated above.

Activities carried out without conducting a risk assessment or found to be non-compliant with the risk assessment, will be stopped until such time a risk assessment is compiled, and work is carried out according to the risk assessment.

Risk assessments must be fully communicated to all relevant personnel and must be considered when establishing training, awareness and competency requirements. Records of risk assessment communications must be kept for inspection purposes.

b) **Baseline Risk Assessment**

SANRAL prepared a Baseline Risk Assessment from which the Health and Safety Specifications for this project was prepared. The Baseline Risk Assessment highlights all work for which The Principal Contractor must prepare safe work procedures and or work method statements. It must be noted that the Baseline Risk Assessment is not exhaustive and Principal Contractors are required to identify risks and come up with control measures, this must be identified by Principal Contractor when preparing the Issue Based Risk Assessments.

The Baseline Risk Assessment for this Project can be found in clause E1018.

c) **Continuous Risk Assessment**

The Principal Contractor shall continuously assess the risks of the activities that are carried out. Risk assessments must be in writing, site specific and must be reviewed continuously as per

C3-206

E1009 a(iii) to ensure it is current and it address all the relevant hazards and risks associated with the specific activity at the specific site.

The Risk assessment must be discussed with the whole work crew before the activity starts and the work crew must acknowledge in writing having discussed the risk assessment and that they understand it. This acknowledgement must be on site and must be available to the client for audit purposes.

## **E1010      LEGAL COMPLIANCE AND DOCUMENT CONTROL**

The Principal Contractor is required to implement systems and procedures to ensure legal compliance through:

- Identification of all relevant HSE legislation, standards and codes applicable to its operations.
- Have available copies of all relevant HSE legislation, standards and codes for reference purposes.
- Update systems and procedures with changed/updated legislation, standards and codes.
- Communicate to all employees any changes that may affect their accountabilities and conformance
- Incorporate any legal requirements into their HSE management system
- Monitor and review their HSE management system for effectiveness.

The Principal Contractor shall, as a minimum, comply with:

- The Occupational Health and Safety Act and Regulations (Act 85 of 1993), an up-to-date copy of which shall be available on site at all times.
- The Compensation for Occupational Injuries and Diseases Act (Act 130 of 1993), an up-to-date copy of which shall be available on site at all times.
- Where work is being carried out on a quarry/borrow pit/"mine", The Principal Contractor shall comply with the Mines Health and Safety Act and Regulations (Act 29 of 1960) and any other OH&S requirements that the mine may specify. An up-to-date copy of the Mines Health and Safety Act and Regulations shall be available on site at all times.

Wherever in the Construction Regulations or this specification there is reference to other regulations (e.g. Construction Regulation 24: Electrical Installations and Machinery on Construction Sites) The Principal Contractor shall be conversant with and shall comply with these regulations.

All legal appointments of The Principal Contractor regarding the Health and Safety of his employees who are to work on the project are addressed and governed by the OHS Act and applicable Regulations. Legal appointments must be in place and must reflect in the project safety file before work commences.

### **a)      Overall Supervision and Responsibility for OH&S**

SANRAL will appoint the Principal Contractor in terms of Construction Regulation 5(1)(k). A Mandatory agreement as per Section 37.2 of the OHS Act, shall be signed between SANRAL and the Principal Contractor.

It is a requirement that the Principal Contractor, when he appoints other contractors in terms of Construction Regulations 7(1)(c), 7(1)(d), 7(1)(f) and 7(3) includes in his agreement with such Contractors the following:

- OH&S Act (85 of 1993), Section 37(2) agreement: "Agreement with Mandatory".
- OH&S Act (85 of 1993), Section 16(2) appointee(s) as detailed in his/her/their respective appointment forms. (Where applicable).

The signed Mandatory agreements shall be placed in the project file for reference and for audit trail purposes.

### **b)      Specific Supervision Responsibilities for OH&S**

The Principal Contractor shall appoint designated competent employees and/or other competent persons as required by the OHS Act and Regulations, as well as this specification. Appointments shall be in writing and the responsibilities clearly stated together with the period for which the appointment is made. This information shall be communicated to and agreed with the appointees. Where applicable, the training certificate must be attached to the appointment. Notice of

appointments shall be submitted to the Employer. All changes shall also be communicated to the Employer.

Below is a list of possible appointments for the project, which is not an all-inclusive list, but for reference purposes only:

<b>Appointment</b>	<b>Legal Reference</b>
Assistant to CEO	OHS Act 16(2)
Health and Safety Representative	OHS Act 17(1)
Nominated Health and Safety Committee Member	OHS Act 19(3)
Contractor (Sub-contractor)	CR 7(1)(c)(v)
Construction Manager	CR 8(1)
Alternate Construction Manager	CR 8(1)
Assistant Construction Manager	CR 8(2)
Health and Safety Officer	CR 8(5)
Construction Supervisor	CR 8(7)
Assistant Construction Supervisor	CR 8(8)
Risk Assessor	CR 9(1)
Fall Protection Plan Developer	CR 10(1)(a)
Structure Inspector	CR 11(2)(a)
Temporary Works Designer	CR 12(1)
Temporary Works Supervisor	CR 12(2)
Excavation Supervisor	CR 13(1)(a)
Demolition Supervisor	CR 14(1)
Competent Person in the use of Explosives	CR 14(11)
Scaffold Supervisor	CR 16(1)
Suspended Platform Supervisor	CR 17(1)
Rope Access Supervisor	CR 18(1)(a)
Material Hoist Inspector	CR 19(8)(a)
Bulk Mixing Plant Supervisor	CR 20(1)
Explosive actuated fastening device Inspector	CR 21(2)(b)
Explosive actuated fastening device cartridge Controller	CR 21(2)(g)(i)
Construction Vehicle & Mobile Plant Operator Authorised	CR 23(1)(d)(i)
Temporary Electrical Installation Controller	CR 24(c )
Stacking and Storage Supervisor	CR 28(a)
Fire Equipment Inspector	CR 29(h)
Incident investigator	GAR 9(2)
Lifting tackle inspector	DMR 18(10)(e)
Ladder inspector	GSR 13(a)
Certified Explosives Manager	ER 12(1)
First Aider GSR	GSR 3(4)
Lifting machine Operator	DMR 18(11)

In addition to the above, the Employer requires that a Traffic Safety Officer be appointed.

It is a requirement that The Principal Contractor shall provide the Employer with an organogram of all sub-contractors that he/she has appointed or intends to appoint and keep this list updated and prominently displayed on site.

c) **Designation of OH&S Representatives (Section 17 of the OH&S Act)**

Where the Principal Contractor employs more than 20 persons (including the employees of sub-contractors) he has to appoint 1 (one) OH&S representative for every 50 employees or part thereof. This is a minimum (legal) requirement. The Principal Contractor may at his own discretion appoint more OH&S representatives according to site specific requirements. General Administrative Regulation 6 requires that the appointment or election of the OH&S representatives be conducted in consultation with employee representatives or employees (Section 17 of the Act and General Administrative Regulation 6 & 7). OH&S representatives shall be designated in writing and the designation shall include the area of responsibility of the person and term of the designation. OH&S representatives must be experienced, permanently employed by The Principal Contractor or his sub-contractors, trained and able to move freely within their designated area of responsibility.

d) **Duties and Functions of the OH&S Representatives (Section 18 of the OH&S Act)**

The Principal Contractor shall ensure that the designated OH&S representatives perform their functions in respect of the workplace or section of the workplace for which they have been appointed. These functions include to conduct continuous monitoring and monthly inspections of their respective areas of responsibility, focusing on unsafe acts and unsafe conditions and report thereon to The Principal Contractor and OH&S Committee. OH&S representatives shall participate in accident or incident investigations. OH&S representatives shall attend all OH&S committee meetings. The complete list of functions can be found in Section 18 of the OHS Act.

e) **Appointment of OH&S Committee (Sections 19 and 20 of the OH&S Act)**

The Principal Contractor shall establish an OH&S committee, which shall meet at least once a month, where two or more Health and Safety Representatives have been appointed. OH&S representatives must be appointed as OH&S committee members. The number of members nominated by management may not exceed the number of OH&S representatives on the committee and must be appointed in writing.

## **E1011 OPERATIONAL INTEGRITY**

The operational integrity of plant, equipment, structures and protective systems must be monitored and assured on an ongoing basis throughout the project cycle. Hazards must be identified, risks assessed and as far as reasonably practicable, eliminated or the risks treated to as low as reasonably practicable (ALARP).

a) **Construction Plant & Equipment**

The Principal Contractor shall maintain all items of plant and equipment necessary to perform the work in a safe condition.

SANRAL reserves the right to inspect items of plant and equipment brought to site and used on site by The Principal Contractor. Should it be found that any item is inadequate, faulty, unsafe or in any other way unsuitable for the safe and satisfactory execution of the work for which it is intended, The Principal Contractor will be advised of such observation/inspection, and The Principal Contractor shall be required to repair, make safe or remove such item from operation and replace it with a safe and adequate substitute.

The Principal Contractor shall ensure that all plant, equipment, and power tools that are brought onto and used on site are:

- Appropriate for the type of work to be performed
- Placed on a register and inspected by a competent person and/or the authorized operator before use, daily or monthly dependent on Legislation.
- Record inspection findings on a register that must be kept on site.
- The inspection register shall reflect the serial number of the plant, equipment or power tool.
- Maintained and used in accordance with the manufacturers' recommendations
- Have adequate machine guarding fitted to all exposed rotating or moving parts, as reasonably practicable, that have the potential to cause harm
- All electrical power supply units are protected with operational earth leakage devices.

- Any defective, damaged or sub-standard equipment must be marked as unsafe for use and removed from operation as soon as possible

**b) Standards and Registers**

As standard project procedures, The Principal Contractor is expected to:

- Set up an initial set of registers as per the requirements of the OHS Act and Regulations.
- Complete the registers for each piece of plant, tool and equipment brought on and used on site
- Maintain a complete, continuous and comprehensive inspection and service history in these registers or checklists
- Ensure daily, weekly, monthly inspections are done and recorded for all plant, tools & equipment by a competent person and/or authorized operator as required by the OHS Act and Regulations.
- Have the inspection and maintenance records available for audit purposes.

## **E1012 OCCUPATIONAL HEALTH AND HYGIENE**

**a) Medical Fitness for Duty**

All contractor employees shall undergo medical examinations and be certified fit for duty by an Occupational Health Practitioner before they are allowed to work on site.

The medical certificate must be in the form of Annexure 3 of the Construction Regulations and stipulate the possible exposures the employee might be exposed to during the execution of the project.

It is recommended and in the best interest of The Principal Contractor to implement pre-employment, periodic, as well as exit medical surveillance, especially with regards to Section 8 of the Noise Induced Hearing Loss Regulation.

**b) First Aid**

According to GSR 3(4), where more than 10 employees are employed at a workplace/worksites, The Principal Contractor shall ensure that there is at least one trained first aider for every group of 50 employees at the workplace/site. First Aid boxes must be provided where more than 5 employees are employed and must be readily available and accessible for the treatment of injured persons at the workplace.

To ensure immediate treatment of an injured person, it is recommended that all work crews have at least one trained first aider, with a fully stocked first aid box, irrespective of the number of people in the work crew. This is especially important when contractors work at great distances from the nearest emergency facility or town. These persons shall be appointed in writing as the first aiders with their certificates attached as proof of competency.

The minimum contents of the first aid box shall be as per the supplied list in the General Safety Regulations.

All treatments done must be recorded on a register and kept with the first aid box. A trained and appointed first aider must be responsible for the first aid box and its content. Used content must be replenished as soon as possible.

In order to ensure prompt response at the emergency facility it is recommended that the W.CI 2 forms be partially completed with the Employers' details.

**c) Hygiene Facilities**

The Principal Contractor and his contractors shall ensure compliance to Section 30 of the Construction Regulations with regards to facilities on the construction site as well as where accommodation is provided to employees on remote sites. The Principal Contractor shall ensure that the facilities are kept clean at all times, either through a service provider or self-employed persons. The Principal Contractor shall provide employees with at least one sanitary facility for

each sex and for every 30 workers, changing facilities for each sex and sheltered eating areas. No substances containing Formaldehyde may be used in Chemical Toilets.

**d) Health related Epidemics and Pandemics**

The contractor shall, as far as reasonably practicable describe in his health and safety plan how health related epidemics and pandemics will be dealt with. The Employer is aware that this section in the health and safety plan will not speak to specifics, but generic procedures. The Contractor must ensure that the requirements stipulated in the Hazardous Biological Agents (HBA) Regulation are addressed in his health and safety plan, training and information given to staff and procedures implemented on site to prevent health risks on site.

Once the nature and scale of the epidemic or pandemic is known, the Contractor must update his health and safety plan with the relevant information and send the updated plan to the relevant appointed OHS Agent for approval. Once approved, the Contractor must implement the updated health and safety plan and maintain the updated plan on site.

**E1013 WASTE MANAGEMENT**

The Principal Contractor shall comply with all applicable and relevant Waste management legislation, as well as municipal bylaws applicable to waste management.

The Principal Contractor shall remove all waste generated at the construction site as soon as possible after generation to ensure good housekeeping at all times. The Principal Contractor shall have a waste management plan which must be implemented on the construction site and which will have the objective to ensure that waste is managed according to the Waste Management Hierarchy:

- Reduce what you can. If you cannot reduce then,
- Re-use what you can. If you cannot re-use then,
- Recycle what you can. What you cannot recycle,
- Convert into energy sources. If it cannot be converted to an energy source,
- Dispose of in a landfill – this is only to be done as a last resort and disposed without endangering human health and without using processes or methods which could harm the environment.

**E1014 HAZARDOUS SUBSTANCE MANAGEMENT**

The Principal Contractor shall ensure that hazardous substances brought onto site are easily identifiable and stored according to the requirements of the General Safety Regulations, GNR. 1031 of 1986, Section 4.

Where flammable liquids are being used or stored, this must be done in a manner which would not cause a fire or explosion hazard.

The Principal Contractor shall have Material Safety Data Sheets (MSDS) readily available for flammable, hazardous and toxic chemical substances and materials brought onto site and shall ensure that his employees are trained in these MSDS's.

Flammable, hazardous or toxic chemical substances may not be stored in empty food or drink containers. Empty flammable, hazardous and toxic containers must be disposed of in a safe manner, which will prevent further use of such a container.

A survey of the construction site must be done during site establishment, to locate any asbestos. Should asbestos be located, the conditions of the Asbestos Regulations, GNR. 155 of 2002 must be followed and complied with.

## **E1015 CONTRACTORS**

### **a) Consultations, Communications and Liaison**

OH&S liaison between the Employer, The Principal Contractor, The Contractors, the designer and other concerned parties will be through the OH&S committee. In addition to the above, communication may be directly to the Employer or his appointed agent, verbally or in writing, as and when the need arises.

Consultation with the workforce on OH&S matters will be through their construction managers and supervisors, OH&S representatives and the OH&S committee. The Principal Contractor shall be responsible for the dissemination of all relevant OH&S information to The Contractors e.g. design changes agreed with the Employer and the designer, instructions by the Employer and/or his/her agent, exchange of information between subcontractors, the reporting of hazardous/dangerous conditions/situations etc. The Principal Contractors' most senior manager on site shall be required to attend all OH&S meetings.

### **b) Operational Procedures**

Each construction activity shall be assessed by The Principal Contractor so as to identify operational procedures that will mitigate against the occurrence of an incident during the execution of each activity. This specification requires The Principal Contractor:

- to be conversant with all relevant Regulations;
- to comply with their provisions;
- to include them in his OH&S plan where relevant

### **c) Checking, Reporting and Corrective Actions**

#### **i) Monthly Audit by Employer (Construction Regulation 5(1)(o))**

The Employer will conduct monthly health and safety and document verification audits in compliance with Construction Regulation 5(1)(o) in order to ensure that The Principal Contractor has implemented and is maintaining the agreed and approved OH&S plan.

The Principal Contractor will be provided with a copy of the Health and Safety audit report within seven days after the audit. The Employer or his representative may stop any Principal Contractor from executing a construction activity which poses a threat to the health and safety of persons which is not in accordance with the client's health and safety specification and the Principal contractor's health and safety plan for the specific site.

#### **ii) Other Audits and Inspections by the Employer**

The Employer reserves the right to conduct other ad hoc audits and inspections as deemed necessary. This will include site safety walks.

#### **iii) Principal Contractor's Audits and Inspections**

The Principal Contractor must conduct his own regular internal audits to verify compliance with his own OH&S management system, as well as with this specification.

The Principal Contractor shall furthermore ensure that each contractor's health & safety plan is being implemented and maintained. The Principal Contractor will ensure that periodic health and safety audits and document verification are conducted at intervals mutually agreed upon between the Principal Contractor and any contractor, but at least once every 30 days.

#### **iv) Inspections by OH&S Representatives and other Appointees**

OH&S representatives shall conduct monthly inspections of their areas of responsibility and report thereon to their foreman or supervisor, as well as the OH&S Committee, whilst other appointees shall conduct inspections and report thereon as specified in their appointments e.g. vehicle, plant and machinery drivers, operators and users must conduct daily inspections before start-up.

v) Recording and Review of Inspection Results

All the results of the abovementioned inspections shall be in writing, reviewed at OH&S committee meetings, endorsed by the chairman of the meeting and placed on the OH&S File.

d) **Project Health and Safety Management Plan**

As per Section 5(1) (l) and Section 7(1) (a) of the Construction Regulations of 2014, The Principal Contractor shall develop, implement and administer a Health and Safety Management Plan. The plan shall be in writing and shall be negotiated between The Principal Contractor and SANRAL or designated OHS Agent and must be approved by SANRAL or the designated OHS Agent prior to the commencement of work on site. The plan shall demonstrate management's commitment to ensure employee health and safety as their primary objective during the contract. The H&S plan shall be site and project specific and must address all aspects of the project H&S specification.

e) **Project Health and Safety File**

The Principal Contractor shall compile a project specific Health and Safety File that consist of all the relevant project specific documentation. The Health and Safety file may consist of multiple files, which when combined should contain all the required documentation.

It is recommended that the project specific Health and Safety file contain at least the following:

- Scope and summary of the project as well as any scope changes.
- Notification of Construction Work to DoL / Copy of Work Permit
- Proof of COID registration (Letter of Good Standing)
- Contractor Health and Safety Policy statement signed by management
- Appointment of Principal Contractor
- Mandatory Agreement – OH&S Act 37.2 (Between Employer and Principal Contractor)
- Client Health and Safety specification
- Latest copy of the OHS Act and Regulations
- Company Organogram depicting Health and Safety Responsibilities, including sub-contractors
- Employee list including copy of IDs and medicals
- Project specific Health and Safety Management Plan agreed with the Employer – See E1015(d) above
- Relevant OH&S Legal appointments which includes duties and responsibilities as well as competencies (training certificate)
- Copies of minutes of meetings – OH&S committee and other relevant OH&S meeting minutes
- Site specific Fall Protection Plan (if applicable)
- Risk Assessments
- Contractor Induction material
- Waste management Plan
- Emergency preparedness (first aid, firefighting, emergency plan, etc.)
- Emergency Contact Telephone numbers
- List of hazardous chemical substances used on site
- Material Safety Data Sheets of hazardous chemicals on site
- List of plant & equipment to be used on site
- Inspection Checklists/Registers of plant & equipment and emergency equipment
- List of Sub-contractors including type of work
- Sub-contractor 37.2 Mandatory Agreements
- Sub-contractor appointments which shall include the type of work The Principal Contractor is appointed for.

f) **Contracting Philosophy**

Any site-specific hazards and safety management expectations will be made known to the Principal Contractor prior to the work commencing on site. This will be done through the OH&S Specification for the project. SANRAL as the Employer/Client may specify requirements that are stricter than Legislative requirements in this OH&S Specification. Legal OHS requirements



contained in the OHS Act and Regulations, SANS Codes and the project OH&S Specifications are the minimum requirements the Principal Contractor must apply during this contract with regards to Occupational Health and Safety. The Principal Contractor shall implement the minimum OH&S requirements and ensure conformance to these at all times.

g) **Workers Compensation Registration**

The Principal Contractor shall ensure that his employees are covered for any occupational injuries and illnesses in terms of the Occupational Injuries and Diseases Act 130 of 1993, which cover shall remain in place and up to date for the duration of the project.

The Principal Contractor shall ensure that his sub-contractor employees are covered for any occupational injuries and illnesses in terms of the Occupational Injuries and Diseases Act 130 of 1993, which cover shall remain in place and up to date for the duration of the project.

h) **HSE Non-Compliance**

It is a legal duty of the client according to the Construction Regulation 5(1)(q) that a Principal Contractor is stopped from executing any activity which poses a threat to the health and safety of persons. Depending on the seriousness of the non-compliance only the specific activity may be stopped until the non-compliance is rectified or the whole operation may be stopped.

It is also the duty of every employee to take reasonable care of his own health and safety and of other persons who may be affected by his acts as per OHS Act, Section 14(a). Keeping this in mind, it is required of The Principal Contractor to ensure his employees has the right to remove themselves from any unsafe situation or work activity, without any negative consequence to them until such time as The Principal Contractor has made the unsafe situation or activity as safe as practicable possible.

i) **Indemnity by Contractor**

The Principal Contractor shall indemnify the Employer against and from all damages, losses and expenses (including legal fees and expenses) resulting from:

- i) the loss of output and delay caused by the slowing down or partial or total stoppage of work caused by:
  - all or any of The Principal Contractor's workforce as a result of a dispute between all or any of the Principal Contractor's workforce and The Principal Contractor; or
  - all or any of the Principal Contractor's suppliers' difficulty or impossibility to deliver goods or materials needed to perform the Works;
- ii) Any unlawful, riotous or disorderly conduct by or amongst the Principal Contractor's personnel."

j) **The Principal Contractor Conduct**

Guidelines to the most important rules that shall be implemented and maintained by the Principal Contractor:

- Complete compliance to the OH&S Act 85 of 1993 and Regulations,
- Hazard identification and Risk Assessments for all activities,
- Daily communication of DSTI's before work commences, even if it is a repetitive task,
- Safe access and egress to and from work areas,
- Compulsory use of lifelines, Safety Harnesses and Fall Arrestors (Lanyards to be attached at all times), when working in elevated positions,
- Scaffold shall comply with Legal and SANS standards at all times,
- Good housekeeping and stacking practices,
- Safe lifting, rigging and slinging practices,
- Complying to Legal standards for lifting machinery & equipment,
- No lifting in wind conditions exceeding 30km/h (This is a guide and is dependent on risk assessments),
- Securing of tools, equipment and material at heights,
- Wearing of appropriate personal protective equipment as identified in the risk assessment.

Supervisors in charge are responsible for ensuring that the employees are aware of the hazards/risks involved in the work they will be doing/are doing and shall ensure the safety rules are obeyed.

No person shall act in a manner that endangers or is likely to endanger, the safety of any other person, or cause harm to any other person.

An employee who observes any dangerous situation, shall as soon as possible inform the person who is responsible for that section of the site.

Any employee who becomes aware of any person disregarding any safety rules, shall remind that person of the rules. If he persists in disregarding the rules, the matter must be reported to his supervisor.

No person shall damage, alter, remove, render ineffective or interfere with anything that has been provided for the protection of the site, or for the health and safety of persons.

No person shall interfere with or use firefighting equipment without authority and training.

No person in a state of intoxication or condition that render him incapable of controlling himself shall enter or be allowed to enter the site.

No alcohol or illegal drugs shall be taken onto the site.

All safety and warning signs shall be obeyed.

Always be alert of construction vehicles as well as traffic. Never turn your back to oncoming traffic, always have a line of sight.

**k) Principal Contractor and Contractor Management**

The Principal Contractor shall establish, maintain and ensure that all his contractors establish and maintain OH&S standards and systems as necessary and to comply with the Legal requirements as well as these OH&S specifications.

The Principal Contractor shall be solely responsible for carrying out work on the project, having the highest regard for the health and safety of his employees and people in the vicinity of his work area.

**l) Public Health and Safety**

The Principal Contractor shall, as far as is reasonably practicable, be responsible for ensuring that non-employees affected by the construction work are made aware of the dangers likely to arise from said construction work as well as the precautionary measures to be observed to avoid or minimise those dangers.

This includes:

- Non- employees entering the site for whatever reason
- The surrounding community
- Passers-by to the site.

**E1016 DESIGNING FOR HEALTH, SAFETY AND THE ENVIRONMENT**

Designing for safety is a process aimed at minimizing injury, death, property damage or destruction and harm to the environment, by utilizing an approach to identify and eliminate or control hazardous conditions and material during the design process. The Principal Contractor is responsible for appointing the temporary works Designer and shall ensure that the temporary works Designer implement a process and designs the temporary works in such a way that ensure the safety of employees during the erection, use and dismantling of the temporary works. The temporary work designer shall comply with the duties of the Temporary Work Designer as per the Construction Regulations, 2014 Section 6(2).

The Principal Contractor must communicate the anticipated risks and hazards resulting from the design to his employees and establish safe work procedures for the temporary works.

## **E1017 INCIDENT MANAGEMENT**

The Principal Contractor shall ensure that a culture exists within his company that promotes the recognition, response, reporting and investigation of incidents, including near misses (near hits). The Principal Contractor must implement a procedure for reporting and investigating accidents, incidents and near misses. The Principal Contractor should have a clear objective and target to obtain zero injuries for the duration of the project and such an objective must be communicated to all employees.

Appropriate corrective actions must be implemented, and the applicable learnings must be shared within The Principal Contractors business to prevent a recurrence of the incident or to prevent the near miss from becoming an incident in future.

### **(a) Incidents and Accidents**

The Principal Contractor and his contractors shall coordinate their investigation of all accidents/incidents where employees and non-employees were injured to the extent that he had to be referred for medical treatment by a doctor, hospital or clinic. The results of the investigation shall be entered into an accident/incident register, which must be updated with each accident/incident.

The Principal Contractor shall notify the relevant SANRAL Project Manager and or SANRAL OHS Specialist of any incident/accident within the Principal Contractors or his Contractors area of responsibility in writing as soon as possible.

Although the accident/incident is reported to the client, the Principal Contractor has a responsibility and is required by law to report any Section 24 accidents and incidents to the Department of Labour. Any road traffic accident must be reported to the relevant authorities.

It is essential that the Principal Contractor demonstrate that corrective and preventative action has been taken to prevent a similar incident in future and that it is communicated to all the Principal Contractors affected staff. A copy of the investigation, corrective and preventative action taken as well as the attendance register of the employees who attended the discussion of the incident and the action implemented to prevent a similar incident, must be forwarded to the SANRAL Project Manager and or the SANRAL OHS Specialist.

Investigations must be completed for:

- Near Miss Incidents (To prevent it from becoming an incident)
- First Aid case Incidents
- Medical treatment case Incidents
- Fatalities

### **(b) Incident Reporting**

The Principal Contractor shall provide the Employer with copies of all statutory reports required in terms of the Act within 7 days of the incident occurring. In addition, The Principal Contractor shall update monthly the Disabling Injury Frequency Ratio (DIFR) and display this information on a signboard at the site office.

The Principal Contractor is responsible for collecting, recording, calculating and reporting his and his sub-contractors Health & Safety statistics to the SANRAL OHS Specialist.

The statistics should contain at least the following for all employees of all contractors working on the project:

- Total Number of workers
- Total Number of hours worked (on the SANRAL project)
- Total Number of Near Miss Incidents
- Total Number of First Aid case Incidents
- Total Number of Medical Treatment case Incidents (Excluding Section 24 type incidents)
- Total Number of Section 24 type Incidents
- Preventative actions taken on incidents that have occurred
- Communication to employees and contractors of incidents and preventative actions.

## **E1018 PROJECT SPECIFIC CONSTRUCTION REQUIREMENTS**

The clause contains specific requirements for Contract SANRAL R342-010-2024/1, which must be adhered to in addition to minimum legislative requirements.

### **a) Baseline Risk Assessment**

The following is a list of activities but not limited to, hazards and risks identified which forms the Baseline Risk Assessment for the project prepared by the Client in terms of Construction Regulation 5(1) (a): Full Baseline Risk Assessment included

Risks associated for identified activities and hazards:

Risks in connection with:

- Site Establishment
- Personal health risks in connection with ablution facilities, eating areas, drinking water.
- Secure/safe storage of materials, plant and equipment
- Secure/safe storage and use of hazardous and/or flammable materials
- Maintenance workshop - onsite repairs to construction vehicles, mobile plant & equipment.
- Possibility of asbestos in existing structures
- Existing services, e.g. gas, telecommunications, electrical supply and similar
- Temporary electrical installations
- Adjacent land uses/surrounding property exposures
- Boundary and access control/public liability exposures (NB: The Employer is also responsible for the OH&S of non-employees affected by his/her work activities)
- Biological hazards, e.g. bees, snakes, spiders
- Environmental risks, e.g. lighting, strong winds, heavy rains, dark environments, hot/cold and wet environments
- Exposure to a water environment
- Exposure to noise
- Exposure to vibration
- HIV/Aids and other diseases such as silicosis or asbestosis, where applicable
- Hazardous Biological Agents that could lead to epidemics and/or pandemics
- Use of portable electrical equipment including, but not limited to:
  - Angle grinder
  - Electrical drilling machine
  - Circular saw
  - Generator
- Excavations including, but not limited to:
  - Ground/soil conditions
  - Trenching
  - Shoring
  - Drainage of trenches
- Welding including, but not limited to:
  - Arc welding
  - Gas welding
  - Flame cutting
  - Use of LP gas torches and appliances
- Loading and off-loading of trucks, including material deliveries
- Manual and mechanical handling
- Lifting and lowering operations
- Driving and operation of construction vehicles and mobile plant including:
  - Trenching machine
  - Excavator
  - Bomag roller
  - Plate compactor
  - Front end loader
  - Mobile cranes and the ancillary lifting tackle
  - Grader
  - Parking of vehicles and mobile plant
  - Towing of vehicles and mobile plant
- Layering and bedding
- Installation of pipes in trenches

- Pressure testing of pipelines
- Backfilling of trenches
- Protection against flooding
- Gabion work
- Use of explosives
- Overhead Electrical Cables
- Work adjacent or in proximity of railway lines
- Work adjacent or in proximity of traffic
- Working in elevated positions
- Working in confined spaces – tunnelling
- Formwork and support work (temporary works) including scaffolding
- Demolition work, where applicable
- Bulk mixing plant, where applicable
- Environmental impacts such as pollution of water, air or soil.

BASE LINE RISK ASSESSMENT: R.342-010-2024/1											low	med	high
Risk Rating multiplier: Low = 1; Medium = 2; High = 3											1	4	12
The base line risk assessment is to highlight hazards emanating from project risks identified. This list of risks is therefore not the replacement of the contractor's risk assessment but rather to point the contractor towards some risks he might not be aware of during tendering stage and while conducting his formal risk assessment.											2	6	18
											3	8	27
Baseline Raw Design Risk - Typical behaviour given the design / factors present Residual Risk - The extra factors noted that must be in place to reduce the risk Low Risk - Does not mean that the activity is safe, or that potential injuries and / or fatalities are eliminated Key Risks will be assessed and reported on in the Site Specific H&S Specification New tasks require assessment as the project progresses. method Statements, risk analyses and safe work procedures to be revised on an annual basis													
GAR GSR SANS SABS NIHL GMR OHS Act SWP MS HCS PrDP CR	General Administration Regulations General Safety Regulations South African National Standards South African Bureau of Standards Noise Induced Hearing Loss General Machinery Regulations Occupational Health and Safety Act and Regulations 85 of 1993 Safe Work Procedures Method Statements Hazardous Chemical Substances Professional Driving Permit Construction Regulations			Baseline Raw Design Risk					Residual Risk				
COTO REF	Design Aspects present	Describe the obvious methods usually provided by the Contractor	Risks	Likely consequences of	Frequency of Exposure	Probability of harm	Risk rating and risk category	Extra control measures necessary to reduce risk / Redesign	Likely consequences of an accident	Frequency of Exposure	Probability of harm	Risk rating and risk category	
CHAPTER 1 – GENERAL (SITE ESTABLISHMENT)													
1.2	Overhead Eskom, if near proposed construction, Eskom will remove own services where required. PC will expose and protect services. May be illegal connections	Hand exposure of and protection services. Demarcation of services with candy tape	Contact with high voltage electricity. Contact with contaminated water	2	1	1	2	Competent supervision and adequate pre-task training required. All excavations open longer than 24hours to be demarcated with netting or similar, at least .5m away from edge	1	1	1	1	
	Potable water is available in the towns and rural water schemes are available for use. Water lines may require moving	Extra water may need to be taken to site, haulage from approved rivers, permits obtained. PC may need potable water connections at accommodation and site camp	Ingestion of contaminated water	2	3	2	12	Treatment of contaminated water will be required, water testing will take place regularly. Tankers of water may be required to be brought in from other sources	1	3	2	6	

1.4	Construction plant workshops and camps to be established and maintained by the contractor for the duration of the contract.	A number of camps may be established and maintained for various activities to construct what is required to undertake the works. Concrete floors will be cast	Worker struck by Vehicle or plant. Load falls on worker	3	3	3	27	The PC will be required to submit with his H & S plan the method statements, risk assessments and supporting documentation to ensure overall activities are managed.	2	3	2	12
	Setting up Offices and other buildings	Container offices may be used. This will need loading and offloading using cranes/crane trucks. Clearing and levelling of site using heavy machinery	Cranes fails load falls on worker, worker struck by plant or machinery	2	3	2	12	The PC will be required to submit with his pre-tender H&S plan the method statements, risk assessments and supporting documentation to ensure overall activities are managed. All formwork to adhere to specification and require method statements	2	3	2	12

<b>ACCESS CONTROL</b>												
1.2	Access control to camp site	Camp site fenced and access limited to authorised persons. General public to be kept clear of work sites along the road although passage through the site must be allowed	Public enter site, theft, damage to property	2	2	2	8	Access control by guard. Register to be completed. Work sites on road to be clear of members of the public. Care in road works must form part of worker induction	2	1	2	4
<b>LABORATORY</b>												
1.4	Establishment and use of joint site laboratory. Laboratory will be used by Civil PC and Client, will be treated as a PC reporting to the Resident Engineer. Managed by H&S Agent, but will follow site rules of Civil PC	Ovens, radioactive equipment, bitumen testing, storage of test cubes, materials and chemicals. Various site activities to collect samples on site and test. Fire protection, first aid cover and daily checklists usually provided	Contact with hot equipment or material, radiation risk, noise, dust	2	3	3	18	Monthly inspections by the H&S Agent, Laboratory is controlled and managed as a PC by the Engineer	2	3	2	12
<b>STAFF HOUSING</b>												
1.4	Staff and workers will be housed in local accommodation or at PC's existing camp	Housing already established	poor accommodation, no proper sanitation, lighting or ventilation	2	3	2	12	Accommodation must be adequate for workers and staff. Proper sanitation, ventilation and space	2	3	1	6
<b>TRAFFIC ACCOMMODATION</b>												
1.5	Traffic accommodation will be required throughout the project. Construction and maintenance will normally be in half widths	Appointment of Traffic Safety officer -Construction drawings from the Consultants will be provided for the standard requirements. Use of TSO's to ensure all traffic requirements are met over 24 hour, 7 day periods. Demarcation to ensure public walkways identified around schools and clinics. Stop/go closures to be properly set up.	Collision between plant or transport. Collision between private and/or contractor vehicles. Worker struck by vehicle. Flag persons are highly vulnerable	3	3	3	27	Any deviations from construction drawings to be in line with SARTSM Ch 13 Vol 2, and approved by RE. Method statements and risk assessments to reflect management of same. TSOs to be adequately trained and use of drawings to be basis of daily checks. TSOs to report to H&S Officer. Penalties to be issued for non-compliances. Flag persons to have adequate PPE for tasks. Night time closures to be properly lit and workers to be supplied with adequate torches	2	3	3	18
<b>MATERIALS</b>												
1.5	Material will require haulage through the project. Material will possibly be collected and stored for re- use	Spoil material will be moved around the site. Co-contractors may be used for haulage. Road wetting to manage dust	Collision between plant or transport. Collision between private and/or contractor vehicles. Worker struck by vehicle, noise dust, speeding vehicles	3	3	3	27	PC will ensure only competent contractors appointed 7 days prior to commencing work, only competent, fit operators to be used	3	3	2	18

PLANT AND EQUIPMENT													
	All plant will be heavy vehicles, including: tipper trucks, Bell dumpers, loaders.	Use of Tipper trucks, dumpers, loaders, excavators, TLBs, bulldozers graders and rollers	Collision between plant or transport. Collision between private and/or contractor vehicles. Worker struck by vehicle, noise dust, speeding vehicles	3	3	3	27	CVs, including training and medical certificates required for all operators. Daily records on H&S file may not be more than a week behind. An updated list of daily plant to be kept by the H&S Officer	3	3	2	18	
CLEARING AND GRUBBING													
1.6	Clearing and Grubbing generally on site	Use of machinery such as graders and hand clearing and excavation	Worker struck by Vehicle, plant or hand tool. Dust, noise	3	3	3	27	Pre-tender H&S plan, method statements, risk assessments and other supporting documentation to ensure all clearing and grubbing activities are adequately managed. Traffic accommodation required	3	3	2	18	
DAY WORKERS													
1.2	Day works are required for various labour and plant	Use of local labour, and SMMEs to provide services and plant for items not in BoQ	Worker struck by Vehicle or plant. Dust, Noise. Other dependant on operation	3	3	3	27	Provision of H&S Spec, Training of labour, first aid provision and appropriate medical care to be provided. Use of MSDSs for assessing specific needs. Method statements, risk assessments, competent supervision and training records available for type of plant required as per the H&S Specification	2	3	2	12	
CHAPTER 3: DRAINAGE													
3.1	Side drains and cut off drains sub-soil drains. Depth of max 2 m, drainage pipes, concrete structures, manholes and cleaning eyes, testing of subsoil drains	Excavation for sub-soil drains by TLB, side and mitre drains cut by grader. Laying of plastic drain pipe in sub-soil drains, backfilled with stone and soil material	Worker engulfed by collapsing trench, water fills trench, worker falls into trench. Use of excavation plant. Ergonomic risks to workers	3	2	2	12	Should Fin drains not be used, workers are to rotate to limit musculoskeletal disorders at 3 hourly intervals between activities. Any Contractor to be approved 7 days prior to commencing work. Work on steep slopes to be addressed in method statements and risk assessments	2	2	1	4	
3.2	Repair of culverts. Areas include catch pits and manholes, around subsoil drains or storm water management systems (V-drains).	Demarcation of open excavations, competent supervision for excavations appointed, daily registers of plant and equipment, method statements and risk assessments, proof of training. Batter back edges, some shoring may be required	Worker engulfed by collapsing trench, water fills trench, worker falls into trench. Worker struck by machine.	3	3	3	27	CV of appointee responsible for excavations to show training regarding H&S, limit number of open excavations, especially around schools and areas where public access possibly an issue. Demarcation using orange netting or similar and be at least 0.5m away from edge of excavation. Berms at least 1m from edge. Battering or shoring to be approved by RE. Fines will be issued for non compliance	3	3	2	18	
3.2	Removal of existing concrete	Use of pavement breakers, removal of spoil to off site dump	Worker struck by pavement breaker, other plant or falling concrete, noise, dust	2	3	2	12	Method statements and risk analyses, noise measurements and establishment of noise zones. Dust to be monitored	2	2	2	8	
3.3	Concrete kerbing, channelling, chutes and downpipes, and concrete linings for open drains.	Kerbs and other concrete products may be moved by machine or hand. Delivery normally by truck and offloading by crane. Concrete linings for drains cast in situ. Work to be done by SMME contractors	Worker injured by falling kerb, pipe or chute; Ergonomic risks. C, contact with fresh concrete, vibration; noise	3	3	2	18	Terrain to be covered and method statements and HIRA to be managed accordingly. Loading and offloading to be supervised. Proper training. Contractor to provide H&S Plans and risk analyses before work starts.	3	3	1	9	
3.3	Any materials to be used (ensure MSDSs are available Epoxies / cements - see chemicals at end	used in grouts, joints and sealants	Exposure to volatile noxious fumes and materials	3	3	3	27	Choice of products by PC to be approved by RE, Registers of products, training of workers prior to issue of products, Requirements of MSDS to be followed	2	3	2	12	



CHAPTER 4 and 5: EARTHWORKS AND PAVEMENT LAYERS (MATERIALS AND CONSTRUCTION)												
4.0 & 5.0	Use of Borrow pits, Quarries	> Contractor must be satisfied that all DMR requirements are met	Risks at source responsibility of quarry operator. A 37.2 agreement must be in place	3	3	3	27	Compliance with DMR requirements. Method statements and risk analyses, competent operators and supervision. Environmental monitoring, checking of plan and equipment and registers kept, by quarry/borrowpit operator	3	3	2	18
4.0 & 5.0	Haulage of material in trucks, ride on compaction and grid rolling plant will be used. Workers exposed to whole body vibration.	Dust management, suppression, competent fit operators, daily registers for plant placed in H&S file	Risks inherent in the use of heavy machinery, dust, noise vibration, exposure to silica in dust. Worker struck by plant or tip truck, collisions,	3	3	3	27	Proper PPE for workers. Operators to be licensed and have Certificates of Competency Dust management, suppression, competent fit operators, daily registers for plant placed in H&S file	3	3	2	18
4.0 & 5.0	Milling of surface and base course	Use of milling machine, tipper trucks.	Risks inherent in the use of heavy machinery, dust, noise vibration, exposure to silica in dust. Worker struck by plant or tip truck, collisions. Possible pinch points on milling machine. Worker falls under milling machine	3	3	3	27	Increased changes in PPE to ensure visibility and limit dust inhalation. Storage areas to be controlled for temporary storage, dust suppression during mixing of materials and milling. Noise levels to be checked. Competent staff to operate milling machine.	3	3	2	18
4.0 & 5.0	Pavement layers of gravel material will be required. Gravel sub base to be chemically stabilised with cement and lime	Placement of gravel using tipper trucks and graders to place in position.	Risks inherent in the use of heavy machinery, dust, noise vibration, exposure to silica in dust. Worker struck by plant or tip truck, collisions,	3	3	2	18	Appointment of competent supervision and competent, fit operators. Method statements to be approved by RE, Risk assessments for the use of specialised plant.	2	3	2	12
4.0 & 5.0	Layer works require stabilization with cement, Construction drawings will be provided for typical layouts	Placement of bags of cement, spread over road and mixed with base course by graders	Use of heavy plant, inhalation of cement dust, Skin contact with cement, noise, dust. Ergonomic risks in moving bags of cement	2	3	3	18	Method statements to be approved by RE, Risk assessments for the use of specialised plant, limit dust and health effects of cement. MSDSs for various products used. Use of PPE as needed	2	3	2	12
4.0 & 5.0	Use of crushed base course G2 material obtained from commercial source or stockpile, and concrete/surfacing aggregate	tipping of gravel, spreading by grader and compaction by rollers	Risks inherent in the use of heavy machinery, dust, noise vibration, exposure to silica in dust. Worker struck by plant or tip truck, collisions,	3	3	3	27	All construction vehicles and plant fitted with Reverse alarms and sensors. Appointment of competent supervision and competent, fit operators. Method statements to be approved by RE, Risk assessments for the use of specialised plant.	2	3	2	12

CHAPTER 8, 9 and 10: PRETREATMENT AND REPAIR OF EXISTING LAYERS, ASPHALT LAYERS AND SURFACE TREATMENTS												
8, 9 & 10	The final road surfacing will consist of a 20/7mm double seal. The binder for the seal will be a bitumen-rubber (S-R2) tack coat and a S-E1 binder penetration coat. The seal will be completed with an application of a 65% cationic spray-grade emulsion (diluted with 40% water) cover spray as the final binder application	Hot bitumen sprayed by bitumen distributor, stone spread by mobile spread, emulsion based slurry (cold) spread by hand	Contact with hot bitumen, inhalation of fumes. Ergonomic problems. Worker struck by vehicle.	3	3	3	27	Medical surveillance, liver function testing, increased changes in PPE to ensure visibility and saturation of chemicals. First aid treatment for burns, level 3 first aiders, increased arrangements for emergencies. Storage areas to be controlled for temporary storage, dust suppression during mixing of materials. Rotate labour	3	3	2	18

8, 9 &10	Distributor, rollers, chip spreader, watercart, slurry batcher, rotary brooms, hand tools. Tipper truck, tanker, distributor will most likely be used, to transport	Specialised team to do surfacing, may be contractor. Registers	Contact with hot bitumen, inhalation of fumes. Ergonomic problems. Worker struck by vehicle. Dust at slurry plant, noise	3	3	3	27	Competent personnel and supervision, method statements, approved H&S plan and procedures, including all associated documentation if contractor appointed; Level 3 first aid cover, burn emergency management. Registers for plant, daily checks	3	3	2	18
8, 9 &10	Construction of asphalt berms	Hot bitumen used for mixing asphalt	Contact with hot bitumen, inhalation of fumes. Ergonomic problems. Worker struck by vehicle.	2	3	3	18	Competent personnel and supervision, method statements, approved H&S plan and procedures, including all associated documentation if contractor appointed; Level 3 first aid cover, burn emergency management. Registers for plant, daily checks	2	3	2	12
8, 9 &10	PC may use Karoo mixer (stationary), mobile mixer, spreader box, some hand spraying in small areas will be required	Mixing emulsion, sand and cement to make slurry	Ergonomic problems. Worker struck by vehicle. Dust at slurry plant, noise, pinch points at conveyors, mixers	3	3	3	27	Competent supervision and operators; guarding of nip points and spindles/ belt drives; emergency stop button/ safe work procedures (SWPs)	3	3	2	18

CHAPTER 11: ANCILLARY ROADWORKS												
11.1	Stone pitching will occur frequently throughout the project as erosion protection. Labour intensive work	Stone collected by hand and transported to site, laid in concrete matrix	Ergonomic problems. Worker struck by vehicle. Dust	2	3	2	12	Supply and approval of H&S documentation prior to commencement 7 days prior to work. Competent supervision, pre-task training, SWPs, Special transportation arrangements to site and from site. Rotation of labour, detailed in method statements and risk assessments	2	3	1	6
11.2	Gabions, baskets will be pre made. Work will be on slopes, river banks and in cuttings. Stone will be delivered and baskets filled by hand. Ergonomic risk deemed high	Gabion baskets made up on site, placed and filled with stone	Ergonomic problems. Worker struck by vehicle. Dust. Minor injuries from stone and hand tools	2	3	2	12	Supply and approval of H&S documentation prior to commencement 7 days prior to work. All workers to be issued with neon green double dipped pvc gloves or similar. Rotation of labour picking and placing stones. Method statement to be submitted to address ergonomic issues	2	3	1	6
11.4	Guardrails be required along the route. Pre treated creosote, cut and drilled timber posts are specified.	Excavation of holes for support poles, placing of guard rails	Ergonomic problems. Worker struck by vehicle. Dust. Minor injuries from stone and hand tools	2	2	2	8	Supply and approval of H&S documentation prior to commencement 7 days prior to work. Competent supervision, pre-task training, SWPs, Special transportation arrangements to site and from site. No transportation with plant or materials on site. No transportation in open vehicles, adherence to Road Traffic Safety Act. Rotation of labour, detailed in method statements and risk assessments Issue of PPE for handling poles, daily registers for plant and portable electrical tools	2	2	1	4

11.5	Appointment of an SMME for Fencing. Repair of existing fencing may occur. Gates may be required	Excavation of holes for fence posts, straining of barbed and smooth wire. Concrete to corner and straining posts. Erection of gates	Ergonomic problems. Worker struck by vehicle. Dust. Minor injuries from stone and hand tools. Worker struck by breaking wire	3	3	2	18	Supply and approval of H&S documentation prior to commencement 7 days prior to work. Competent supervision, pre-task training, SWPs, Special transportation arrangements to site and from site. No transportation with plant or materials on site. No transportation in open vehicles, adherence to Road Traffic Safety Act. Rotation of labour, detailed in method statements and risk assessments Rotation of labour, gloves appropriate for working with wire	2	3	2	12
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11.6	Use of SMME for the Erection and removal of road signs will be required along the route. Timber poles, pre-cut and drilled specified	Approval of H&S plan - and systems by the SMME. Lifting of larger signs by crane truck, load testing, use of competent, fit o operators and supervision, use of ladders. Daily registers in H&S file	Ergonomic problems. Worker struck by vehicle. Dust. Minor injuries from stone and hand tools. Worker falls from ladder, sign falls on worker	2	2	2	8	Approval of H&S plan - and systems by the SMME. Lifting of larger signs by crane truck, load testing, use of competent, fit o operators and supervision, use of ladders. Daily registers in H&S file	2	2	1	4
11.7	Appointment of an SMME for road marking. Retro Reflective road marking paint will be required, with road studs. Thermo-plastic lines will also be used.	Use of a Contractor at various stages of the project. Pre-marking by hand, Spray painting for marking. Sandblasting may be used	Ergonomic problems. Worker struck by vehicle. Dust. Minor injuries from stone and hand tools. Inhalation of fumes from paint, possible dermatitis from paint. Worker injury from sandblasting	3	2	3	18	H&S documentation by Contractors to be approved by Principal at least 7 days prior to commencement. PC to ensure work is done in closures still in situ and will remain responsible for all traffic accommodation requirements. Strict control will be applied, focus on high visibility.	3	2	2	12
11.8	Appointment of an SMME for landscaping will be required. Hand seeding will be done in areas, as per the advice of Environmental consultant. Work will include rehabilitation at the quarry and borrow pits	Trimming batter slopes, grass seeding and watering. Fertilizing and installation of erosion protection	Ergonomic problems. Worker struck by vehicle. Dust. Minor injuries from stone and hand tools	2	2	2	8	H&S documentation by Contractors to be approved by Principal at least 7 days prior to commencement. Management of batter trimming, hydroseeder required. MSDSs, training of workers,	2	2	1	4
11.9	Road reserve will be finished off to ensure adequate water run-off and finishing of work. Clearing of drains and storm water structures	Grading and shaping, windrows to be created. Competent supervision, fit, competent operators, daily registers	Risks inherent in the use of heavy machinery, dust, noise vibration, exposure to silica in dust. Worker struck by plant or tip truck, collisions,	2	2	2	8	Method statements and risk assessments for use of mechanical removal, noise management	2	2	1	4

#### CHAPTER 13 & 14: STRCTURES REPAIR AND REHABILITATION OF STRUCTURES

13 & 14	Work on structure of bridge	Repair to parapet walls and balustrades. Involves working at heights	Worker falls from Bridge. Worker struck by plant or passing traffic	3	3	3	27	Submission of H&S Specification, approval of H&S plan, fall protection plan for working at heights for all activities. System for advising of possible flash floods. ladders to be on register and to extend at least 1m above the edge of excavation	3	3	2	18
13 & 14	Access and drainage including backfilling use of plant for breaking of hard material, drilling dowels, use of grout	Use of drill, concrete breakers compaction machinery	Injury to worker from drill or breaker, noise, vibration. Ergonomic risks.	3	2	3	18	Method statements and risk assessment., Housekeeping and stacking and storage required. Noise control, vibration to be measured	3	2	2	12

13 & 14	Concrete for structures. Cast in situ, floor slab, deck slabs, haunches, beams, wing walls	Use of batch plant for concrete, vibrators, wheel barrows	Worker caught in pinch point on batch plant. Ergonomic risks, worker falls from access ramp	3	3	3	27	use of plant, vibrating tools and generators to be managed. All pinch points on machinery to be guarded, access ramps to have hand rails . H&S documentation by Contractors to be approved by Principal at least 7 days prior to commencement.	3	3	2	18
13 & 14	Work on parapets and drainage	May involve drilling, cutting and grinding, access to underside of deck,	Injury to worker from drill, noise, vibration. Ergonomic risks. Use of joint sealant	3	3	2	18	H&S documentation by Contractors to be approved by Principal at least 7 days prior to commencement. Management of excavations, lifting devices, mechanical plant required. MSDSs, training of workers, training of workers, inductions, method statements and risk assessments for use of mechanical removal, noise management. Apply SANS 10085 for all access scaffolding, or appropriate codes/ standards	3	3	1	9
13 & 14	Support work	All support scaffolding to be erected on a firm footing. Note possible danger of flash floods	Danger of worker washed away or caught in support work.	3	1	2	6	H Submission of method statements, SWPS and risk assessments. All support work to be designed by "competent:" person and erected by qualified erectors. Inspection before use by qualified person. Flood warning system to be set up	3	1	1	3
	Clearing and Grubbing	Clearing by hand, use of small tools	Ergonomic risks, worker struck by pick or shovel, dust,	2	2	2	8	Method statements and risk assessments. dust management. Rotation of labour	2	2	1	4
	Mixing and placing of concrete	Possible use of small concrete mixer or hand mixing, compaction of concrete	Worker caught in pinch point on mixer. Ergonomic risks, worker falls from access ramp	2	2	2	8	Method statements and risk assessments. dust management. Rotation of labour. Access ramp to be guarded.	2	2	1	4

#### HAZARDOUS CHEMICAL SUBSTANCES SPECIFIED OR REQUIRED

	Cement	Used across the project for a range of tasks, 50kg bags delivered on pallets, ergonomic risk from handling, dust exposure	exposure to cement dust, lung damage, dermatitis	3	3	2	18	Dust control, PPE(eye and respiratory) Use of distributor when stabilising road. Rotation of workers	2	3	1	6
	Shutter oil	Usually hand application prior to placing formwork in position. Volatiles present	Exposure to volatiles	1	1	2	2	PPE - gloves for skin protection, adequate supervision	1	1	1	1
	Prime MC 30	Required for surfacing preparation. Dangerous fumes. Burns, gas bottle explosion, fire	Exposure to volatiles, exposure to hot materials	3	3	3	27	Limit workers exposure and provide adequate protective clothing. First aid measures available, medical surveillance incl liver function testing. Consider use of emulsion type prime	2	3	2	12
	Cape Seal - 80/100 penetration bitumen	Used on all surfacing	Exposure to volatiles, exposure to hot materials	2	2	2	8	Limit workers exposure and provide training, limit exposure, adequate protective clothing.	1	2	2	4
	Bitumen (tack coat) (hot road grade) will be used in sprays and in various grades	Entire surface. Burns, gas explosion from gas bottles, fire. May be stored on site	Exposure to volatiles, exposure to hot materials	3	3	3	27	Limit workers exposure and provide Distributor to limit exposure, adequate protective clothing.	3	2	2	12

	35 and 65% spray grade emulsions and 65% cationic stable-grade emulsions	Use over entire site, mainly an irritant to skin and respiratory centres. Although cold mix, volatiles are present.	Exposure to emulsion. Skin irritation	2	3	2	12	Limit workers exposure and provide Distributor to limit exposure, adequate protective clothing.	1	3	2	6
	Retro-reflective Road paint	High levels of volatiles, while Contractors may be used, the Principal Contractor may do this himself. Products could have narcotic effect	Exposure to volatiles, ergonomic risks.	1	1	2	2	PPE - gloves for skin protection, adequate supervision. Masks should be worn during mixing process	1	1	1	1
	Petrol/diesel/lubricants	Storage tanks on site. Fire, spillage, fumes	Worker exposed to volatiles, fire	2	3	2	12	Local supplier preferred for petrol. bund walls around diesel tanks, emergency plan, Hazardous chemical store for petrol and lubricants. Supervision. Permit from local municipality required	2	3	1	6
	Herbicides and ant poison	Not specified, but will be used. Principal Contractor to ensure use of MSDSs and appropriate protection measures	AS MSDS	3	2	3	18	Appropriate PPE - skin, eye and face protection	2	3	2	12
	Epoxies (including resins)	Not specified, but will be used. Principal Contractor to ensure use of MSDSs and appropriate protection measures	AS MSDS	2	3	2	12	Assess the availability of alternative products to limited the exposure to workers	2	3	1	6
	Coatings	Not specified, but will be used. Principal Contractor to ensure use of MSDSs and appropriate protection measures	AS MSDS	2	2	2	8	Appropriate PPE - skin, eye and face protection	1	2	2	4
	Grouts	Will be determined by the Principal Contractor; various grouts will be required, cementitious or other, may contain silica (crystalline - quartz), hexavalent chromium. Respiratory, skin and eye irritant	AS MSDS	3	3	3	27	Nitrile gloves, FF2 dust masks, eye protection required. Preferably use a single component epoxy system.	2	3	3	18

OTHER ASPECTS CONSIDERED												
	Weather is a factor to be considered, raised temperatures in summer, with high humidity levels. Flash floods could affect low lying areas, especially at structures. Temperatures can reach near freezing especially overnight	Working in wet, extreme cold or hot conditions	Work stoppage in rain or following rain that would affect the works. Cold weather protective clothing may become necessary Hot weather conditions may cause heat exhaustion sunburn and dehydration	3	3	2	18	Use of weather stations to monitor temperature, Work to be assessed should discomfort index reach 100, work may be stopped at 105 if deemed problematic. Adequate water intake. Monitoring of rainfall, not allowing work to occur downstream or low lying areas when threats of flooding. Adequate PPE such as sun hats to be provided if necessary	2	3	2	12
	Natural hazards	General work around site	Possibility of snake bite, bee stings and subsequent allergic reaction,	3	3	2	18	Worker induction to high light the dangers of site work	2	3	2	12
	Local labour and SMMEs will be used on the project, only core personnel are likely to be permanently employed	Appointment of local labour and SMMEs by local Project Liaison Committee (PLC) and Project Liaison Officer (PLO)	inadequate local labour, improper training.	3	3	3	27	Mentoring following the identification of the appropriate Contractors. All workers to have medical screening to ensure fit for duty. Pre-qualification of SMMEs a prerequisite. H&S Plans to be approved at least 7 days prior to SMMEs commencing work	2	3	3	18



EXPOSURE TO NOISE													
N-IH I Regs	Exposure to Noise	Over 85 Db for long period:When activities are in process	Hearing Loss	2	3	3	18	Specification to require establishment of noise zones by AIA.	2	2	2	8	
EXPOSURE TO DUST													
	Exposure to Dust	If severe lack of clear vision; Breathing problems.When activities are in process	Loss of Lung Function	2	3	3	18	Specification to include dust palliative requirements.	2	2	2	8	
STACKING AND STORAGE													
CR28	Stacking and Storage	Poor Storage of Materials and equipment	Physical injury –tripping and falling	3	2	2	12	Worker training. Experienced supervision by site staff and P A. Competent Inspection. Method statements	2	2	2	8	
PORTABLE ELECTRICAL TOOLS													
	Use of small electrical tools	Contact with electricity	Electric shock	3	2	2	12	Ensure all connections secure, no breaks in cable. Proper routing of cables on site	3	2	1	6	
HOTWORK													
GSR 9	Welding operation	Contact with electricity / contact with gas	Incompetent operator / Defective Machinery . Burns / Injury to hand and eyes	3	3	3	27	Ensure opertion by competent welders. Hazardous awareness training. All vessels and equipmentto be inspected regularly. Registers to be kept	3	2	2	12	
WORKING IN CONFINED SPACES													
GSR 5	Working in Confined spaces	Exposure to dangers entering confined spaces	Competent persons to be appointed to test and evaluate the air. Proof to be kept in writing after testing. Correct PPE to be used at all times. Oxygen mask etc.Sufficient ventilation	3	2	3	18	Only authorized person to work in designated area. Sufficient training provided. Risk Assessment and Method statements to be done by a competent person this must be communicated to all workers. Medical surveillance to be done on all workers. Workers to be comprehensively trained proof to be kept in the Health and Safety File	3	2	2	12	

WORKING NEAR OR CLOSE TO WATER												
Water Safety	Inadequate barricading, access control	Worker tripping and falling. Injury to person / risk of drowning resulting in death	Sufficient hand rails around areas where there is a risk of falling. Sufficient security provide in high risk areas. Sufficient training to be provided to employees. Employees to wear the suitable PPE.	2	1	2	4	Ensure operation in areas close to water done by competent person. Hazardous awareness training for workers working in close proximity to water. Regular toolbox talks	1	3	2	6
EXCAVATIONS												
Deep Excavations	Plant & Manual	Injury or death to employees, Public and employees and animals	Proper training of operator: Medicals, machine in good working order, all employees to have regular tool box talks	3	2	3	18	Excavation barricaded/shored as required. Soil to be dumped at least 1 metre from the edge of the excavations. Proper supervision. Required signage to be in place	3	2	2	12

b) **Daily Site Attendance Register**

The Principal Contractor shall keep a daily site register so as to be able to identify the entire Contractors personnel on site in case of an emergency or evacuation situation. The attendance register must include permanent as well as temporary workers working on the site.

All contractors shall report to security/reception upon arrival at site. The Principal Contractor will only grant first time access to work on the site if all required documentation has been provided by the contractor and has been approved by the Principal Contractor.

All site visitors, suppliers and any new contractors shall report to security/reception upon arrival at site. All visitors need to sign an attendance register when visiting the site. Visitors include all persons which are not permanently working on the site but excludes temporary site workers. Visitors must undergo site induction training before they are allowed on site to make them aware of the site dangers.

c) **Emergency Numbers / Emergency Evacuation**

A list with emergency numbers must be readily available to first aiders and supervisors. Emergency numbers must be site specific and must display the nearest emergency facilities.

The Principal Contractor shall identify and formulate emergency procedures in the event an incident does occur. The emergency procedures thus identified shall also be included in The Principal Contractor's OH&S plan and communicated as part of induction training. It is the responsibility of the first aid worker, together with the construction supervisor, to make an assessment regarding the severity of injuries and which actions are appropriate. For example: transfer to a medical facility by ambulance or helicopter.

The Principal Contractor must implement an emergency evacuation procedure on site to ensure that in case of an emergency, all staff will leave their place of work when the emergency siren is sound and proceed to the designated emergency assembly point. The emergency assembly point at the site office must display the sign "Emergency Assembly Point".

An evacuation route diagram must be displayed and visible at strategic points in the site office buildings and on notice boards.

All staff working on site must be given awareness training on the emergency evacuation procedure and evacuation drills must be exercised to ensure all staff know the correct procedure to follow in case of an emergency.

d) **Site Security**

Certain areas where work must be carried out, is recognized unsafe areas and certain other areas may from time to time become unsafe, due to 3<sup>rd</sup> party actions. The Principal Contractor must, as far as reasonably possible, anticipate unsafe areas and must ensure that his site staff is safe from 3<sup>rd</sup> party actions, which include but is not limited to:

- Unrests,
- Violent Demonstrations,
- Theft,
- Injury to staff due to 3<sup>rd</sup> party actions.

The Principal Contractor must, when work is to be carried out in the above-mentioned areas, make provision for security services to accompany site staff during the execution of their work, as The Principal Contractor is responsible for the Health, Safety and Security of his own staff. The provision for security services must form part of The Principal Contractors tender.

e) **Personal Protective Equipment**

Comply with General Safety Regulations, Section 2



The Principal Contractor shall identify the hazards in the workplace and follow the hierarchy of controls to prevent incidents. Where possible, hazards must be eliminated or, where impracticable, mitigate the hazards through implementing control measures. Where mitigated hazards still pose a risk to the health and safety of workers, take steps to protect workers and make it possible for them to work safely and without risk to their health under the hazardous conditions, by wearing personal protective equipment and clothing.

Personal protective equipment (PPE) should, however, be the last resort and there should always first be an attempt to apply engineering and other solutions to mitigate hazardous situations before the wearing of PPE is considered. The hierarchy of hazard control must be followed before the option of personal protective equipment is considered. The following hierarchy of controls must be followed:

- Elimination
- Passive Controls
  - Substitution – Using a cherry picker or man-lift instead of a ladder.
  - Engineering Controls – Installing barrier railings; Installing stairs instead of using vertical ladders.
- Active Controls
  - Administrative policies and procedures
  - Personal protective equipment

Where it is not possible to create an absolutely safe and healthy workplace, the Principal Contractor shall inform employees regarding this and issue, free of charge, suitable equipment to protect them from any hazards being present and that allows them to work safely and without risk to health in the hazardous environment.

It is a further requirement that the Principal Contractor maintain the said equipment, that he instructs and trains the employees in the use of the equipment and ensures that the prescribed equipment is used by the employee/s.

Employees do not have the right to refuse to use/wear the equipment prescribed by the Employer and, if it is impossible for an employee to use or wear prescribed protective equipment through health or any other reason, the employee cannot be allowed to continue working under the hazardous condition/s for which the equipment was prescribed but an alternative solution has to be found that may include relocating the employee.

The Principal Contractor shall include in his OH&S plan the PPE he intends issuing to his employees for use during construction and the sanctions he intends to apply in cases of non-conformance by his employees. Conformance to the wearing of PPE shall be discussed at the DSTI and Toolbox Talk meetings.

The Principal Contractor shall ensure that all his personnel, excluding those who are permanently office bound, are equipped with reflective safety jackets and that these are worn at all times when working on site. Any person found not wearing a reflective jacket on site must be removed from the site until such time as he is in possession of and wearing a reflective jacket. Reflective safety jackets shall be kept in good condition and any jackets that are ineffective must immediately be replaced by The Principal Contractor.

**f) Site Supervision**

Comply with Construction Regulation, Section 8.

The Principal Contractor shall appoint a competent Construction Manager who shall be responsible for the construction activities and for ensuring occupational health and safety compliance on the construction site.

**g) Working in Elevated Positions**

Comply with Construction Regulation, Section 10

The Principal Contractor shall ensure that a fall protection plan, developed by a competent person who is designated as the Fall Protection Plan Developer, is available on site and understood by all employees who will be working in elevated positions.

All employees working in elevated positions shall protect themselves from falls by wearing a full body harness and the lanyard shall be attached as far as possible above the head of the worker to a life-line or other approved and anchor point indicated in the fall protection plan.

In addition to obvious elevated work activities, work activities which include:

- Working on the edge of an excavation where there is a risk of falling into the excavation; or
- Work on the edge of a vertical drop where there is a risk of falling;

shall be considered work in elevated positions and Section 10 of the Construction Regulations must be adhered to at all times. The hierarchy of controls must be implemented when such activities are carried out. As a minimum the employee must wear PPE as identified in the risk assessment, which shall include a full body harness.

#### **h) Structures**

Comply with Construction Regulations, Section 11.

The Principal Contractor shall ensure that all practicable measures are taken to prevent the uncontrolled collapse of new or existing structures or any part thereof, which may become unstable or is in a temporary state of weakness or instability due to the carrying out of construction work. No structure may be loaded in a manner which would render it unsafe.

When a structure is of temporary nature, all conditions as required by the Construction Regulations Section 12 - Temporary Works, must also be complied with.

#### **i) Excavations**

Comply with Construction Regulations, Section 13

The Principal Contractor shall ensure that all excavations are carried out under the supervision of a competent person who has been appointed in writing as Excavation Supervisor.

The Principal Contractor must evaluate the stability of the ground before excavation work begins as well as during excavation work.

Excavations must be barricaded to prevent unauthorized access.

Material removed from excavations, as well as heavy machinery and construction vehicles, must not be closer than 1 meter to the edge of the excavation, to prevent additional loads on the excavation edge, which could cause cave-ins, to prevent construction vehicles from falling into the excavation and to prevent the accumulation of carbon monoxide gas inside the excavation.

The principal contractor and its contractors must cause every excavation which is accessible to the public or which is adjacent to the public roads or thoroughfares, or whereby the safety of persons may be endangered, to be –

- Adequately protected by a barrier or fence and as close to the excavation as is practicable; and
- Provided with warning illuminants or any other boundary indicators that are clearly visible at night or when visibility is poor.

People working in the excavation must be adequately protected from cave-ins, by means of protection systems such as trench boxed and shielding and must have a safe means of access into the excavation and egress from the excavation and such access may not be further than six metres from the point where any worker within the excavation is working.

#### **j) Scaffolding**

Comply with Construction Regulations, Section 16, General Safety Regulations, Section 6 and SANS 10085 – The Design, erection, use and inspection of access scaffolding

The Principal Contractor shall appoint a competent person in writing as scaffolding Supervisor. Scaffolding Inspectors and Scaffolding Erectors must be trained and found competent to carry out scaffolding work. It is important to note that only competent scaffold erectors are allowed to

build the scaffolding. The scaffold inspector is not allowed to build the scaffold with the scaffold erector team.

Scaffolding shall be erected according to SANS 10085 and shall be tagged "Unsafe for use" while it is being build and "Safe for Use" after inspection indicated that the scaffold is safe to use. The inspection of the scaffold shall be in writing and proof thereof shall be available for any user of the scaffold as well as for audit purposes.

Scaffold left erected while The Principal Contractor is not in attendance, must be tagged with a "Not Safe for Use" tag and all reasonably practicable measures must be taken to prevent unauthorised access to the scaffold.

Scaffold must be inspected by the competent scaffold inspector on completion of the scaffold build, weekly thereafter or following severe weather conditions.

Hazards such as overhead power lines must be identified before the scaffold is build and must be reflected in the risk assessment.

When using mobile scaffold, employees and materials must be removed from scaffold before moving the mobile scaffold. Hazards such as overhead power lines must be identified before moving mobile scaffold and must reflect in the risk assessment.

**k) Suspended Platforms**

Comply with Construction Regulation, Section 17, SANS 10295-2 - Suspended access equipment Part 2: Temporary suspended platforms (TSPs)

All suspended platform work must be carried out under the supervision of a competent appointed Suspended Platform Supervisor. Suspended platform erectors, operators and inspectors must be competent.

The Principal Contractor must be in possession of a certificate of design for the use of the suspended platform system.

**l) Cranes**

Comply with Construction Regulation, Section 22, Driven Machinery Regulation, Section 18.

Crane operators must be trained and found competent to operate the particular type of lifting machine and have a valid operator's card. The crane operator must be in possession of a valid medical certificate of fitness, issued by an occupational health practitioner.

The wind factor should always be taken into consideration when operating cranes and a wind speed device must be fitted so that it provides the operator with an audible warning when the speed exceeds the safe lifting speed. Upon noticing that the wind speed is equal or more than the specified speed limit, the operator should stop immediately.

**m) Construction Vehicles & Mobile Equipment**

Comply with Construction Regulation, Section 23, National Road Traffic Act, 1996

Construction vehicle operators must have received training to operate the class of construction vehicle or mobile equipment and must be in possession of an operator's card as proof of competency. Construction vehicle operators must be authorised in writing and have a medical certificate of fitness issued by an occupational health practitioner to operate the construction vehicle and/or mobile equipment.

All construction vehicles operating on a public road, must be roadworthy, licenced and when operated on a public road, comply with the National Road traffic Act.

The contractor is required to ensure that any oil spillages from plant and equipment must be treated immediately.

Drip trays shall also be provided in construction areas for all stationary plant (such as compressors) and for "parked" plant.

All vehicles and equipment shall be kept in good working order and serviced regularly. Leaking equipment shall be repaired immediately or removed from the Site.

Contractor to ensure that maintenance of all plant and equipment to be done in designated workshop where, drip trays shall be used to collect the waste oil and other lubricants.

Failure to do so will be considered a serious offence.

n) **Electrical Equipment**

Comply with Construction Regulations, Section 24.

The Principal Contractor shall take adequate steps to ascertain the presence of and guard against danger to workers from electrical cables or apparatus which is under, over or on the site.

The exact location of underground electric power cables must be determined before any excavators are used for excavation purposes.

The location of overhead electrical cables must be assessed when working with cranes and lifting equipment. Injury may be possible from touching the electrical cables with the crane boom, or from arching when the crane boom comes too close to the electrical cable.

All temporary electrical installations must be inspected at least once a week by a competent person and the records of the inspections must be recorded in a register which must be kept on site.

Electrical machinery and extension cords must be in a serviceable condition and must be inspected on a daily basis before use on a construction site by the authorised operator and the inspection checklist must be kept on the construction site.

Comply with Electrical Installation Regulations.

All electrical installations shall be inspected and approved by an accredited electrical inspector and a valid Certificate of Compliance must be issued for the installation.

All electrical installations carried out on site (permanent and temporary) must be in accordance and comply with the Electrical Installation Regulations.

All power supplies and generating units must be fitted with a functional earth leakage device.

o) **Temporary Storage of Flammable Liquids**

Comply with Construction Regulation, Section 25 and General Safety Regulations, Section 4

The Principal Contractor must ensure storage areas of flammable liquids are well ventilated and "No Smoking" signs are placed at the entrances and ventilation ducts of the storage areas. Firefighting equipment must be available in suitable positions around the storage areas.

The Principal Contractor must ensure that good housekeeping is practiced in and around the flammable storage areas.

p) **Water Environments**

Comply with Construction Regulation, Section 26.

The Principal Contractor must ensure that a lifejacket forms part of the employees PPE and is worn when the employee is exposed to the risk of drowning, by falling into water.

The risk assessment must make provision for the rescuing of persons in danger of drowning and for preventing employees from falling into the water.

When working next to a river, the Principal Contractor shall put a system in place to monitor the river water level in order to evacuate employee in case of a flood.

When working over water environments, Section 10 of the Construction Regulations – Fall Protection will also apply.

q) **Housekeeping**

Comply with Construction Regulation, Section 27, Environmental Regulations for Workplaces, Section 6(3).

The Principal Contractor shall ensure that suitable and acceptable housekeeping is continuously implemented and maintained on the construction site. Off-cuts and waste must be removed as soon as practicable.

r) **Stacking & Storage of Material, Plant & Equipment**

Comply with Construction Regulations, Section 28 and General Safety Regulations, Section 8.

The Principal Contractor shall appoint a competent person in writing with the duty of supervising all stacking and storage operations on site.

Stacking shall only take place in areas specifically demarcated for this purpose. Circular items must be secured with wedges or chocks.

Items removed from a stack shall only take place from the topmost layer of the stack.

Stacks shall not obstruct any fire extinguishing equipment, first aid equipment, electrical switchgear (DB Boxes) and ventilation or lighting installations.

Unstable stacks must be broken down immediately.

s) **Fire Precautions**

Comply with Construction Regulation, Section 29.

The Principal Contractor must provide his own firefighting equipment that is within the service date and safe for use. Firefighting equipment must be on a register and inspected by a competent person who has been appointed in writing.

Suitable and sufficient fire extinguishing equipment must be placed at strategic locations and a sufficient number of firefighters must be available, which must be trained in the use of it.

t) **Intoxicating Liquor and Drugs**

Comply with General Safety Regulations, Section 2A.

The principal Contractor must compile a Substance Abuse Policy, which must be communicated to all employees. This policy should form part of the induction material for employees as well as visitors.

The Substance Abuse Policy should set the limit for intoxication to zero in order to complement a vision of zero tolerance.

Any person found to be intoxicated, or consuming intoxicating liquor or illegal drugs, shall not be allowed onto the premises and/or must be removed from the premises.

The Principal Contractor has the right to test any person entering the premises for intoxicating liquor or illegal drugs and may refuse entrance on the basis of the outcome of the test.

The Principal Contractor shall ensure that employees taking prescription medicine informs the Principal Contractor of such and shall ensure that the side effect of such medicine does not constitute a hazard to the employee himself or people working with, or in close proximity to the employee.

u) **Confined Space Work & Tunnelling**

Comply with Construction Regulation, Section 15 and General Safety Regulations, Section 5.

The Principal Contractor shall ensure that only authorized persons enter confined spaces.

An entrance log must be kept to ensure people are not left inside the confined space. Adequate air monitoring must be carried out before entering the confined space. When air monitoring indicated the oxygen to be less than 20% by volume, the confined space must be purged and ventilated to obtain a safe atmosphere or self-contained breathing apparatus must be used.

v) **Site Services**

The Principal Contractor shall provide and maintain on the site adequate facilities for employees to use, which must be serviced and kept sanitary and hygienic at all. The following site services should be taken not of:

i) Drinking Water

The Principal Contractor must ensure that an adequate supply of potable drinking water is available for all persons engaged in managing and working on the construction site and, if necessary, similar facilities elsewhere for such personnel off the site. Employees working in hot conditions must consume enough water per hour to prevent dehydration.

Where water is unsafe for human consumption, it must be so indicated by means of adequate signage.

ii) Accommodation

The Principal Contractor shall comply with the requirements of Construction Regulation 30 with regards to employee's accommodation. Reasonable and suitable living accommodation must be provided to employees who are far removed from their homes.

iii) Sanitary Facilities

The Principal Contractor shall comply with the requirements of Construction Regulation 30 with regards to employee's sanitary facilities. Sanitary facilities must be positioned in close proximity of the work area. Sanitary facilities must be serviced regularly and kept in a clean and hygienic condition.

w) **Traffic Accommodation**

The Principal Contractor must develop a clear Traffic Management Plan, which must be approved by the Engineer. Traffic must be organized and controlled in accordance to the Traffic Management Plan and any work area must have adequate signage, signaling or other control arrangements to guard against the dangers relating to the movement of vehicles. Where reasonably practicable, solid barriers must be placed between workers and traffic passing by.

When the Principal Contractor is executing night work, permission should be obtained from the Engineer. The Principal Contractor must put in place visible or reflective signs that can be seen by motorist at a distance. If a stop and go method is used flag persons must be properly trained on how to control the traffic.

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## **PART C4: PROJECT INFORMATION**

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## PART C4: PROJECT INFORMATION

TABLE OF CONTENTS	PAGE
C4.1 DESCRIPTION OF THE WORKS .....	C3-238
C4.2 DRAWINGS .....	C3-242
C4.3 CAMP ESTABLISHMENT, POWER SUPPLY AND OTHER SERVICES .....	C3-242
C4.4 CONSTRUCTION IN CONFINED AREAS .....	C3-242
C4.5 MANAGEMENT OF THE ENVIRONMENT .....	C3-242
C4.6 TRAFFIC.....	C3-243
C4.7 SMALL CONTRACTOR DEVELOPMENT, TRAINING AND COMMUNITY LIAISON.....	C3-243
C4.8 CLIMATE .....	C3-243
C4.9 REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS 2014.....	C3-245
C4.10 RISK AND SAFETY PROCEDURES .....	C3-245
C4.11 SERVICES.....	C3-246
C4.12 CENTRELINE MATERIALS INVESTIGATION INFORMATION .....	C3-246
C4.13 WATER FOR CONSTRUCTION .....	C3-248
C4.13 APPENDICES.....	C3-248
APPENDIX 1: LOCALITY PLAN .....	C3-249
APPENDIX 2: D1000 PROVISIONAL SCHEDULES FOR WORK ENVISAGED FOR TARGETED ENTERPRISES.....	C3-250
APPENDIX 3: DRAINAGE SCHEDULE .....	C3-251
APPENDIX 4: INTERSECTION AND FARM ACCESS SCHEDULE .....	C3-252
APPENDIX 5: OHS BASELINE RISK ASSESSMENT .....	C3-253
APPENDIX 6: TEST PIT PROFILE AND SLOT PROFILE SHEETS, DCP RESULTS AND ..... LABORATORY TEST RESULTS.....	C3-254
APPENDIX 7: CORRESPONDENCE FROM THE LOWER SUNDAY'S RIVER WATER USE ASSOCIATION .....	C3-255
APPENDIX 8: DISPUTE ADJUDICATION AGREEMENT .....	C3-256
APPENDIX 9: IMPORTED CONTENT DECLARATION .....	C3-271
APPENDIX 10 – CONTRACT PARTICIPATION GOAL (CPG) PLAN FORMAT .....	C3-290
APPENDIX 11 – SANRAL PROJECT LIAISON COMMITTEE GUIDELINES.....	C3-291
APPENDIX 12 – CHECKLIST FOR PLCS AND PLOS .....	C3-292
APPENDIX 13 – PROFORMA SUBCONTRACT DOCUMENT FOR TARGETED ENTERPRISES .....	C3-293
APPENDIX 14 – EXISTING TARGETED ENTERPRISE DATABASE .....	C3-294
APPENDIX 15: HEALTH AND SAFETY OBLIGATIONS .....	C3-295



### Information Only

All data and descriptions contained in this section of the contract documents are given for information purposes only and cannot be interpreted as prescriptive or as an instruction despite the fact that the text may give the opposite perspective. If any conflict arises between the content of this section and other sections of the contract documents, the latter take precedence.

## C4.1 DESCRIPTION OF THE WORKS

The South African National Roads Agency SOC Limited (SANRAL) intends to enter into a contract for the strengthening of National Route R342 Section 1 from km 27.00 (at the Nguni River Lodge access) to km 36.93 (at the intersection with National Route 10). A locality plan is included in Appendix 1.

### Note:

All references in Volumes 3 and 4 and the pricing schedule to kilometre distances are based on a contract kilometre distance system which varies from SANRAL's current road kilometre system, see referencing table on layout drawings. The contract kilometre system will be used for construction purposes but the SANRAL kilometre system will be used for all as-built records.

### C4.1.1 ROADWORKS

#### C4.1.1.1. Km 27.00 to km 36.20: Pavement restoration using Cold In-situ Recycling (CIR)

The section between km 27.00 and km 36.20 requires full width base stabilisation (CIR). The width of the base stabilisation are as follows:

- km 27 and km 31: 8.2m, i.e. 3.4m lanes and 0.7m shoulders with no rounding provided.
- km 31 to km 36.2: 9.6m, i.e. 3.4m lanes and 1.2m shoulders with no rounding provided.

The only the guardrails on this section are the approaches to the rail over road bridge at km 32.9 where the guardrails would need to encroach into the 1.2m surfaced shoulder.

The work on this section is to be undertaken as follows:

- a) The existing surface seal to be milled off to spoil to expose all the buried patches (wearing course and BTB).
- b) All asphalt patches to be milled out (to spoil or for re-use) and replaced with imported G5A material.
- c) The in-situ base to be recycled to a depth of 200mm and stabilized with approximately 2.5% cement to yield a C4 layer compacted to 96% of MDD.
- d) Import G2 material to create a G2 base layer stabilized with approximately 2.5% emulsion and 1% cement, creating a 150 mm BSM1 layer compacted to 100% of MDD.
- e) The compacted BSM 1 layer shall be finished and slushed with water.
- f) A temporary armour seal (using 10 mm aggregate and a slurry) shall be constructed for traffic accommodation purposes until the final seal is placed.
- g) The final road surfacing will consist of a 20/7mm double seal. The binder for the seal will be a bitumen-rubber (S-R2) tack coat and a S-E1 binder penetration coat.

- h) The seal will be completed with an application of a 65% cationic spray-grade emulsion (diluted with 40% water) cover spray as the final binder application.

**C4.1.1.2 Km 36.20 to km 36.93: Widening of the road prism and providing a pedestrian walkway**

The existing 7.2 m cross section of this section of the road will be upgraded and widened to provide a 9.2 m surfaced width. To safely accommodate traffic without affecting traffic on National Route 10, the upgrade of this portion will require the construction of a temporary bypass. The following phasing will be used for the construction of this portion:

**a) Phase 1: Temporary Bypass (LHS)**

- Clear the left side of the road reserve and strip topsoil.
- Excavate an approximately 7.5 m wide box alongside the existing road edge to a depth of 200 mm.
- Rework the floor of the excavation (roadbed preparation) by ripping and recompacting to 93% (100% for sand) of MDD.
- Using material imported from commercial sources, construct a 200 mm stabilized C4 base (G5A) layer compacted to 97% of MDD.
- Prime the layer.
- Construct a 10 mm single seal and slurry (armour seal) surfacing.
- Complete the bypass by applying the necessary road marking allowing for two 3.5 m wide lanes which will be used to accommodate two-way traffic during the next construction phase.

**b) Phase 2: Permanent works (RHS)**

- Excavate approximately 8.3 m of the existing surfaced road and gravel shoulder to a depth of 250 mm.
- Rework the floor of the excavation (roadbed preparation) by ripping and recompacting to 93% (100% for sand) of MDD.
- Import G5A material across the full width from commercial sources,
- Stabilize the imported G5A material with approximately 2.5% cement to yield a 250 mm thick C4 subbase layer compacted to 96% MDD.
- Import G2 crushed stone from commercial sources for the construction of a 150 mm thick G2 base compacted to 88% of apparent relative density (AD).
- Prime the complete width (approximately 8.3 m).
- Construct a 45 mm asphalt wearing course (8.0 m) using a class A-E2 binder with rolled in chips.
- Complete this phase by applying the necessary road marking demarcating two 3.5 m wide lanes which will be used to accommodate two-way traffic during the next construction phase.

**c) Phase 3: Permanent works (LHS)**

- Excavate approximately 2.6 m of the existing road LHS lane and bypass to a depth of 250 mm cutting into the newly constructed subbase on the RHS.
- Using the G5 material cut from the bypass construct a stabilized subbase with approximately 2.5% cement to yield a 250 mm thick C4 layer compacted to 96% MDD (2.6 m).
- Import G2 crushed-stone from commercial sources for the construction of a 150 mm thick G2 base compacted to 88% of apparent relative density (AD) benching into the RHS by cutting back 150 mm into the newly constructed base layer on the RHS.
- Prime the completed layer.
- Construct a 45 mm asphalt wearing course using a class A-E2 binder with rolled in chips.
- Complete the permanent LHS and RHS lanes by applying the necessary road marking allowing for 3.7 m lanes and 0.9 m shoulders.

d) Phase 4: Removal of temporary works (LHS) and construction of walkway

- Excavate any remaining material from the temporary bypass on the LHS and reinstate the road reserve using stockpiled topsoil and re-establish vegetation.
- Using the material (where possible) from the bypass to construct the pedestrian walkway between km 36.70 and km 36.93. Reinstatement of the road reserve using topsoil and re-establish vegetation.

C4.1.1.3 **Km 27.00 to km 36.20: Final Seal**

The final road surfacing will consist of a 20/7mm double seal. The binder for the seal will be a bitumen-rubber (S-R2) tack coat and a S-E1 binder penetration coat. The seal will be completed with an application of a 65% cationic spray-grade emulsion (diluted with 40% water) cover spray as the final binder application.

C4.1.1.4 **Km 36.20 to km 36.93: Final Wearing Course**

The final road surfacing for the length of this section (and including access bellmouths within this section) will be a 45 mm asphalt wearing course (continuously graded medium grade using class A-E2 binder).

C4.1.2 **ANCILLARY WORKS**

(a) Intersection bellmouths

The contract makes provision to pre-treat and reseal all surfaced access bellmouths with a 20 mm Cape Seal.

For the unsurfaced bellmouths, the following provision has been made:

- Cut to spoil 150 mm existing wearing course
- In-situ roadbed preparation
- Import 150 mm G5A material compacted to 96%
- Prime and surface with 20 mm Cape seal

Approximately 40 m of the access road (DR1995) at km 34.39 will be reconstructed and shall tie into the new level of the R342 as per the drawing 113246-2-CT23. The following layerworks shall be used:

Surfaced bellmouth

- 45 mm A-E2 asphalt wearing course.
- 150 mm G2 base compacted to 88% of apparent relative density (AD).
- 150 mm G5A subbase compacted to 95% of MDD.
- 150 mm G7 upper selected compacted to 95% of MDD.

Gravel section

- 190 mm type 1 gravel wearing course compacted to 95% of MDD.
- 150 mm G5A subbase compacted to 96% of MDD.
- 150 mm G7 upper selected compacted to 95% of MDD.

A concrete edge beam shall be constructed at the limit of surfacing for all bellmouths, refer to drawing 113246-2-CT2.

(b) Structural work

Structural work on this contract includes:

- Repair of parapets, headwalls and wingwall spalls.
- Application of protective coatings to parapet inside walls and balustrades.
- Installation of new bridge number plates.
- Replacement of existing joint system.

(c) Drainage

*(i) Culverts*

Some of the existing culverts do not have inlet and outlet structures and the majority of those that do were constructed with concrete, stone pitching and masonry. Most of the existing inlet and outlet structures are in a fair to poor condition, with a few requiring minor repairs and some needing to be rebuilt. The pipes have generally silted up and require cleaning.

Based on a drainage survey it is estimated that of the sixty-two culvert inlet and outlet structures, fifty six will need to be rebuilt. It is also estimated that two new drainage culverts (450 mm dia.) will have to be constructed at accesses. Provision is also made to extend pipe culverts at two existing access.

A drainage schedule is included in Appendix 3.

*(ii) Side Drains*

Provision is made to install approximately 450 m of new concrete lined drains in the cuttings between km 28.44 and km 28.56, and km 28.82 and km 29.06. The contract also makes provision for the trimming and shaping of unlined drains.

*(iii) Subsoil Drains*

Provision is made for the construction of new longitudinal subsoil drains under all concrete lined drains.

(e) Guardrails

Provision has been made for the installation of approximately 510 m of new guardrails.

The contract makes provision for the construction of a semi-mountable kerb (figure 7) and in-situ channel as per drawing TD-D-RD-1001-V1 (Type B).

(f) Fencing

Provision has been made to repair and/or replace fencing in all areas where it is missing or damaged.

(g) Signage

The contract makes provision to replace all permanent signage.

(h) Road markings and studs

The contract makes provision for temporary and permanent road markings and road studs. New solvent based road markings will be painted on completion of the new surfacing and shall be replaced with thermoplastic markings before the expiry of the Defect Notification Period.

C4.1.3 MAINTENANCE WORKS

The road reserve within the defined limits of the contract falls within the limits of another contract that has already been let to a routine maintenance contractor.

The Routine Road Maintenance Contractor's details are as follows:

Route Manager:

GG&G

Mr. Henry Steins

Contact number: 082 312 7343

Contractor:

QTC Civils

Mr. Dean Romer

Contact number: 082 772 5232

The Contractor shall take over the maintenance responsibility on the date of handover but may liaise with the routine maintenance contractor by arranging a transition period immediately after the hand-over of the site to allow sufficient time to muster his resources required for routine maintenance of the road. However, the transition period may not extend beyond the contractual starting time defined in sub-clause 8.1 of the FIDIC Conditions of Contract and C1.2.2 Contract Data."

#### **C4.2 DRAWINGS**

The drawings that form part of the tender document (Volume 4, Roadworks Drawings) are issued for tender purposes only.

The contractor will be supplied with one set of paper prints plus a CD containing all the construction documentation.

Only figured dimensions may be used and drawings may not be scaled unless so instructed by the engineer. The engineer will supply all figured dimensions omitted from the drawings.

The levels given on bridge drawings are subject to confirmation on site, and the contractor shall submit all levels to the engineer for confirmation before he commences any structural construction work. It is the contractor's responsibility to check all clearances given on the drawings and to inform the engineer of any discrepancies.

#### **C4.3 CAMP ESTABLISHMENT, POWER SUPPLY AND OTHER SERVICES**

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

The Contractor shall provide a suitable site for his camp and for accommodating his labourers. No camp establishment will be permitted within the road reserve.

#### **C4.4 CONSTRUCTION IN CONFINED AREAS**

It will be necessary for the contractor to work within confined areas. In certain places the width of the fill material and pavement layers may decrease to zero and the working space may be confined. The method of construction in these confined areas largely depends on the contractor's constructional plant.

Regardless, measurement and payment will be in accordance with the specified cross-sections and dimensions only, irrespective of the method used for achieving these cross-sections and dimensions. It is deemed that the rates tendered in the Pricing Schedule include full compensation for all special equipment and construction methods and for all difficulties encountered when working in confined areas and narrow widths, and at or around obstructions. No extra payment will be made nor will any claim for additional payment be considered in such cases. (Refer to standard specification sub-clause C1.1.3.2(b)).

#### **C4.5 MANAGEMENT OF THE ENVIRONMENT**

The contractor will be responsible for construction according to an environmental management plan in terms of Section C1000 Scope of Works.

The contractor must take the utmost care to minimise the impact of his establishment and other construction activities on the environment and must adhere to the requirements as set out in Section C of the Scope of Works. Where the contractor fails to adhere to these requirements the specifications in Section C of the Scope of Works provide the methodology and cost liability of remedy.

#### **C4.6 TRAFFIC**

The most recent (2018) Average Daily Traffic (ADT) were recorded using traffic counts and indicate that traffic volumes are 593 total vehicles and 70 heavy vehicles (ADTT) per day in both directions.

Construction will be undertaken in half-widths and the traffic accommodated by closing half the carriageway at a time and accommodating one-way traffic on the remaining open lane. The maximum length of half width construction (lane closure) is 4 km. For each individual road section, a maximum of two half-width day-night closures affecting traffic will be allowed at a specific time.

#### **C4.7 SMALL CONTRACTOR DEVELOPMENT, TRAINING AND COMMUNITY LIAISON**

The South African National Roads Agency SOC Limited is committed to the implementation of Government's policies and in turn expects the same from its contractors. Accordingly, it is a requirement of this project that tenderers are familiar with the specifications that relate to the transformation of the construction industry through the following:

- (i) adherence to the policies of the Reconstruction and Development Programme and other similar Government initiatives,
- (ii) employment and/or creation of Targeted Enterprises,
- (iii) arrangement of generic skills, engineering skills and entrepreneurial skills training programmes for which provision has been made in the Pricing Schedule,
- (iv) construction using labour maximisation principles and,
- (v) active participation with community-based structures.

Tenderers should note that liaison with Community Stakeholders via active participation with the Project Liaison Committee, as well as employment of people from within the community, are essential parts of the project. A provisional sum to cover costs incurred by members of the community in the liaison process has also been included in the Pricing Schedule.

An existing targeted enterprise database is included in Appendix 14.

Section D of the Scope of Works covers the contractor's requirements in detail, as well as defining the targets that comprise the Contract Participation Goal (CPG).

In order to assist the Contractor in achieving the required minimum percentage of work to be subcontracted to Targeted Enterprises (CE1 and 2) as specified in the Specification Data, provision has been made in Section D1000 for the following:

- (a) Roadworks
  - Section 1.6
  - Section 3.1
  - Section 11.4
  - Section 11.5

Provisional schedules for the work envisaged by Targeted Enterprises above has been included in Appendix 2.

It should be noted that where an item of work has been included under the provisional sum under item D10.05 the total quantity for the item has been split with a portion of the total quantity covered by the provisional sum and a portion remaining in Schedule A for the Contractor to price and there is no double counting of quantities.

#### **C4.8 CLIMATE**

This area of the Eastern Cape experiences a typical Mediterranean climate. The summer (November to March) maximum temperatures average around 29°C, dropping overnight to around 12°C. During winter (May to August) the day temperatures average 22°C, dropping to a low of about 5 or 6°C during the evenings. Records indicate that the extreme summer

temperatures may reach up to 42 °C during the day, and drop to around -1°C at night during the winter months.

This region typically has rainfall year round with the bulk of it falling mainly during summer and autumn. The total rainfall in this region averages about 455 mm per year. The historically recorded climatic data [Station No. 0055447A7 Addo (2005 - 2016)] is represented in Table 1: Statistical Temperature Data and Table 2: Statistical Rainfall Data.

Table 1: Statistical Temperature Data

Month	Average of Daily Temperatures		Average of Monthly Extremes	
	Max °C	Min °C	High °C	Low °C
January	28.7	15.0	38.2	9.1
February	31.1	16.5	42.0	10.9
March	30.0	14.3	41.4	8.3
April	26.9	10.9	37.6	4.5
May	24.8	8.2	33.7	2.6
June	22.1	5.1	29.7	-0.3
July	22.2	4.8	29.7	-0.8
August	23.7	6.2	34.0	0.4
September	25.1	7.8	35.9	2.0
October	26.1	10.6	38.3	4.3
November	27.6	12.1	39.3	6.5
December	29.4	14.5	39.9	9.2

Station No. 0055447A7\_ADDO (2005 – 2016)

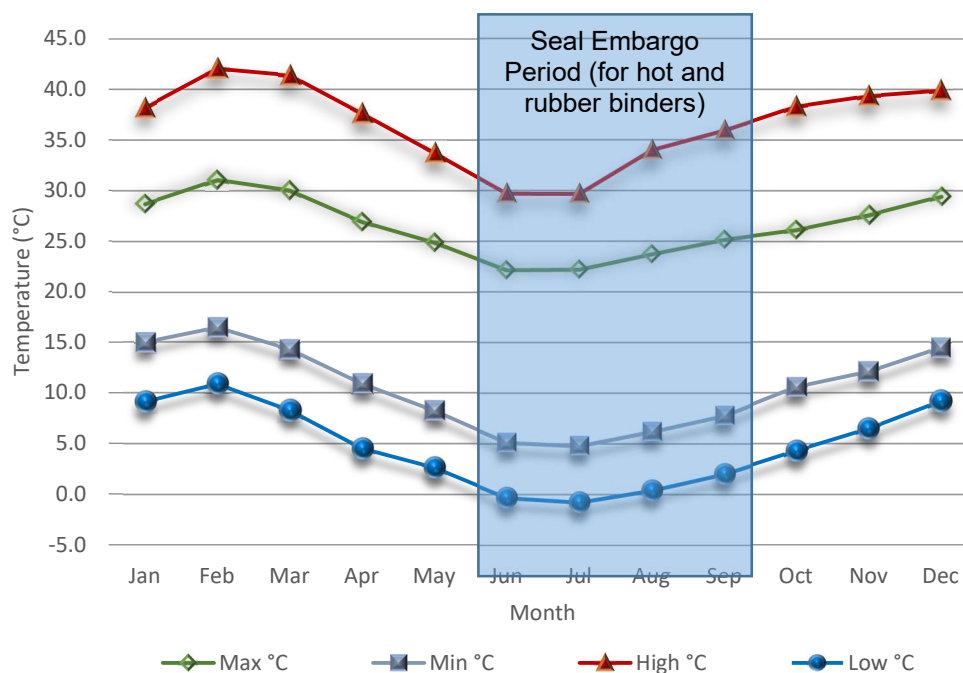


Figure 1: Graphical Representation of Temperature Data

Table 2: Statistical Rainfall Data

Month	Rainfall (mm)			Ave. Rain Days (No.)			
	Avg.	24 hr. Max.	Total	1 - 5 mm	5 - 10 mm	10 - 20 mm	> 20 mm
January	27.6	33.0	10.0	2.5	1.5	0.5	0.1
February	48.9	59.0	10.0	3.4	1.2	0.5	0.7
March	48.5	72.2	11.0	2.8	1.0	1.1	0.3
April	49.3	57.0	11.0	3.1	1.2	0.8	0.5
May	25.2	51.4	8.0	1.7	0.9	0.5	0.2
June	28.4	38.6	9.0	2.7	0.7	0.7	0.2
July	32.6	44.8	9.0	2.2	1.0	0.6	0.3
August	31.0	56.2	8.0	3.0	0.5	0.3	0.4
September	18.6	29.8	6.0	2.0	1.1	0.3	0.1
October	51.5	98.8	11.0	2.7	1.4	0.8	0.5
November	39.8	48.0	9.0	2.3	1.2	0.8	0.4
December	36.0	41.2	12.0	3.8	1.3	0.4	0.2

Station No. 0055447A7\_ADDO\_(2005-2016)

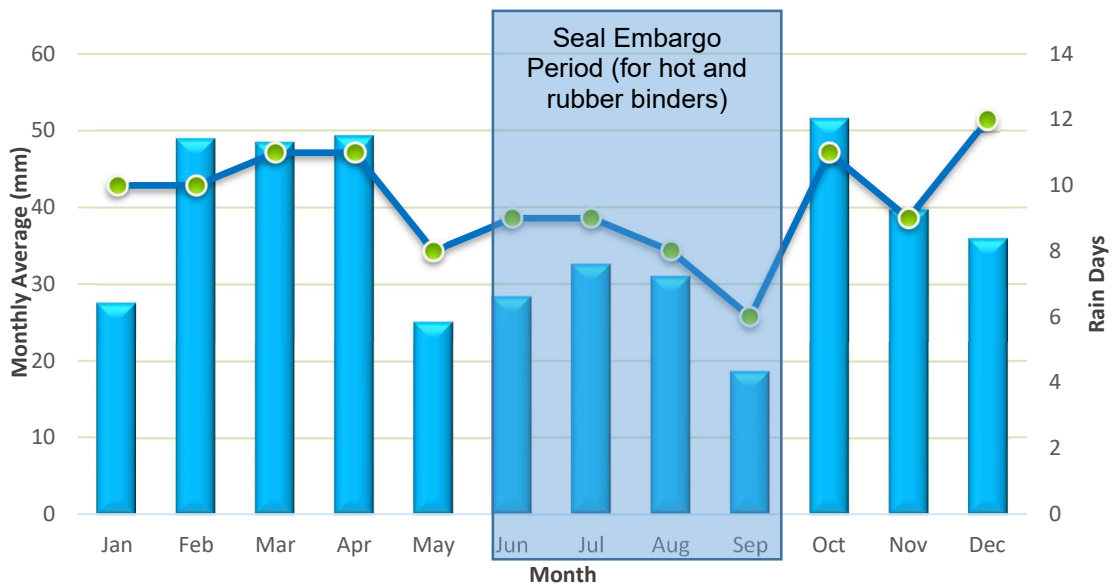


Figure 2: Graphical Representation of Rainfall Data

#### C4.9 REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS 2014

Refer to Section E of the Scope of Works for general requirements in terms of the OH&S requirements.

The project specific Baseline Risk Assessment and Site specific health and safety specification prepared by the OHS Agent in terms of construction Regulation 5(1)(a) and 5(1)(f) is included as Appendix 5.

#### C4.10 RISK AND SAFETY PROCEDURES

The Contractor shall note that the Site is in an area where there is currently a high level of unemployment within the communities and there are significant expectations that employment opportunities will be created for the people of the communities during the completion of the Contract.

The Contractor shall also note that local businesses currently operating in the communities near the Site have significant expectations that they will be given opportunities to participate in the completion of the Contract.



The Contractor shall therefore take in to account the risks that may be associated with any failure to fully comply with the requirements of the specification, particularly Section D, with regard to the participation of local labour, subcontractors, suppliers and businesses etc.

The Contractor shall take note that, due to the limited number of routes or roads that provide access to the Site, there is a risk that access to the Site may be affected by protest actions or other criminal activities.

The Contractor shall be responsible for complying, at all times, with the requirements of Clause 4.8 of the FIDIC Conditions of Contract regarding safety procedures. The Contractor shall liaise and co-operate with all authorities, such as the South African Police Service (SAPS), who are also responsible for public safety and security services in the vicinity of the Site.

#### **C4.11 SERVICES**

Known services are provided under Clause A2.1.3.2 under Section B Chapter 2.

It is the Contractor's responsibility to obtain wayleaves for the various service providers.

#### **C4.12 CENTRELINE MATERIALS INVESTIGATION INFORMATION**

The centreline investigation was carried out by Labco in October 2007.

The information obtained from the base and subbase layers is summarised in Tables 1 and Table 2 respectively.

Note:

The materials investigation was carried out using a contract kilometre distance system which varies from SANRAL's current road kilometre system, see referencing table on layout drawings.

##### **C4.12.1 Materials Summary – Base Layer**

<b>Table 1: Summary of materials in the base layer</b>					
Section (km)	Thickness (mm)		General Description	Quality	
	Range	Mean		Range	Mean
27 to 37	100 to 250	166	Crushed quartzitic sandstone rock	G5	G5

Large variations were found in the thickness of the base layer. The quality of the material in the base layer is generally G5, although there are a few isolated areas where G7 or lesser quality material was found in the base layer. The Plasticity Index (PI) was found to be higher than 6 in several places, with occasional values of up to 12. Between km 26 and km 39 there is a trend for the PI values to be above 6. Severe pumping is evident along most of this section and it is likely that the higher plasticity in the base is caused by clayey material being pumped up from lower levels in the pavement.

##### **C4.12.2 Materials Summary – Subbase Layer**

<b>Table 2: Summary of materials in the subbase layer</b>			
Section (km)	General Description	Quality	
		Range	Mean
27.2 to 37	Crushed sandstone or quartzitic cobbles with clayey gravel	G5 to G8	G6

The thickness of the subbase layer varies considerably, from as thin as 140 mm to 450 mm; although it was not possible to distinguish two layers in the trial pits it is likely that the subbase was in fact constructed in two approximately 150 mm thick layers. The quality of the material is generally G5 or G6 as indicated in Table 2.

#### C4.12.3 Materials Summary – Selected Layer

The makeup of the selected layer is summarised in Table 3.

<b>Table 3: Summary of materials in the selected layer</b>			
Section (km)	General Description	Quality	
		Range	Mean
2.8 to 36.4	Silty clay	G5 to <G10	G10

As can be seen in the table, several different materials were used in the selected layer and it is probable that the difference in the qualities of material found along the various sections can be related, at least to some extent, to their durability, with the quality of some of the materials having deteriorated more than others over time. The thickness of the selected layer varies considerably, but is generally in the region of 150 mm.

Except for the few cases shown in Table 4, the CBR swells of the materials in the selected layer were found to be less than 1.5%, indicating the general suitability for this material to remain within the pavement's material depth.

<b>Table 4: Location of materials in the selected layer with high CBR swells</b>	
Location (km)	CBR Swell (%)
27.8	2.5
28.2	1.7
29.2	1.7

#### C4.12.4 Materials Summary – Subgrade

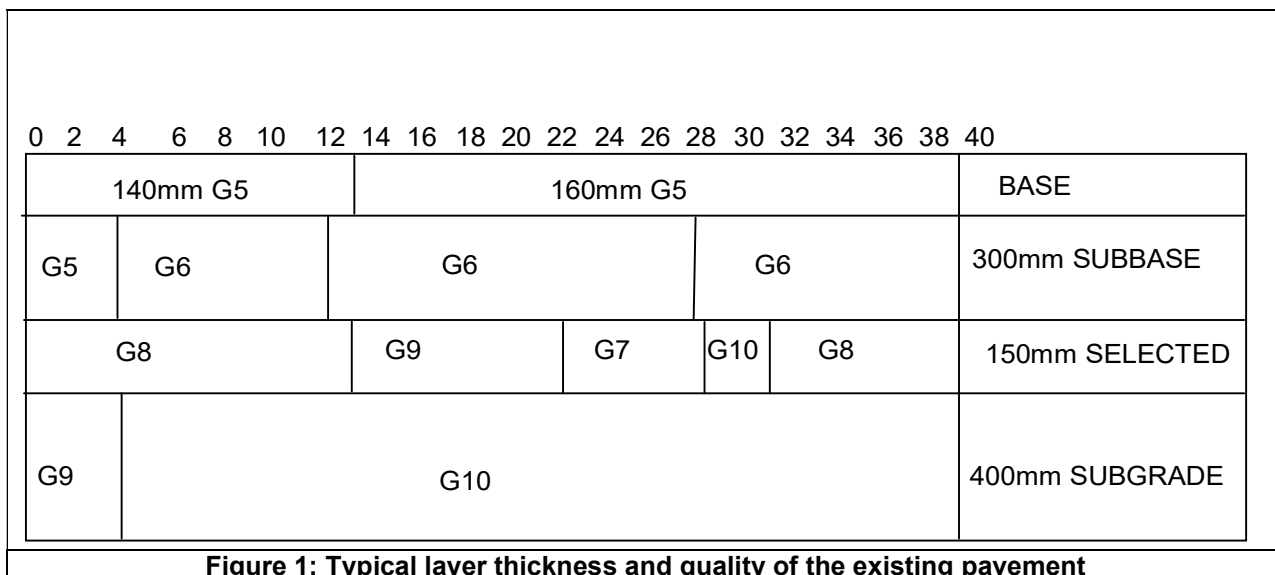
The quality of the material in the subgrade, which was generally encountered in the trial pits from approximately 600 mm below the existing road surface to the final depth of the trial pit at 1000 mm, is summarised in Table 5.

<b>Table 5: Summary of materials in the subgrade</b>			
Section (km)	General Description	Quality	
		Range	Mean
21.6 to 27.4	Crushed quartzitic sandstone	G5 to G7	G7
27.4 to 29.4	Clayey calcrete and sandstone fragments	G10 to <G10	G10
29.4 to 37	Silty or sandy clay and calcrete	G6 to G10	G8

High CBR swells of 1.5% and above were found in the trial pits at the locations scheduled in Table 6. The investigation therefore shows frequent occurrences of unsuitable material in the section from km 27 to around km 36.

<b>Table 6: Location of poor quality materials with high CBR swells in the subgrade</b>	
Location (km)	CBR Swell (%)
27.6	1.9
31.2	1.9
31.4	2.3
34.1	1.6
35.0	1.6
35.1	2.2
36.2	1.7

Typical layer thicknesses and materials qualities found in the existing pavement are summarised in Figure 1.



Test pit profile sheets, DCP results and laboratory test results done during the intrusive investigation are included in Appendix 6.

#### **C4.13 WATER FOR CONSTRUCTION**

The Contractor may not extract water from unapproved water sources within the contract limits and must make his own arrangements for procuring, transporting and storing suitable water for construction.

The Lower Sunday's River Water Use Association have indicated that they will allow the Contractor to draw water from the irrigation canal located at km 6.06 subject to the Contractor submitting an application to the Association and paying the relevant fees. Refer to Appendix 7.

#### **C4.13 APPENDICES**

Appendix 1:	Locality Plan
Appendix 2:	D1000 Provisional Schedules for work envisaged for Targeted Enterprises
Appendix 3:	Drainage Schedule
Appendix 4:	Intersection and Farm Access Schedule
Appendix 5:	OHS Baseline Risk Assessment
Appendix 6:	Test Pit Profile and Slot Profile Sheets, DCP Results and Laboratory Test Results
Appendix 7:	Correspondence from the Lower Sunday's River Water use association
Appendix 8:	Dispute Adjudication Agreement
Appendix 9:	Imported content
Appendix 10:	CPG Plan
Appendix 11:	SANRAL Project Liaison Committee Guidelines
Appendix 12:	Checklist for PLC and PLO
Appendix 13:	Proforma subcontract document
Appendix 14:	Existing Targeted Enterprise Database
Appendix 15:	Health And Safety Obligations

## **APPENDIX 1: LOCALITY PLAN**







**APPENDIX 2: D1000 PROVISIONAL SCHEDULES FOR WORK ENVISAGED FOR TARGETED ENTERPRISES**

## SCHEDULE A: ROADWORKS

## C1.6 CLEARING AND GRUBBING

Item				Description	Unit	Quantity	Rate	Amount R
C1.6				CLEARING AND GRUBBING				
C1.6.1				Clearing:				
	C1.6.1.1			Clearing with machines and some hand labour where necessary	ha	0.15		
	C1.6.1.2			Clearing with hand labour only when labour enhanced work is specified	ha	18.9		
C1.6.2				Grubbing:				
	C1.6.2.1			Grubbing with machines and some hand labour where necessary	ha	0.15		
C1.6/ C1.7				LOADING AND HAULING				
	C1.7.2			Hauling				
	C1.7.2.2			Hauling material to spoil and off-loading it at a designated spoil or stockpile area:				
		(a)		Cleared and grubbed material (organic matter and all other unsuitable or waste material)	m³ - km	164,700		
PC1.6.11				Trimming material (debris and vegetation) build up on verge or shoulder				
		(a)		with a grader	m²	6,660		
		(b)		with labour	m²	26,460		
Total Carried Forward To Summary								

## SCHEDULE A: ROADWORKS

### C3.1 DRAINS

Item				Description	Unit	Quantity	Rate	Amount R
C3.1				DRAINS				
C3.1.1				Excavation for open drains:				
	C3.1.1.1			Excavating all material situated within the following depth ranges below the surface level using conventional methods:				
		(a)		0 m to 1,5 m	m³	1,845		
	C3.1.1.2			Extra over sub-item C3.1.1.1 for excavation in hard and boulder material, irrespective of depth	m³	369		
C3.1.2				Clearing, shaping and disposal of accumulated sediment in existing unlined open drains				
	C3.1.2.1			Using conventional methods	m³	7,380		
C3.1.3				Excavation, clearing and disposal of accumulated sediment in existing lined drains and drainage systems:				
	C3.1.3.1			Using conventional methods (up to 1,5 m)				
		(b)		Culvert barrels	m³	90		
C3.1.4				Excavation and disposal of material for subsoil drainage systems:				
	C3.1.4.1			Excavating all material situated within the following depth ranges below the surface:				
		(a)		0 m to 1,5 m	m³	1,224		
	C3.1.4.4			Extra over sub-item C3.1.4.1 for excavation in hard and boulder material, irrespective of depth	m³	252		
C3.1.5				Impermeable backfilling to subsoil drainage systems:				
	C3.1.5.2			G5 material obtained from commercial sources	m³	99		
	C3.1.5.3			Extra over items C3.1.5.1 and C3.1.5.2 for stabilisation with 4,0 % CEM II (32.5) cement	m³	99		
C3.1.7				Natural permeable material in subsoil drainage systems (approved crushed stone):				
	C3.1.7.2			Crushed stone obtained from commercial sources:				
		(b)		Coarse grade (20mm aggregate washed clean of fines)	m³	234		
C3.1.8				Natural permeable material in subsoil drainage systems (approved natural sand):				
	C3.1.8.2			Natural sand from commercial sources:				
		(c)		Coarse grade (washed clean of fines)	m³	900		
C3.1.9				Pipes in subsoil drainage systems:				
	C3.1.9.1			U-PVC pipes and fittings, normal duty, complete with couplings:				
		(a)		100 mm internal dia, perforated or slotted	m	1,629		
		(b)		100 mm internal dia, unperforated	m	20		
C3.1.11				Geotextiles (Grade 2)	m²	3,060		
C3.1.13				Concrete outlet structures, manhole boxes, junction boxes and cleaning eyes for subsoil drainage systems:				
Total Carried Forward								



**CONTRACT SANRAL R.342-010-2024/1**

## SCHEDULE A: ROADWORKS

### C3.1 DRAINS

Item		Description	Unit	Quantity	Rate	Amount R
Brought Forward						
	C3.1.13.1	Outlet structures (Type A, inclusive of outlet marker board) as per Drawing TD-D-SD-1002-V1)	number	9		
	C3.1.13.4	Cleaning eyes (as per Drawing TD-D-SD-1003-V1)	number	18		
C3.1.14		Caps for subsoil drain pipes:				
	C3.1.14.1	Concrete caps	number	18		
C3.1.16		Loading and hauling of material in excess of 1,0 km	m <sup>3</sup> -km	41,760		
C3.1.18		Backfilling of drains with selected material compacted to 93 % of MDD prior to construction of concrete lining and / or stone pitched lining	m <sup>3</sup>	90		
C3.1.19		Exposing of existing subsoil drains	m <sup>3</sup>	9		
C3.1.20		Breaking into existing drainage structures and install subsoil drain pipe	number	2		
C3.1.21		Clearing of existing subsoil drains:				
	C3.1.21.1	Clearing rod, brush and flushing	m	100		
C3.1.22		Test flushing of subsoil drain pipe systems	number	20		
C3.1.23		Subsoil drain outlet marker (as per Drawing TD-D-SD-1002-V1)	number	20		
Total Carried Forward To Summary						

## SCHEDULE A: ROADWORKS

## C11.4 ROAD RESTRAINT SYSTEMS

Total Carried Forward To Summary

## SCHEDULE A: ROADWORKS

## C11.5 FENCING

Item				Description	Unit	Quantity	Rate	Amount R
C11.5				FENCING				
C11.5.1				Supply and erect new fencing material for new fences and for supplementing material in existing fences which are being repaired or removed:				
	C11.5.1.1			Zinc-coated barbed wire (SANS 675)				
		(a)		High tensile grade single strand 3.2 mm x 2.5 mm oval shaped wire, 2.81 mm equivalent dia, fully galvanised as per Drawings TD-R-FG-1003-V1 and TD-R-FG-1005-V1	km	85.5		
	C11.5.1.2			Zinc-coated smooth wire (SANS 675)				
		(a)		4.0 mm dia mild steel straining wire, fully galvanised	km	1.8		
		(b)		3.0 mm dia mild steel straining wire, fully galvanised	km	1.8		
		(c)		2.5 mm dia mild steel tying wire, fully galvanised	km	2.43		
	C11.5.1.3			Diamond mesh	m <sup>2</sup>	1,170		
	C11.5.1.7			Standards, 2,5kg/m Y-sections:				
		(a)		100 mm dia timber, 2000 mm long as per Drawing TD-R-FG-1003-V1	number	450		
		(b)		1850 x 2.5 kg/m "Y" section with holes at 50 mm centres, fully galvanised as per Drawing TD-R-FG-1005-V1	number	54		
	C11.5.1.8			Droppers, 0.56 kg/m ridgeback pattern:				
		(a)		130 mm dia timber, 1400 mm long as per Drawing TD-R-FG-1003-V1	number	4,050		
		(b)		Steel droppers 100 mm dia x 0.56 kg/m ridgeback pattern, 1400 mm long as per Drawing TD-R-FG-1005-V1	number	234		
	C11.5.1.9			Straining posts, stays and anchors:				
		(a)		Vertical:				
		(i)		Steel straining posts and corner posts 100 mm dia x 3 mm thickness, 2130 mm long as per Drawing TD-R-FG-1005-V1	number	18		
		(ii)		Timber straining posts and corner posts 125 mm dia, 2100 mm long as per Drawing TD-R-FG-1003-V1	number	144		
		(b)		Inclined:				
		(i)		Steel stays and anchors 60 mm dia x 3 mm thickness, 2130 mm long with base plate as per Drawing TD-R-FG-1005-V1	number	18		
		(c)		Horizontal:				
		(i)		Steel cross brace support 60 mm dia x 3 mm thickness, 2400 mm long, bent and flattened ends as per Drawing TD-R-FG-1005-V1	number	1		
		(ii)		Timber stays and anchors, 100 mm dia, 2000 mm long as per Drawing TD-R-FG-1003-V1	number	90		
C11.5.2				New gates:				
		(a)		3.6 m wide as per Drawing TD-R-FG-1003-V1	number	1		
		(b)		4.2 m wide as per Drawing TD-R-FG-1005-V1	number	1		
Total Carried Forward								

**CONTRACT SANRAL R.342-010-2024/1**

## SCHEDULE A: ROADWORKS

## C11.5 FENCING

Item		Description	Unit	Quantity	Rate	Amount R
Brought Forward						
C11.5.4		Dismantling existing fences and gates:				
	C11.5.4.1	Fences:				
	(a)	Stock-proof fences	km	1.8		
	(b)	Vermin-proof fences	km	1.8		
	(e)	Game fences	km	0.05		
C11.5.6		Ringbolts for anchoring fencing to structures as per Drawing TD-R-FG-1102-V1	number	14		
C11.5.7		Drilling and blasting holes for posts and anchors	number	54		
C11.5.8		Posts fixed horizontally to the bottom of wire mesh for the closing of openings under fences:				
	C11.5.8.1	Timber posts (150 mm dia, in streams)	m	45		
	C11.5.8.2	Mild steel sections (2.5 kg/m "Y" section standards in ditches)	m	20		
C11.5.9		Repairing existing fences:				
	(a)	Stock-proof fences	km	1.8		
	(b)	Vermin-proof fences	km	0.9		
	(c)	Game fences	km	0.9		
C11.5.10		Disposal of existing fencing materials:				
	C11.5.10.1	Stock-proof fences	km	1.8		
	C11.5.10.2	Vermin-proof fences	km	1.8		
	C11.5.10.5	Game fences	km	0.4		
Total Carried Forward To Summary						

### **APPENDIX 3: DRAINAGE SCHEDULE**

R342 Section	SV	Conduit Type *		Size (ϕ in m or m by m)	Inlet / Outlet	Structure Type									Structural Condition		Danger plates				COMMENTS		
		Stone Pitch				Brick			Concrete			Inlet	Outlet	LHS		RHS							
		H/W	W/W			APRON	H/W	W/W	APRON	H/W	W/W			APRON	Y	N	Y	N					
59	27.638		2	2 x 0.9	Inlet							x			Poor		X		X		Demolish and reconstruct wingwalls		
					Outlet							x				Poor					Construct new Inlet and Outlet Structures		
60	27.733		1	0.45	Inlet	Inlet and outlet overgrown/inaccessible, assessment based on previous design data													X			Construct new Inlet and Outlet Structures	
					Outlet																		
61	27.903	2		2 x 1.8 x 1.2	Inlet							x	x	x	Poor		X		X		Demolish and reconstruct inlet and outlet structures		
					Outlet							x	x	x		Poor							
62	28.361	1		1.8 x 1.8	Inlet							x	x	x	Poor		X		X		Demolish and reconstruct inlet and outlet structures		
					Outlet							x	x	x		Poor							
63	28.604		1	0.45	Inlet	Inlet and outlet overgrown/inaccessible, assessment based on previous design data									Poor		X				Construct new inlet and outlet structures		
					Outlet											Poor							
64	28.737		1	0.9	Inlet	Inlet and outlet overgrown/inaccessible, assessment based on previous design data									Poor		X		X		Construct new inlet and outlet structures		
					Outlet											Poor							
65	29.328		2	2 x 0.9	Inlet							x	x	x	Good		X		X		None		
					Outlet							x	x	x		Good							
66	29.382		1	0.45	Inlet							x	x	x	Good				X		None		
					Outlet							x	x	x		Good							
67	29.711		1	0.6	Inlet	x	x	x							Poor		X		X		Demolish and reconstruct inlet and outlet structures		
					Outlet	x	x	x								Poor							
68	29.867		1	0.45	Inlet	x	x	x							Poor		X		X		Demolish and reconstruct inlet and outlet structures		
					Outlet	x	x	x								Poor							
69	29.989		1	0.45	Inlet	x	x	x							Poor		X		X		Demolish and reconstruct inlet and outlet structures		
					Outlet	x	x	x								Poor							
70	30.189		1	0.45	Inlet	x	x	x							Poor		X		X		Demolish and reconstruct inlet and outlet structures		
					Outlet	x	x	x								Poor							
71	30.375		1	0.45	Inlet	x	x	x							Poor		X		X		Demolish and reconstruct inlet and outlet structures		
					Outlet	x	x	x								Poor							
72	30.923		1	0.6	Inlet	Inlet and outlet overgrown/inaccessible, assessment based on previous design data									Poor		X		X		Demolish and reconstruct inlet and outlet structures		
					Outlet											Poor							
73	31.173		2	2 x 0.9	Inlet	Inlet and outlet overgrown/inaccessible, assessment based on previous design data									Poor		X		X		Demolish and reconstruct inlet and outlet structures		
					Outlet											Poor							
74	31.192	1		1.8 x 1.2	Inlet							x	x		Fair		X		X		Agricultural underpass (Repair Cracks)		
					Outlet							x	x			Fair							
75	31.559		1	0.6	Inlet	Inlet and outlet overgrown/inaccessible, assessment based on previous design data									Poor		X				Construct new Inlet and Outlet Structures		
					Outlet											Poor							
76	31.682		1	0.6	Inlet	Inlet and outlet overgrown/inaccessible, assessment based on previous design data									Poor				X		Construct new Inlet and Outlet Structures		
					Outlet											Poor							
77	31.858	2		2 x 1.8 x 1.8	Inlet	Inlet and outlet overgrown/inaccessible, assessment based on previous design data									Poor		X		X		Demolish and reconstruct inlet and outlet structures		
					Outlet											Poor							
78	32.253		1	0.45	Inlet	Inlet and outlet overgrown/inaccessible, assessment based on previous design data									Poor		X				Construct new Inlet and Outlet Structures		
					Outlet											Poor							
79	33.410		1	0.45	Inlet	Inlet and outlet overgrown/inaccessible, assessment based on previous design data									Poor		X		X		Construct new Inlet and Outlet Structures		
					Outlet											Poor							
80	33.930		3	3 x 0.75	Inlet							x	x	x	Poor		X		X		Demolish and reconstruct inlet and outlet structures		
					Outlet							x	x	x		Poor							

R342 Section	SV	Conduit Type *		Size (ϕ in m or m by m)	Inlet / Outlet	Structure Type									Structural Condition		Danger plates				COMMENTS	
		Box	Pipe			Stone Pitch			Brick			Concrete			Inlet	Outlet	LHS		RHS			
						H/W	W/W	APRON	H/W	W/W	APRON	H/W	W/W	APRON			Y	N	Y	N		
81	34.370		2	2 x 0.6	Inlet									x		Poor		X		X		Demolish and reconstruct inlet and outlet structures
					Outlet									x			Poor					
82	34.428		1	0.45	Inlet	x	x									Poor		X		X		Demolish and reconstruct inlet and outlet structures
					Outlet	x	x										Poor					
83	34.669		1	0.45	Inlet	x	x	x								Poor		X		X		Demolish and reconstruct inlet and outlet structures
					Outlet	x	x	x									Poor					
84	34.959		1	0.45	Inlet	Inlet and outlet overgrown/inaccessible, assessment based on previous design data									Poor				X		Extend existing 450ø PC to suite major farm access. Construct new inlet and outlet structures	
					Outlet											Poor						
85	34.968		1	0.45	Inlet	Inlet and outlet overgrown/inaccessible, assessment based on previous design data									Poor		X			Construct new Inlet and Outlet Structures		
					Outlet											Poor						
86	35.306		1	0.6	Inlet	x	x	x								Poor		X		X		Demolish and reconstruct inlet and outlet structures
					Outlet	x	x	x										Poor				
87	35.707		1	0.45	Inlet	Inlet and outlet overgrown/inaccessible, assessment based on previous design data									Poor				X		Extend existing 450ø PC to suite major farm access. Construct new inlet and outlet structures	
					Outlet											Poor						
88	35.802		1	0.45	Inlet	x	x	x								Poor				X		Demolish and reconstruct inlet and outlet structures
					Outlet	x	x	x										Poor				
89	35.895		2	2 x 0.45	Inlet	x	x	x								Poor		X		X		Demolish and reconstruct inlet and outlet structures
					Outlet	x	x	x										Poor				

#### **APPENDIX 4: INTERSECTION AND FARM ACCESS SCHEDULE**



Intersections and Farm Access Schedule - km 27.00 to km 36.92												
No.	SV(Km)		Access			Intersection	Edge Beam		Used		notes	Type of surface
	Start Chainage	End Chainage	Type	LHS	RHS		Y	N	Y	N		
1	29.51	29.54	Entrance		x		x		x		Addo Afrique Estate	Surfaced
2	30.90	30.92	Entrance	x				x	x		Game Farm	surfaced (poor)
3	31.65	31.66	Farm Entrance		x			x	x			Gravel
4	32.02	32.02	Farm Access	x				x	x		Poor Bellmouth	surfaced (poor)
5	33.50	33.51	Farm Entrance		x			x	x		new gate	Gravel
6	33.97	33.98	Farm Entrance		x			x	x		new gate	Gravel
7	34.32	33.33	Farm Entrance	x	x			x	x		RHS - to farm; LHS new gate	Gravel
8	34.48	34.49	Entrance		x			x	x		Kortdoringspad	surface (poor)
9	34.79	34.80	Farm Entrance	x	x			x	x		RHS - to farm; LHS new gate	Gravel
10	35.05	35.06	Farm Entrance		x			x	x		Zandvlakte	Surface (very poor)
11	35.79	35.80	Farm Entrance	x	x			x	x		for both	Gravel
12	36.57	36.58	Access	x	x			x	x		for both	Gravel
13	36.70	36.75	-			Sandflats - LHS		x	x		Sandflats B&B	surface (poor)
14	36.70	36.75	-			Street - RHS		x	x		Street	surface (poor)
15	36.81	36.81	Home Access		x			X	X			Gravel
16	36.86	36.87	Home Access		x			X	X			Gravel
17	36.91	36.92	Entrance	x				X	X		Nova feeds	surface (poor)

## **APPENDIX 5: OHS BASELINE RISK ASSESSMENT**

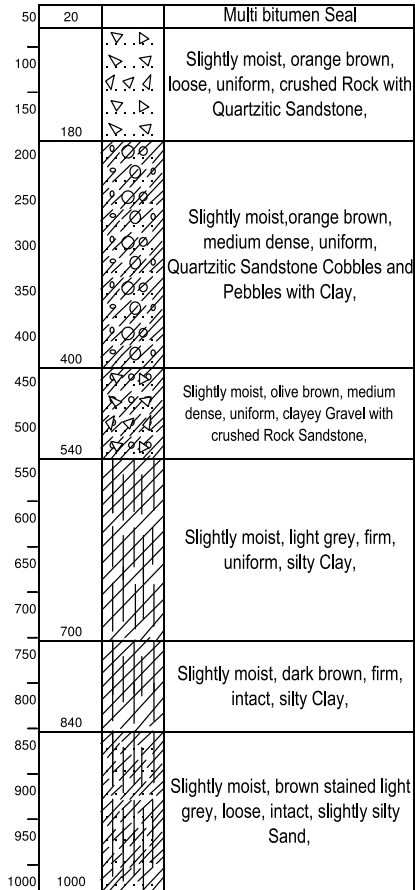
Refer to Clause E1018.

**APPENDIX 6: TEST PIT PROFILE AND SLOT PROFILE SHEETS, DCP RESULTS AND  
LABORATORY TEST RESULTS**

## TEST PIT LOGS / TOETSPUT PROFIELE

MR 473

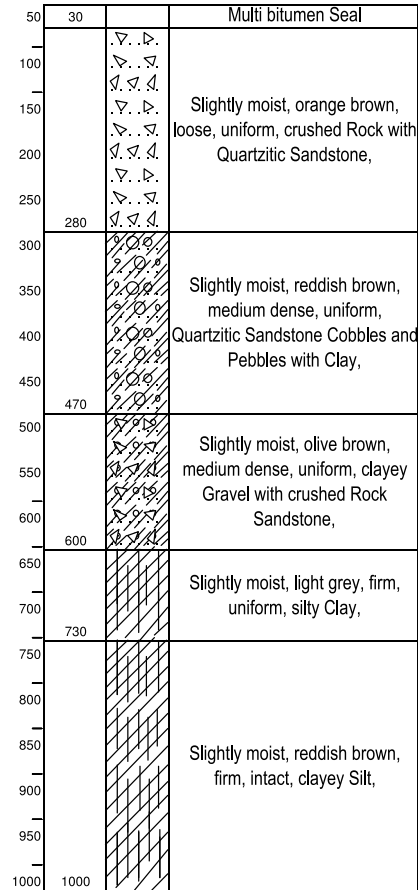
Testpits



(mmx1000)

Co-ordinates: Diameter is 1,2 x 0,8  
CH: 26 + 800 LHS

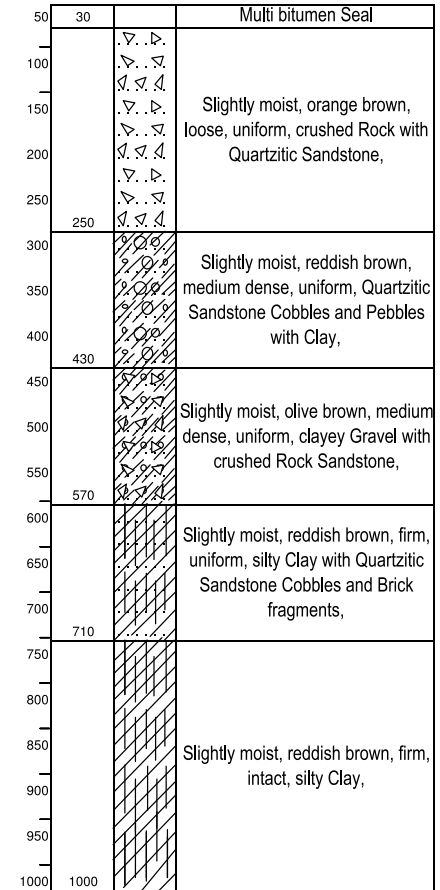
Remarks :  
1. Excavation stopped  
2. Rutting @ 6mm



(mmx1000)

Co-ordinates: Diameter is 1,2 x 0,8  
CH: 27 + 000 RHS

Remarks :  
1. Excavation stopped  
2. Rutting @ 5mm  
3. Longitudinal Cracks.



(mmx1000)

Co-ordinates: Diameter is 1,2 x 0,8  
CH: 27 + 200 LHS

Remarks :  
1. Excavation stopped  
2. Rutting @ 7mm

KILOMETER DISTANCE  
KILOMETER AFSTAND

DISTANCE TO CENTRELINE  
AFSTAND NA MIDDELLYN

BORROW PIT No.  
LEENGROEF Nr. TP141-143

ROUTE  
ROETE

MR 473

SECTION  
SEKSIE

DESCRIPTION  
BESKRYWING

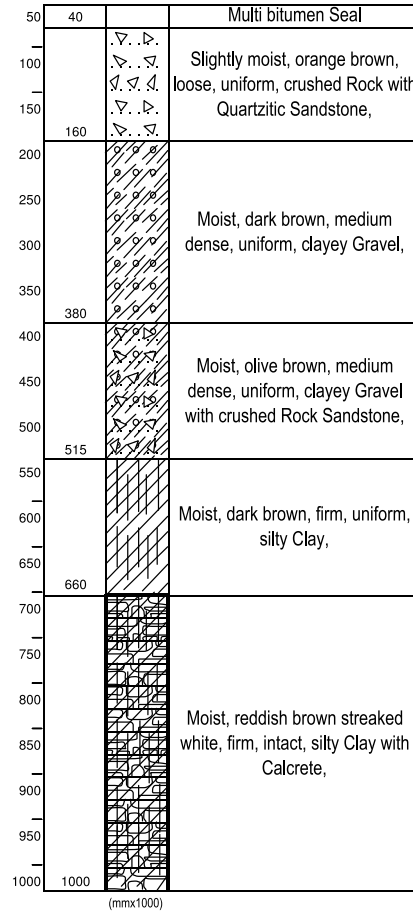
Addo to Paterson

PAGE NO.  
BLADSY NO. 44

## TEST PIT LOGS / TOETSPUT PROFIELE

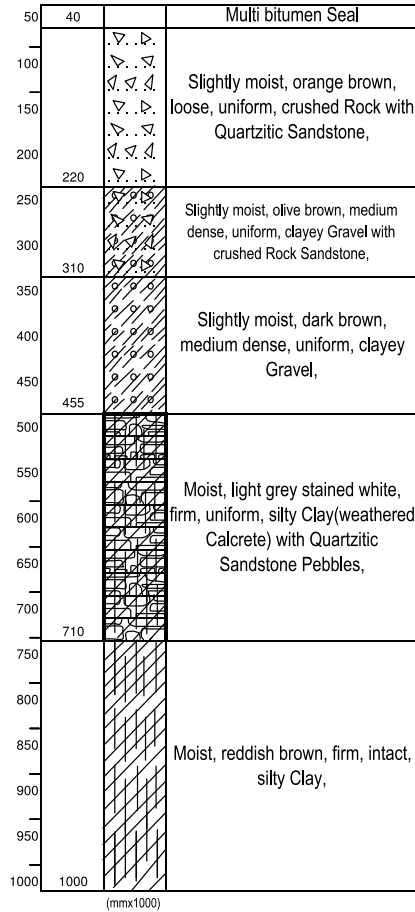
MR 473

Testpits



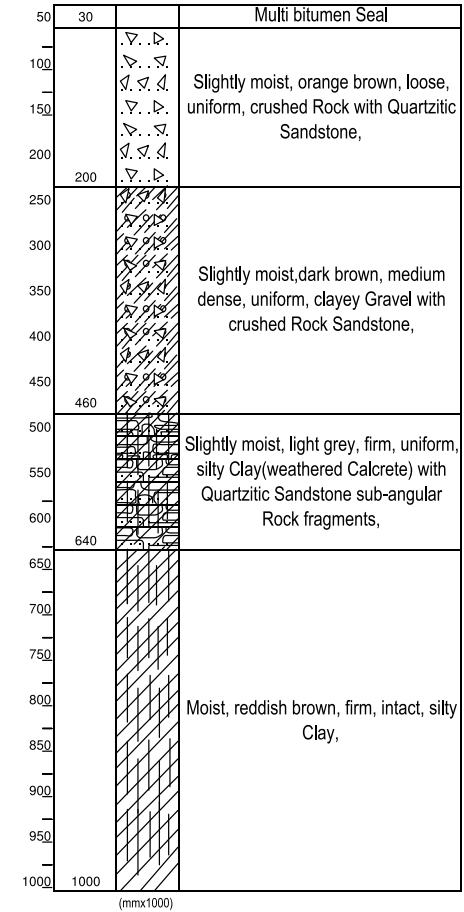
Co-ordinates: Diameter is 1,2 x 0,8  
CH: 27 + 400 RHS

Remarks : 1. Excavation stopped  
2. Rutting @ 4mm  
3. Crocodile Cracks.



Co-ordinates: Diameter is 1,2 x 0,8  
CH: 27 + 800 LHS

Remarks : 1. Excavation stopped  
2. Rutting @ 15mm  
3. Crocodile Cracks.



Co-ordinates: Diameter is 1,2 x 0,8  
CH: 28 + 000 RHS

Remarks : 1. Excavation stopped  
2. Rutting @ 5mm

KILOMETER DISTANCE  
KILOMETER AFSTAND

DISTANCE TO CENTRELINE  
AFSTAND NA MIDDELLYN

BORROW PIT No.  
LEENGROEF Nr. TP144&146-147

ROUTE  
ROETE MR 473

SECTION  
SEKSI

DESCRIPTION  
BESKRYWING

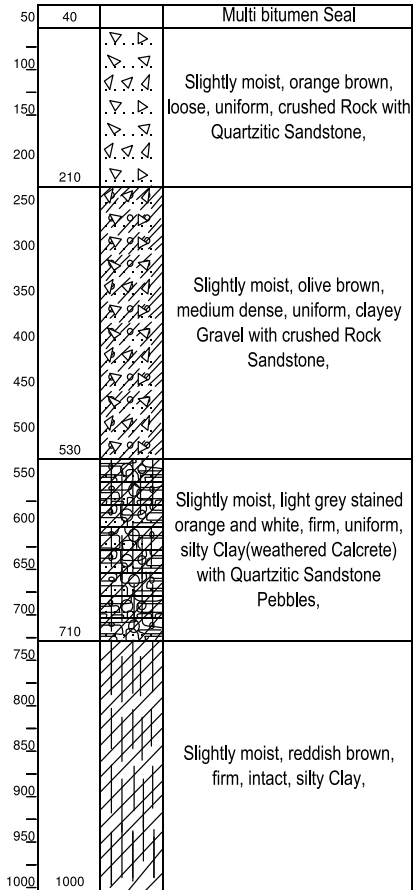
Addo to Paterson

PAGE NO.  
BLADSY NO. 45

## TEST PIT LOGS / TOETSPUT PROFIELE

MR 473

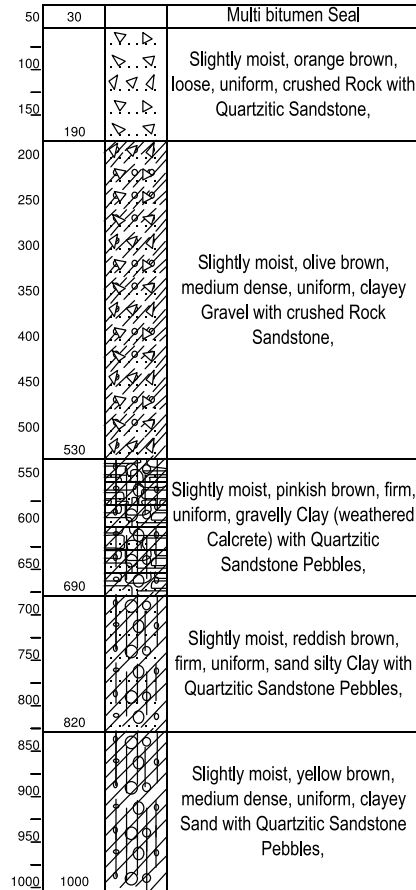
Testpits



(mmx1000)

Co-ordinates: Diameter is 1.2 x 0.8  
CH: 28 + 200 LHS

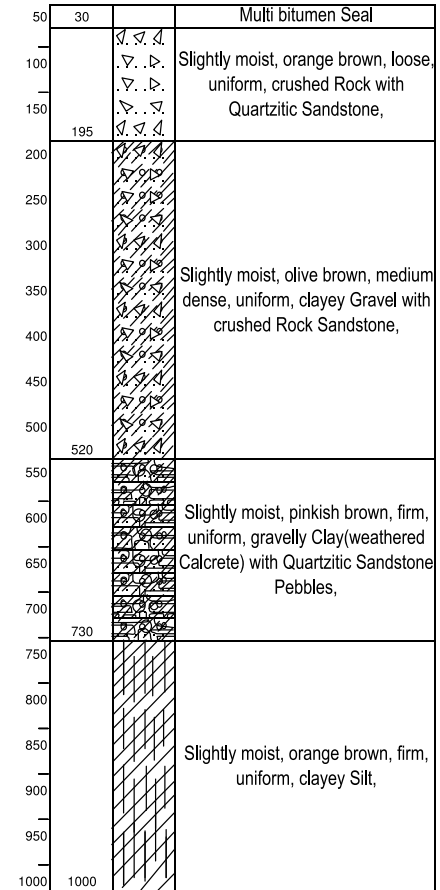
Remarks : 1. Excavation stopped  
2. Rutting @ 10mm



(mmx1000)

Co-ordinates: Diameter is 1.2 x 0.8  
CH: 28 + 400 RHS

Remarks : 1. Excavation stopped  
2. Rutting @ 10mm



(mmx1000)

Co-ordinates: Diameter is 1.2 x 0.8  
CH: 28 + 600 LHS

Remarks : 1. Excavation stopped  
2. Rutting,

KILOMETER DISTANCE  
KILOMETER AFSTAND

DISTANCE TO CENTRELINE  
AFSTAND NA MIDDELLYN

BORROW PIT No.  
LEENGROEF Nr. TP148-150

ROUTE MR 473 SECTION SEKSIE DESCRIPTION BESKRYWING

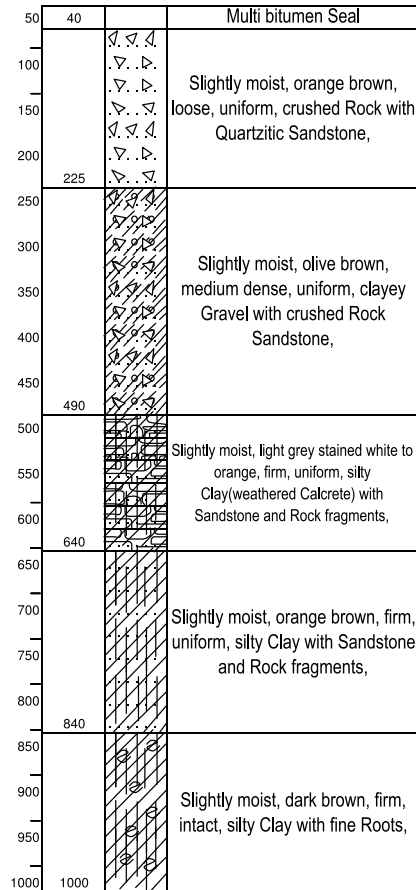
Addo to Paterson

PAGE NO.  
BLADSY NO. 46

TEST PIT LOGS / TOETSPUT PROFIELE

MR 473

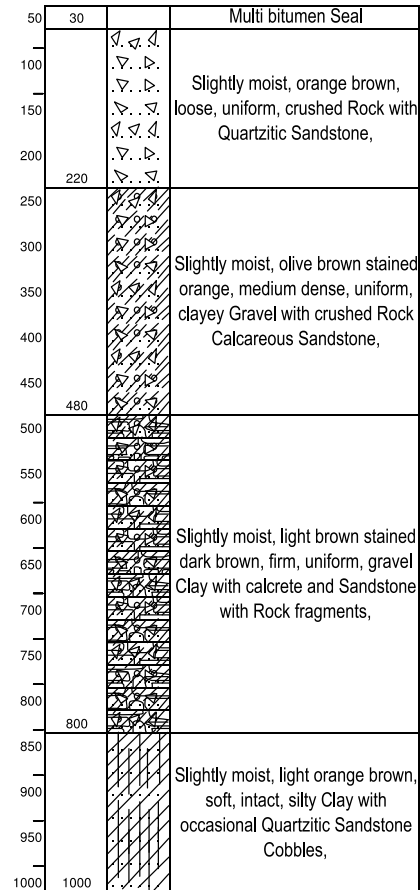
Testpits



(mmx1000)

Co-ordinates: Diameter is 1,2 x 0,8  
CH: 29 + 000 LHS

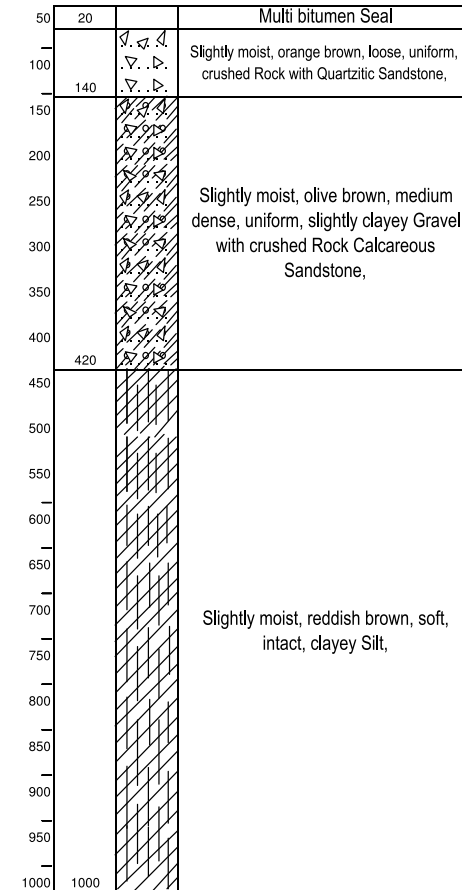
Remarks :  
1. Excavation stopped  
2. Rutting @ 3mm.



(mmx1000)

Co-ordinates: Diameter is 1,2 x 0,8  
CH: 29 + 200 RHS

Remarks :  
1. Excavation stopped  
2. Rutting @ 25mm  
3. Crocodile Cracks.



(mmx1000)

Co-ordinates: Diameter is 1,2 x 0,8  
CH: 29 + 600 LHS

Remarks :  
1. Excavation stopped  
2. Rutting @ 4mm

KILOMETER DISTANCE  
KILOMETER AFSTAND

DISTANCE TO CENTRELINE  
AFSTAND NA MIDDELLYN

BORROW PIT No.  
LEENGROEF Nr. TP152-153&155

ROUTE  
ROETE MR 473

SECTION  
SEKSIE

DESCRIPTION  
BESKRYWING

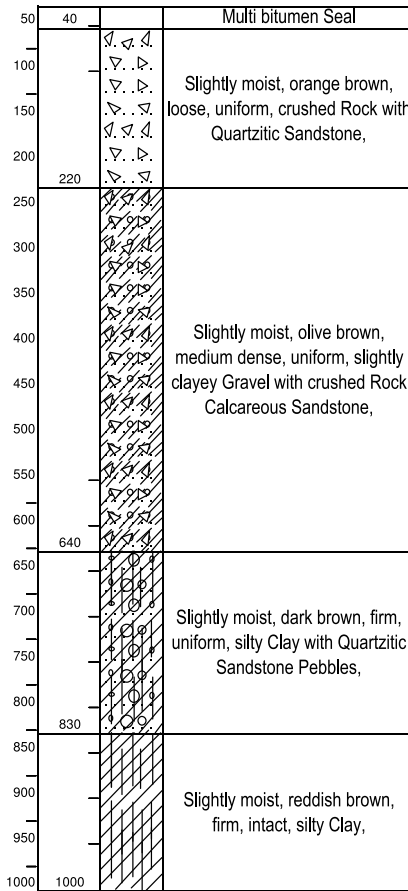
Addo to Paterson

PAGE NO.  
BLADSY NO. 47

## TEST PIT LOGS / TOETSPUT PROFIELE

MR 473

Testpits



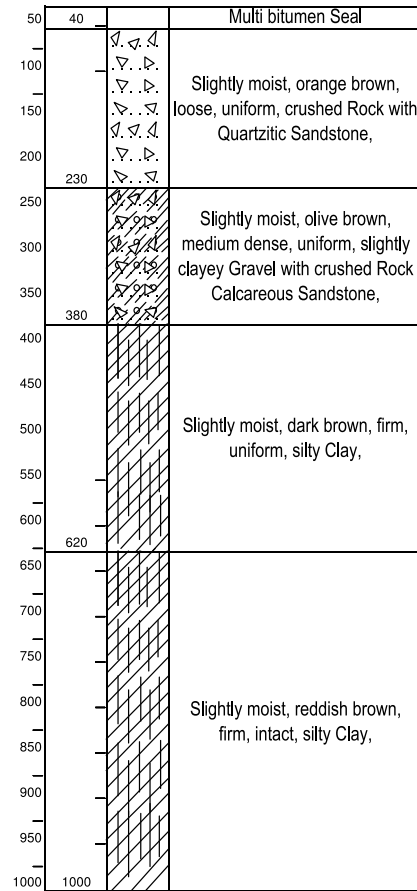
(mmx1000)

Co-ordinates:

Diameter is 1,2 x 0,8  
CH: 29 + 800 LHS

Remarks :

- Excavation stopped
- Rutting



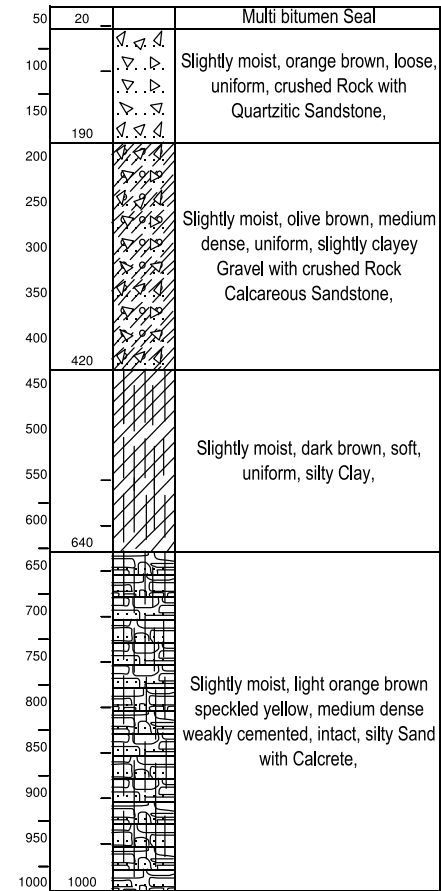
(mmx1000)

Co-ordinates:

Diameter is 1,2 x 0,8  
CH: 30 + 000 RHS

Remarks :

- Excavation stopped
- Rutting



(mmx1000)

Co-ordinates:

Diameter is 1,2 x 0,8  
CH: 30 + 200 LHS

Remarks :

- Excavation stopped
- Rutting @ 3mm

KILOMETER DISTANCE  
KILOMETER AFSTAND

DISTANCE TO CENTRELINE  
AFSTAND NA MIDDELLYN

BORROW PIT No.  
LEENGROEF Nr. TP156-158

ROUTE  
ROETE MR 473

SECTION  
SEKSE

DESCRIPTION  
BESKRYWING

Addo to Paterson

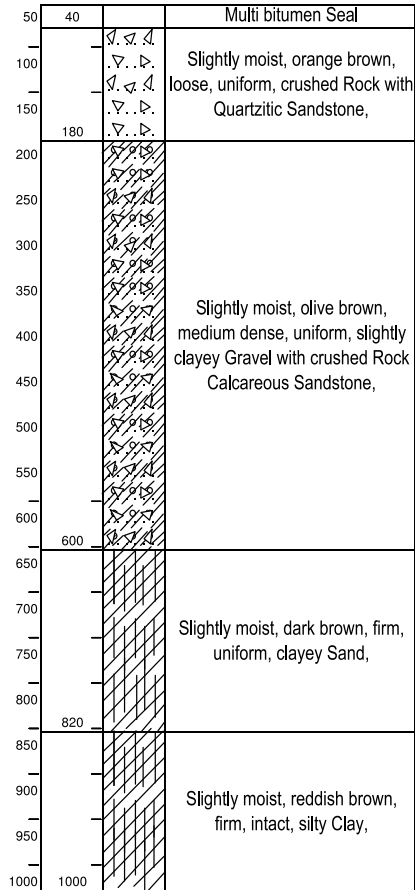
PAGE NO.  
BLADSY NO. 48



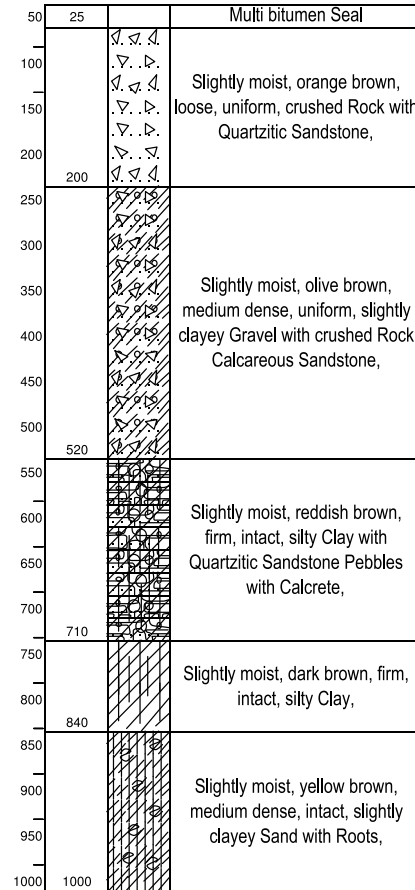
TEST PIT LOGS / TOETSPUT PROFIELE

MR 473

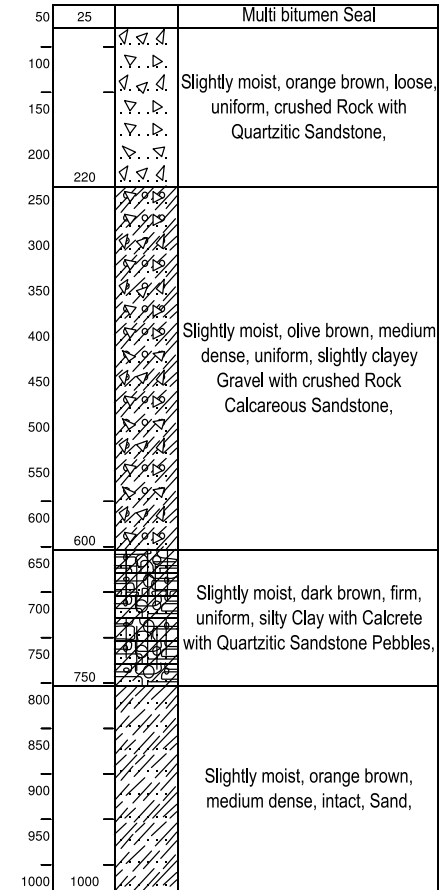
Testpits



Co-ordinates: Diameter is 1,2 x 0,8  
CH: 30 + 400 RHS  
Remarks : 1. Excavation stopped  
2. Rutting @ 10mm



Co-ordinates: Diameter is 1,2 x 0,8  
CH: 30 + 600 LHS  
Remarks : 1. Excavation stopped  
2. Rutting @ 3mm



Co-ordinates: Diameter is 1,2 x 0,8  
CH: 30 + 800  
Remarks : 1. Excavation stopped  
2. Rutting @ 9mm RHS  
3. Longitudinal Cracks.

KILOMETER DISTANCE  
KILOMETER AFSTAND

DISTANCE TO CENTRELINE  
AFSTAND NA MIDDELLYN

BORROW PIT No.  
LEENGROEF Nr. TP159-161

ROUTE  
ROETE

MR 473

SECTION  
SEKSIE

DESCRIPTION  
BESKRYWING

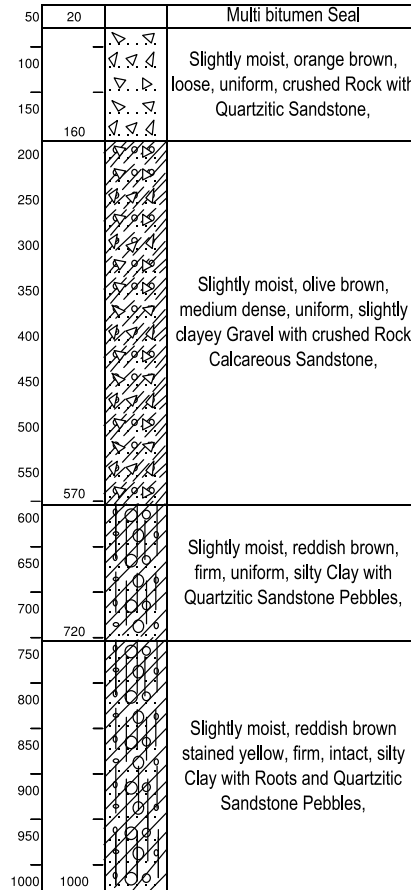
Addo to Paterson

PAGE NO.  
BLADSY NO. 49

## TEST PIT LOGS / TOETSPUT PROFIELE

MR 473

Testpits



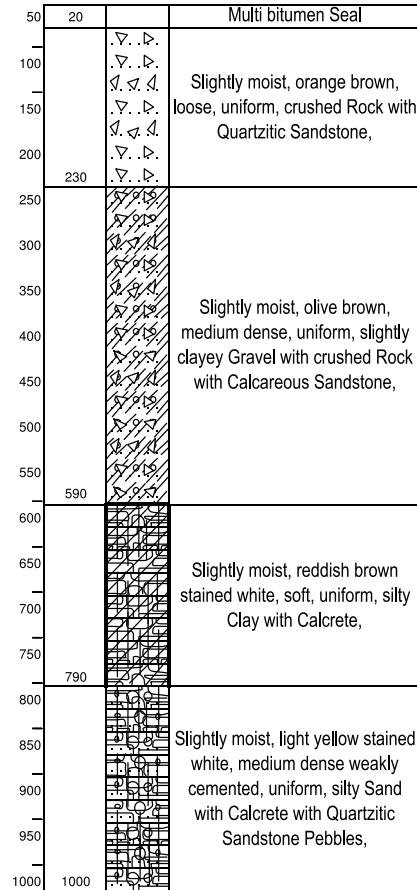
Co-ordinates:

Diameter is 2.5 x 0.8

CH: 31+200 LHS

Remarks :

1. Excavation stopped
2. Rutting



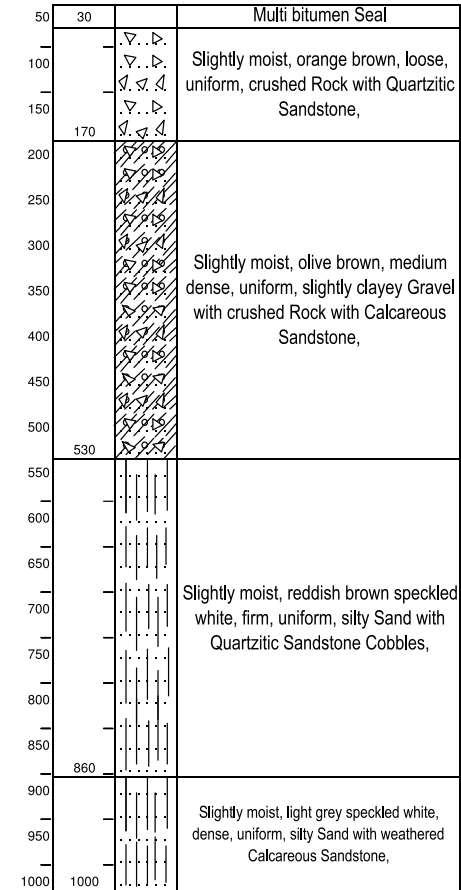
Co-ordinates:

Diameter is 1.2 x 0.8

CH: 31 + 600 RHS

Remarks :

1. Excavation stopped
2. Rutting @ 15mm



Co-ordinates:

Diameter is 1.2 x 0.8

CH: 31 + 800

Remarks :

1. Excavation stopped
2. Rutting @ 10mm LHS

KILOMETER DISTANCE

DISTANCE TO CENTRELINE

BORROW PIT No.

KILOMETER AFSTAND

AFSTAND NA MIDDELLYN

LEENGROEF Nr.

TP163-166

ROUTE

MR 473

SECTION

DESCRIPTION

Addo to Paterson

PAGE NO.

ROETE

SEKSI

BESKRYWING

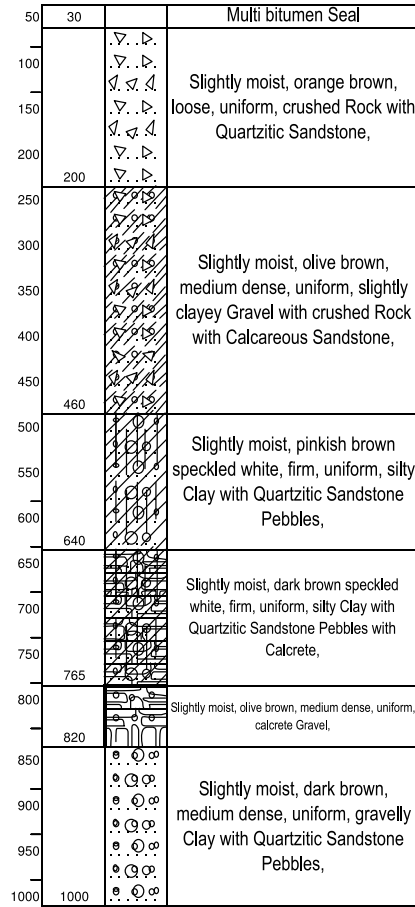
BLADSY NO.

50

## TEST PIT LOGS / TOETSPUT PROFIELE

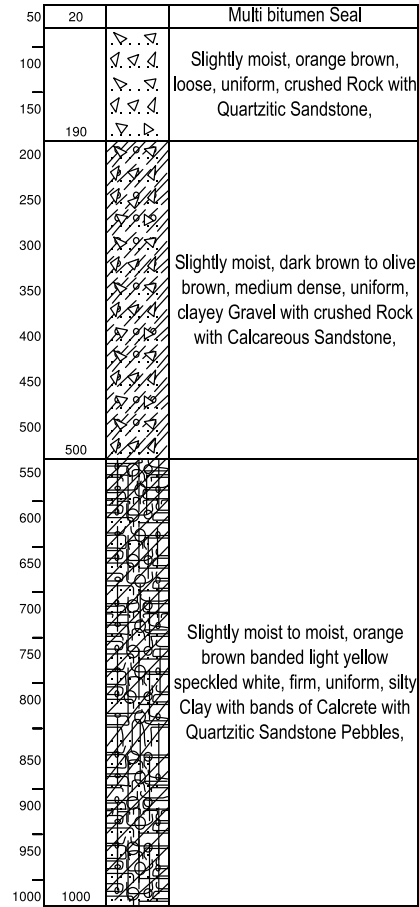
MR 473

## Testpits



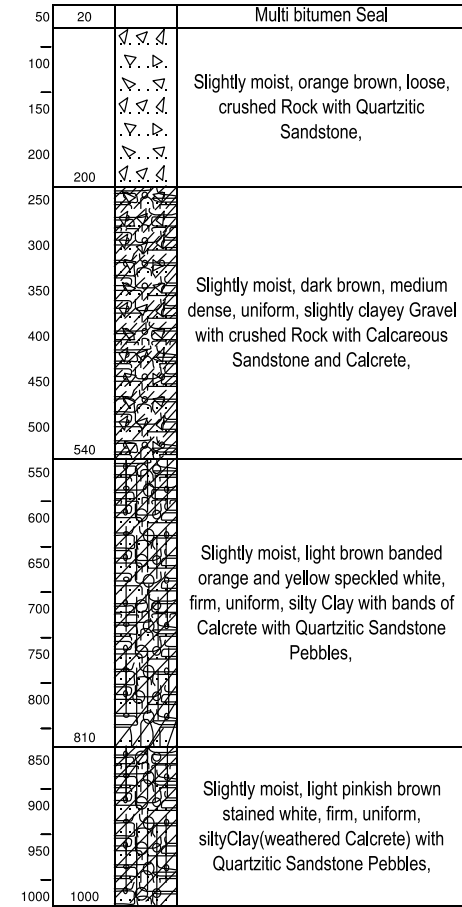
Co-ordinates: Diameter is 1,2 x 0,8  
CH: 32 + 000 RHS

Remarks :  
1. Excavation stopped  
2. Rutting @ 5mm



Co-ordinates: Diameter is 1,2 x 0,8  
CH: 32 + 200 LHS

Remarks :  
1. Excavation stopped  
2. Rutting @ 10mm



Co-ordinates: Diameter is 1,2 x 0,8  
CH: 32 + 400

Remarks :  
1. Excavation stopped  
2. Rutting @ 2mm

KILOMETER DISTANCE  
KILOMETER AFSTAND

DISTANCE TO CENTRELINE  
AFSTAND NA MIDDELLYN

BORROW PIT No.  
LEENGROEF Nr. TP167&176-177

ROUTE  
ROETE MR 473

SECTION  
SEKSIE

DESCRIPTION  
BESKRYWING

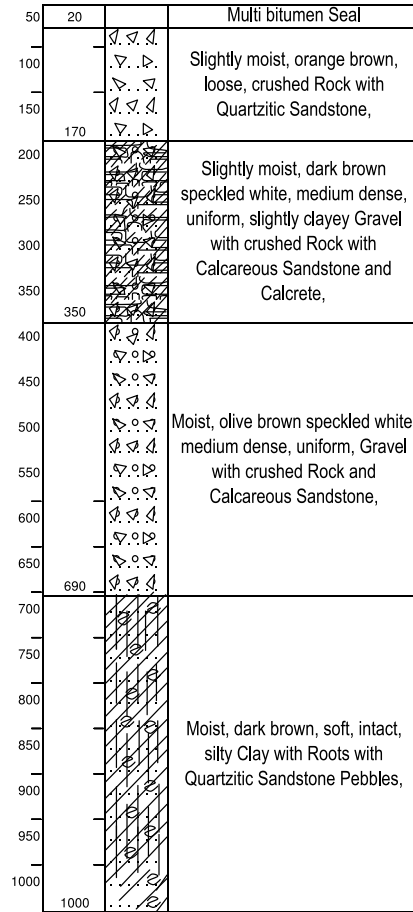
Addo to Paterson

PAGE NO.  
BLADSY NO. 51

## TEST PIT LOGS / TOETSPUT PROFIELE

MR 473

Testpits



(mmx1000)

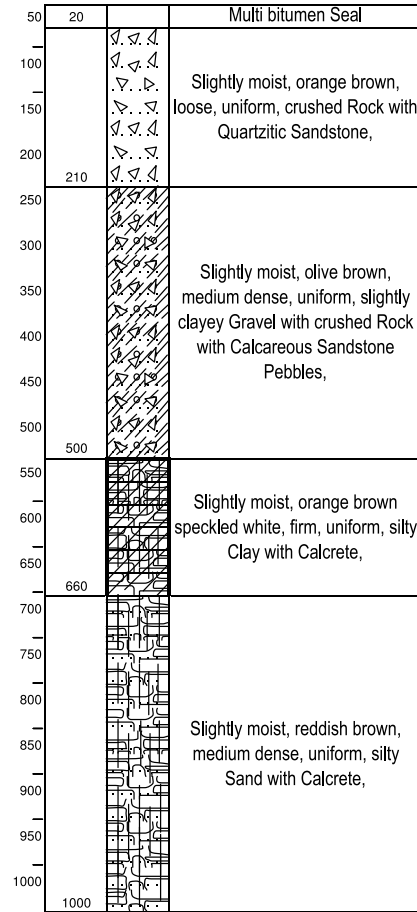
Co-ordinates:

Diameter is 1.2 x 0.8

CH: 32 + 600 LHS

Remarks :

1. Excavation stopped
2. Rutting @ 13mm



(mmx1000)

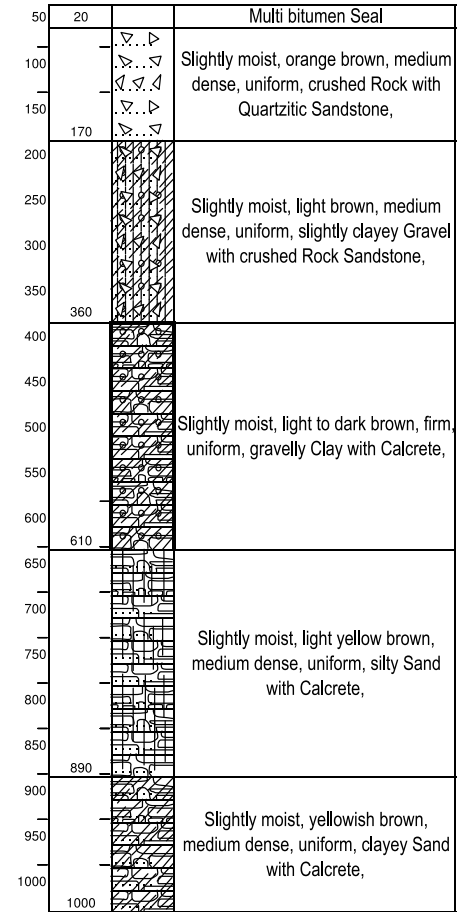
Co-ordinates:

Diameter is 1.2 x 0.8

CH: 33 + 000 LHS

Remarks :

1. Excavation stopped
2. Rutting @ 10mm



(mmx1000)

Co-ordinates:

Diameter is 1.2 x 0.8

CH: 33 + 200 LHS

Remarks :

1. Excavation stopped,

KILOMETER DISTANCE  
KILOMETER AFSTANDDISTANCE TO CENTRELINE  
AFSTAND NA MIDDELLYNBORROW PIT No.  
LEENGROEF Nr. TP178,180&41ROUTE  
ROETE MR 473SECTION  
SEKSEDESCRIPTION  
BESKRYWING

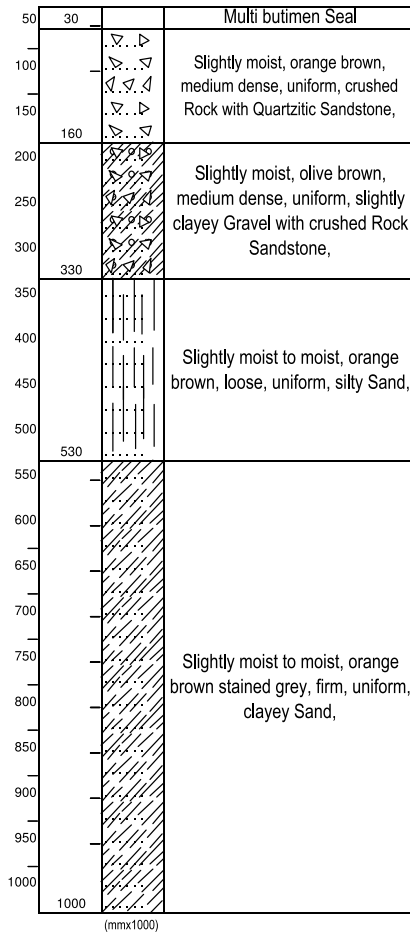
Addo to Paterson

PAGE NO.  
BLADSY NO. 52

## TEST PIT LOGS / TOETSPUT PROFIELE

MR 473

Testpits

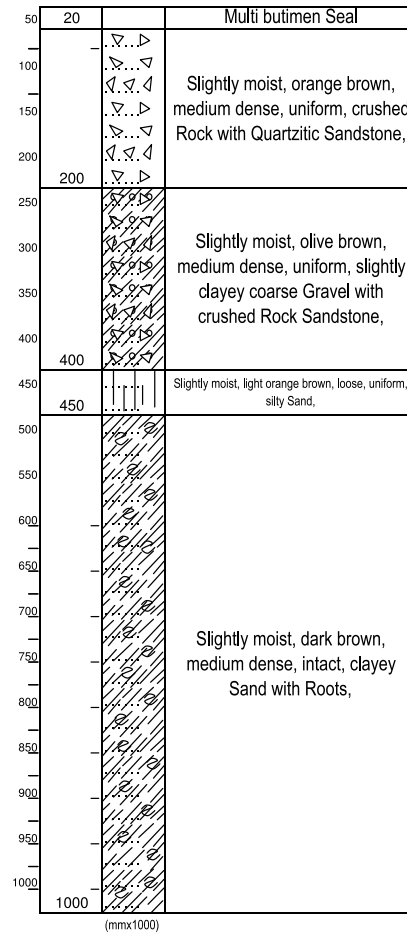


Co-ordinates: Dian Diameter is 1,2 x 0,8

CH: 33 + 400 RHS

Remarks:

1. Excavation stopped,
2. Rutting @ 10mm.

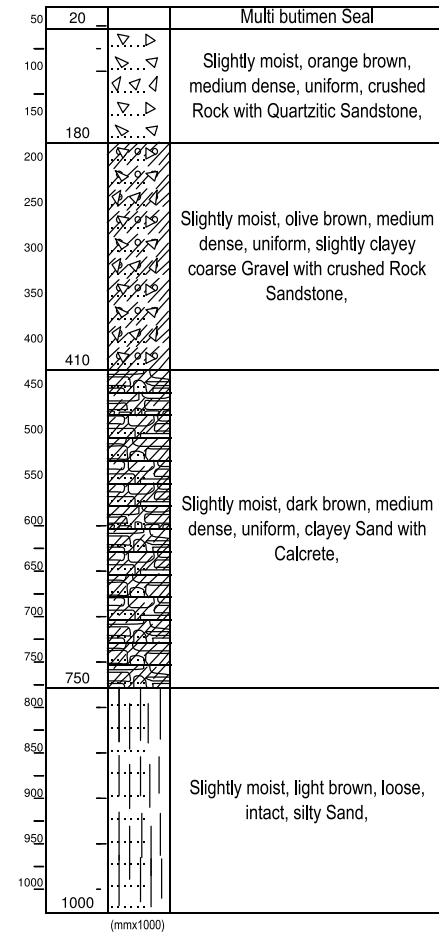


Co-ordinates: Diameter is 1,2 x 0,8

CH: 33 + 600 LHS

Remarks:

1. Excavation stopped,
2. Rutting @ 15mm.



Co-ordinates: Dian Diameter is 1,2 x 0,8

CH: 33 + 800 RHS

Remarks:

1. Excavation stopped,
2. Rutting @ 25mm.

KILOMETER DISTANCE  
KILOMETER AFSTAND

DISTANCE TO CENTRELINE  
AFSTAND NA MIDDELLYN

BORROW PIT No.  
LEENGROEF Nr. TP42-44

ROUTE MR 473 SECTION SEKSIE DESCRIPTION BESKRYWING

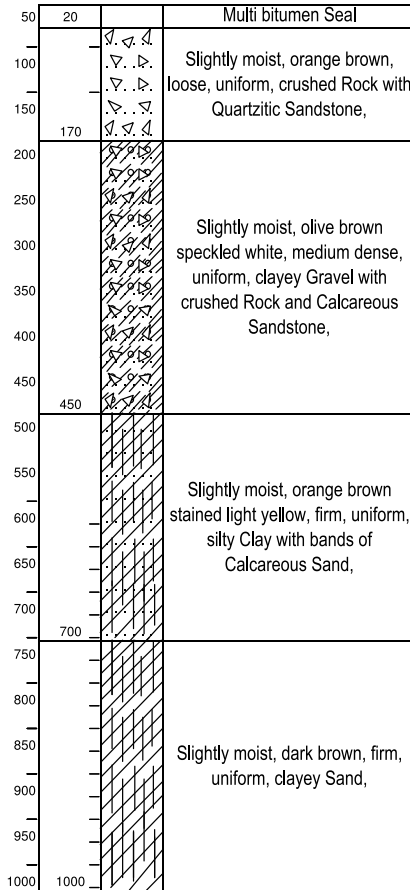
Addo to Paterson

PAGE NO.  
BLADSY NO. 53

## TEST PIT LOGS / TOETSPUT PROFIELE

MR 473

Testpits

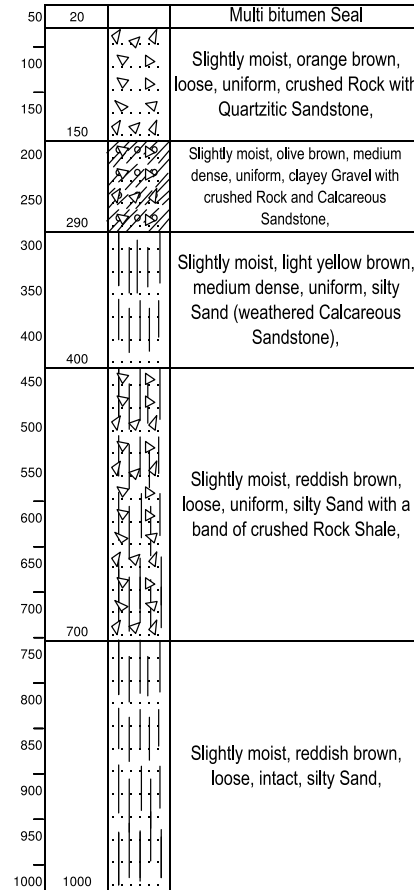


Co-ordinates:

Diameter is 1.2 x 0.8  
CH: 34 + 000 LHS

Remarks :

1. Excavation stopped
2. Rutting @ 25mm

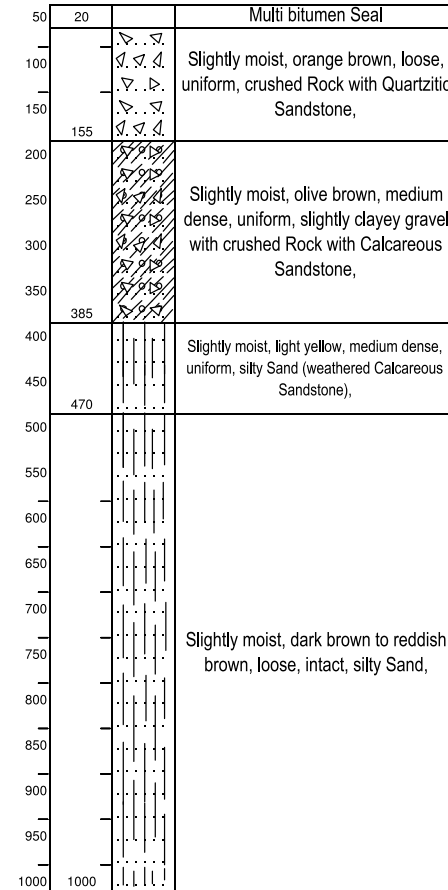


Co-ordinates:

Diameter is 1.2 x 0.8  
CH: 34 + 400 LHS

Remarks :

1. Excavation stopped
2. Rutting @ 20mm



Co-ordinates:

Diameter is 1.2 x 0.8  
CH: 34 + 600 RHS

Remarks :

1. Excavation stopped
2. Rutting @ 9mm

KILOMETER DISTANCE  
KILOMETER AFSTAND

DISTANCE TO CENTRELINE  
AFSTAND NA MIDDELLYN

DESCRIPTION  
BESKRYWING

Addo to Paterson

BORROW PIT No.  
LEENGROEF Nr. TP168&170-171

PAGE NO.  
BLADSY NO.

MR 473

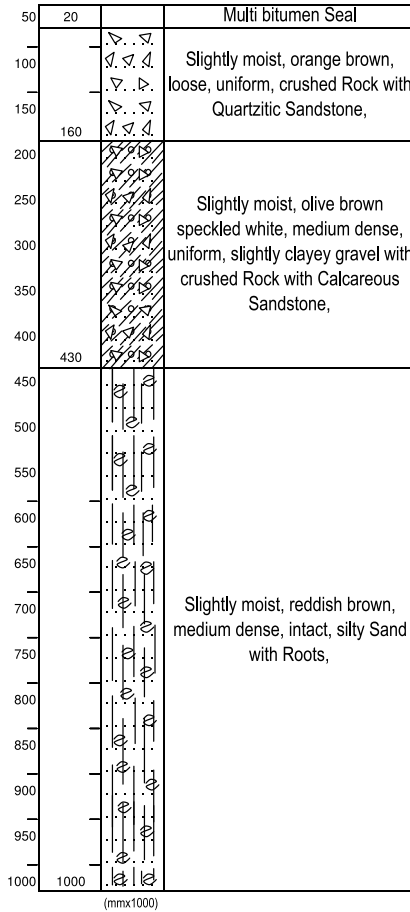
SECTION  
SEKSE

54

## TEST PIT LOGS / TOETSPUT PROFIELE

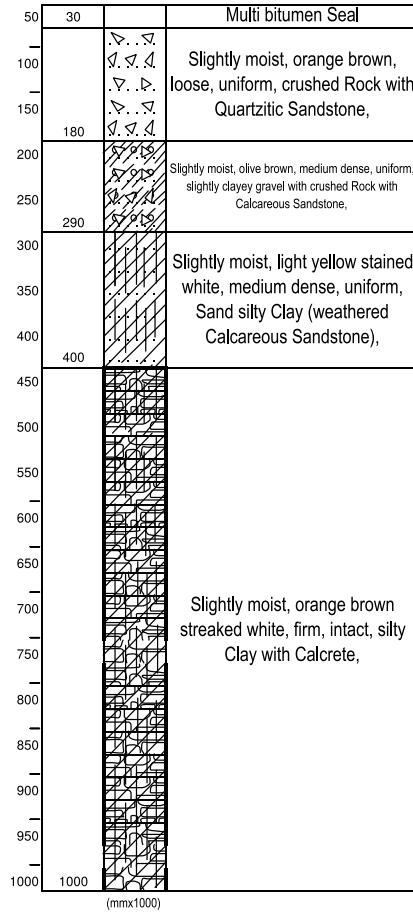
MR 473

Testpits



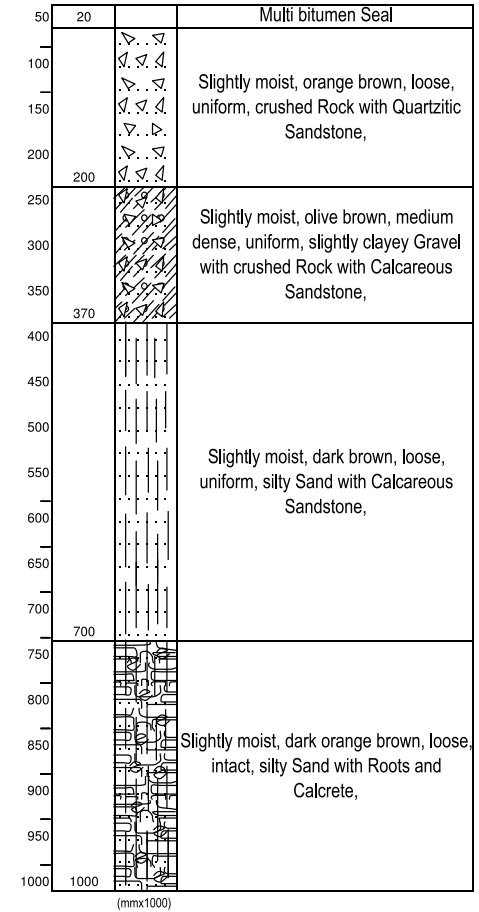
Co-ordinates: Diameter is 1,2 x 0,8  
CH: 34 + 800 LHS

Remarks :  
1. Excavation stopped  
2. Rutting @ 9mm



Co-ordinates: Diameter is 1,2 x 0,8  
CH: 35 + 000 RHS

Remarks :  
1. Excavation stopped  
2. Rutting



Co-ordinates: Diameter is 1,2 x 0,8  
CH: 35 + 400 RHS

Remarks :  
1. Excavation stopped  
2. Rutting @ 10mm  
3. Crocodile Cracks

KILOMETER DISTANCE  
KILOMETER AFSTAND

DISTANCE TO CENTRELINE  
AFSTAND NA MIDDELLYN

BORROW PIT No.  
LEENGROEF Nr. TP172-173&175

ROUTE  
ROETE MR 473

SECTION  
SEKSE

DESCRIPTION  
BESKRYWING

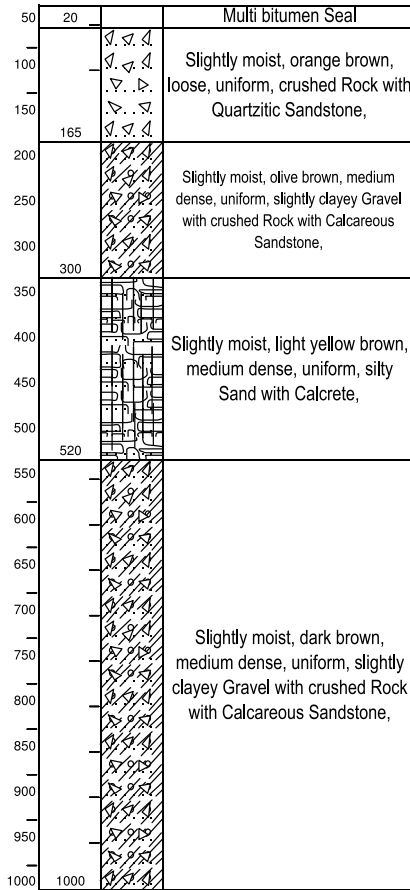
Addo to Paterson

PAGE NO.  
BLADSY NO. 55

## TEST PIT LOGS / TOETSPUT PROFIELE

MR 473

Testpits



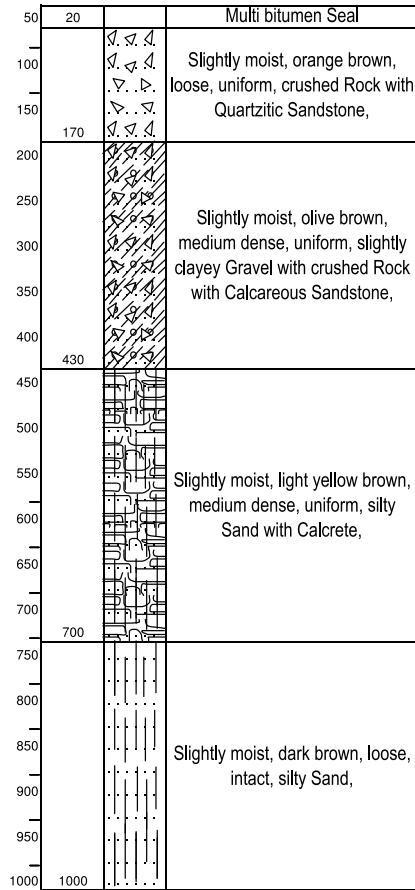
(mmx1000)

Co-ordinates:

Diameter is 1,2 x 0,8  
CH: 35 + 600 LHS

Remarks :

1. Excavation stopped
2. Rutting @ 20mm
3. Crocodile Cracks,



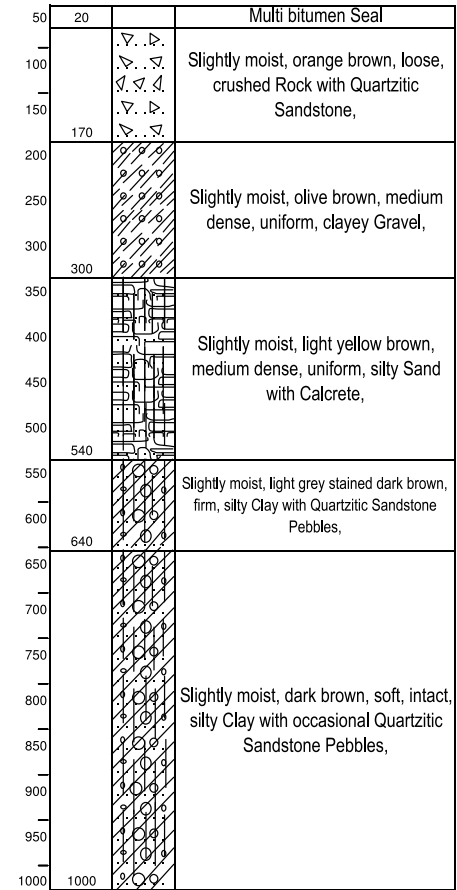
(mmx1000)

Co-ordinates:

Diameter is 1,2 x 0,8  
CH: 35 + 800 RHS

Remarks :

1. Excavation stopped
2. Rutting @ 10mm



(mmx1000)

Co-ordinates:

Diameter is 1,2 x 0,8  
CH: 36 + 000 LHS

Remarks :

1. Excavation stopped
2. Rutting @ 25mm
3. Crocodile Cracks,

KILOMETER DISTANCE

KILOMETER AFSTAND

ROUTE

ROETE

MR 473

SECTION

SEKSIE

DISTANCE TO CENTRELINE

AFSTAND NA MIDDELLYN

DESCRIPTION

BESKRYWING

Addo to Paterson

BORROW PIT No.

LEENGROEF Nr.

PAGE NO.

BLADSY NO.

TP181-183

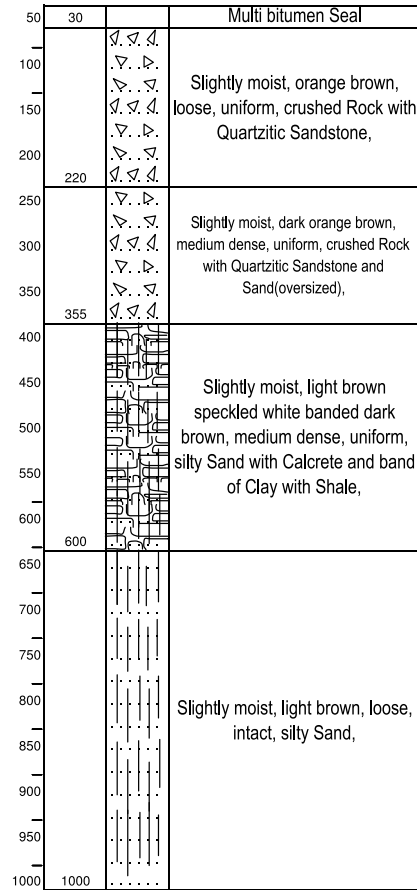
56



## TEST PIT LOGS / TOETSPUT PROFIELE

MR 473

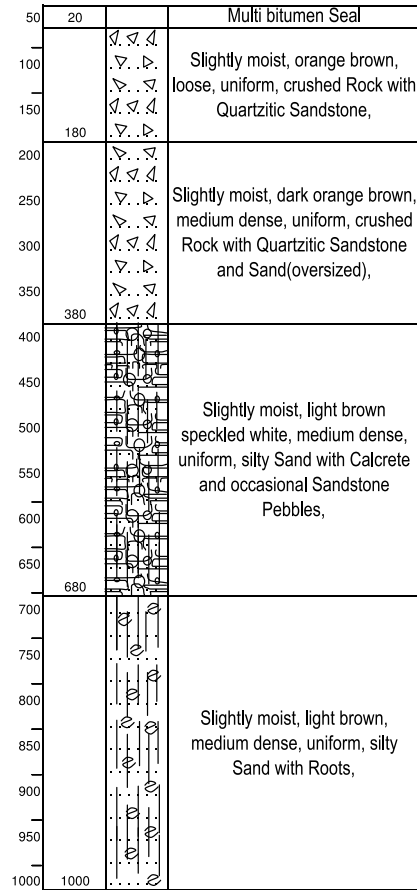
Testpits



(mmx1000)

**Co-ordinates:** Diameter is 1,2 x 0,6  
CH: 36 + 400 LHS

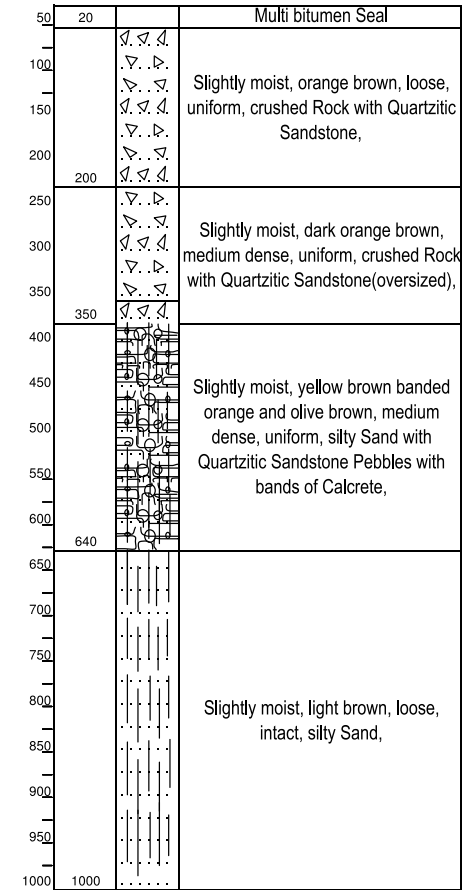
**Remarks :** 1. Excavation stopped



(mmx1000)

**Co-ordinates:** Diameter is 1,2 x 0,8  
CH: 36+600 LHS

**Remarks :** 1. Excavation stopped  
2. Rutting @ 5mm R/S



(mmx1000)

**Co-ordinates:** Diameter is 1,2 x 0,8  
CH: 36 + 800 LHS

**Remarks :** 1. Excavation stopped  
2. Rutting @ 5mm

KILOMETER DISTANCE  
KILOMETER AFSTAND

DISTANCE TO CENTRELINE  
AFSTAND NA MIDDELLYN

BORROW PIT No.  
LEENGROEF Nr. TP185-188

ROUTE  
ROETE MR 473

SECTION  
SEKSI

DESCRIPTION  
BESKRYWING

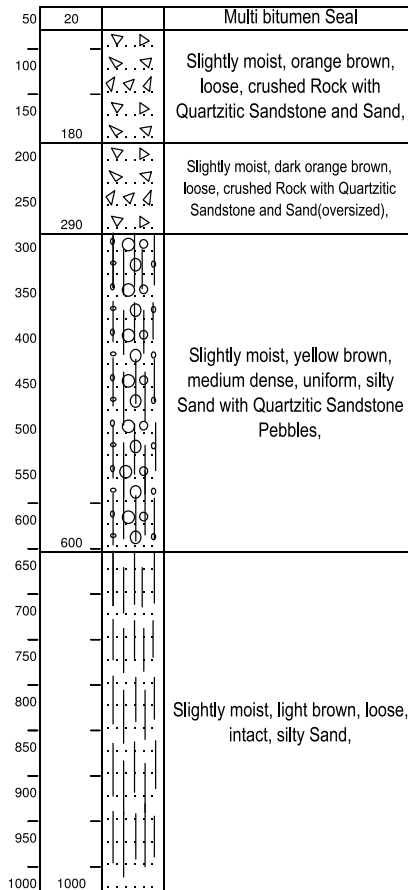
Addo to Paterson

PAGE NO.  
BLADSY NO. 57

## TEST PIT LOGS / TOETSPUT PROFIELE

MR 473

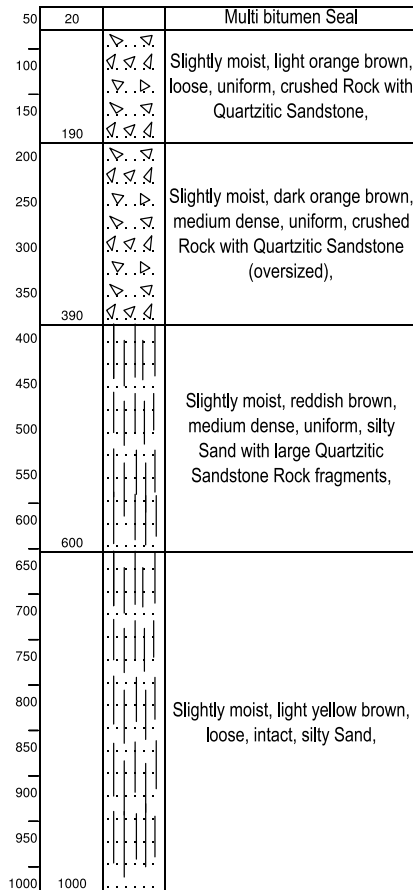
Testpits



(mmx1000)

Co-ordinates: Diameter is 1,2 x 0,8  
CH: 37 + 000 RHS

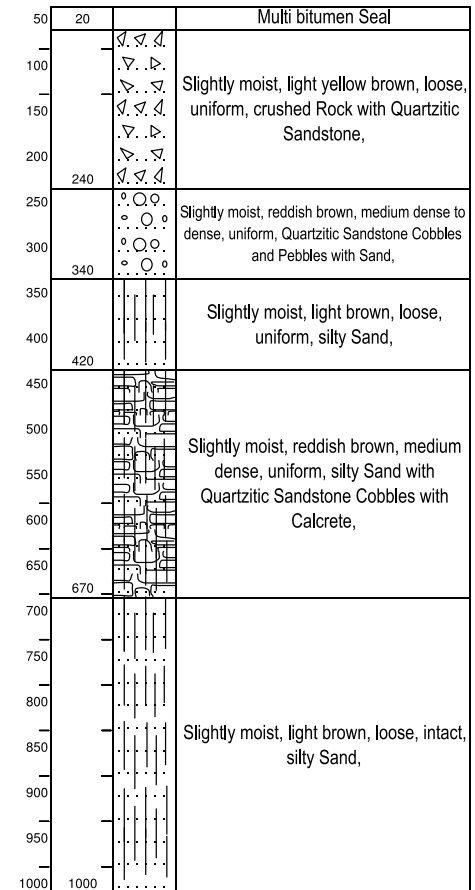
Remarks :  
1. Excavation stopped  
2. Rutting @ 10mm



(mmx1000)

Co-ordinates: Diameter is 1,2 x 0,8  
CH: 37 + 260 LHS

Remarks :  
1. Excavation stopped  
2. Rutting



(mmx1000)

Co-ordinates: Diameter is 1,2 x 0,8  
CH: 37 + 400 RHS

Remarks :  
1. Excavation stopped  
2. Rutting @ 15mm

KILOMETER DISTANCE  
KILOMETER AFSTAND

DISTANCE TO CENTRELINE  
AFSTAND NA MIDDELLYN

BORROW PIT No.  
LEENGROEF Nr. TP185&189-190

ROUTE  
ROETE MR 473

SECTION  
SEKSIE

DESCRIPTION  
BESKRYWING

Addo to Paterson

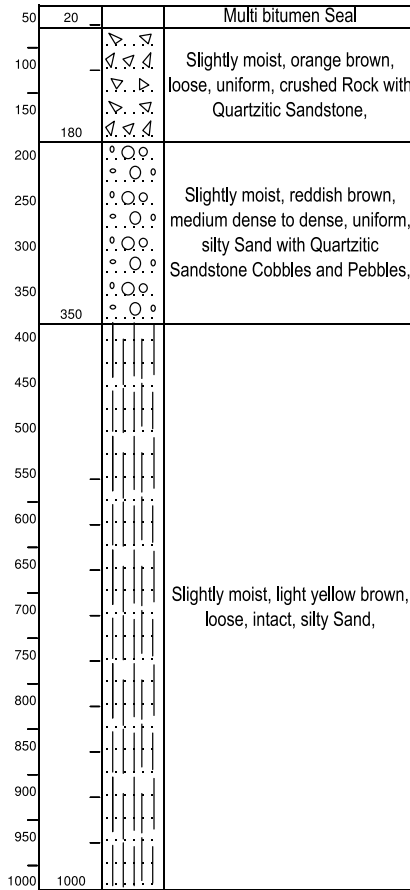
PAGE NO.  
BLADSY NO.

58

## TEST PIT LOGS / TOETSPUT PROFIELE

MR 473

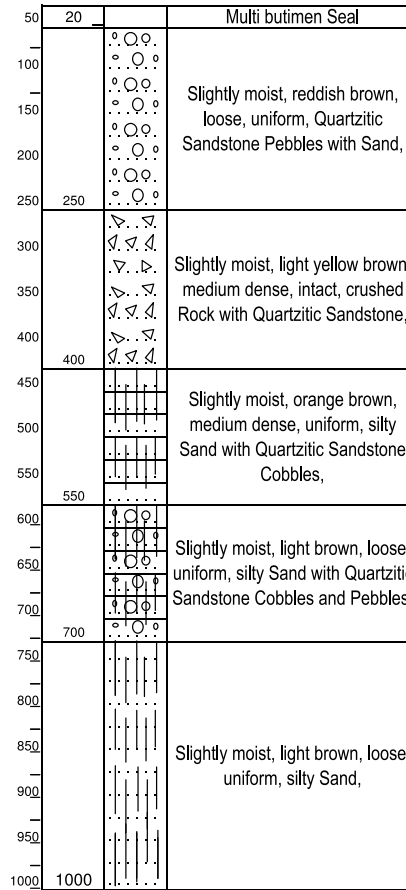
Testpits



(mmx1000)

**Co-ordinates:** Diameter is 2,5 x 0,6  
CH: 37 + 600 LHS

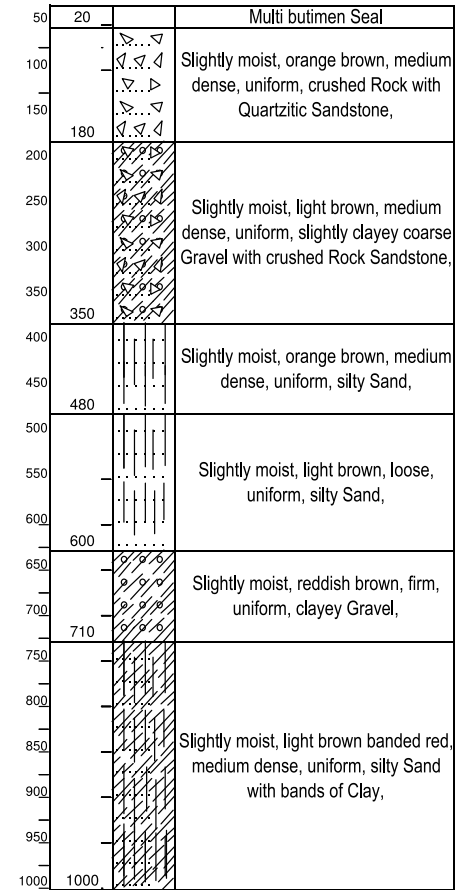
**Remarks :** 1. Excavation stopped  
2. Rutting



(mmx1000)

**Co-ordinates:** Diameter is 1,2 x 0,8  
CH: 37+800 RHS

**Remarks :** 1. Excavation stopped  
2. Rutting



(mmx1000)

**Co-ordinates:** Diameter is 1,2 x 0,8  
CH: 38 + 000 LHS

**Remarks :** 1. Excavation stopped.  
2. Rutting at 4mm.

KILOMETER DISTANCE  
KILOMETER AFSTAND

DISTANCE TO CENTRELINE  
AFSTAND NA MIDDELLYN

BORROW PIT No.  
LEENGROEF Nr. TP191-192&45

ROUTE  
ROETE MR 473

SECTION  
SEKSIE

DESCRIPTION  
BESKRYWING

Addo to Paterson

PAGE NO.  
BLADSY NO. 59

SURFACE



TESTPIT



(mmx1000)

**Co-ordinates:** CH: 26.600  
RHS**Remarks :**

SURFACE



TESTPIT



(mmx1000)

**Co-ordinates:** CH: 26.800  
LHS**Remarks :**

SURFACE



TESTPIT



(mmx1000)

**Co-ordinates:** CH: 27.000  
RHS**Remarks :**

SURFACE



TESTPIT



(mmx1000)

Co-ordinates: CH: 27.200  
RHS

Remarks :

SURFACE



TESTPIT



(mmx1000)

Co-ordinates: CH: 27.400  
RHS

Remarks :

SURFACE



TESTPIT



(mmx1000)

Co-ordinates: CH: 27.800  
RHS

Remarks :



SURFACE



SURFACE



SURFACE



TESTPIT



TESTPIT



TESTPIT



(mmx1000)

Co-ordinates: CH: 28.000  
RHS

Remarks :

(mmx1000)

Co-ordinates: CH: 28.200  
RHS

Remarks :

(mmx1000)

Co-ordinates: CH: 28.400  
RHS

Remarks :

SURFACE



SURFACE



SURFACE



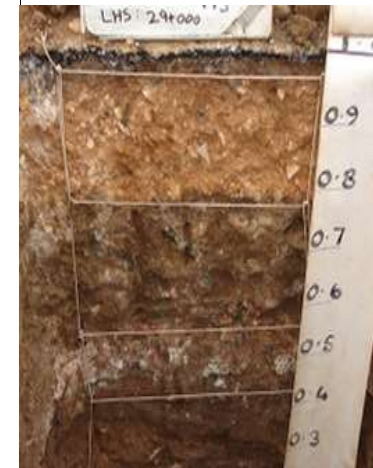
TESTPIT



TESTPIT



TESTPIT



(mmx1000)

Co-ordinates: CH: 28+200  
RHS

Remarks :

(mmx1000)

Co-ordinates: CH: 28.900  
RHS

Remarks :

(mmx1000)

Co-ordinates: CH: 29.000  
RHS

Remarks :



SURFACE



SURFACE



SURFACE



TESTPIT



TESTPIT



TESTPIT



(mmx1000)

Co-ordinates: CH: 29.200  
RHS

Remarks :

(mmx1000)

Co-ordinates: CH: 29.600  
RHS

Remarks :

(mmx1000)

Co-ordinates: CH: 29.800  
RHS

Remarks :





(mmx1000)  
**Co-ordinates:** CH: 30.000  
 RHS  
**Remarks :**



(mmx1000)  
**Co-ordinates:** CH: 30.200  
 RHS  
**Remarks :**



(mmx1000)  
**Co-ordinates:** CH: 30.400  
 RHS  
**Remarks :**

SURFACE



SURFACE



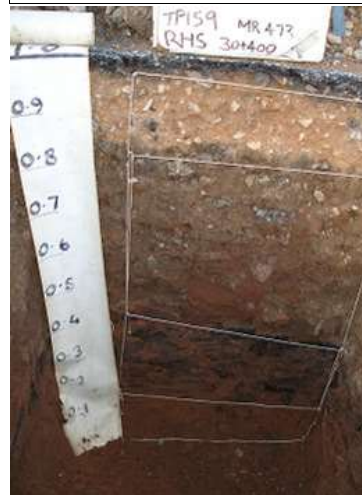
SURFACE



TESTPIT



TESTPIT



TESTPIT



(mmx1000)

Co-ordinates: CH: 30.200  
RHS

Remarks :

(mmx1000)

Co-ordinates: CH: 30.000  
RHS

Remarks :

(mmx1000)

Co-ordinates: CH: 30.600  
RHS

Remarks :



SURFACE



SURFACE



SURFACE



TESTPIT



TESTPIT



TESTPIT



(mmx1000)

Co-ordinates: CH: 30.600  
RHS

Remarks :

(mmx1000)

Co-ordinates: CH: 30.800  
RHS

Remarks :

(mmx1000)

Co-ordinates: CH: 31.200  
RHS

Remarks :

SURFACE



SURFACE



SURFACE



TESTPIT



TESTPIT



TESTPIT



(mmx1000)

**Co-ordinates:** CH: 31.600  
RHS**Remarks :**

(mmx1000)

**Co-ordinates:** CH: 31.800  
RHS**Remarks :**

(mmx1000)

**Co-ordinates:** CH: 32.000  
RHS**Remarks :**



SURFACE



SURFACE



SURFACE



TESTPIT



TESTPIT



TESTPIT



(mmx1000)

Co-ordinates: CH: 32.200  
RHS

Remarks :

(mmx1000)

Co-ordinates: CH: 32.400  
RHS

Remarks :

(mmx1000)

Co-ordinates: CH: 32.600  
RHS

Remarks :

SURFACE



SURFACE



SURFACE



TESTPIT



(mmx1000)

Co-ordinates: CH: 33.000  
RHS

Remarks :

TESTPIT



(mmx1000)

Co-ordinates: CH: 33.100  
RHS

Remarks :

TESTPIT



(mmx1000)

Co-ordinates: CH: 33.400  
RHS

Remarks :



SURFACE



SURFACE



SURFACE



TESTPIT



(mmx1000)

Co-ordinates: CH: 33.600  
RHS

Remarks :

TESTPIT



(mmx1000)

Co-ordinates: CH: 33.800  
RHS

Remarks :

TESTPIT



(mmx1000)

Co-ordinates: CH: 34.400  
RHS

Remarks :

SURFACE



SURFACE



SURFACE



TESTPIT



TESTPIT



TESTPIT



(mmx1000)

Co-ordinates: CH: 34.600  
RHS

Remarks :

(mmx1000)

Co-ordinates: CH: 34.800  
RHS

Remarks :

(mmx1000)

Co-ordinates: CH: 35.000  
RHS

Remarks :



SURFACE



SURFACE



SURFACE



TESTPIT



(mmx1000)

Co-ordinates: CH: 35.400  
RHS

Remarks :

TESTPIT



(mmx1000)

Co-ordinates: CH: 35+000  
RHS

Remarks :

TESTPIT



(mmx1000)

Co-ordinates: CH: 35.800  
RHS

Remarks :

SURFACE



SURFACE



SURFACE



TESTPIT



TESTPIT



TESTPIT



(mmx1000)

Co-ordinates: CH: 36.000  
RHS

Remarks :

(mmx1000)

Co-ordinates: CH: 36.400  
RHS

Remarks :

(mmx1000)

Co-ordinates: CH: 36.600  
RHS

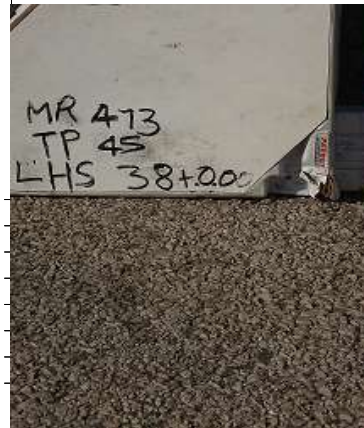
Remarks :



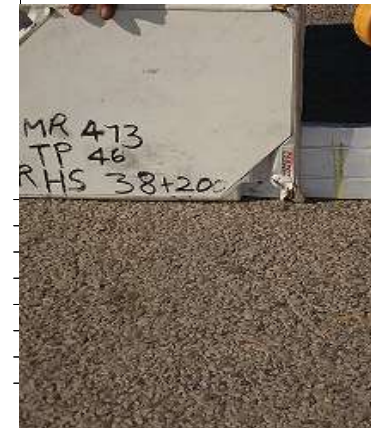
SURFACE



SURFACE



SURFACE



TESTPIT



TESTPIT



TESTPIT



(mmx1000)

Co-ordinates: CH: 36.800  
RHS

Remarks :

(mmx1000)

Co-ordinates: CH: 38.000  
RHS

Remarks :

(mmx1000)

Co-ordinates: CH: 38.200  
RHS

Remarks :

## MR 473

## Testpit

## M1 -1

### SAMPLE DATA

### SUMMARY OF TEST RESULTS

km DISTANCE	OFFSET	DEPTH	SAMPLE NO.	% MOISTURE CONTENT	DESCRIPTION	SIEVE ANALYSIS ( % PASSING ) mm										SOIL MORTAR ANALYSIS			ATTERBERG CONSTANTS			GM	MODIFIED AASHO		CBR		CBR / UCS					CLASSIFICATION			
						75.0	63.0	53.0	37.5	26.5	19.0	13.2	4.75	2.00	0.425	0.075	CS	FS	Mat. 0.075	LL	PI		LS ( % )	OMC	MDD	COMP MOIST	SWELL	100	98	95	93	90	TRH14 / 2001	TRB	
26.800	LHS	180-400	X64870		O. Br. Qtzte. Ss. cob & peb with CI			100	82	75	72	64	48	41	32	16	35	25	38	17	7	3.0	2.11	4.8	2307	4.8	0.0	235	118	56	50	41	G5	A-2-4(0)	
26.800	LHS	840-1000	X64871		Br. std lt. G. slt. Sty s					100	97	96	93	91	87	44	12	40	48	22	9	4.5	0.78											A-4(1)	
27.000	RHS	280-470	X64876		R. Br. Qtzte. Ss. cob & peb with CI			100	96	79	61	55	43	37	30	17	31	24	45	20	10	4.5	2.16	5.4	2263	5.4	0.1	109	99	79	60	40	G5	A-2-4(0)	
27.000	RHS	730-1000	X64877		R. Br. Sty cly s									100	99	96	57	8	34	58	22	10	3.5	0.48									A-4(2)		
27.200	LHS	250-430	X64872		R. Br. Qtzte. Ss. cob & peb with CI			100	86	76	70	63	49	43	35	18	33	27	41	18	8	3.5	2.05											A-2-4(0)	
27.200	LHS	430-570	X64873		Ol. Br. cly Grav & Cr. Rock Ss.			100	89	86	80	68	48	38	29	17	34	22	44	26	9	4.5	2.16	11.3	2097	11.3	0.1	32	24	18	16	14	G7	A-2-4(0)	
27.200	LHS	710-1000	X64874		R. Br. Sty CI					100	98	98	95	93	89	52	11	33	56	23	11	5.5	0.66	14.0	1907	14.1	0.5	5	4	4	3	3	G10	A-6(2)	
27.400	RHS	40-160	X64878		O. Br. Cr. Rock Qtzte. Ss.						100	81	53	43	26	8	59	22	19	-	NP	0.0	2.23											A-1-a(0)	
27.400	RHS	380-515	X64879		Ol. Br. cly Grav & Cr. Rock Ss.	100	93	88	87	80	74	68	45	33	23	14	39	19	42	30	13	6.5	2.30	11.4	2133	11.4	0.1	60	59	46	30	16	G7	A-2-6(0)	
27.400	RHS	660-1000	X64880		R. Br. streaked Wh. Sty CI with Calc.							100	98	97	95	67	5	26	69	38	22	10.5	0.42	14.4	1690	14.4	1.9	1	1	1	0	0	N/A	A-6(12)	
27.800	LHS	310-455	X64881		Dk. Br. c Grav				100	99	96	91	81	74	67	55	13	12	75	31	18	8.5	1.04	10.8	1969	10.8	2.5	3	2	2	1	1	N/A	A-6(6)	
27.800	LHS	455-710	X64882		Lt. G. std Wh. Sty CI(With. Calc. ) & Qtzte. Ss. peb	100	90	84	81	78	75	68	51	39	26	15	43	20	37	28	12	6.0	2.21	10.2	2150	10.2	0.0	42	35	27	22	17	G7	A-2-6(0)	
27.800	LHS	840-1000	X64883		R. Br. Sty CI							100	97	94	91	63	8	25	67	27	12	6.5	0.52											A-6(5)	
28.000	RHS	30-200	X64884		O. Br. Cr. Rock Qtzte. Ss.				100	92	85	69	46	36	22	9	56	19	25	18	7	3.0	2.33	6.5	2244	6.5	0.0	99	55	25	24	22	G7	A-2-4(0)	
28.000	RHS	200-460	X64885		Dk. Br. cly Grav & Cr. Rock Ss.	100	92	88	83	79	70	60	42	34	26	16	33	21	46	28	13	7.0	2.24	12.2	1776	12.2	0.0	29	26	23	19	14	G7	A-2-6(0)	
28.000	RHS	460-640	X64886		Lt. G. Sty CI (With. Calc. ) with Qtzte. Ss. Sub Angular Rock Fragments			100	97	91	87	85	79	75	70	51	12	20	68	26	13	6.5	1.04												A-6(3)
28.200	LHS	210-530	X64890		Ol. Br. cly Grav & Cr. Rock Ss.			100	89	83	78	68	49	37	25	14	39	15	45	29	11	5.5	2.24												A-2-6(0)
28.200	LHS	530-710	X64891		Lt. G. std O. & Wh. Sty CI(With. Calc. ) & Qtzte. Ss. peb			100	96	94	91	85	74	66	58	44	17	15	67	30	15	6.5	1.32	11.4	2042	11.4	1.7	5	5	4	2	1	N/A	A-6(3)	
28.200	LHS	710-1000	X64892		R. Br. Sty CI			100	97	97	95	94	92	90	87	65	8	20	72	29	13	6.5	0.58												A-6(6)
28.400	RHS	30-190	X64893		O. Br. Cr. Rock Qtzte. Ss.			100	98	90	81	62	42	34	22	8	56	21	23	-	SP	0.5	2.36												A-1-a(0)
28.400	RHS	190-530	X64894		Ol. Br. cly Grav & Cr. Rock Ss. & Calc.	100	93	88	83	77	71	62	48	36	24	14	42	19	39	25	10	4.0	2.26	8.8	2193	8.8	0.1	88	81	70	61	49	G5	A-2-4(0)	
28.400	RHS	530-690	X64895		Pk Br. gravy CI (With. Calc. ) & Qtzte. Ss. & peb				100	99	94	91	83	75	65	30	22	28	40	25	11	7.0	1.30												A-2-6(0)
28.600	LHS	30-195	X64896		O. Br. Cr. Rock Qtzte. Ss.				100	98	86	72	46	38	23	9	55	22	23	-	NP	0.0	2.30												A-4(1)
28.600	LHS	520-730	X64897		Pk Br. gravy CI (With. Calc. ) & Qtzte. Ss. & peb	100	80	80	78	73	66	60	48	39	28	15	39	22	38	26	11	5.0	2.18	9.5	2198	9.5	0.1	94	94	78	43	18	G5	A-2-4(0)	
28.600	LHS	730-1000	X64898		O. Br. Sty cly s			100	95	95	94	91	81	76	71	46	13	27	60	27	9	4.5	1.07	14.4	1848	14.4	0.2	10	6	3	2	1	N/A	A-2-6(0)	
29.000	LHS	225-490	X64903		Ol. Br. cly Grav & Cr. Rock Ss.				100	93	81	66	46	38	22	7	61	21	19	-	NP	0.0	2.33	5.6	2189	5.5	0.0	198	164	134	130	123	G4	A-6(5)	
29.000	LHS	490-640	X64904		Lt. G. std Wh. to O. Sty CI(With. Calc. ) with Ss. Rock Fragments		100	96	93	85	78	68	47	35	24	13	41	22	37	27	10	5.0	2.28												A-1-a(0)

## MR 473

## Testpit

## M1 -1

### SAMPLE DATA

### SUMMARY OF TEST RESULTS

km DISTANCE	OFFSET	DEPTH	SAMPLE NO.	% MOISTURE CONTENT	DESCRIPTION	SIEVE ANALYSIS ( % PASSING ) mm										SOIL MORTAR ANALYSIS			ATTERBERG CONSTANTS			GM	MODIFIED AASHO		CBR		CBR / UCS					CLASSIFICATION				
						75.0	63.0	53.0	37.5	26.5	19.0	13.2	4.75	2.00	0.425	0.075	CS	FS	Mat. 0.075	LL	PI		LS ( % )	OMC	MDD	COMP MOIST	SWELL	100	98	95	93	90	TRH14 / 2001	TRB		
29.200	RHS	30-220	X64905		O. Br. Cr. Rock Qtzte. Ss.			100	99	93	83	65	41	33	20	8	58	19	23	19	8	3.5	2.40	6.0	2188	5.9	0.0	175	130	93	86	76	G5	A-2-4(0)		
29.200	RHS	480-800	X64906		Lt. Br. stnd dk. Br. gravy Cl with Calc. & Ss. Rock Fraaments			100	92	88	85	82	75	72	68	37	20	30	51	26	12	5.5	1.23	12.6	1897	12.6	1.7	3	3	2	1	1	N/A	A-2-4(0)		
29.200	RHS	800-1000	X64907		Lt. O. Br. Sty Cl with occasional Qtzte. Ss. cob							100	99	97	91	55	16	27	57	24	9	4.5	0.57										A-6(1)			
29.600	RHS	20-140	X64908		O. Br. Cr. Rock Qtzte. Ss.				100	95	86	73	50	40	24	9	56	22	22	-	SP	0.5	2.27												A-2-6(0)	
29.600	RHS	140-420	X64909		Ol. Br. slt. cly Grav & Cr. Rock Calc. Ss.		100	81	64	58	52	47	33	24	15	9	46	18	36	30	14	7.0	2.52	10.8	2115	10.8	0.0	93	66	39	21	8	G7	A-1-a(0)		
29.600	RHS	420-1000	X64910		R. Br. Sty cly s								100	99	96	52	12	36	52	17	6	3.0	0.53	11.6	1961	11.6	0.1	18	17	15	12	8	G9	A-2-6(0)		
29.800	LHS	40-220	X64914		O. Br. Cr. Rock Qtzte. Ss.				100	93	84	71	47	38	22	8	59	20	21	16	4	2.0	2.32	5.2	2236	5.2	0.0	108	71	40	31	22	G6	A-4(0)		
29.800	LHS	220-640	X64915		Ol. Br. slt. cly Grav & Cr. Rock Calc. Ss.		100	97	89	84	79	65	42	32	22	12	40	21	39	32	12	5.5	2.34												A-1-a(0)	
29.800	LHS	830-1000	X64916		R. Br. Sty Cl				100	93	85	85	81	79	76	46	14	28	58	32	16	8.5	0.99												A-2-6(0)	
30.000	RHS	40-230	X64917		O. Br. Cr. Rock Qtzte. Ss.				100	86	72	60	42	34	21	8	55	22	22	-	SP	0.5	2.37	4.8	2246	4.7	0.0	223	216	159	96	45	G4	A-6(4)		
30.000	RHS	230-380	X64918		Ol. Br. slt. cly Grav & Cr. Rock Calc. Ss.	100	94	94	85	77	72	60	40	30	21	13	38	19	42	32	14	7.0	2.36												A-1-a(0)	
30.000	RHS	620-1000	X64919		R. Br. Sty Cl						100	99	99	98	93	57	11	30	58	24	10	5.0	0.52												A-4(3)	
30.200	LHS	190-420	X64920		Ol. Br. slt. cly Grav & Cr. Rock Calc. Ss.	100	92	92	83	79	70	61	45	33	22	13	41	20	39	34	17	8.5	2.32	10.8	2141	10.8	0.0	84	79	73	71	69	G6	A-2-6(0)		
30.200	LHS	420-640	X64921		Dk. Br. Sty Cl		100	82	77	64	56	50	38	29	21	13	36	19	45	39	16	9.5	2.37	12.5	2097	12.5	0.1	55	48	39	33	25	G6	A-2-6(0)		
30.200	LHS	640-1000	X64922		Lt. O. Br. sp Y. Sty s with Calc.						100	92	73	49	34	19	39	24	38	-	NP	0.0	1.99												A-1-b(0)	
30.400	RHS	40-180	X64923		O. Br. Cr. Rock Qtzte. Ss.				100	98	86	76	58	48	29	13	56	22	23	18	6	3.0	2.10													A-1-a(0)
30.400	RHS	180-600	X64924		Ol. Br. slt. cly Grav & Cr. Rock Calc. Ss.			100	98	93	85	77	51	37	23	13	47	18	35	29	10	4.5	2.27	9.4	2104	9.4	0.1	61	61	52	38	24	G5	A-2-4(0)		
30.400	RHS	600-820	X64925		Dk. Br. Sty cly s			100	96	92	91	84	73	67	61	33	18	33	48	23	8	4.0	1.40	13.9	1832	14.0	0.1	17	16	14	12	10	G8	A-2-4(0)		
30.600	LHS	25-200	X64929		O. Br. Cr. Rock Qtzte. Ss.				100	94	81	65	45	36	23	9	53	23	24	19	4	2.0	2.32	5.3	2257	5.8	0.0	173	82	27	24	23	G7	A-1-a(0)		
30.600	LHS	200-520	X64930		Ol. Br. Sl. cly Grav & Cr. Rock Calc. Ss.			100	97	90	88	83	66	51	35	23	37	17	45	31	11	6.0	1.91												A-2-6(0)	
30.600	LHS	520-710	X64931		R. Br. Sty Cl with Qtzte. Ss. peb & Calc.			100	97	92	91	85	77	72	66	37	19	29	52	29	12	6.0	1.25	12.6	1905	12.6	0.8	11	10	8	6	4	G10	A-6(1)		
30.800	RHS	220-600	X64926		Ol. Br. slt. cly Grav & Cr. Rock Calc. Ss.			100	93	85	83	77	59	49	39	24	29	22	49	32	7	3.5	1.88												A-2-4(0)	
30.800	RHS	600-750	X64927		Dk. Br. Sty Cl with Calc. & Qtzte. Ss. peb			100	97	96	94	91	84	81	77	46	15	27	57	26	14	6.5	0.96												A-6(3)	
30.800	RHS	750-1000	X64928		O. Br. s			100	95	93	92	90	87	86	83	29	17	48	34	-	SP	0.5	1.02	8.9	2020	8.9	0.1	38	32	23	17	11	G7	A-2-4(0)		
31.200	LHS	30-160	X64932		O. Br. Cr. Rock Qtzte. Ss.				100	92	85	67	43	34	20	8	57	21	22	19	4	2.0	2.38													A-1-a(0)
31.200	LHS	160-570	X64933		Ol. Br. slt. cly Grav & Cr. Rock Calc. Ss.		100	94	85	78	77	70	46	35	24	16	37	17	45	29	12	6.5	2.25													A-2-6(0)
31.200	LHS	720-1000	X64934		R. Br. stnd Y. Sty Cl with Roots & Qtzte. Ss. peb			100	94	93	90	88	84	82	79	49	15	26	60	29	12	6.5	0.90	14.9	1816	14.9	1.9	3	2	1	1	1	N/A	A-6(3)		

## MR 473

## Testpit

## M1 -1

### SAMPLE DATA

### SUMMARY OF TEST RESULTS

km DISTANCE	OFFSET	DEPTH	SAMPLE NO.	% MOISTURE CONTENT	DESCRIPTION	SIEVE ANALYSIS ( % PASSING ) mm										SOIL MORTAR ANALYSIS			ATTERBERG CONSTANTS			GM	MODIFIED AASHO		CBR		CBR / UCS					CLASSIFICATION		
						75.0	63.0	53.0	37.5	26.5	19.0	13.2	4.75	2.00	0.425	0.075	CS	FS	Mat. 0.075	LL	PI		LS ( % )	OMC	MDD	COMP MOIST	SWELL	100	98	95	93	90	TRH14 / 2001	TRB
31.600	RHS	20-230	X65429		O. Br. Cr. Rock Qtzte. Ss.				100	95	77	61	37	29	17	6	59	19	21	19	7	4.0	2.48											A-2-4(0)
31.600	RHS	230-590	X65430		Ol. Br. slt. cly Grav & Cr. Rock Calc. Ss.		100	94	79	63	55	43	28	23	16	7	48	23	29	18	7	4.5	2.54	8.2	2165	8.2	0.0	76	70	60	29	9	G5	A-2-4(0)
31.600	RHS	590-790	X65431		R. Br. stnd Wh. Sty Cl with Calc.		100	95	83	71	65	58	46	40	34	20	26	25	49	32	14	7.5	2.06											A-2-6(0)
31.800	LHS	30-170	X65423		O. Br. Cr. Rock Qtzte. Ss.				100	86	79	63	41	32	21	9	49	22	29	23	10	6.0	2.38											A-2-4(0)
31.800	LHS	170-530	X65424		Ol. Br. slt. cly Grav & Cr. Rock Calc. Ss.	80	80	75	67	65	58	51	37	28	19	11	40	22	38	29	12	6.0	2.42											A-2-7(0)
31.800	LHS	530-860	X65425		R. Br. sp Wh. Sty Cl with Qtzte. Ss. cob			100	98	94	91	90	85	83	80	46	15	30	55	27	13	7.0	0.91											A-6(2)
32.000	RHS	30-200	X64938		O. Br. Cr. Rock Qtzte. Ss.	83	83	83	78	70	66	63	56	52	47	19	20	44	36	20	7	3.0	1.82	10.3	2044	10.3	0.1	70	49	29	24	18	G7	A-2-4(0)
32.000	RHS	460-640	X64939		pk Br. sp Wh. Sty Cl with Qtzte. Ss. peb				100	94	91	88	80	72	60	34	27	27	47	29	12	6.0	1.35											A-2-6(0)
32.200	LHS	20-190	X65456		O. Br. Cr. Rock Qtzte. Ss.				100	89	74	56	34	27	17	7	58	16	26	19	4	2.0	2.49	6.9	2207	6.9	0.0	193	143	91	68	44	G4	A-1-a(0)
32.200	LHS	190-500	X65457		Dk. Br. to Ol. Br. cly Grav & Cr. Rock Calc. Ss.		100	87	79	74	67	54	35	25	17	10	44	16	40	31	11	5.0	2.48	11.3	2086	11.3	0.0	105	81	54	40	26	G6	A-2-6(0)
32.200	LHS	500-1000	X65458		O. Br. Banded lt. Y. sp Wh. Sty Cl with B&s of Calc. & Qtzte. Ss. peb			100	92	90	86	80	71	67	61	26	22	39	39	31	14	6.5	1.46											A-2-6(0)
32.400	RHS	20-200	X65459		O. Br. Cr. Rock Qtzte. Ss.				100	93	81	63	38	29	17	7	56	19	24	19	4	2.0	2.47											A-1-a(0)
32.400	RHS	540-810	X65460		Lt. Br. banded O. & Y. sp Wh. Sty Cl with bands of Calc. with Qtzte Ss.				100	97	94	87	79	76	71	43	17	27	56	34	18	9.0	1.10	13.3	1867	13.3	0.7	11	10	7	4	2	N/A	A-2-6(0)
32.400	LHS	810-1000	X65461		Lt. pk Br. Stnd Wh. Sty Cl with Qtzte Ss peb			100	92	82	79	77	71	66	58	31	23	30	47	30	12	6.0	1.45											A-2-6(0)
32.600	LHS	20-170	X65462		O. Br. Cr Rock with Qtzte Ss	100	89	89	76	72	67	53	34	24	16	10	40	18	41	29	12	6.0	2.50	12.3	2085	12.3	0.1	61	57	38	20	8	G7	
32.600	LHS	690-1000	X65464		Dk. Br. Sty Cl with roots with Qtzte Ss peb			100	97	84	72	69	64	62	59	32	17	31	52	30	15	7.5	1.47											A-2-6(0)
33.000	LHS	210-500	X65468		Ol. Br. slt. cly Grav & Cr. Rock Calc. Ss. & peb		100	93	89	79	73	58	39	29	20	12	40	19	43	32	14	7.0	2.39	11.2	2069	11.2	0.0	61	52	43	38	33	G6	A-2-6(0)
33.000	LHS	500-660	X65469		O. Br. sp Wh. Sty Cl with Calc.			100	94	89	86	85	78	74	69	42	14	29	57	33	16	8.0	1.15											A-6(3)
33.000	LHS	660-1000	X65470		R. Br. Sty s									100	99	35	10	56	34	15	4	2.0	0.67	9.7	2064	9.7	0.1	25	18	12	11	9	G8	A-2-4(0)
33.200	LHS	20-170	X63403		O. Br. Cr. Rock Qtzte. Ss.				100	92	82	65	42	33	21	8	55	20	24	-	NP	0.0	2.38											A-1-a(0)
33.200	LHS	170-360	X63404		Lt. Br. slt. cly Grav with Cr. Rock Ss.	76	76	76	69	65	58	48	32	22	14	9	45	17	39	29	13	8.5	2.56	9.2	2199	9.3	0.0	61	49	35	33	30	G6	A-2-6(0)
33.200	LHS	610-890	X63405		Lt. Y. Br. Sty s with Calc.							100	99	98	96	25	16	58	25	-	SP	0.0	0.81										A-2-4(0)	
33.200	LHS	890-1000	X63406		Y. Br. Sty s with Calc.				100	89	72	58	38	31	19	9	56	17	28	-	SP	0.5	2.42											A-1-a(0)
33.400	RHS	330-530	X63407		O. Br. Sty s						100	99	98	97	94	18	18	63	19	-	NP	0.0	0.91	8.3	1781	8.3	0.1	26	20	14	12	10	G8	A-2-4(0)
33.400	RHS	530-1000	X63408		O. Br. stnd G. cly s									100	98	30	14	56	30	22	12	4.5	0.72	11.0	1942	11.1	0.8	10	6	3	2	2	N/A	A-2-6(0)
33.600	LHS	20-200	X63409		O. Br. Cr. Rock Qtzte. Ss.				100	88	80	66	43	34	21	8	56	20	24	17	4	2.0	2.37											A-1-a(0)
33.600	LHS	200-400	X63410		Ol. Br. slt. cly Coarse Grav with Cr. Rock Ss.	100	90	90	80	75	73	62	38	29	21	13	34	20	45	26	10	2.0	2.37	9.7	2101	9.8	0.0	49	41	31	27	22	G6	A-2-4(0)

## MR 473

## Testpit

## M1 -1

### SAMPLE DATA

### SUMMARY OF TEST RESULTS

km DISTANCE	OFFSET	DEPTH	SAMPLE NO.	% MOISTURE CONTENT	DESCRIPTION	SIEVE ANALYSIS ( % PASSING ) mm										SOIL MORTAR ANALYSIS			ATTERBERG CONSTANTS			GM	MODIFIED AASHO		CBR		CBR / UCS					CLASSIFICATION			
						75.0	63.0	53.0	37.5	26.5	19.0	13.2	4.75	2.00	0.425	0.075	CS	FS	Mat. 0.075	LL	PI		LS ( % )	OMC	MDD	COMP MOIST	SWELL	100	98	95	93	90	TRH14 / 2001	TRB	
33.600	LHS	450-1000	X63411		Dk. Br. cly s with Roots							100	98	97	96	40	11	48	41	22	10	4.5	0.67	12.8	1854	12.9	0.1	16	13	9	7	5	G9	A-4(1)	
33.800	RHS	20-180	X63412		O. Br. Cr. Rock Qtzte. Ss.			100	97	90	78	69	45	36	22	9	55	20	25	-	NP	2.3		5.0	2202	5.0	0.0	103	74	45	32	19	G5	A-1-a(0)	
33.800	RHS	180-410	X63413		Ol. Br. silt. cly Coarse Grav with Cr. Rock Ss.	100	72	72	69	58	52	49	40	32	23	15	37	18	45	29	16	7.5	2.31	10.7	2070	10.8	0.1	52	35	20	14	8	G8	A-2-6(0)	
33.800	RHS	410-750	X63414		Dk. Br. cly s with Calc.				100	98	98	97	94	92	87	28	17	52	31	19	4	2.0	0.93											A-2-4(0)	
34.000	LHS	20-170	X65441		O. Br. Cr. Rock Qtzte. Ss.			100	97	93	82	68	43	34	22	9	55	19	25	20	9	4.5	2.35	5.7	2206	5.6	0.0	212	142	79	56	33	G5	A-2-4(0)	
34.000	LHS	170-450	X65442		Ol. Br. sp Wh. cly Grav & Cr. Rock Calc. Ss.			100	92	86	80	80	79	78	76	27	16	49	35	18	6	3.5	1.19	9.3	2178	9.3	0.1	76	61	40	27	16	G6	A-2-4(0)	
34.000	LHS	700-1000	X65443		Dk. Br. Sty cly s				100	96	83	68	45	35	22	9	53	22	25	20	9	4.5	2.34											A-2-4(0)	
34.400	LHS	20-150	X65432		O. Br. Cr. Rock Qtzte. Ss.				100	90	74	59	37	29	20	9	50	20	30	-	SP	0.5	2.42	5.8	2256	5.8	0.0	105	101	77	48	23	G5	A-1-a(0)	
34.400	LHS	150-290	X65433		Ol. Br. cly Grav & Cr. Rock Calc. Ss.			100	96	90	82	75	55	42	29	18	40	18	43	27	11	5.5	2.11											A-2-6(0)	
34.400	LHS	700-1000	X65434		R. Br. Sty s		100	86	67	67	62	62	61	60	58	12	18	63	19	-	NP	0.0	1.70	10.1	1890	10.1	0.0	54	42	31	27	22	G6	A-3(0)	
34.600	RHS	20-155	X65435		O. Br. Cr. Rock Qtzte. Ss.			100	92	75	53	43	28	22	15	7	50	20	31	18	4	2.5	2.56											A-1-a(0)	
34.600	RHS	155-385	X65436		Ol. Br. silt. cly Grav & Cr. Rock Calc. Ss.			100	97	90	78	73	57	43	28	15	45	20	35	24	5	2.5	2.14												A-1-a(0)
34.600	RHS	385-470	X65437		Lt. Y. Br. Sty s (With. Calc. Ss.)						100	99	95	92	86	23	22	54	25	-	SP	0.5	0.99	11.6	1978	11.6	0.1	32	25	19	17	15	G7	A-2-4(0)	
34.800	LHS	20-160	X65447		O. Br. Cr. Rock qith Qtzte. Ss.				100	95	86	67	40	31	20	9	52	18	29	-	SP	0.5	2.40	6.4	2188	6.4	0.0	100	57	32	30	28	G6	A-1-a(0)	
34.800	LHS	160-430	X65448		Ol. Br. sp Wh. slightly cly Grav with Cr. Rock with Calc. Ss.				100	96	91	85	70	59	47	19	34	34	31	-	SP	0.5	1.76											A-1-b(0)	
34.800	LHS	430-1000	X65449		R. Br. Sty s with Roots									100	99	42	20	38	42	-	NP	0.0	0.59	11.4	1934	11.4	0.0	71	62	48	38	27	G8	A-4(3)	
35.000	RHS	30-180	X65450		O. Br. Cr. Rock Qtzte. Ss.				100	86	67	49	29	22	14	7	50	17	33	-	SP	0.5	2.57	5.3	2239	5.2	0.0	96	72	33	30	27	G6	A-1-a(0)	
35.000	RHS	180-290	X65451		Ol. Br. silt. cly Grav & Cr. Rock Calc. Ss.				100	99	94	89	76	67	56	17	30	44	25	-	SP	0.5	1.60											A-2-4(0)	
35.000	RHS	400-1000	X65452		O. Br. Streaked Wh. Sty Cl with Calc.						100	99	99	98	28	14	58	28	20	5	2.5	0.75	12.0	1857	12.1	1.6	5	4	2	1	1	N/A	A-2-4(0)		
35.400	RHS	200-370	X65444		Ol. Br. silt. cly Grav & Cr. Rock Calc. Ss.			100	90	84	78	68	57	50	41	16	29	39	32	20	4	2.0	1.93	9.7	2193	9.7	0.0	56	55	54	50	46	G5	A-1-b(0)	
35.400	RHS	370-700	X65445		Dk. Br. Sty s with Calc. Ss.						100	99	98	97	95	19	14	66	20	-	NP	0.0	0.89											A-2-4(0)	
35.400	RHS	700-1000	X65446		Dk. O. Br. Sty s with Roots & Calc.	100	91	91	89	87	86	84	79	76	72	22	20	51	29	-	SP	0.5	1.30	9.9	2084	9.9	0.1	46	39	27	17	8	G7	A-2-4(0)	
35.600	LHS	20-165	X65477		O. Br. Cr. Rock Qtzte. Ss.				100	89	80	65	41	32	21	9	50	22	28	20	6	3.0	2.38	6.2	2262	6.1	0.0	157	102	56	43	29	G5	A-1-a(0)	
35.600	LHS	165-300	X65478		Ol. Br. silt. cly Grav & Cr. Rock Calc. Ss.			100	98	93	84	74	55	42	28	15	42	21	36	26	10	4.5	2.15											A-2-4(0)	
35.600	LHS	300-520	X65479		Lt. Y. Br. Sty s with Calrete				100	95	95	91	85	82	73	26	25	44	31	22	8	4.5	1.20	13.1	1901	13.2	0.1	38	21	11	11	10	G8	A-2-4(0)	
35.800	RHS	20-170	X65474		O. Br. Cr. Rock Qtzte. Ss.			100	85	77	71	65	47	35	24	13	40	21	38	27	12	6.0	2.28											A-2-6(0)	
35.800	RHS	430-700	X65476		Lt. Y. Br. Sty s with Calc.					100	97	95	88	83	72	22	25	49	26	-	SP	0.5	1.23											A-2-4(0)	



MR 473

Testpit

M1 -1

SAMPLE DATA

SUMMARY OF TEST RESULTS

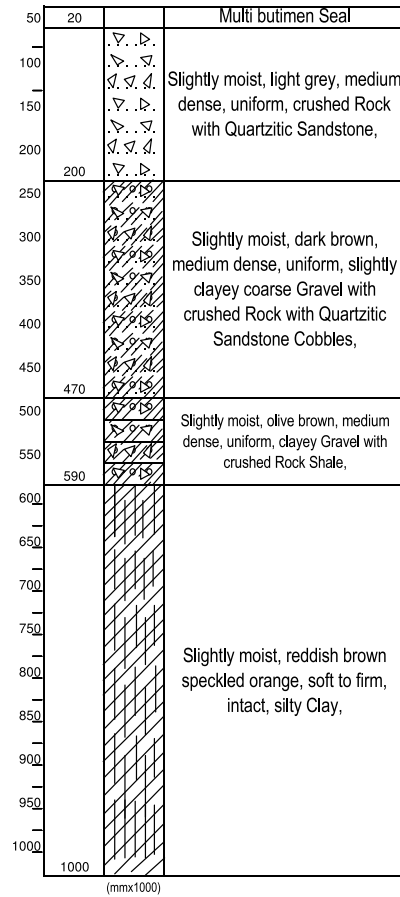
km DISTANCE	OFFSET	DEPTH	SAMPLE NO.	% MOISTURE CONTENT	DESCRIPTION	SIEVE ANALYSIS ( % PASSING ) mm										SOIL MORTAR ANALYSIS			ATTERBERG CONSTANTS			GM	MODIFIED AASHO		CBR		CBR / UCS					CLASSIFICATION			
						75.0	63.0	53.0	37.5	26.5	19.0	13.2	4.75	2.00	0.425	0.075	CS	FS	Mat. 0.075	LL	PI		LS ( % )	OMC	MDD	COMP MOIST	SWELL	100	98	95	93	90	TRH14 / 2001	TRB	
36.000	LHS	20-170	X65471		O. Br. Cr. Rock Qtzte. Ss.				100	92	87	73	43	35	22	8	56	21	23	19	8	3.5	2.35												A-2-4(0)
36.000	LHS	300-540	X65472		Lt. Y. Br. Sty s with Calc.			100	97	95	94	93	88	85	76	20	24	53	23	-	SP	0.5	1.20	10.9	2016	10.9	0.1	41	32	22	16	10	G7	A-2-4(0)	
36.000	LHS	640-1000	X65473		Dk. Br. Sty Cl with occasional Qtzte. Ss. peb			100	98	98	96	95	93	92	90	35	10	52	38	21	6	3.0	0.83	11.7	1934	11.7	1.7	5	3	2	1	1	N/A	A-2-4(0)	
36.400	LHS	30-220	X65492		O. Br. Cr. Rock Qtzte. Ss.				100	85	69	60	44	37	28	8	43	36	21	-	NP	0.0	2.27												A-1-a(0)
36.400	LHS	220-355	X65493		Dk. O. Br. Cr. Rock Qtzte. Ss. (Oversized) & s	100	88	88	85	82	77	72	59	53	46	12	32	46	22	-	NP	0.0	1.89												A-1-b(0)
36.400	LHS	600-1000	X65494		Lt. Br. Sty s				100	93	92	90	86	85	83	15	15	66	17	-	NP	0.0	1.17	10.0	1801	10.1	0.0	35	28	21	18	14	G7	A-3(0)	
36.600	LHS	20-180	X65489		O. Br. Cr. Rock Qtzte. Ss.				100	93	82	68	50	43	34	10	36	41	24	-	SP	0.5	2.13	6.2	2197	6.1	0.1	147	140	108	73	41	G5	A-1-b(0)	
36.600	LHS	180-380	X65490		Dk. O. Br. Cr. Rock Qtzte. Ss. (Oversized) & s			100	95	85	79	69	50	45	38	12	34	40	26	-	NP	0.0	2.05	5.6	2132	5.5	0.0	132	99	66	53	37	G5	A-1-b(0)	
36.600	LHS	380-680	X65491		Lt. Br. sp Wh. Sty s with Calc. & occasional Ss. & peb				100	99	97	93	88	86	82	17	18	63	20	-	NP	0.0	1.15												A-2-4(0)
36.800	LHS	20-200	X65486		O. Br. Cr. Rock Qtzte. Ss.			100	99	85	75	61	43	37	30	9	38	39	23	-	SP	0.5	2.25												A-1-a(0)
36.800	LHS	200-350	X65487		Dk. O. Br. Cr. Rock Qtzte. Ss. (Oversized)	100	95	91	86	81	76	69	53	48	42	11	35	43	23	-	NP	0.0	1.99	7.6	2111	7.6	0.0	175	129	80	48	22	G5	A-1-b(0)	
36.800	LHS	350-640	X65488		Y. Br. Banded O. & Ol. Br. Sty s & Qtzte. Ss. peb with B&s of Calc.		100	91	87	84	80	77	67	62	53	16	35	39	26	19	8	3.0	1.69	9.0	2138	9.1	0.0	44	42	40	39	36	G6	A-2-4(0)	
37.000	RHS	20-180	X65483		O. Br. Cr. Rock Qtzte. Ss. & s			100	95	88	78	66	48	40	31	9	40	38	23	-	NP	0.0	2.20	6.8	2151	6.8	0.0	151	133	108	82	54	G5	A-1-b(0)	
37.000	RHS	180-290	X65484		Dk. O. Br. Cr. Rock Qtzte. Ss. & s			100	91	83	72	66	53	46	38	10	41	38	21	-	NP	0.0	2.07												A-1-b(0)
37.000	RHS	600-1000	X65485		Lt. Br. Sty s						100	99	98	98	96	9	12	78	10	-	NP	0.0	0.97												A-3(0)
37.260	LHS	20-190	X65495		Lt. O. Br. Cr. Rock Qtzte. Ss.				100	95	85	68	49	40	31	9	39	39	23	-	SP	0.5	2.20	7.2	2173	7.2	0.0	176	158	138	131	121	G5	A-1-b(0)	
37.260	LHS	190-390	X65496		Dk. O. Br. Cr. Rock Qtzte. Ss. (Oversized)			100	98	91	86	77	54	45	36	10	36	42	23	-	NP	0.0	2.09												A-1-b(0)
37.260	LHS	600-1000	X65497		Lt. Y. Br. Sty s									100	99	6	16	78	6	-	NP	0.0	0.95												A-3(0)
37.400	RHS	20-240	X65504		Lt. Y. Br. Cr. Rock Qtzte. Ss.				100	92	78	66	46	39	31	9	38	39	23	-	SP	0.5	2.21	5.7	2196	5.6	0.0	210	163	118	104	85	G5	A-1-b(0)	
37.400	RHS	240-340	X65505		R. Br. Qtzte. Ss. Cr. cob & peb & s	100	90	90	89	86	79	75	61	56	46	14	39	37	25	-	NP	0.0	1.84												A-1-b(0)
37.400	RHS	670-1000	X65506		Lt. Br. Sty s			100	98	95	95	94	93	92	82	20	22	57	21	-	NP	0.0	1.07	12.2	1907	12.2	0.1	4	4	3	3	2	N/A	A-2-4(0)	
37.600	LHS	20-180	X65498		O. Br. Cr. Rock Qtzte. Ss.			100	98	87	68	57	39	33	26	8	38	39	23	-	NP	0.0	2.33												A-1-a(0)
37.600	LHS	180-350	X65499		R. Br. Sty s with Qtzte. Ss. peb & cob				100	95	83	70	43	35	21	8	58	20	22	18	6	3.0	2.36	6.9	2175	6.1	0.0	156	129	78	41	16	G4	A-1-a(0)	
37.600	LHS	350-1000	X65500		Lt. Y. Br. Sty s						100	99	98	98	96	19	14	67	19	-	NP	0.0	0.87	11.2	1824	11.2	0.1	63	53	43	39	34	G7	A-2-4(0)	
37.800	RHS	20-250	X65501		R. Br. Qtzte. Ss. peb & s			100	91	78	65	53	36	29	24	11	28	36	36	23	8	4.0	2.37	5.5	2233	5.4	0.0	69	62	53	32	14	G5	A-2-4(0)	
37.800	RHS	400-550	X65502		O. Br. Sty s with Qtzte. Ss. cob			90	84	82	75	68	53	48	40	11	43	34	23	-	SP	0.0	2.01	6.3	2110	6.2	0.0	112	91	73	70	66	G5	A-1-b(0)	
37.800	RHS	550-700	X65503		Lt. Br. Sty s with Qtzte. Ss. cob & peb			100	98	95	86	80	65	58	47	19	35	32	33	26	9	4.5	1.76												A-2-4(0)



## TEST PIT LOGS / TOETSPUT PROFIELE

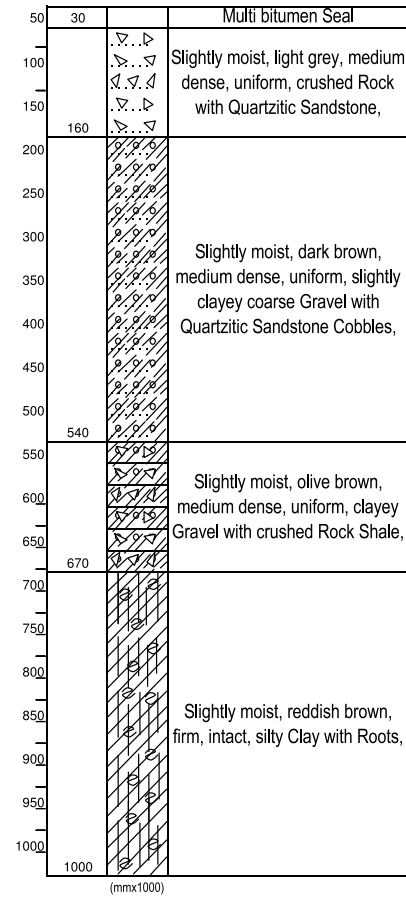
MR 473

Trenches



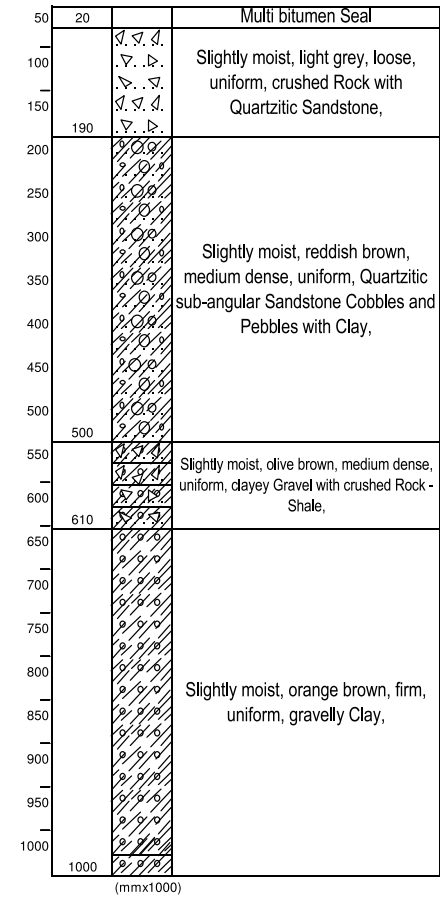
**Co-ordinates:** Diameter is 1.2 x 0.8  
CH: 12+700 RHS

**Remarks :** 1. Excavation stopped.  
2. Rutting at 5mm.



**Co-ordinates:** Diameter is 2.5 x 0.8  
CH: 14 + 000 RHS

**Remarks :** 1. Excavation stopped.  
2. Rutting at 10mm.  
3. Longitudinal Cracks.  
4. Pumping.  
5. Crocodile Cracks.



**Co-ordinates:** Diameter is 2.5 x 0.6  
CH: 15 + 000 RHS

**Remarks :** 1. Excavation stopped  
2. Rutting @ 10mm

KILOMETER DISTANCE  
KILOMETER AFSTAND

DISTANCE TO CENTRELINE  
AFSTAND NA MIDDELLYN

BORROW PIT No.  
LEENGROEF Nr. TP50.56&197

ROUTE  
ROETE

MR 473

SECTION  
SEKSE

DESCRIPTION  
BESKRYWING

Addo to Paterson

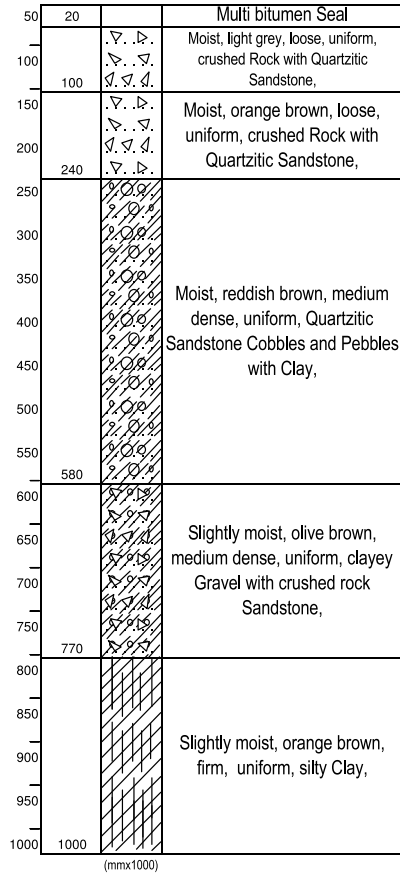
PAGE NO.  
BLADSY NO.

1

## TEST PIT LOGS / TOETSPUT PROFIELE

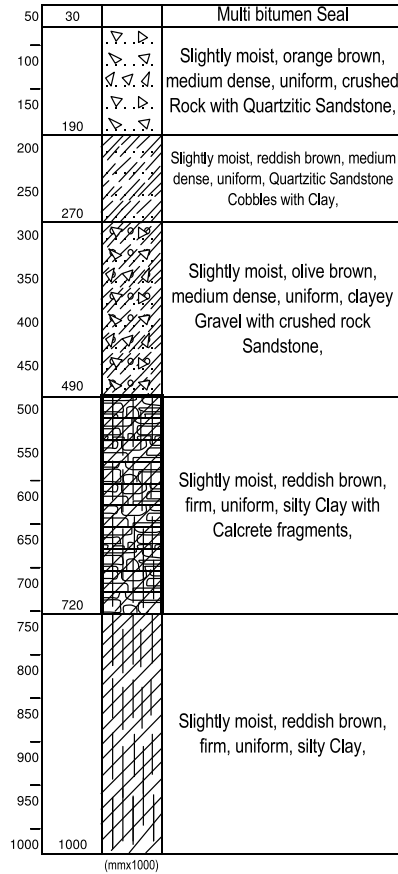
MR 473

Trenches



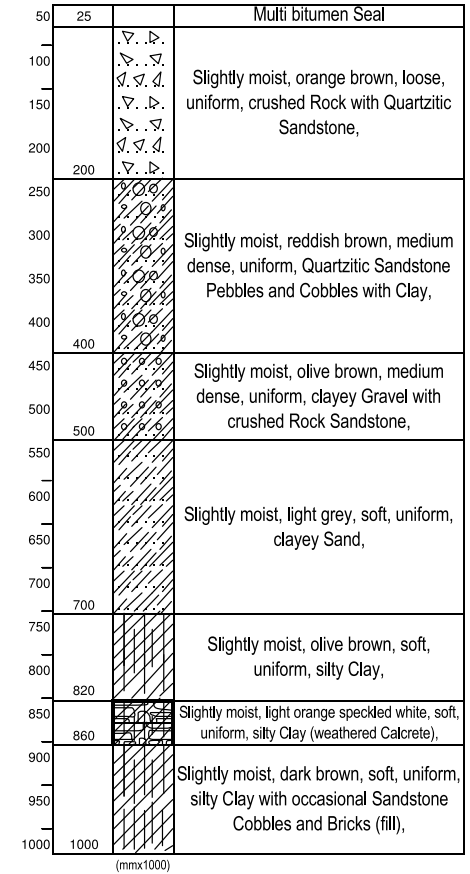
Co-ordinates: Diameter is 1.2 x 0.8  
CH: 23 + 100 LHS

Remarks :  
1. Excavation stopped  
2. Rutting @ 10mm  
3. Crocodile Cracks



Co-ordinates: Diameter is 1.2 x 0.8  
CH: 25 + 100 RHS

Remarks :  
1. Excavation stopped  
2. Rutting @ 2mm



Co-ordinates: Diameter is 1.2 x 0.8  
CH: 26 + 400 LHS

Remarks :  
1. Excavation stopped  
2. Rutting @ 10mm

KILOMETER DISTANCE  
KILOMETER AFSTAND

DISTANCE TO CENTRELINE  
AFSTAND NA MIDDELLYN

BORROW PIT No.  
LEENGROEF Nr. TP123.132&139

ROUTE  
ROETE MR 473

SECTION  
SEKSI

DESCRIPTION  
BESKRYWING

Addo to Paterson

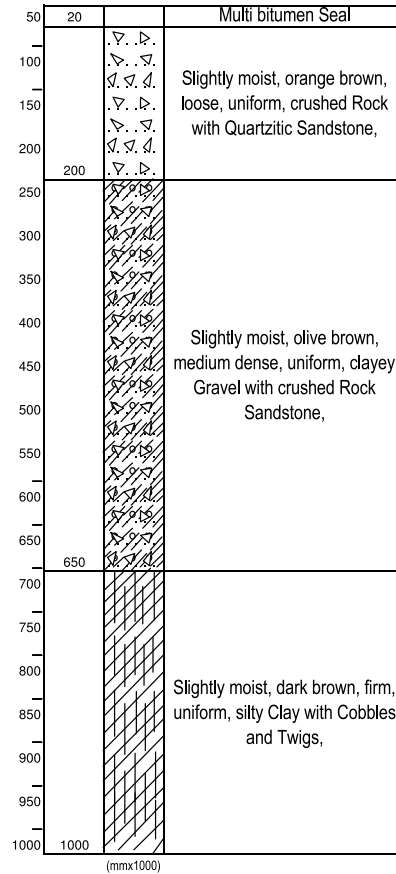
PAGE NO.  
BLADSY NO.

2

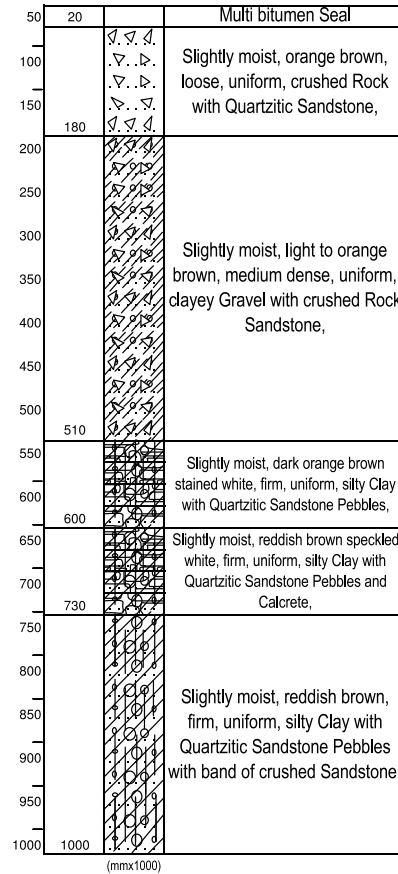
TEST PIT LOGS / TOETSPUT PROFIELE

MR 473

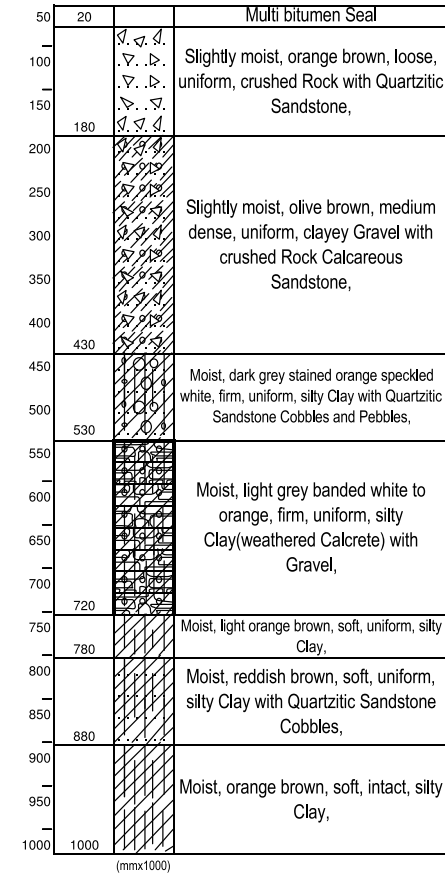
Trenches



Co-ordinates: Diameter is 1.2 x 0.8  
CH: 27 + 600 RHS  
Remarks : 1. Excavation stopped



Co-ordinates: Diameter is 1.2 x 0.8  
CH: 28 + 900 RHS  
Remarks : 1. Excavation stopped



Co-ordinates: Diameter is 1.2 x 0.8  
CH: 29 + 400 LHS  
Remarks : 1. Excavation stopped  
2. Rutting @ 25mm

KILOMETER DISTANCE  
KILOMETER AFSTAND

DISTANCE TO CENTRELINE  
AFSTAND NA MIDDELLYN

BORROW PIT No.  
LEENGROEF Nr. TP145,151&154

ROUTE  
ROETE MR 473

SECTION  
SEKSIE

DESCRIPTION  
BESKRYWING

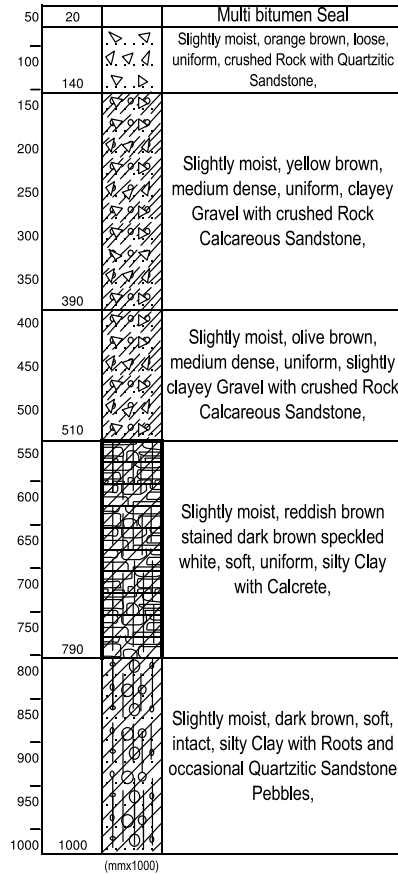
Addo to Paterson

PAGE NO.  
BLADSY NO. 3

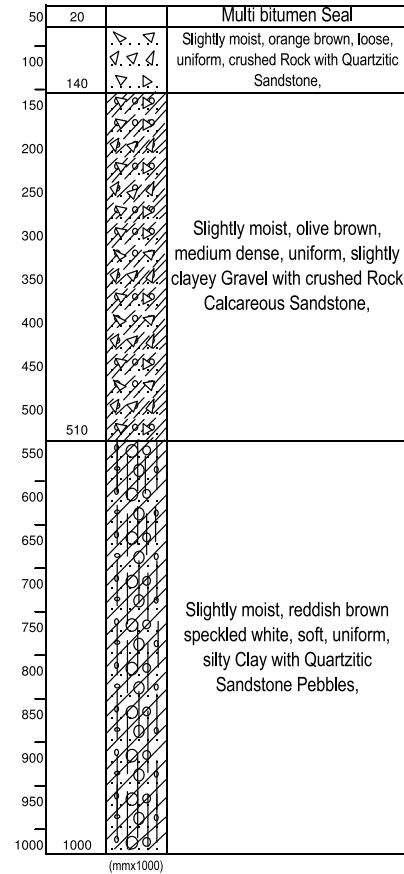
TEST PIT LOGS / TOETSPUT PROFIELE

MR 473

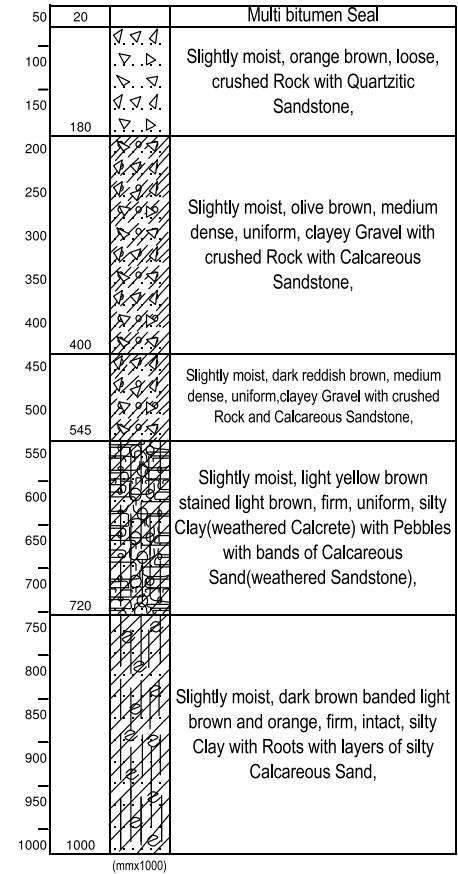
Trenches



**Co-ordinates:** Diameter is 1,2 x 0,8  
CH: 31+000 RHS  
**Remarks :**  
1. Excavation stopped  
2. Rutting @ 10mm



**Co-ordinates:** Diameter is 2,5 x 0,6  
CH: 31 + 400 LHS  
**Remarks :**  
1. Excavation stopped  
2. Rutting @ 20mm

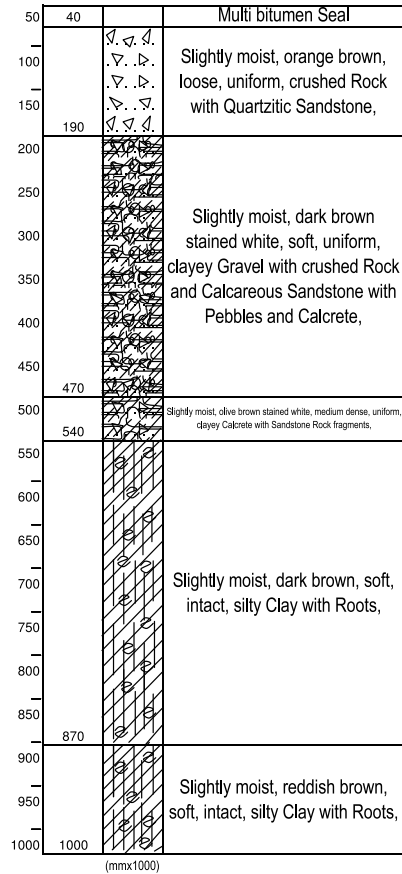


**Co-ordinates:** Diameter is 2,5 x 0,6  
CH: 32 + 800 RHS  
**Remarks :**  
1. Excavation stopped  
2. Rutting @ 20mm

TEST PIT LOGS / TOETSPUT PROFIELE

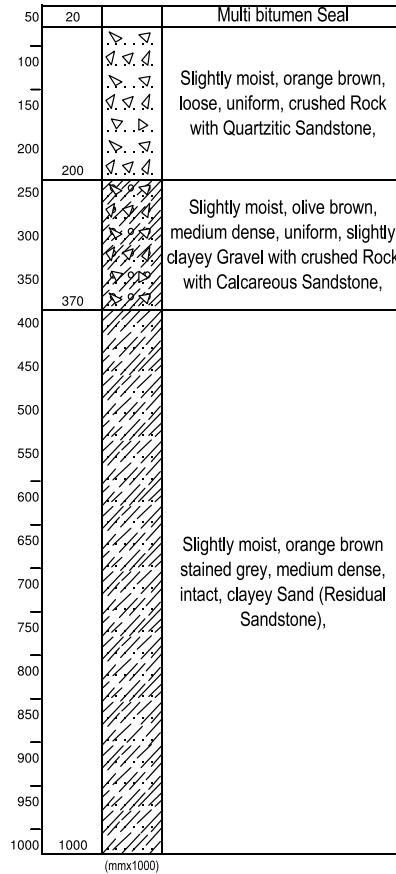
MR 473

Trenches



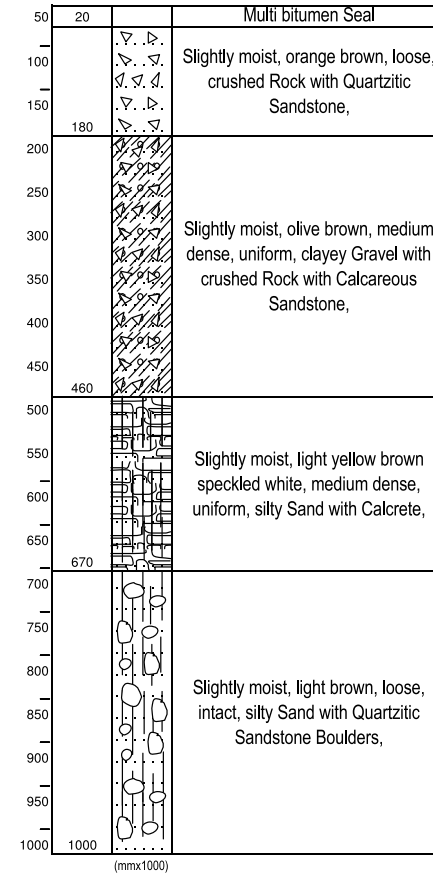
**Co-ordinates:** Diameter is 2,5 x 0,8  
CH: 34 + 100 RHS

**Remarks :**  
1. Excavation stopped  
2. Rutting @ 20mm



**Co-ordinates:** Diameter is 2,5 x 0,8  
CH: 35 + 100 LHS

**Remarks :**  
1. Excavation stopped  
2. Rutting



**Co-ordinates:** Diameter is 2,5 x 0,8  
CH: 36 + 200 RHS

**Remarks :**  
1. Excavation stopped

KILOMETER DISTANCE  
KILOMETER AFSTAND

DISTANCE TO CENTRELINE  
AFSTAND NA MIDDELLYN

BORROW PIT No.  
LEENGROEF Nr. TP169,174&184

ROUTE  
ROETE

SECTION  
SEKSE

DESCRIPTION  
BESKRYWING

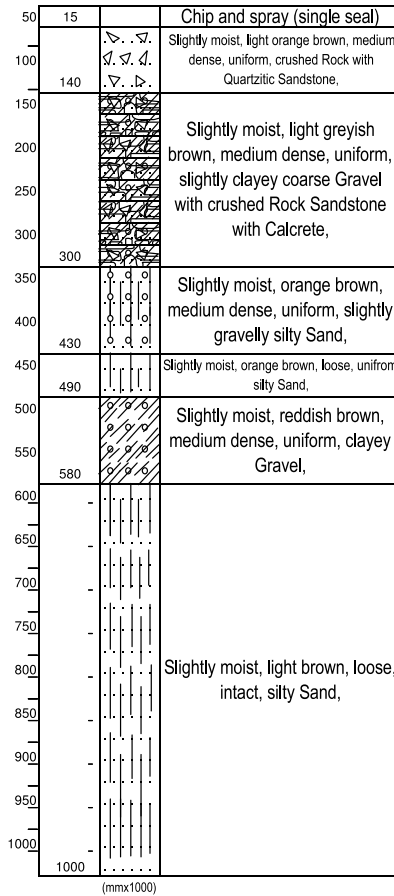
Addo to Paterson

PAGE NO.  
BLADSY NO. 5

TEST PIT LOGS / TOETSPUT PROFIELE

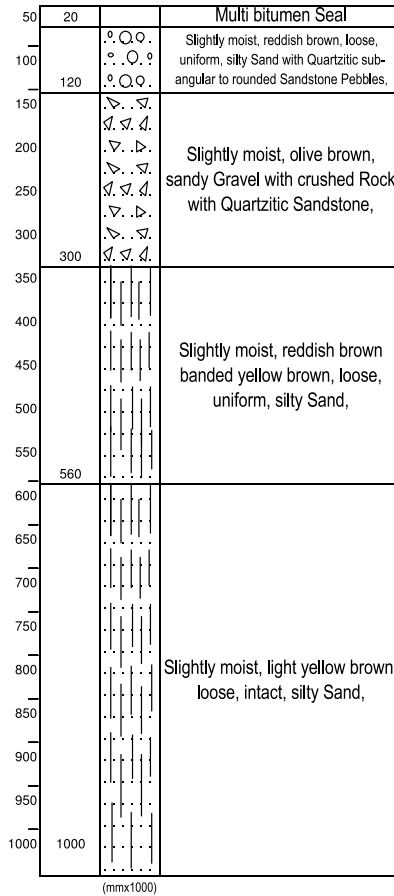
MR 473

Trenches



Co-ordinates: Diameter is 2,5 x 0,8  
CH: 38 + 400 LHS

Remarks : 1. Excavation stopped.  
2. Rutting at 3mm.



Co-ordinates: Diameter is 2,5 x 0,6  
CH: 39+020 RHS

Remarks : 1. Excavation stopped  
2. Rutting @ 20mm

MR 473

Trench

SURFACE



SURFACE



SURFACE



TESTPIT



TESTPIT



TESTPIT



(mmx1000)

Co-ordinates: CH: 12.700  
RHS

Remarks :

(mmx1000)

Co-ordinates: CH: 14.000  
LHS

Remarks :

(mmx1000)

Co-ordinates: CH: 15.000  
RHS

Remarks :



SURFACE



SURFACE



SURFACE



TESTPIT



TESTPIT



TESTPIT



(mmx1000)  
**Co-ordinates:** CH: 23.000  
LHS  
**Remarks :**

(mmx1000)  
**Co-ordinates:** CH: 25.100  
RHS  
**Remarks :**

(mmx1000)  
**Co-ordinates:** CH: 26 + 400  
LHS  
**Remarks :**



MR 473			TEST PIT LOGS / TOETSPUT PROFIELE			Trench		
<div>SURFACE</div> <div></div>			<div>SURFACE</div> <div></div>			<div>SURFACE</div> <div></div>		
<div>TESTPIT</div> <div></div>			<div>TESTPIT</div> <div></div>			<div>TESTPIT</div> <div></div>		
<div>(mmx1000) Co-ordinates: CH: 27+600 LHS Remarks :</div>			<div>(mmx1000) Co-ordinates: CH: 28+900 RHS Remarks :</div>			<div>(mmx1000) Co-ordinates: CH: 29 + 400 LHS Remarks :</div>		
KILOMETER DISTANCE KILOMETER AFSTAND			DISTANCE TO CENTRELINE AFSTAND NA MIDDELYN			BORROW PIT No. LEENGOEF No. TP145,151&154		
ROUTE ROETE			SECTION SEKSE			PAGE NO. BLADSY NO. 3		
MR 473			Addo to Paterson					

SURFACE



SURFACE



SURFACE



TESTPIT



TESTPIT



TESTPIT



(mmx1000)  
**Co-ordinates:** CH: 31+000  
 LHS  
**Remarks :**

(mmx1000)  
**Co-ordinates:** CH: 31+400  
 LHS  
**Remarks :**

(mmx1000)  
**Co-ordinates:** CH: 32.800  
 RHS  
**Remarks :**



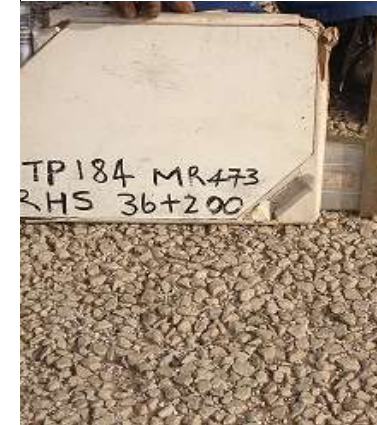
SURFACE



SURFACE



SURFACE



TESTPIT



(mmx1000)  
**Co-ordinates:** CH: 34.200  
RHS  
**Remarks :**

TESTPIT



(mmx1000)  
**Co-ordinates:** CH: 35.100  
LHS  
**Remarks :**

TESTPIT



(mmx1000)  
**Co-ordinates:** CH: 36.200  
RHS  
**Remarks :**

SURFACE



SURFACE



TESTPIT



(mmx1000)  
**Co-ordinates:** CH: 38.400  
LHS  
**Remarks :**

TESTPIT



(mmx1000)  
**Co-ordinates:** CH: 39.020  
RHS  
**Remarks :**

## MR 473

## M1 -Trenches

### SAMPLE DATA

### SUMMARY OF TEST RESULTS

km DISTANCE	OFFSET	DEPTH	SAMPLE NO.	% MOISTURE CONTENT	DESCRIPTION	SIEVE ANALYSIS ( % PASSING ) mm										SOIL MORTAR ANALYSIS			ATTERBERG CONSTANTS			GM	MODIFIED AASHO		CBR		CBR / UCS					CLASSIFICATION		
						75.0	63.0	53.0	37.5	26.5	19.0	13.2	4.75	2.00	0.425	0.075	CS	FS	Mat. 0.075	LL	PI		LS ( % )	OMC	MDD	COMP MOIST	SWELL	100	98	95	93	90	TRH14 / 2001	TRB
12.700	RHS	20-200	X63437		Lt. G. Cr. Rock Qtzte. Ss.			100	98	89	77	60	35	23	14	7	50	17	32	-	NP	0.0	2.56	6.2	2225	6.2	0.0	53	42	30	24	18	G7	A-1-a(0)
12.700	RHS	200-470	X63438		Dk. G. slt.ly cly Coarse Grav with Cr. Rock Qtzte. Ss. cob		100	92	86	78	69	60	44	37	30	16	33	26	42	20	10	5.0	2.17	5.3	2241	5.3	0.4	16	13	10	8	6	G9	A-2-4(0)
12.700	RHS	590-1000	X63439		R. Br. speckled O. Sty cly						100	99	88	80	70	61	15	10	76	35	13	6.5	0.89										A-6(6)	
14.000	RHS	30-160	X63443		Lt. G. Cr. Rock Qtzte. Ss.			100	96	93	84	70	40	25	12	5	64	18	18	-	NP	0.0	2.59	7.3	2142	7.2	0.0	94	59	30	27	23	G6	A-1-a(0)
14.000	RHS	160-540	X63444		Dk. Br. slt. cly Coarse Grav with Qtzte. Ss. cob			100	88	71	60	52	39	33	26	14	34	25	41	-	NP	0.0	2.28	5.0	2221	5.1	0.1	64	54	38	26	15	G6	A-1-a(0)
14.000	RHS	670-1000	X63445		R. Br. Sty cly						100	98	96	94	92	73	7	15	77	38	17	6.5	0.41										A-6(11)	
15.000	RHS	20-180	X63464		Lt. G. Cr. Rock Qtzte. Ss.				100	92	86	72	46	32	20	11	50	17	34	-	SP	0.5	2.37	6.4	2221	6.4	0.0	134	105	73	64	51	G4	A-1-a(0)
15.000	RHS	180-490	X63465		Dk. Br. slt. cly Coarse Grav with Qtzte. Ss. cob		100	91	87	83	80	69	48	40	32	17	31	25	44	24	10	6.0	2.11	7.7	2193	7.7	0.4	14	7	2	2	2	N/A	A-2-4(0)
15.000	RHS	640-1000	X63466		R. Br. slt.ly Gravly Sty cly				100	97	96	95	85	76	69	50	17	18	66	23	10	5.5	1.05											A-4(2)
23.100	LHS	100-240	X65376		O. Br. Cr. Rock Qtzte. Ss.			100	97	84	67	55	33	25	17	6	51	24	25	18	8	4.5	2.52	6.0	2198	6.0	0.0	146	81	37	35	32	G6	A-2-4(0)
23.100	LHS	240-580	X65377		R. Br. Qtzte. Ss. cob & peb with cly			100	81	75	73	62	42	36	29	13	32	31	36	15	4	2.0	2.22											A-1-a(0)
23.100	LHS	580-770	X65378		O. Br. cly Grav & Cr. Rock Ss.		100	93	86	80	75	68	49	39	29	16	35	25	40	25	9	4.5	2.16											A-2-4(0)
25.100	RHS	30-190	X65405		O. Br. Cr. Rock Qtzte. Ss.				100	93	79	61	37	30	21	8	52	20	28	18	8	3.5	2.41	5.8	2236	5.7	0.0	104	95	85	83	79	G5	A-2-4(0)
25.100	RHS	490-720	X65406		R. Br. Sty cly & Calc. Fragments		100	89	81	75	73	69	58	51	44	28	21	25	54	29	12	6.5	1.77	10.6	2062	10.6	0.1	17	16	16	15	14	G7	A-2-6(0)
25.100	RHS	720-1000	X65407		R. Br. Sty cly						100	99	97	95	92	59	8	30	62	20	10	5.5	0.55										A-4(2)	
26.400	LHS	25-200	X64863		O. Br. Cr. Rock Qtzte. Ss.				100	90	77	65	44	36	25	10	51	21	28	18	8	4.0	2.29											A-2-4(0)
26.400	LHS	860-1000	X64865		Dk. Br. Sty cly with occasional Ss. cob & Bricks					100	99	95	93	91	88	60	9	25	66	29	14	7.0	0.61											A-6(5)
27.600	RHS	20-200	X64887		O. Br. Cr. Rock Qtzte. Ss.				100	94	80	67	48	41	26	9	59	20	22	-	NP	0.0	2.24											A-1-a(0)
27.600	RHS	200-650	X64888		O. Br. cly Grav & Cr. Rock Ss.		100	93	82	79	77	70	52	41	28	16	43	19	38	32	16	8.0	2.15											A-2-6(0)
27.600	RHS	650-1000	X64889		Dk. Br. Sty cly with cob & Twigs				100	99	99	98	93	91	89	33	20	43	36	23	11	5.5	0.87											A-2-6(0)
28.900	RHS	20-180	X64899		O. Br. Cr. Rock Qtzte. Ss.			100	98	87	79	65	41	33	22	9	52	20	29	19	8	4.0	2.36	6.1	2219	6.1	0.0	185	111	56	40	24	G4	A-4(2)
28.900	RHS	180-510	X64900		Lt. to O. Br. cly Grav & Cr. Rock Ss.				100	91	82	76	56	43	30	19	39	17	44	17	16	6.0	2.08											A-2-4(0)
28.900	RHS	730-1000	X64901		R. Br. Sty cly with Qtzte. Ss. peb & B& of Cr. Ss.				100	97	96	96	93	91	87	54	11	28	60	23	10	5.0	0.68											A-2-6(0)
29.400	LHS	20-180	X64911		O. Br. Cr. Rock Qtzte. Ss.			100	98	89	69	60	42	34	19	7	59	20	20	-	SP	0.5	2.40	5.1	2243	5.0	0.0	130	104	75	64	50	G4	G-4(2)
29.400	LHS	180-430	X64912		O. Br. cly Grav & Cr. Rock Calc. Ss.		100	85	77	67	56	51	33	25	17	9	42	21	37	25	8	4.0	2.49	8.3	2252	8.3	0.0	109	66	33	30	26	G6	A-1-a(0)
29.400	LHS	430-530	X64913		Dk. G. Stained O. speckled W. Sty cly with Qtzte. Ss. cob & peb			100	89	86	85	77	61	56	49	32	22	20	58	28	16	8.0	1.63											A-2-4(0)
31.000	RHS	20-140	X64935		O. Br. Cr. Rock Qtzte. Ss.				100	92	71	59	40	32	20	7	54	23	22	-	SP	0.5	2.41	5.4	2275	5.3	0.0	209	155	100	78	54	G4	A-1-a(0)
31.000	RHS	510-790	X64936		R. Br. Stained dk. Br. speckled W. Sty cly with Calc.				100	98	97	97	93	91	87	53	14	27	59	27	13	6.0	0.69											A-6(4)

## MR 473

## M1 -Trenches

### SAMPLE DATA

### SUMMARY OF TEST RESULTS

km DISTANCE	OFFSET	DEPTH	SAMPLE NO.	% MOISTURE CONTENT	DESCRIPTION	SIEVE ANALYSIS ( % PASSING ) mm										SOIL MORTAR ANALYSIS			ATTERBERG CONSTANTS			GM	MODIFIED AASHO		CBR		CBR / UCS					CLASSIFICATION		
						75.0	63.0	53.0	37.5	26.5	19.0	13.2	4.75	2.00	0.425	0.075	CS	FS	Mat. 0.075	LL	PI		LS ( % )	OMC	MDD	COMP MOIST	SWELL	100	98	95	93	90	TRH14 / 2001	TRB
31.000	RHS	790-1000	X64937		Dk. Br. Sty cly with Roots & occasional Qtzte. Ss. peb				100	96	93	93	89	87	83	47	17	30	54	25	11	5.5	0.83	13.6	1884	13.7	2.3	5	4	3	3	3	N/A	A-6(2)
31.400	LHS	20-140	X65426		O. Br. Cr. Rock Qtzte. Ss.				100	92	76	61	37	28	17	8	56	18	27	19	5	3.0	2.48	7.1	2221	7.1	0.0	109	77	49	44	37	G5	A-1-a(0)
31.400	LHS	140-510	X65427		O. Br. Slt.ily cly Grav & Cr. Rock Calc. Ss.			100	85	72	60	53	38	28	20	11	38	23	39	29	12	6.0	2.41											A-2-6(0)
31.400	LHS	510-1000	X65428		R. Br. speckled W. Sty cly with Qtzte. Ss. peb			100	95	92	92	92	90	88	85	48	15	29	54	26	13	6.0	0.79	14.8	1830	14.9	2.3	3	1	1	1	1	N/A	A-6(3)
32.800	RHS	20-120	X65465		R. Br. Sty S& with Qtzte. Sub-Angular to rounded peb			100	96	85	81	61	41	33	21	8	55	21	24	18	6	2.5	2.38											A-1-a(0)
32.800	RHS	120-300	X65466		O. Br. s&y Grav & Cr. Rock Qtzte. Ss.			100	96	85	81	77	59	44	29	16	44	19	37	30	12	6.0	2.11											A-2-6(0)
32.800	RHS	560-1000	X65467		Lt. yellow Br. Sty S& with peb				100	97	94	88	78	74	67	35	21	31	47	25	8	4.5	1.24	11.8	1925	11.8	0.9	3	3	2	2	1	N/A	A-2-4(0)
34.100	RHS	40-190	X65438		O. Br. Cr. Rock Qtzte. Ss.				100	93	79	65	43	34	20	8	56	20	23	18	4	2.0	2.38	6.3	2206	6.3	0.0	149	125	68	28	7	G4	A-1-a(0)
34.100	RHS	470-540	X65439		O. Br. Stained W. cly Calc. & Ss. Rock Fragments				100	98	96	95	90	86	78	57	15	18	66	36	18	9.0	0.79											A-6(7)
34.100	RHS	870-1000	X65440		R. Br. Sty cly with Roots						100	99	98	97	94	56	13	29	58	26	14	7.0	0.53	15.3	1791	15.3	1.6	5	5	4	4	4	N/A	A-6(4)
35.100	LHS	20-200	X65453		O. Br. Cr. Rock Qtzte. Ss.				100	94	79	62	39	32	21	9	54	19	27	-	SP	0.5	2.39											A-1-a(0)
35.100	LHS	200-370	X65454		O. Br. slt.ily cly Grav & Cr. Rock Calc. Ss.		100	96	80	74	67	61	45	35	25	13	40	23	37	23	7	3.5	2.27											A-2-4(0)
35.100	LHS	70-1000	X65455		O. Br. Stained G. cly S& (Residual Ss.)						100	96	94	94	93	21	12	65	23	23	8	4.0	0.92	13.7	1885	13.7	2.2	3	2	1	1	1	N/A	A-2-4(0)
36.200	RHS	20-180	X65480		O. Br. Cr. Rock Qtzte. Ss.			100	94	91	87	79	68	64	51	16	42	32	26	-	NP	0.0	1.69	5.9	2217	5.8	0.0	152	130	101	82	60	G5	A-2-4(0)
36.200	RHS	180-460	X65481		O. Br. cly Grav & Cr. Rock Calc. Ss.		100	95	94	89	84	77	63	48	30	17	48	19	35	26	9	5.0	2.06											A-2-4(0)
36.200	RHS	670-1000	X65482		Lt. Br. Sty S& with Qtzte. Ss. Boulders				100	98	98	97	96	95	93	9	20	71	9	-	NP	0.0	1.03	11.4	1812	11.4	0.0	40	39	36	35	33	G6	A-3(0)
38.400	LHS	15-140	X63425		Lt. O. Br. Cr. Rock Qtzte. Ss.			100	88	77	72	63	42	36	31	13	27	37	37	24	9	4.0	2.20	5.5	2203	5.4	0.1	70	50	29	15	6	G7	A-2-4(0)
38.400	LHS	140-300	X63426		Lt. G.ish Br. slt.ily cly Coarse Grav with Cr. Rock Ss. & Calc.		100	92	86	79	79	73	59	54	46	16	27	44	29	-	NP	0.0	1.84	6.8	2166	6.8	0.0	60	46	26	15	6	G7	A-1-b(0)
38.400	LHS	490-580	X63427		R. Br. cly Grav						100	99	98	95	11	15	74	11	-	NP	0.0	0.96												A-3(0)
39.020	RHS	20-120	X65510		R. Br. Sty S& with Qtzte. Sub-Angular Ss. peb			100	98	90	81	71	52	46	41	13	21	50	29	20	6	3.5	2.00	5.4	2245	5.3	0.1	94	84	57	34	16	G5	A-1-b(0)
39.020	RHS	120-300	X65511		O. Br. S&y Grav & Cr. Rock Qtzte. Ss.			100	98	90	80	71	54	49	41	13	29	44	26	19	9	4.5	1.97											A-2-4(0)
39.020	RHS	560-1000	X65512		Lt. Yellow Br. Sty S&						100	99	98	95	10	17	71	11	-	NP	0.0	0.97	8.7	1771	8.7	0.0	27	20	13	12	12	G8	A-3(0)	

Signed : \_\_\_\_\_

Frederik Eijbers  
Position : General Manager



# DCP Report - Single analysis

Region:  
Project date:

27 June, 2007

Road number:  
Print date:

MR 473  
16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-144	19 July 2007	6 -	27	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN<sub>600</sub>):

355

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Base type:

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Optimum

20mm

25.3

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 150	1.75	102	0.7	2.6	190	1520	617	270 - 1406
151 - 300	1.43	125	0.5	2.1	228	1780	763	335 - 1740
301 - 450	3.47	55	1.4	5.3	84	743	298	130 - 678
451 - 600	6.43	39	3.1	10.5	39	373	155	68 - 353
601 - 800	6.20	34	1.4	8.0	40	389	161	71 - 367

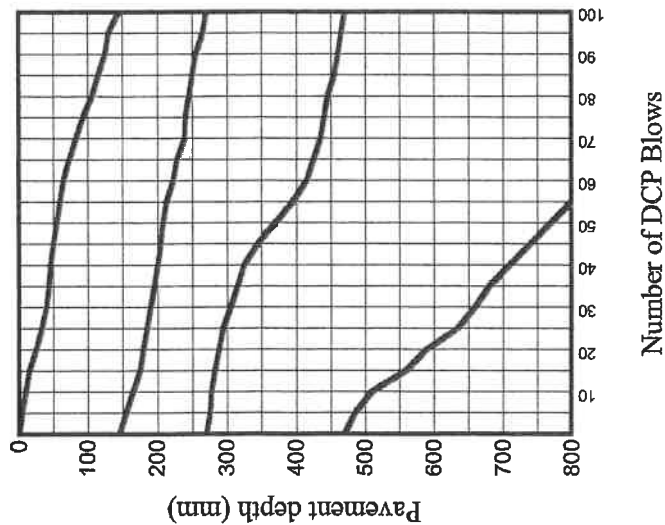
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighted average penetration rate

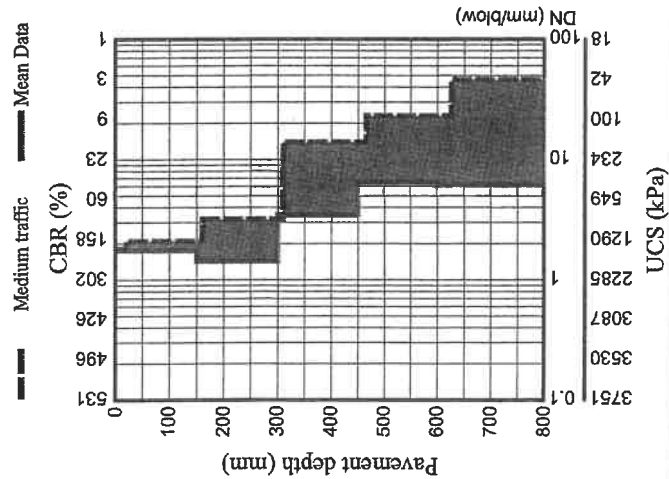
\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)





# DCP Report - Single analysis

Region:

Project date:

27 June, 2007

Road number:

Print date:

MR 473

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-145	19 July 2007	2 -	27.2	Sound	Yes	No	No	No	No	No

Design Structure Number in blows (DSN<sub>800</sub>):

295

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Base type:

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Optimum

20mm  
13.2

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 30	1.00	30	0.0	1.0	300	2270	1116	489 - 2544
31 - 250	2.59	110	1.2	4.2	122	1031	406	178 - 926
251 - 430	2.13	110	1.0	3.4	157	1284	500	219 - 1141
431 - 570	6.46	29	3.8	11.4	38	371	154	67 - 351
571 - 710	15.32	9	2.1	18.0	13	141	62	27 - 140
711 - 800	13.72	7	0.5	14.3	15	160	69	30 - 158

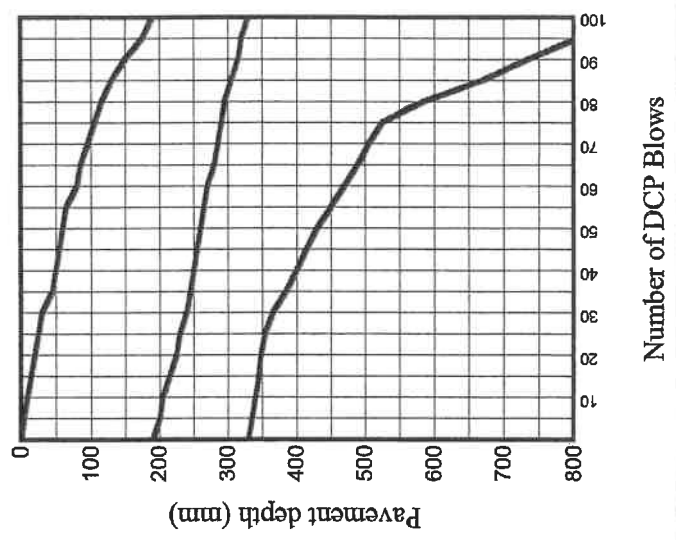
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighted average penetration rate

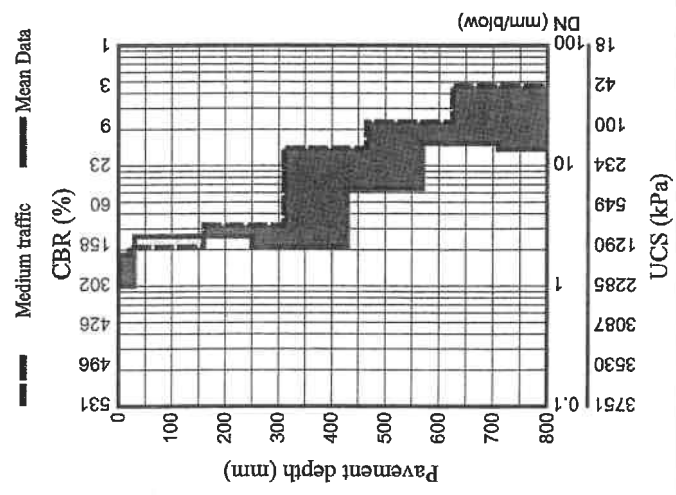
\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)



# DCP Report - Single analysis

Region:

Project date:

27 June, 2007

Road number:

Print date:

MR 473

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-146	19 July 2007	2 -	27.4	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN<sub>900</sub>):

258

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Base type:

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Dry

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 150	3.83	47	1.2	5.4	74	665	268	117 - 611
151 - 300	2.53	71	1.0	3.8	126	1060	417	183 - 951
301 - 450	2.37	84	1.0	3.6	137	1140	447	196 - 1019
451 - 600	7.90	31	3.1	11.9	30	297	124	55 - 284
601 - 800	8.60	23	0.9	9.8	27	270	114	50 - 259

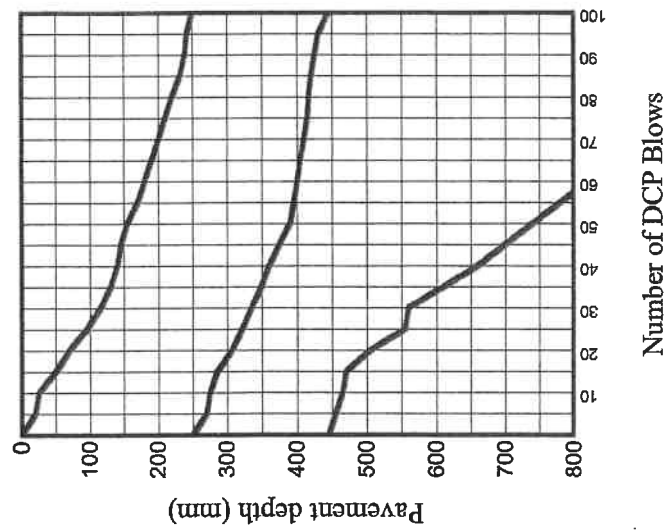
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighed average penetration rate

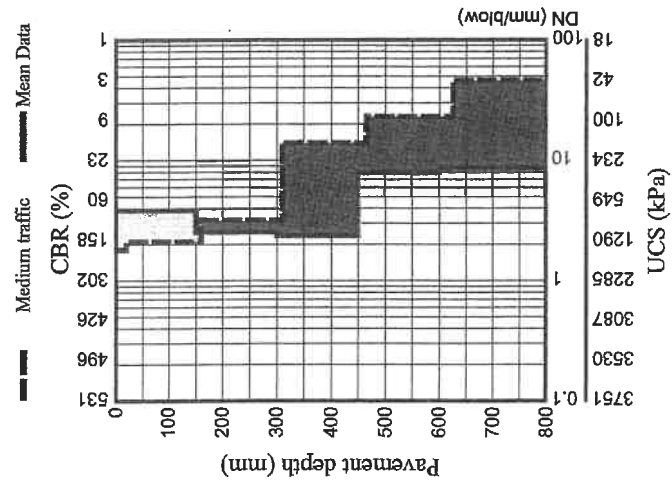
\*\*\* Unconfined Compressive Strength - calculated from weighed average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)



# DCP Report - Single analysis

**Region:**
**Project date:**

2 / June, 2007

**Road number:**

MR 473

**Print date:**

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-147	19 July 2007	2 -	27.6	Sound	No	No	No	No	No	No

**Design Structure Number in blows (DSN<sub>800</sub>):**

335

**Selected Design Traffic:**

Medium traffic

**Rut Limit:**

Road category

B

**Structural capacity (MISA):**

Base type:

Granular

**(MISA = Million Standard Axles, 80 kN)**

Moisture condition of base:

Dry

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 150	1.61	120	1.0	2.9	204	1620	672	294 - 1531
151 - 300	2.32	72	0.7	3.2	141	1165	456	200 - 1040
301 - 450	3.73	42	0.7	4.7	77	685	276	121 - 628
451 - 600	3.27	52	0.9	4.4	91	796	318	139 - 724
601 - 800	5.15	50	2.4	8.2	51	478	196	86 - 447

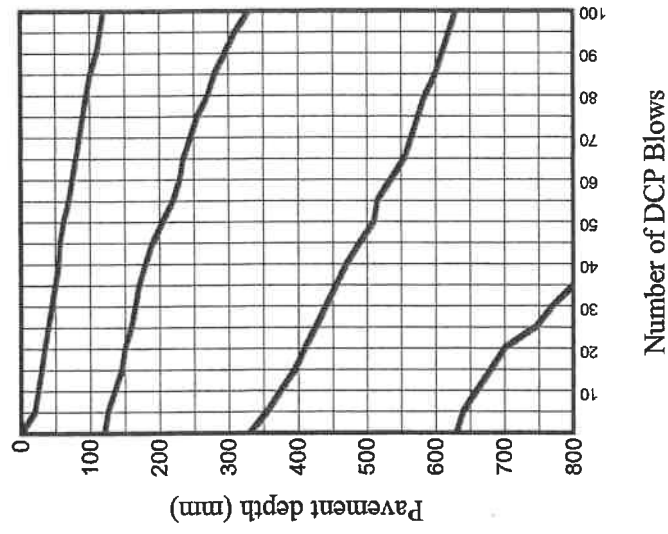
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighed average penetration rate

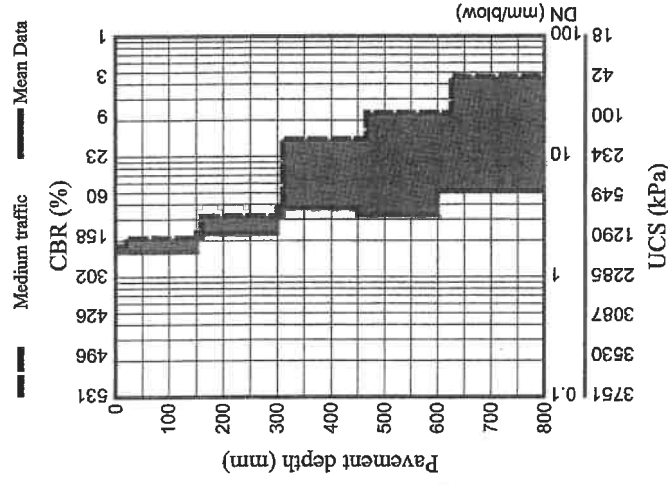
\*\*\* Unconfined Compressive Strength - calculated from weighed average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)





# DCP Report - Single analysis

Region:

Project date:

21 June, 2007

Road number:

MR 473

Print date:

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long Crack	Croc. Crack	Deform	Other
XG5393-148	19 July 2007	2 -	27.8	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN<sub>800</sub>):

149

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Base type:

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Dry

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 150	3.26	63	1.7	5.4	91	796	318	139 - 725
151 - 300	5.27	33	1.8	7.6	50	466	191	84 - 436
301 - 450	6.61	28	3.0	10.5	37	362	150	66 - 343
451 - 600	12.87	13	5.1	19.4	16	172	74	32 - 169
601 - 800	17.70	11	1.6	19.7	11	120	53	23 - 120

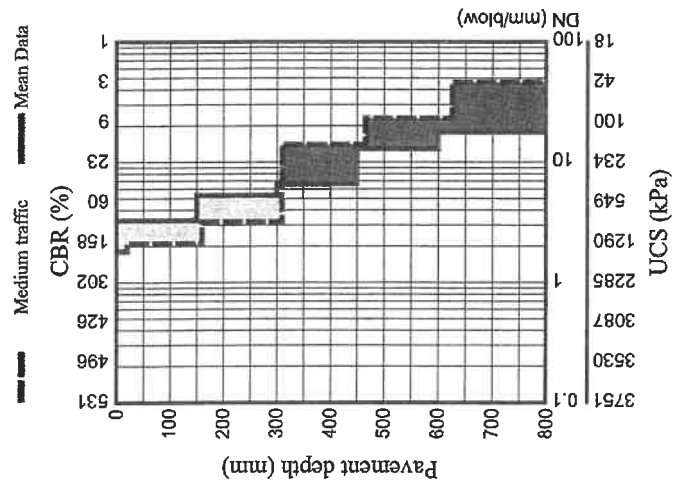
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighted average penetration rate

\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

P = Percentile value in %

### Layer Strength Diagram (LSD)(Existing Structure)





# DCP Report - Single analysis

Region:

Project date:

27 June, 2007

Road number:

Print date:

MR 473

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-149	19 July 2007	7 -	28	Sound	Yes	No	No	No	No	No

Design Structure Number in blows (DSN<sub>600</sub>):

205

Selected Design Traffic:

Heavy traffic

Rut Limit:

Structural capacity (MISA):

(MISA = Million Standard Axles, 80 kN)

Road category

Base type:

Moisture condition of base:

B

Granular

Dry

20mm

7.9

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 30	3.00	15	1.4	4.8	102	875	348	152 - 793
31 - 200	2.39	117	1.7	4.5	136	1129	443	194 - 1010
201 - 460	5.73	54	3.2	9.9	45	425	175	77 - 399
461 - 680	17.00	13	2.6	20.3	11	126	55	24 - 126
681 - 800	21.83	5	0.6	22.5	8	95	42	19 - 96

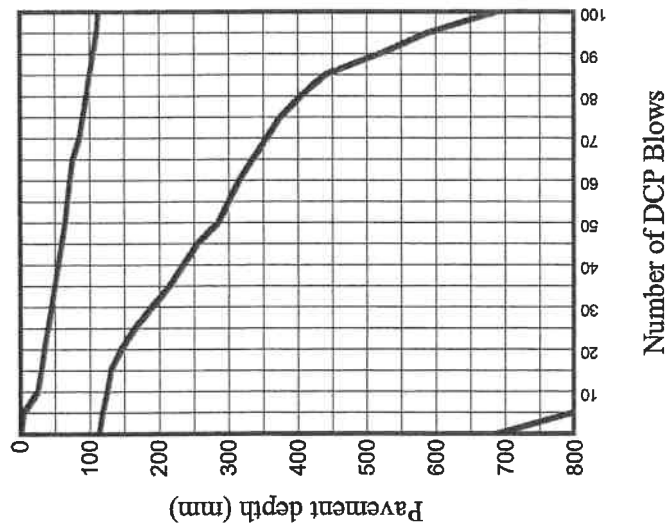
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighted average penetration rate

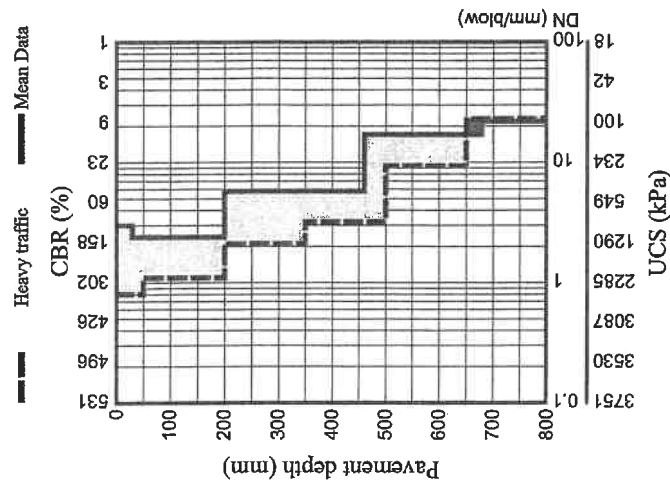
\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)



# DCP Report - Single analysis

Region:

Project date:

4 / June, 2007

Road number:

Print date:

MR 473

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-150	27 June 2007	2 -	28.2	Sound	Yes	No	No	Yes	No	No

Design Structure Number in blows (DSN<sub>800</sub>):

173

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Base type:

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Optimum

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 40	2.50	25	1.5	4.4	128	1073	422	185 - 962
41 - 210	3.79	51	1.2	5.4	75	673	271	119 - 618
211 - 530	5.55	70	2.1	8.2	47	440	181	79 - 413
531 - 710	11.22	17	2.4	14.3	19	200	86	38 - 195
711 - 800	9.00	10	1.6	11.1	25	256	108	47 - 247

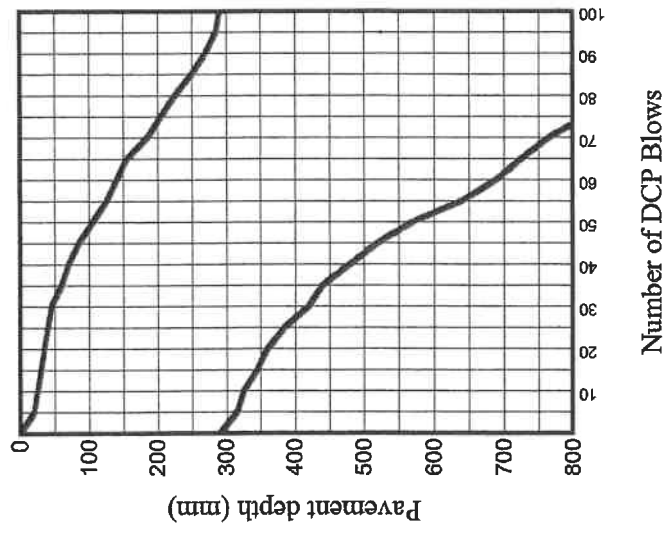
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighted average penetration rate

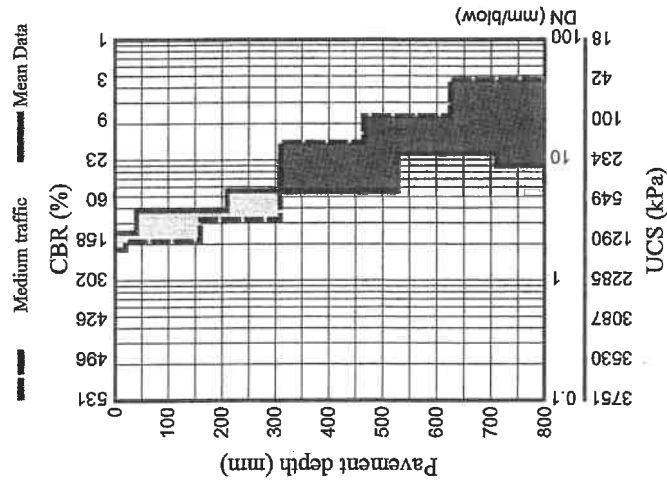
\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)



# DCP Report - Single analysis

Region:

Project date:

27 June, 2007

Road number:

MR 473

Print date:

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-151	19 July 2007	2 -	28.4	Sound	Yes	No	No	No	No	No

Design Structure Number in blows (DSN<sub>600</sub>):

300

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Base type:

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Dry

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 30	2.00	20	1.0	3.3	170	1377	535	234 - 1219
31 - 190	1.66	112	0.6	2.5	199	1584	652	286 - 1487
191 - 530	4.75	103	3.5	9.2	57	524	213	94 - 487
531 - 690	7.19	26	2.8	10.8	33	330	137	60 - 313
691 - 800	4.09	39	2.2	6.9	69	619	250	110 - 570

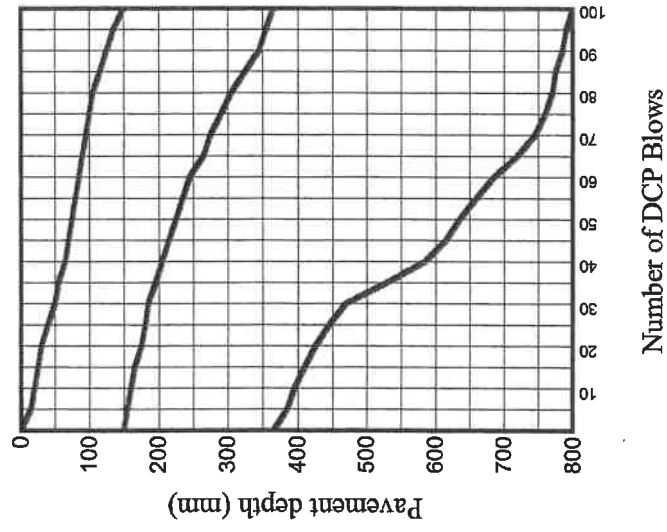
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighted average penetration rate

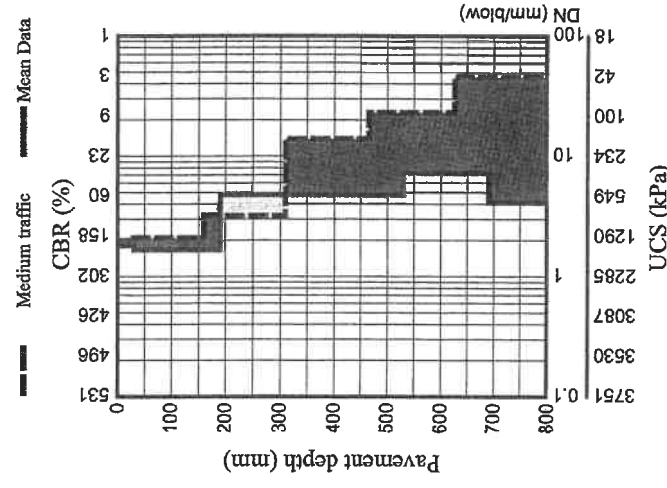
\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)



# DCP Report - Single analysis

Region:

Project date:

27 June, 2007

Road number:

MR 473

Print date:

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-152	19 July 2007	2 -	28.6	Sound	Yes	No	No	No	No	No

Design Structure Number in blows (DSN<sub>800</sub>):

303

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Dry

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 30	2.00	20	1.0	3.3	170	1377	535	234 - 1219
31 - 195	1.67	115	0.6	2.5	198	1576	648	284 - 1477
196 - 520	4.48	98	2.4	7.5	61	560	227	100 - 518
521 - 730	4.90	52	1.5	6.9	54	505	206	90 - 470
731 - 800	5.00	18	2.7	8.5	53	495	202	89 - 461

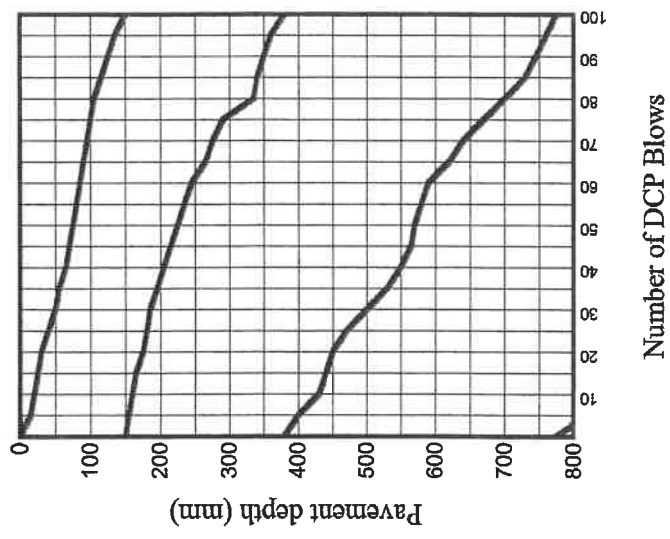
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighted average penetration rate

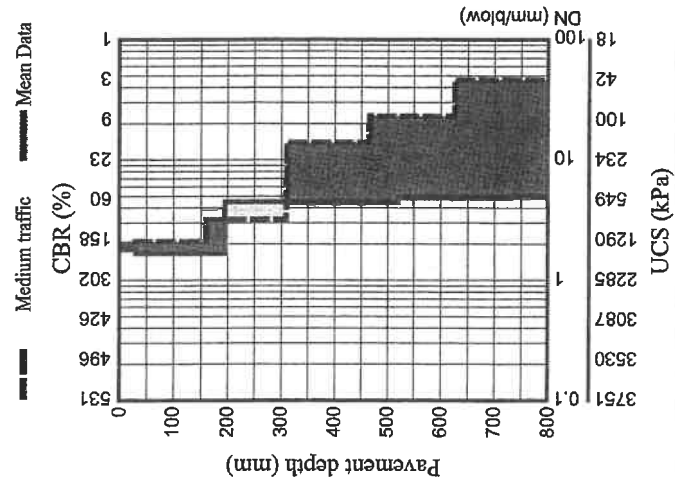
\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)





# DCP Report - Single analysis

Region:

Project date:

21 June, 2007

Road number:

MR 473

Print date:

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-153	19 July 2007	6 -	28.9	Sound	Yes	No	No	No	No	No

Design Structure Number in blows (DSN<sub>800</sub>):

527

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Base type:

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Dry

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 20	1.27	16	0.2	1.5	252	1945	866	380 - 1974
21 - 180	1.52	156	0.9	2.7	216	1698	715	314 - 1631
181 - 510	2.07	202	0.9	3.2	162	1322	514	226 - 1173
511 - 600	3.24	50	2.1	5.9	92	804	321	141 - 731
601 - 730	2.73	54	0.7	3.7	115	974	385	169 - 877
731 - 800	2.34	32	0.6	3.1	139	1157	453	199 - 1033

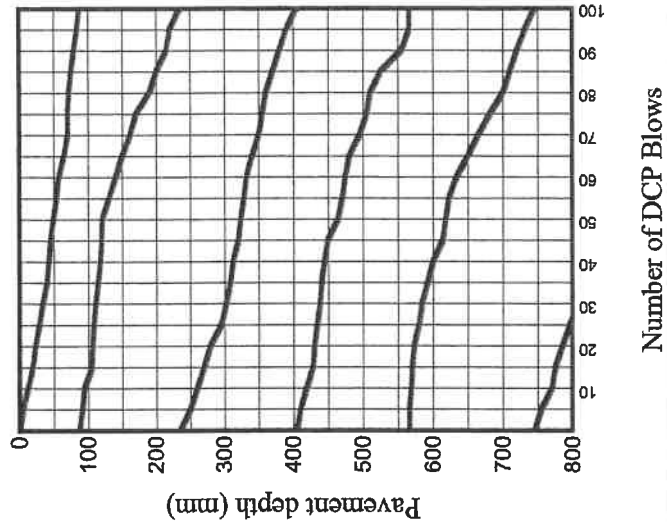
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighted average penetration rate

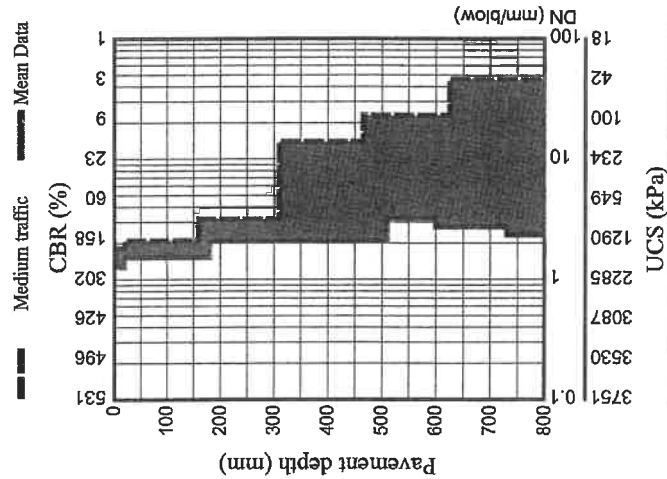
\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)



# DCP Report - Single analysis

Region:

Project date:

27 June, 2007

Road number:

Print date:

MR 473

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-155	19 July 2007	2 -	29	Yes	No	No	No	No	No

Design Structure Number in blows (DSN<sub>800</sub>):

214

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Base type:

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Dry

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 40	1.25	35	0.4	1.8	2.55	1967	880	386 - 2008
41 - 225	2.58	89	1.2	4.1	123	1034	407	179 - 929
226 - 490	5.77	67	3.5	10.2	44	422	174	76 - 396
491 - 640	11.40	15	3.2	15.5	19	197	84	37 - 192
641 - 800	20.66	8	2.5	23.9	9	101	45	20 - 102

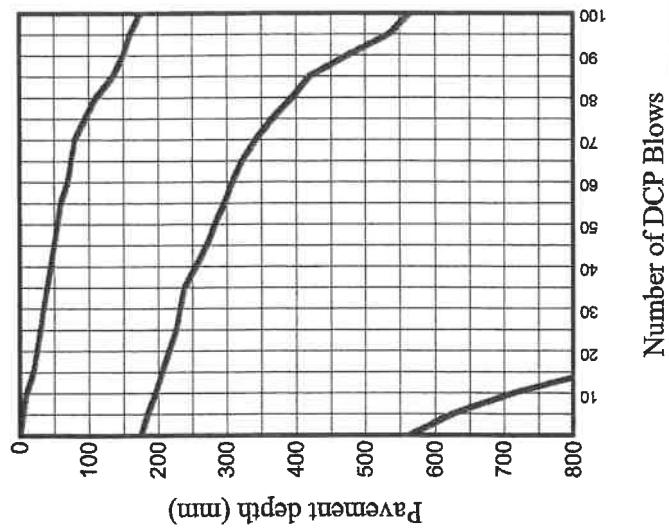
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighted average penetration rate

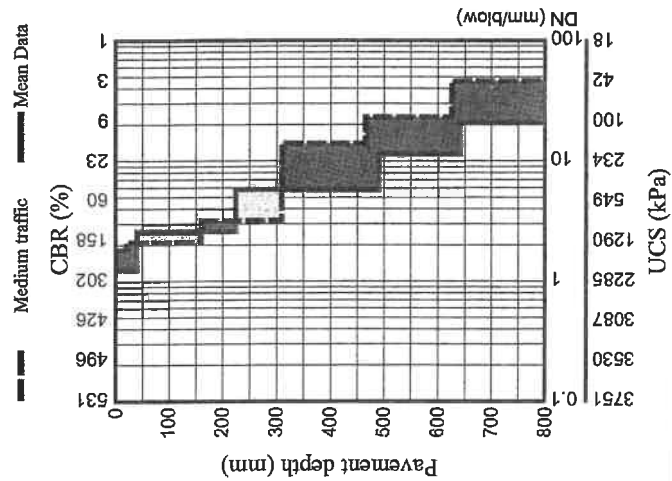
\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)



# DCP Report - Single analysis

Region:

Project date:

27 June, 2007

Road number:

MR 473

Print date:

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-156	19 July 2007	7 -	29.2	Sound	Yes	No	No	Yes	No	No

Design Structure Number in blows (DSN<sub>800</sub>):

291

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Base type:

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Dry

20mm

26.8

## Average equivalent strength (Existing Pavement Structure)

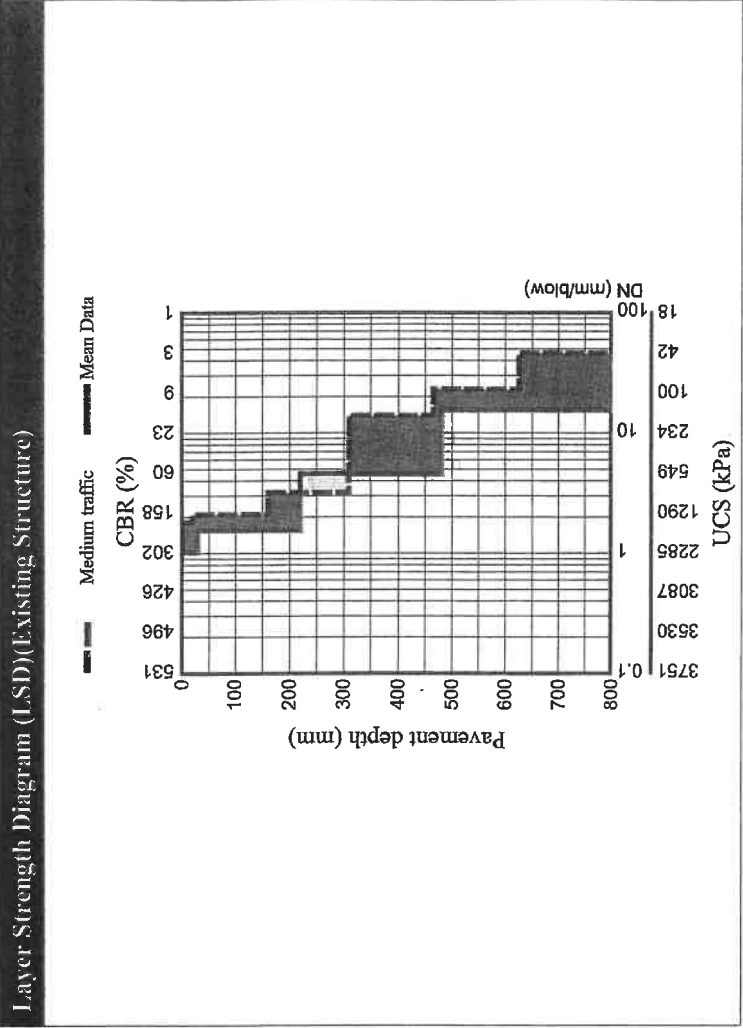
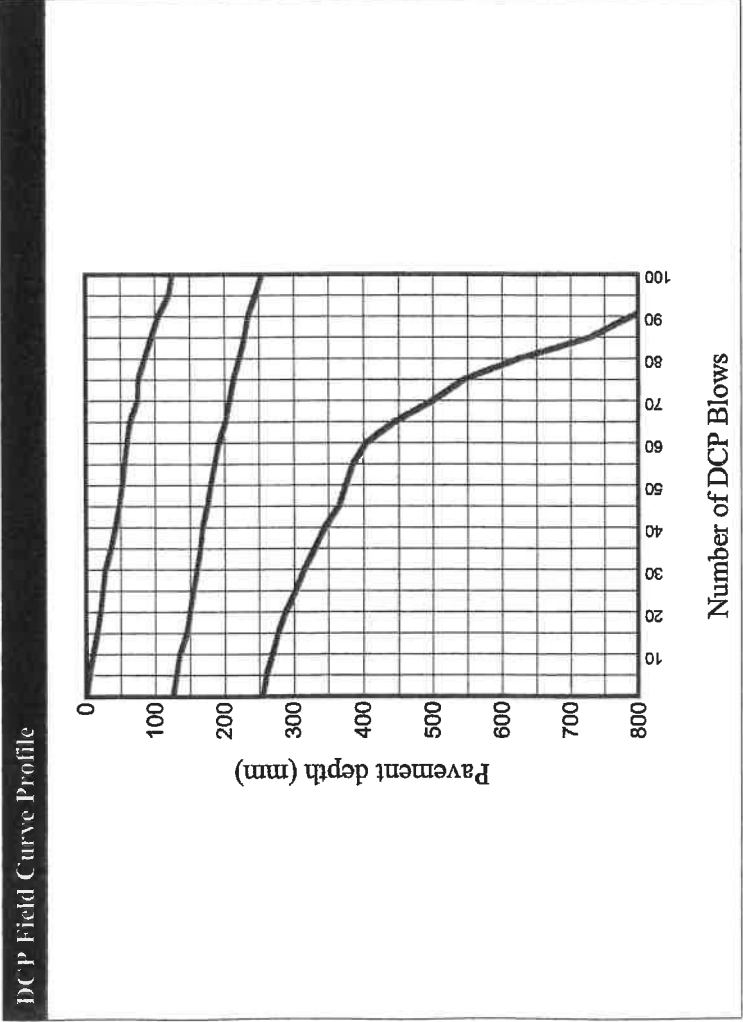
Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 30	1.01	31	0.2	1.3	297	2252	1100	482 - 2509
31 - 220	1.55	148	0.6	2.4	213	1676	703	308 - 1603
221 - 480	4.57	89	3.3	8.8	60	547	222	98 - 507
481 - 800	15.50	23	4.4	21.2	13	140	61	27 - 139

\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighted average penetration rate

\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

P = Percentile value in %



# DCP Report - Single analysis

Region:

Project date: 27 June, 2007

Road number:  
Print date:MR 473  
16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-157	19 July 2007	2 -	29.4	Sound	Yes	No	No	Yes	No	No

Design Structure Number in blows (DSN<sub>800</sub>):

342

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Base type:

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Dry

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 20	4.00	5	0.0	4.0	70	635	256	112 - 584
21 - 180	1.99	100	0.8	3.0	171	1381	537	236 - 1225
181 - 430	1.79	176	0.9	2.9	186	1492	601	264 - 1371
431 - 530	5.92	17	1.0	7.2	43	409	169	74 - 385
531 - 720	11.06	40	8.9	22.5	19	204	87	38 - 198
721 - 780	23.25	3	1.5	25.2	8	89	40	17 - 90
781 - 800	25.00	1	0.0	25.0	7	82	37	16 - 83

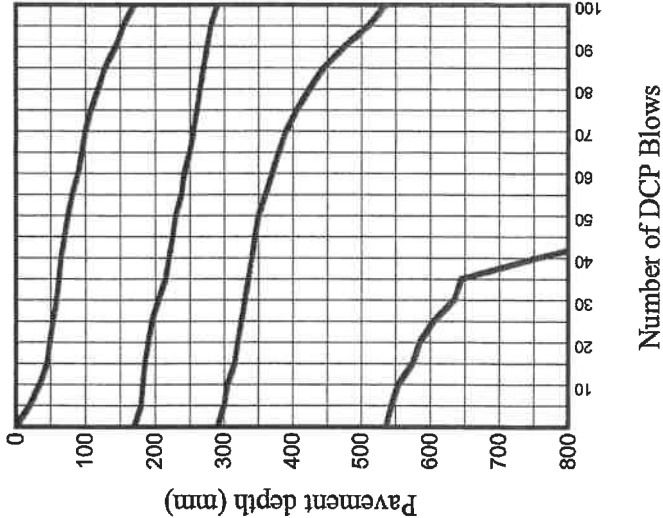
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighed average penetration rate

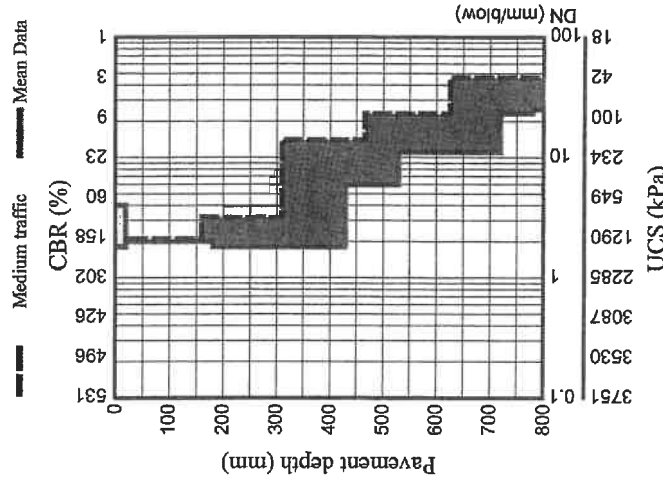
\*\*\* Unconfined Compressive Strength - calculated from weighed average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)





# DCP Report - Single analysis

Region:

Project date:

27 June, 2007

Road number:

Print date:

MR 473

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-158	19 July 2007	2 -	29.6	Sound	Yes	No	No	No	No	No

Design Structure Number in blows (DSN<sub>800</sub>):

262

Selected Design Traffic:

Medium traffic

Rut Limit:

20mm

Structural capacity (MISA):

18.5

Road category

B

Base type:

Granular

Moisture condition of base:

Dry

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 20	2.00	10	0.0	2.0	170	1377	535	234 - 1219
21 - 140	1.96	67	0.5	2.7	172	1393	545	239 - 1242
141 - 420	2.27	143	0.8	3.3	145	1196	468	205 - 1067
421 - 800	9.76	42	2.3	12.7	23	234	99	44 - 226

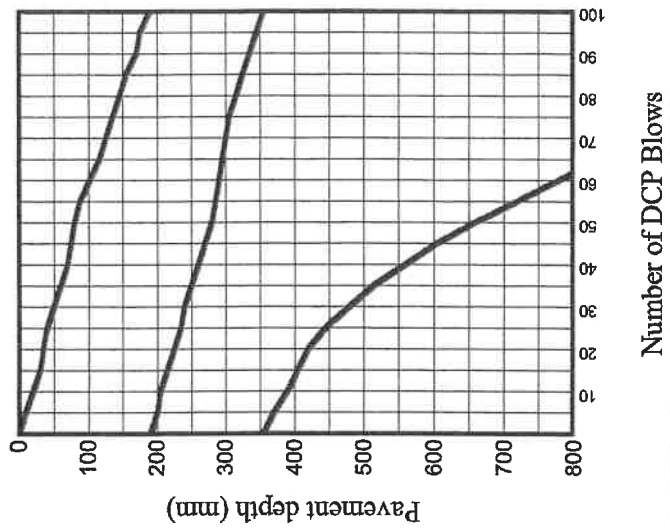
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighted average penetration rate

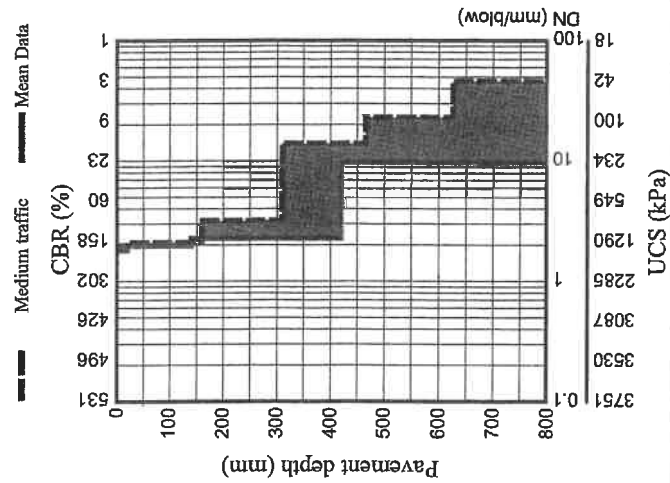
\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)



# DCP Report - Single analysis

Region:

Project date:

21 June, 2007

Road number:

MR 473

Print date:

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Cros. Crack	Deform	Other
X65393-159	19 July 2007	2 -	29.8	Sound	Yes	No	No	No	No	No

Design Structure Number in blows (DSN<sub>800</sub>):

342

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Base type:

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Dry

20mm

47.5

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 40	1.26	43	0.6	2.1	253	1956	873	383 - 1991
41 - 220	1.82	117	0.6	2.6	184	1476	592	260 - 1351
221 - 640	3.59	168	2.4	6.6	81	716	287	126 - 655
641 - 800	10.98	15	0.3	11.4	20	205	88	38 - 200

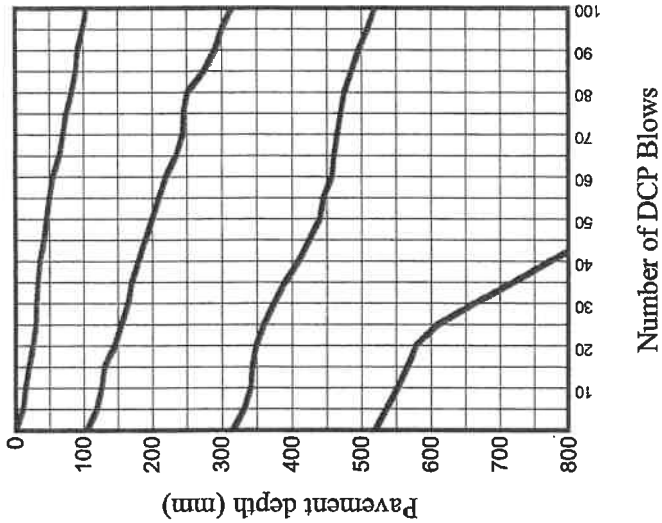
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighted average penetration rate

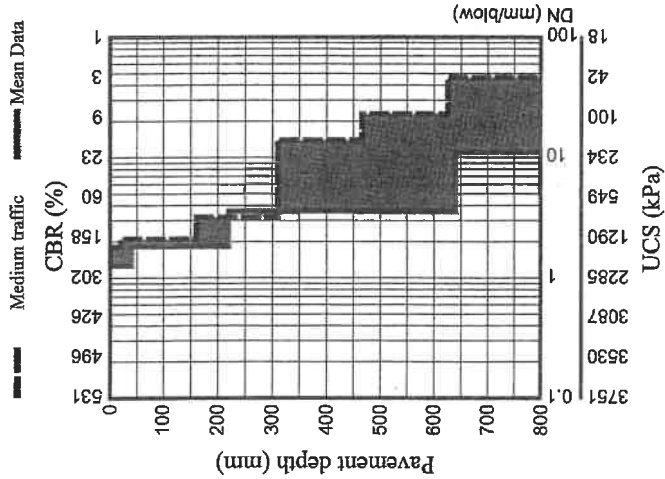
\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)



# DCP Report - Single analysis

Region:

Project date:

27 June, 2007

Road number:

MR 473

Print date:

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Crac. Crack	Deform	Other
X65393-160	19 July 2007	6 -	30	Sound	Yes	No	No	No	No	No

Design Structure Number in blows (DSN<sub>800</sub>):

308

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Base type:

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Dry

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 40	1.56	29	0.5	2.2	211	1663	696	305 - 1587
41 - 230	1.43	159	0.5	2.1	228	1783	765	335 - 1744
231 - 380	3.61	55	1.4	5.4	80	712	286	125 - 652
381 - 620	5.64	48	1.9	8.1	46	433	178	78 - 406
621 - 800	10.98	17	2.3	13.9	20	205	88	38 - 200

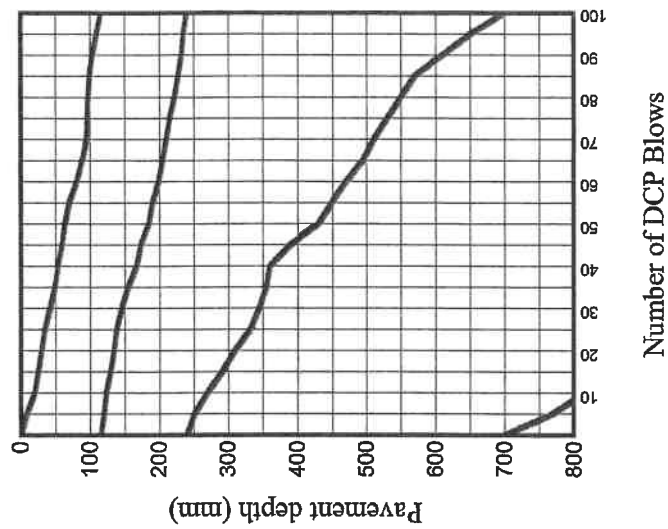
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighted average penetration rate

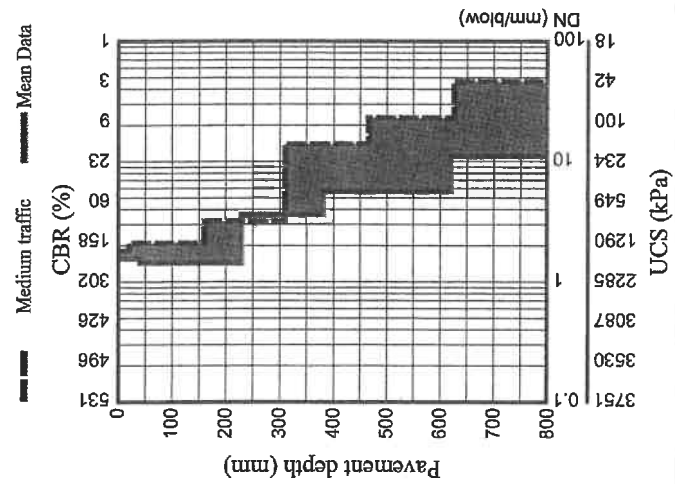
\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)



# DCP Report - Single analysis

Region:

Project date:

21 June, 2007

Road number:

MR 473

Print date:

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-161	19 July 2007	2 -	30.2	Sound	Yes	No	No	No	No	No

Design Structure Number in blows (DSN<sub>800</sub>):

274

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Base type:

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Dry

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 20	1.23	18	0.3	1.7	258	1989	896	393 - 2042
21 - 190	2.07	105	0.8	3.1	163	1325	515	226 - 1175
191 - 420	3.72	98	2.8	7.3	77	689	277	121 - 631
421 - 640	9.41	24	1.6	11.4	24	244	103	45 - 236
641 - 800	5.81	29	1.4	7.6	44	418	172	76 - 393

\* Weighted average penetration rate

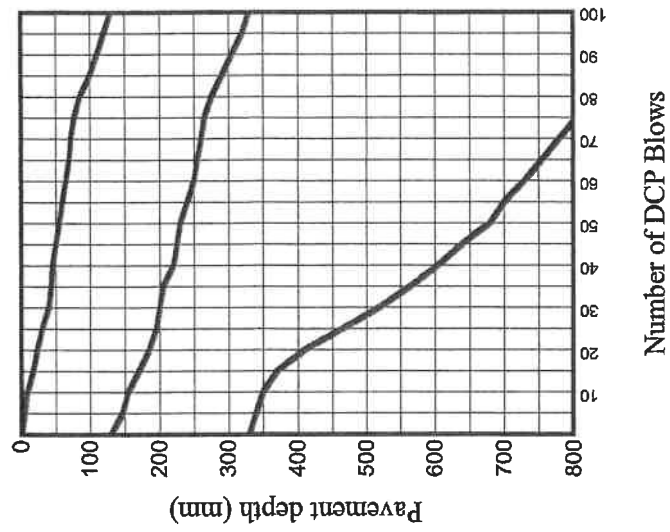
\*\* California Bearing Ratio - calculated from weighted average penetration rate

\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

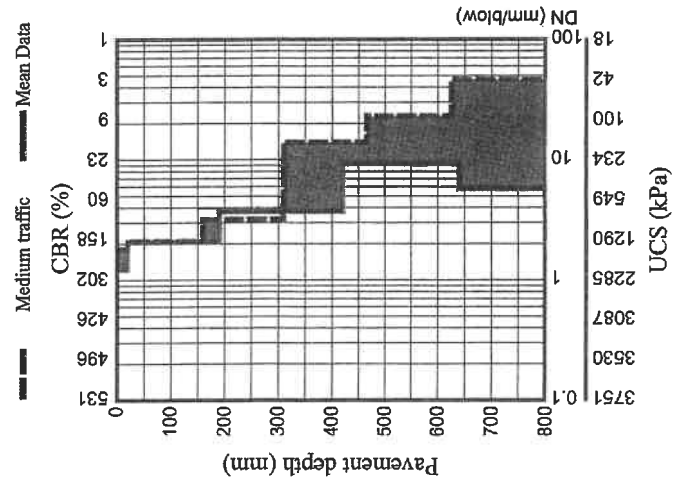
P = Percentile value in %



DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)





# DCP Report - Single analysis

Region:

Project date:

27 June, 2007

Road number:

Print date:

MR 473

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-162	19 July 2007	6 -	30.4	Sound	Yes	No	No	No	No	No

Design Structure Number in blows (DSN<sub>800</sub>):

306

Selected Design Traffic:

Medium traffic

Rut Limit:

Structural capacity (MISA):

(MISA = Million Standard Axles, 80 kN)

Road category

B

Base type:

Granular

Moisture condition of base:

Dry

## Average equivalent strength (Existing Pavement Structure)

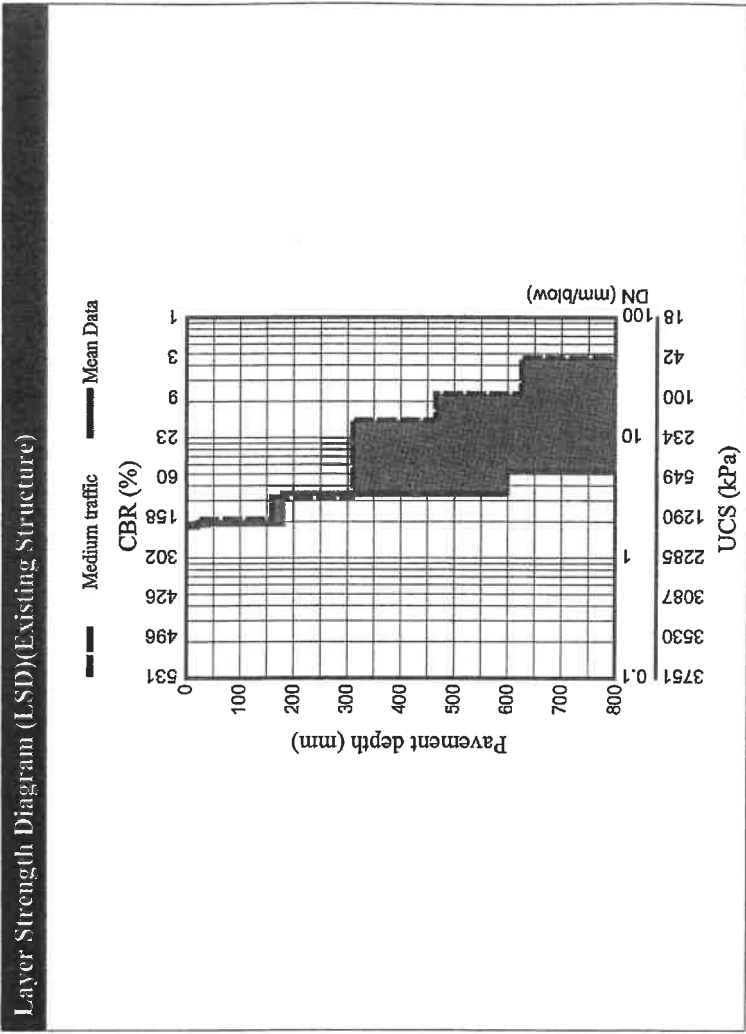
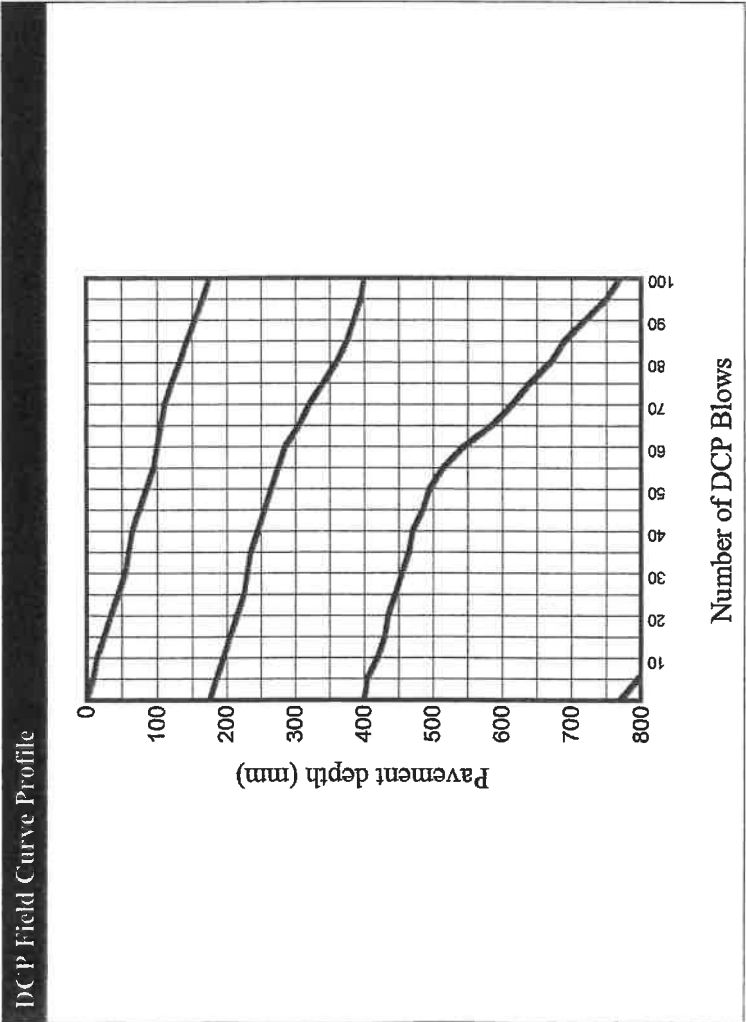
Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 40	1.88	23	0.3	2.3	179	1440	572	251 - 1305
41 - 180	1.91	80	0.4	2.5	177	1423	563	247 - 1283
181 - 600	3.45	165	2.0	6.0	85	748	299	131 - 683
601 - 800	5.33	39	0.8	6.3	49	461	189	83 - 431

\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighted average penetration rate

\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

P = Percentile value in %



# DCP Report - Single analysis

Region:

Project date:

21 June, 2007

Road number:

Print date:

MR 473

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-163	19 July 2007	2 -	30.6	Sound	Yes	No	No	No	No	No

Design Structure Number in blows (DSN<sub>800</sub>):

191

Selected Design Traffic:

Medium traffic

Rut Limit:

20mm

Road category

B

Structural capacity (MISA):

Base type:

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Dry

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 25	5.00	5	0.0	5.0	53	495	202	89 - 461
26 - 200	2.85	88	1.7	5.0	109	928	367	161 - 838
201 - 520	5.76	79	3.3	10.0	44	423	174	76 - 397
521 - 710	14.76	13	1.5	16.7	13	147	64	28 - 146
711 - 800	14.50	6	2.5	17.7	14	150	65	29 - 149

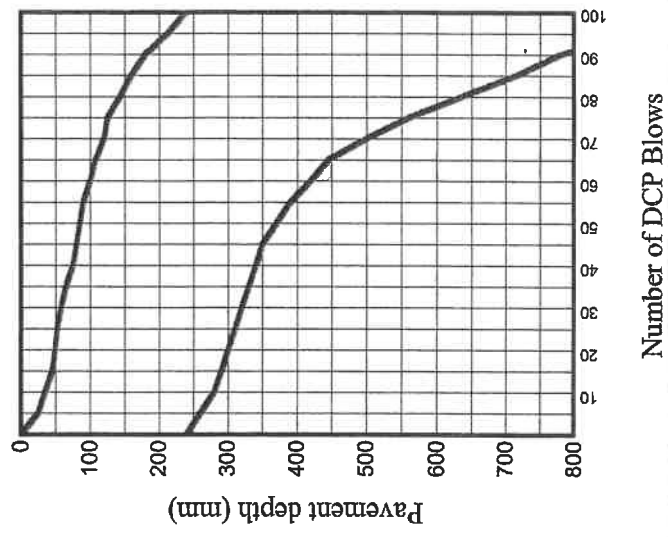
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighted average penetration rate

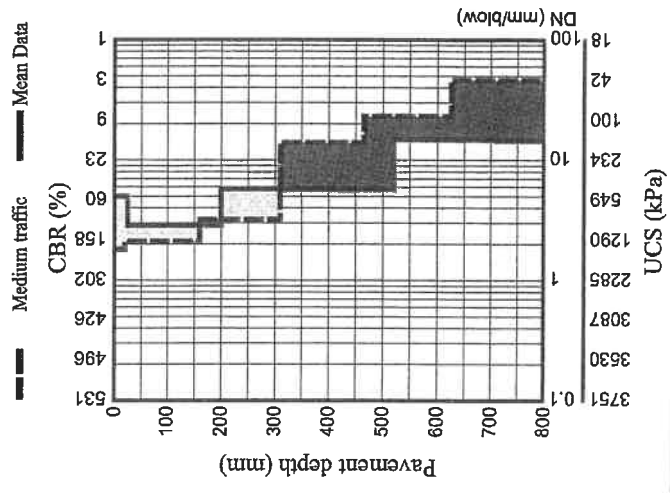
\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)



# DCP Report - Single analysis

Region:

Project date:

21 June, 2007

Road number:

Print date:

MR 473

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-164	19 July 2007	7 -	30.8	Sound	Yes	No	Yes	No	No	No

Design Structure Number in blows (DSN<sub>800</sub>):

501

Selected Design Traffic:

Medium traffic

Rut Limit:

Structural capacity (MISA):

(MISA = Million Standard Axles, 80 kN)

Road category

B

Base type:

Granular

Moisture condition of base:

Dry

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 25	0.73	40	0.2	1.0	358	2654	1563	685 - 3564
26 - 220	1.34	225	0.7	2.3	240	1868	816	358 - 1861
221 - 600	3.04	200	2.5	6.3	100	864	343	151 - 783
601 - 750	6.20	28	2.6	9.5	40	389	161	71 - 367
751 - 800	6.90	8	1.1	8.2	35	345	144	63 - 327

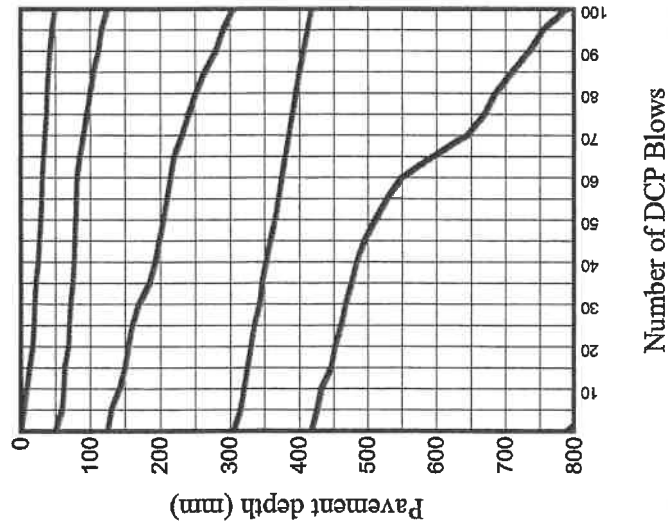
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighted average penetration rate

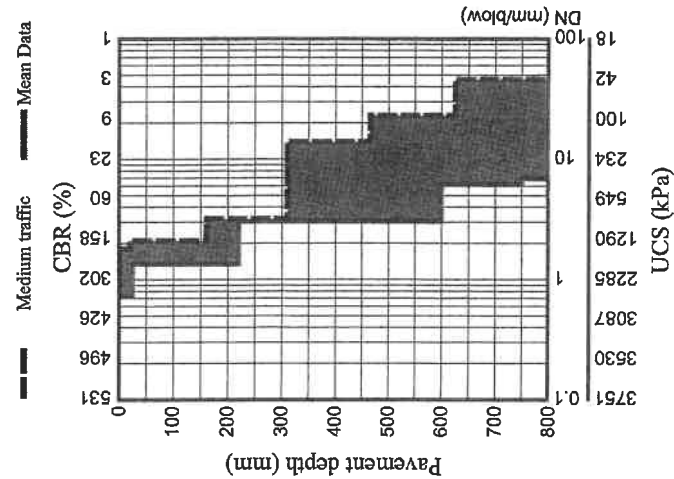
\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)



# DCP Report - Single analysis

Region:

Project date:

21 June, 2007

Road number:

MR 473

Print date:

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Circ. Crack	Deform	Other
X65393-165	19 July 2007	7 -	31	Sound	Yes	No	No	No	No	No

Design Structure Number in blows (DSN<sub>800</sub>):

363

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Base type:

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Dry

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 20	5.00	6	3.1	8.9	53	495	202	89 - 461
21 - 140	3.24	82	2.8	6.9	92	803	320	140 - 730
141 - 390	1.63	179	0.5	2.3	202	1603	663	291 - 1511
391 - 510	2.57	63	1.4	4.4	124	1042	410	180 - 935
511 - 790	9.81	31	2.8	13.4	23	233	99	43 - 225
791 - 800	12.00	1	0.0	12.0	17	186	80	35 - 182

\* Weighted average penetration rate

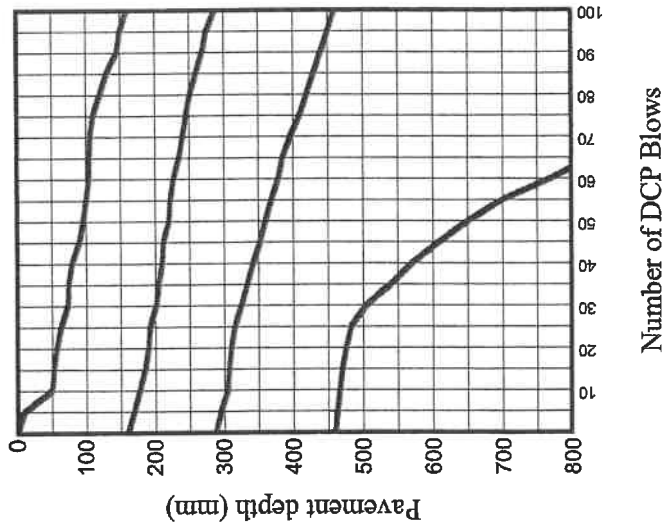
\*\* California Bearing Ratio - calculated from weighted average penetration rate

\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

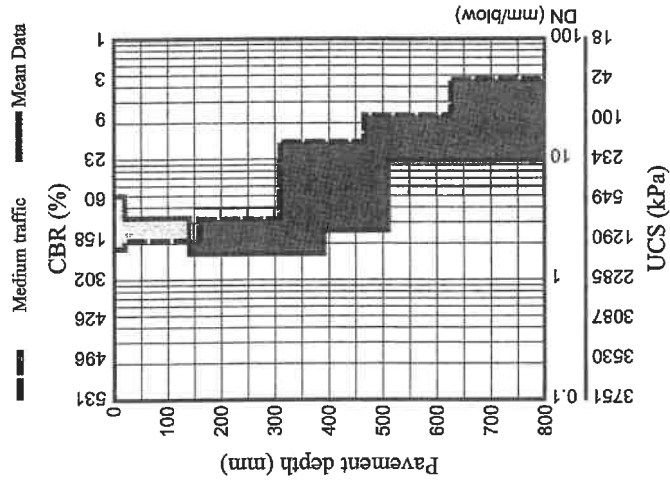
P = Percentile value in %



DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)





## DCP Report - Single analysis

Region:

Project date:

27 June, 2007

Road number:

Print date:

MR 473

16 November, 2007

### Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Cross. Crack	Deform	Other
X65393-167	19 July 2007	3 -	31.4	Sound	Yes	No	No	No	No	No

Design Structure Number in blows (DSN<sub>800</sub>):

181

Selected Design Traffic:

Medium traffic

Rut Limit:

Structural capacity (MISA):

(MISA = Million Standard Axles, 80 kN)

Road category

B

Base type:

Granular

Moisture condition of base:

Dry

### Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 20	1.61	15	0.8	2.6	205	1622	673	295 - 1535
21 - 140	3.58	37	1.0	4.8	81	718	288	126 - 657
141 - 510	4.74	107	2.6	8.1	57	525	214	94 - 488
511 - 800	18.53	22	8.3	29.1	10	114	50	22 - 115

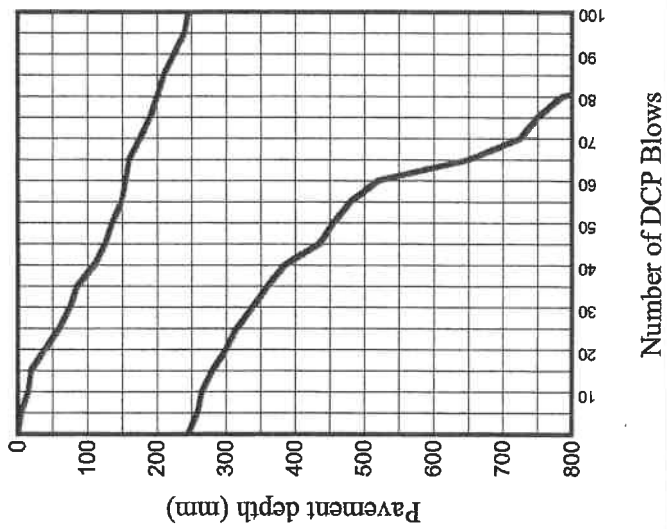
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighted average penetration rate

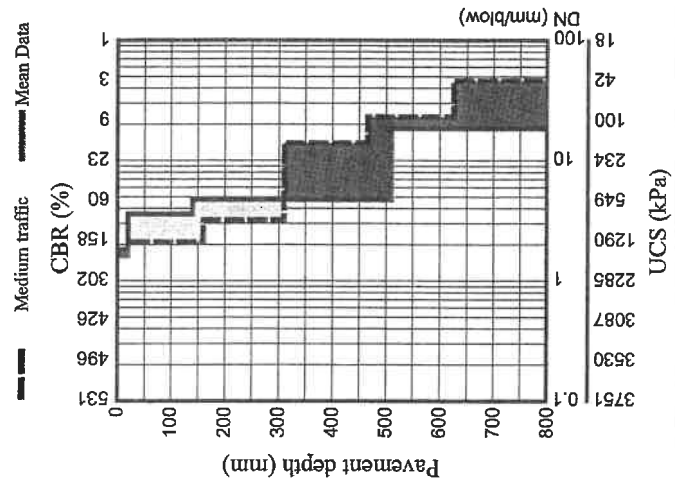
\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)



# DCP Report - Single analysis

Region:

Project date:

27 June, 2007

Road number:

MR 473

Print date:

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-168	19 July 2007	7 -	31.6	Sound	Yes	No	No	No	No	No

Design Structure Number in blows (DSN<sub>800</sub>):

218

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Base type:

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Dry

20mm  
9.7

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 20	1.38	16	0.5	2.0	235	1830	793	348 - 1807
21 - 230	2.53	94	0.8	3.5	126	1061	417	183 - 951
231 - 590	6.25	90	4.4	11.9	40	385	159	70 - 363
591 - 790	13.07	16	1.5	15.0	16	169	73	32 - 166
791 - 800	4.00	3	0.0	4.0	70	635	256	112 - 584

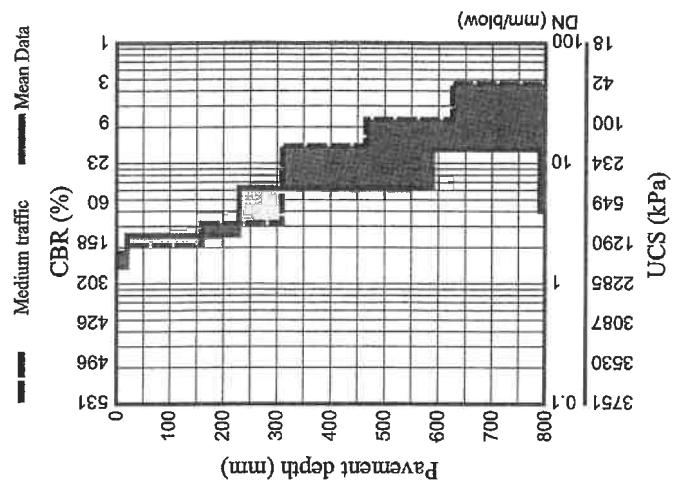
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighted average penetration rate

\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

P = Percentile value in %

### Layer Strength Diagram (LSD)(Existing Structure)



# DCP Report - Single analysis

Region:

Project date:

21 June, 2007

Road number:

Print date:

MR 473

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (cm)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-169	19 July 2007	2 -	31.8	Sound	Yes	No	No	No	No	No

Design Structure Number in blows (DSN<sub>800</sub>):

294

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Base type:

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Dry

20mm  
27.9

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 30	2.33	15	0.8	3.3	140	1159	454	199 - 1035
31 - 170	2.63	61	1.2	4.1	120	1016	400	176 - 913
171 - 530	2.87	180	1.8	5.2	107	919	364	160 - 830
531 - 800	7.43	39	1.6	9.5	32	318	133	58 - 303

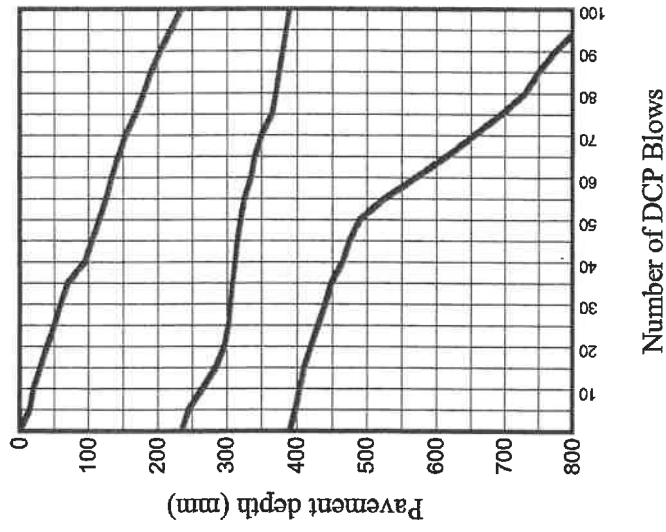
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighed average penetration rate

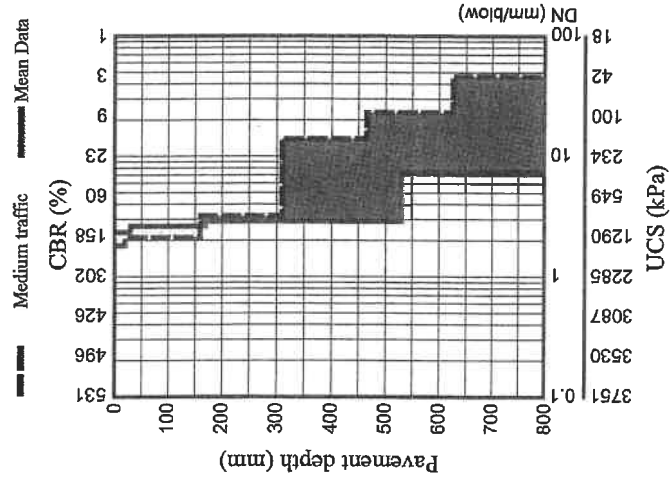
\*\*\* Unconfined Compressive Strength - calculated from weighed average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)



# DCP Report - Single analysis

**Region:**
**Project date:**

27 June, 2007

**Road number:**
**Print date:**

MR 473

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-170	19 July 2007	7 -	32	Sound	Yes	No	No	No	No	No

**Design Structure Number in blows (DSN<sub>600</sub>):**

331

**Selected Design Traffic:**

Medium traffic

**Rut Limit:**
**Road category**

B

**Base type:**

Granular

**Structural capacity (MISA):**
**Moisture condition of base:**

Dry

20mm

42.2

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 30	1.35	25	0.5	2.0	240	1864	813	357 - 1855
31 - 200	1.95	94	0.5	2.6	173	1398	548	240 - 1249
201 - 460	3.96	80	1.6	6.0	71	641	259	113 - 590
461 - 640	4.98	47	2.5	8.2	53	497	203	89 - 463
641 - 765	2.06	66	0.5	2.7	164	1334	519	227 - 1183
766 - 800	2.01	18	0.2	2.3	169	1368	531	233 - 1212

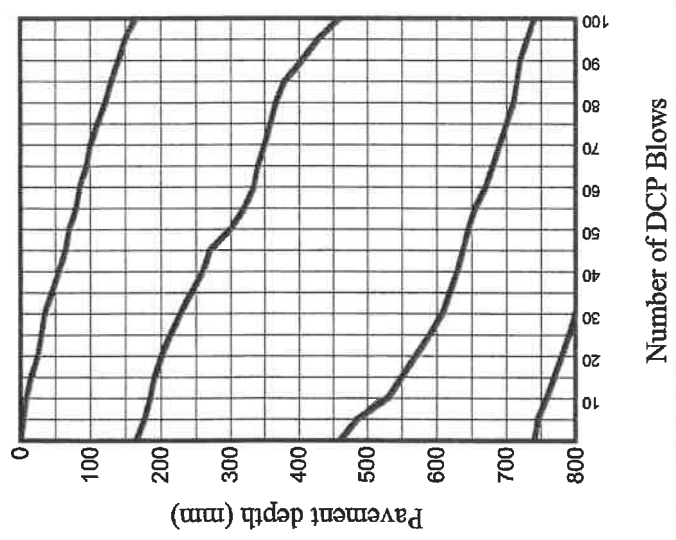
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighted average penetration rate

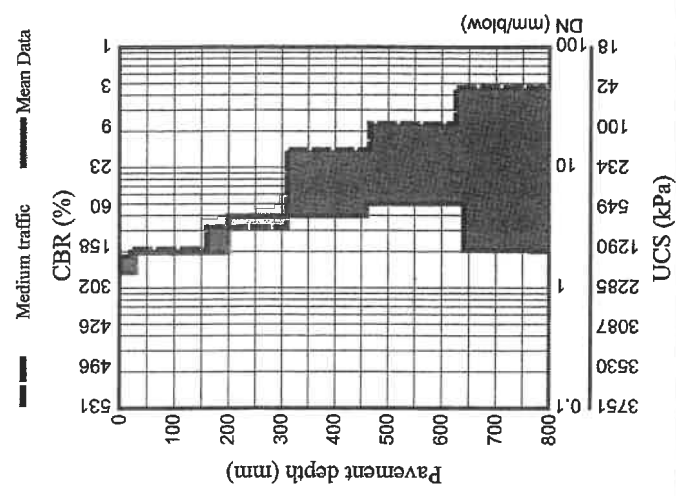
\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)





# DCP Report - Single analysis

Region:

Project date:

27 June, 2007

Road number:

Print date:

MR 473

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-171	19 July 2007	2 -	32.2	Sound	Yes	No	No	No	No	No

Design Structure Number in blows (DSN<sub>800</sub>):

179

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Base type:

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Dry

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 20	1.75	13	0.4	2.3	190	1518	616	270 - 1405
21 - 190	2.78	69	0.9	4.0	112	951	376	165 - 858
191 - 500	5.93	72	3.7	10.7	43	409	169	74 - 384
501 - 800	13.86	25	4.3	19.4	15	158	68	30 - 156

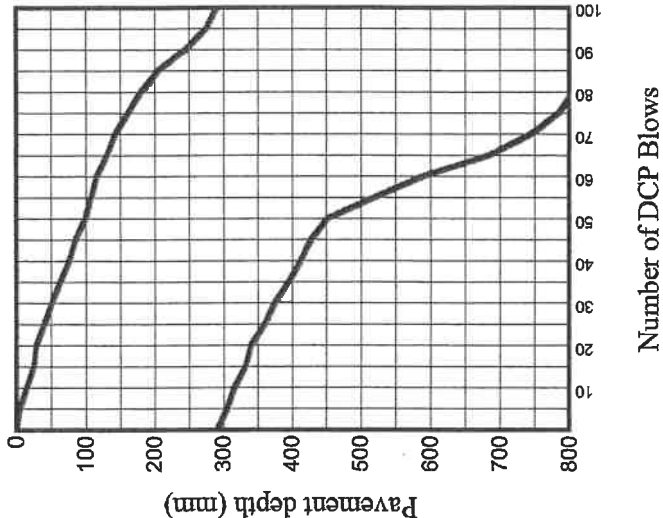
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighed average penetration rate

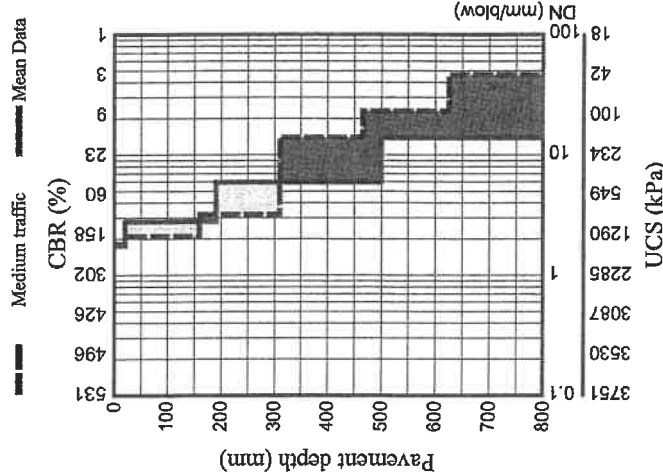
\*\*\* Unconfined Compressive Strength - calculated from weighed average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)



# DCP Report - Single analysis

Region:

Project date:

27 June, 2007

Road number:

Print date:

MR 473

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-172	19 July 2007	6 -	32.4	Sound	Yes	No	No	No	No	No

Design Structure Number in blows (DSN<sub>900</sub>):

188

Selected Design Traffic:

Medium traffic

Rut Limit:

Structural capacity (MISA):

(MISA = Million Standard Axles, 80 kN)

Road category

B

Base type:

Granular

Moisture condition of base:

Dry

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 20	1.76	15	0.8	2.8	189	1512	612	268 - 1396
21 - 200	2.85	87	1.4	4.6	108	926	367	161 - 836
201 - 540	7.72	54	3.2	11.8	31	304	127	56 - 291
541 - 800	10.85	33	5.1	17.3	20	208	89	39 - 203

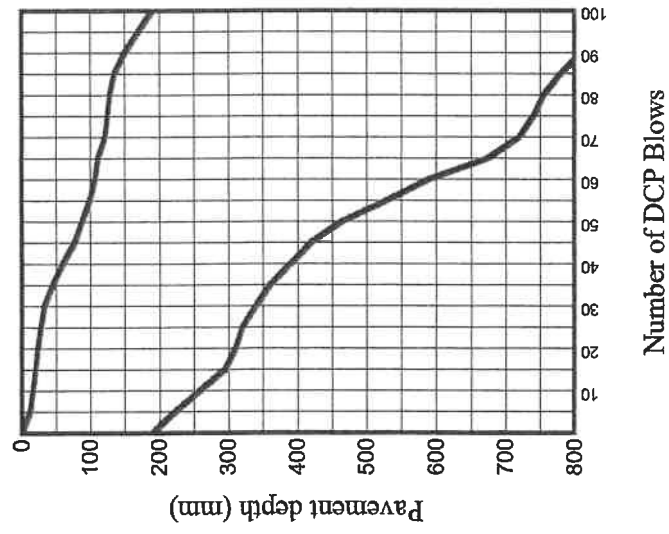
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighted average penetration rate

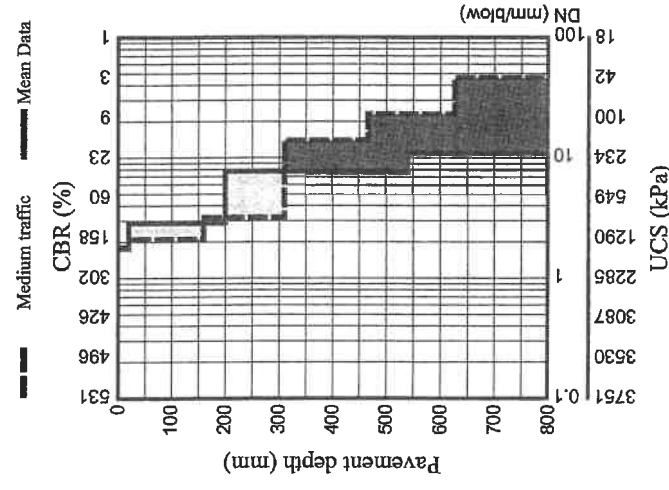
\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)



# DCP Report - Single analysis

Region:

Project date:

27 June, 2007

Road number:

Print date:

MR 473  
16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-173	19 July 2007	3 -	32.6	Sound	Yes	No	No	No	No	No

Design Structure Number in blows (DSN<sub>600</sub>):

161

Selected Design Traffic:

Medium traffic

Rut Limit:

Structural capacity (MISA):

(MISA = Million Standard Axles, 80 kN)

Road category

B

Base type:

Granular

Moisture condition of base:

Dry

20mm  
3.4

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 20	1.56	14	0.5	2.1	211	1663	696	305 - 1587
21 - 170	2.99	70	1.5	5.0	102	879	349	153 - 796
171 - 350	5.17	36	0.9	6.4	51	476	195	86 - 445
351 - 690	24.16	38	19.2	48.7	7	85	38	17 - 87
691 - 800	40.55	3	10.1	53.5	4	48	22	10 - 50

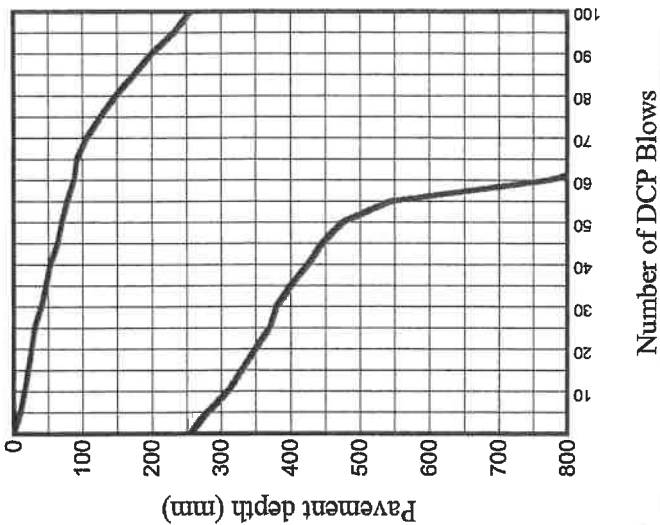
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighted average penetration rate

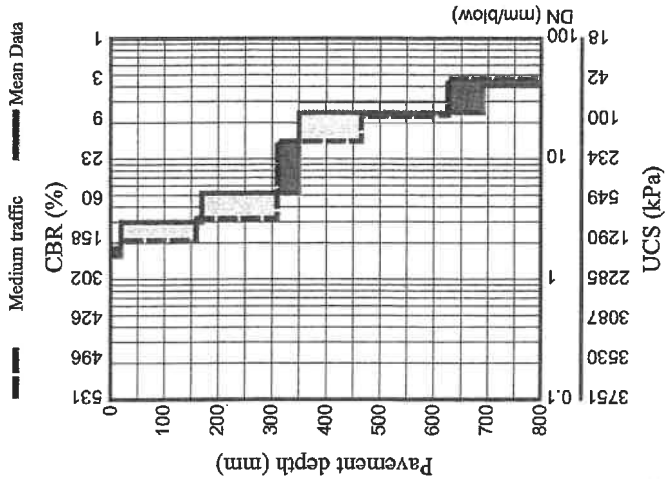
\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)





# DCP Report - Single analysis

Region:

Project date:

21 June, 2007

Road number:

Print date:

MR 473

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-174	19 July 2007	3 -	32.8	Sound	Yes	No	No	No	No	No

Design Structure Number in blows (DSN<sub>600</sub>):

163

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Dry

20mm

3.5

## Average equivalent strength (Existing Pavement Structure)

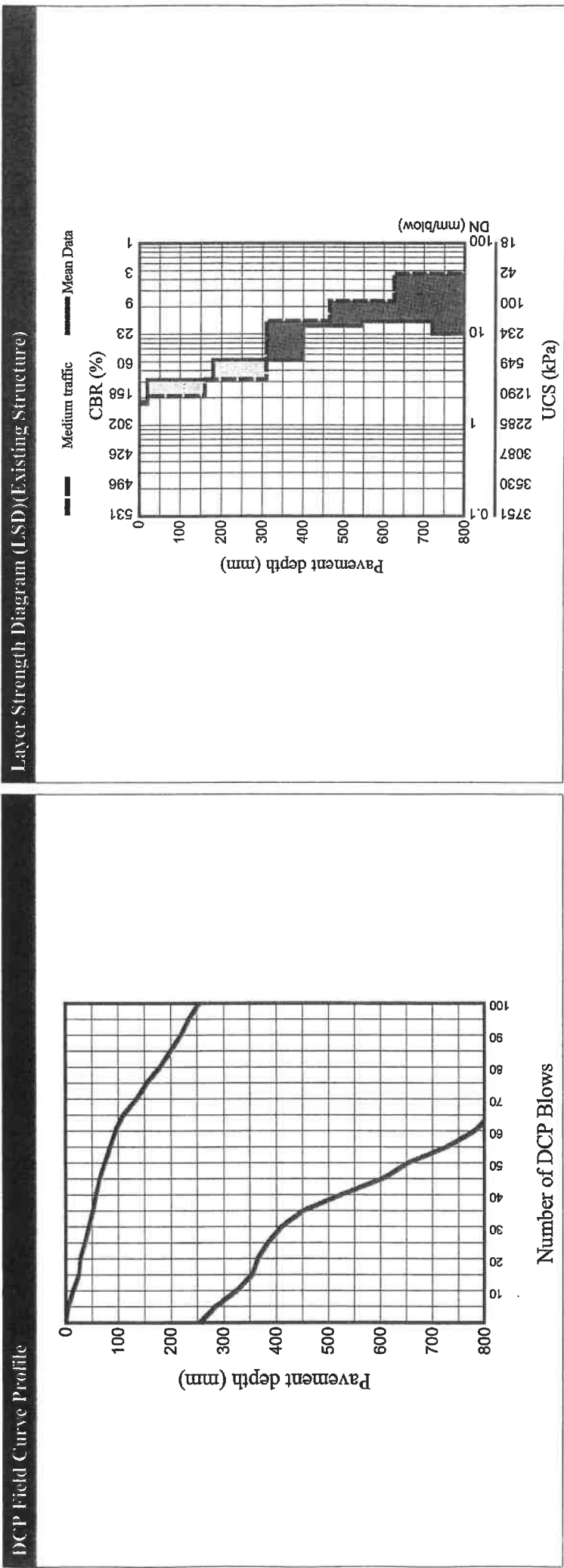
Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 20	1.72	13	0.5	2.3	193	1539	627	275 - 1431
21 - 180	3.15	67	1.5	5.0	96	829	330	145 - 753
181 - 400	5.20	48	1.7	7.4	51	473	194	85 - 442
401 - 545	12.29	13	3.6	16.9	17	181	78	34 - 177
546 - 720	13.77	13	2.5	16.9	15	159	69	30 - 157
721 - 800	10.05	9	2.6	13.3	22	227	96	42 - 219

\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighted average penetration rate

\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

P = Percentile value in %





# DCP Report - Single analysis

Region:  
Project date:

27 June, 2007

Road number:  
Print date:

MR 473  
16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-175	19 July 2007	3 -	33	Sound	Yes	No	No	No	No	No

Design Structure Number in blows (DSN<sub>600</sub>):

271

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Base type:

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Dry

20mm  
19.5

## Average equivalent strength (Existing Pavement Structure)

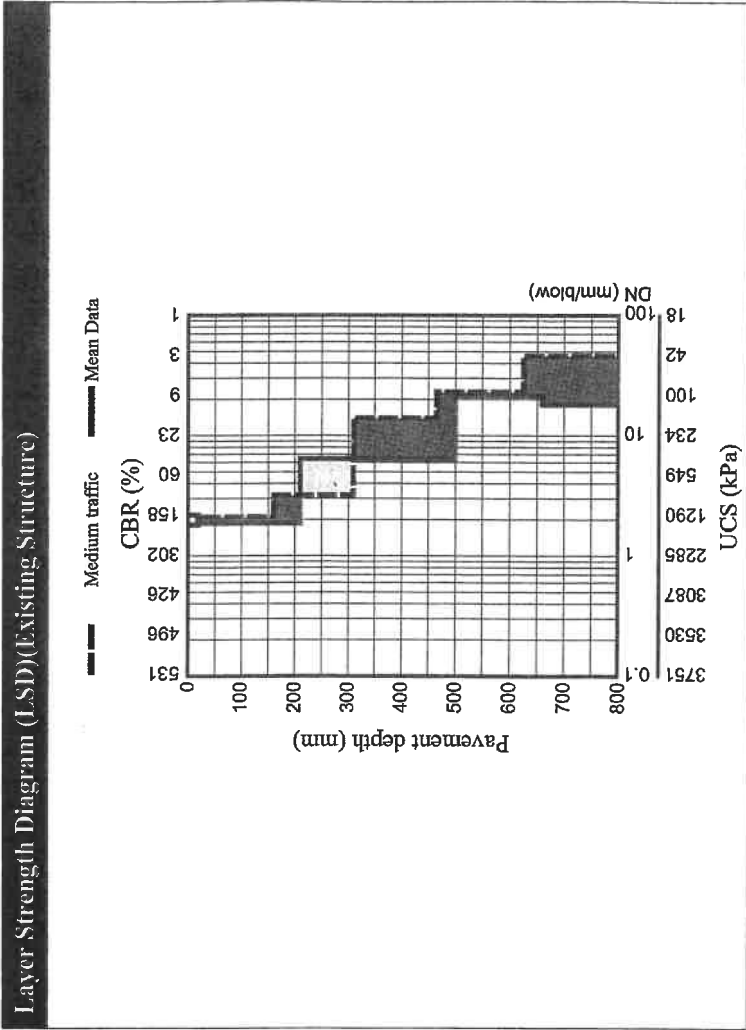
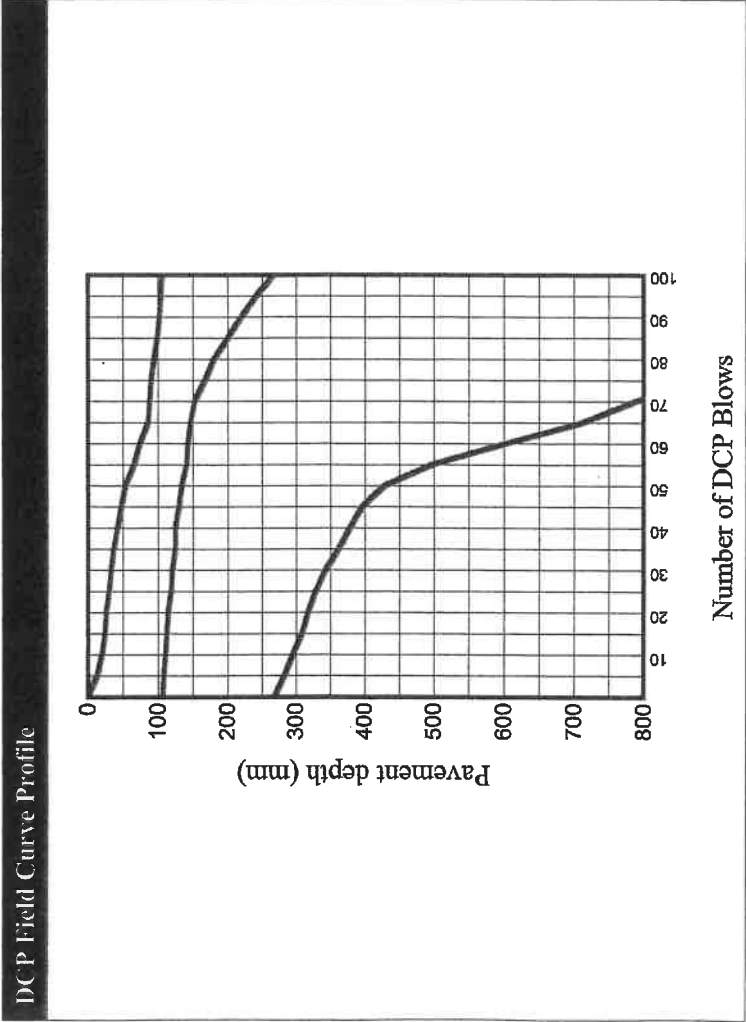
Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 20	2.18	10	0.6	2.9	152	1250	488	214 - 1112
21 - 210	1.86	173	1.2	3.4	180	1449	577	253 - 1316
211 - 500	6.41	68	4.5	12.2	39	375	155	68 - 354
501 - 660	21.49	7	0.4	22.0	8	97	43	19 - 98
661 - 800	18.01	8	3.3	22.3	10	118	52	23 - 118

\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighted average penetration rate

\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

P = Percentile value in %



# DCP Report - Single analysis

Region:  
Project date:

27 June, 2007

Road number:  
Print date:

MR 473  
16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
XG5393-176	27 June 2007	2 -	33.2	Sound	Yes	No	No	No	No	No

Design Structure Number in blows (DSN<sub>800</sub>):

318

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Base type:

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Optimum

20mm  
17.3

## Average equivalent strength (Existing Pavement Structure)

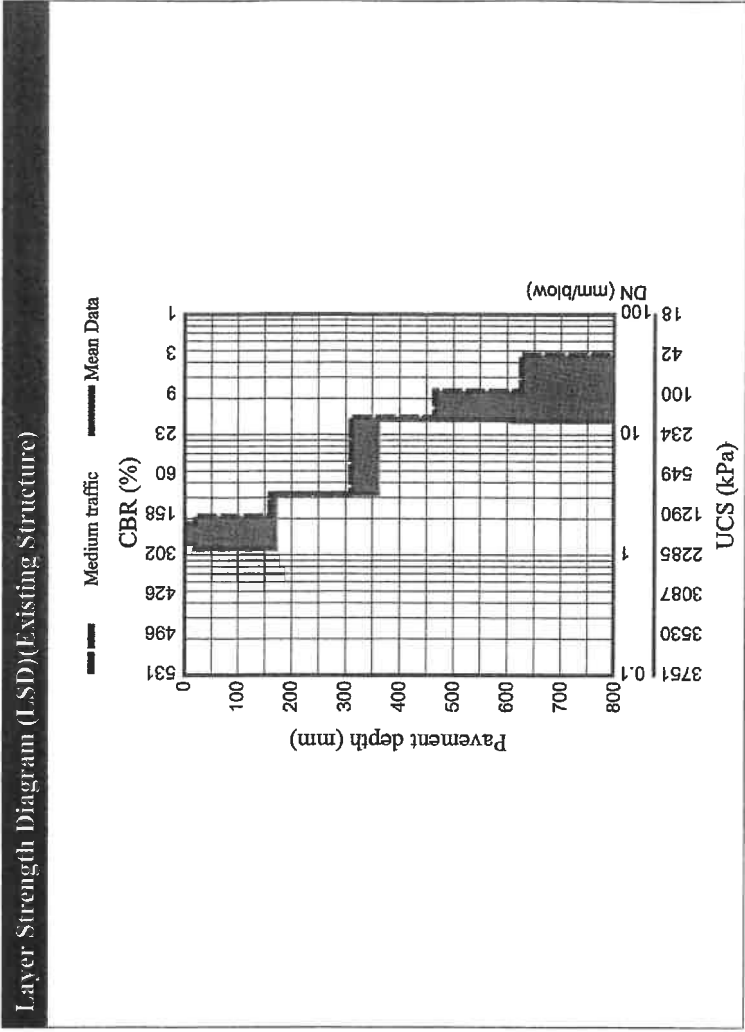
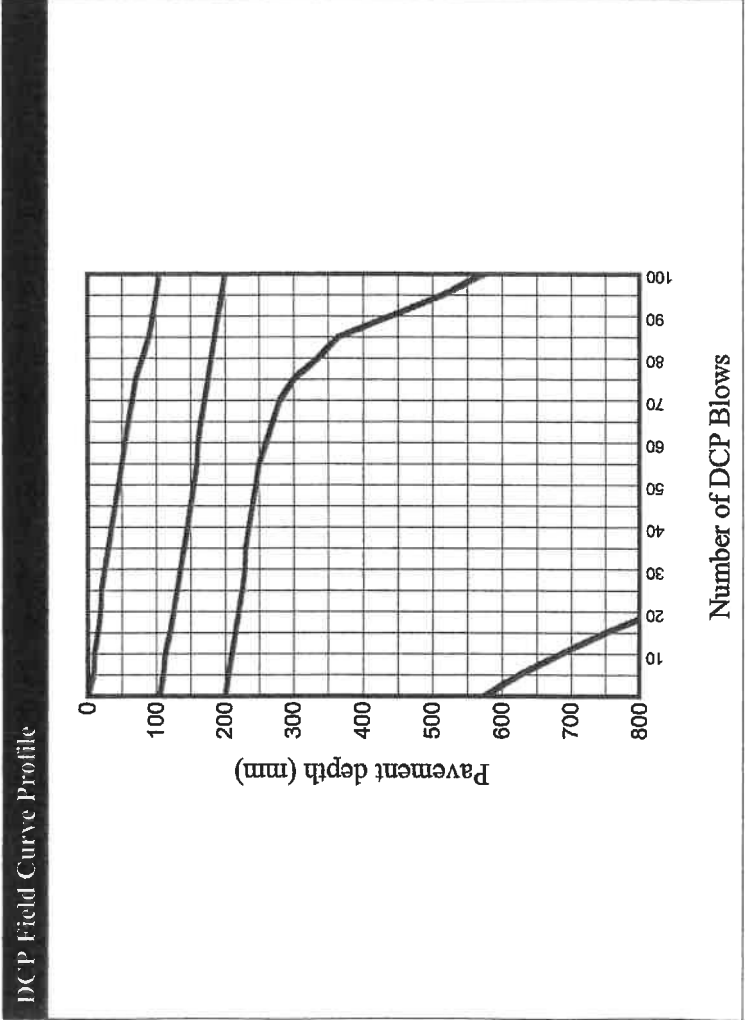
Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 20	1.24	25	0.6	2.0	257	1978	888	389 - 2025
21 - 170	1.13	145	0.4	1.6	276	2112	984	432 - 2245
171 - 360	3.23	114	2.5	6.4	93	806	322	141 - 733
361 - 610	13.40	19	2.2	16.2	15	164	71	31 - 162
611 - 800	12.97	15	1.4	14.8	16	170	73	32 - 167

\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighted average penetration rate

\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

P = Percentile value in %



# DCP Report - Single analysis

Region:  
Project date:

27 June, 2007

Road number:  
Print date:

MR 473  
16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-177	27 June 2007	7 -	33.4	Sound	Yes	No	No	No	No	No

Design Structure Number in blows (DSN<sub>800</sub>):

191

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Granular

(MISA = Million Standard Axles, 80 kN)

Base type:

Optimum

Moisture condition of base:

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 30	3.39	13	1.0	4.7	87	764	306	134 - 697
31 - 160	2.70	55	1.0	3.9	116	986	389	171 - 888
161 - 330	2.90	76	1.2	4.5	106	910	361	158 - 823
331 - 550	11.18	34	6.9	20.0	19	201	86	38 - 196
551 - 800	20.34	13	3.5	24.8	9	103	46	20 - 104

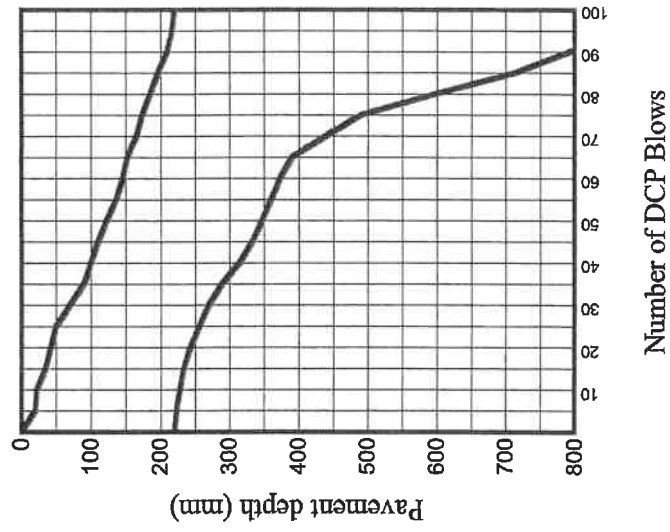
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighted average penetration rate

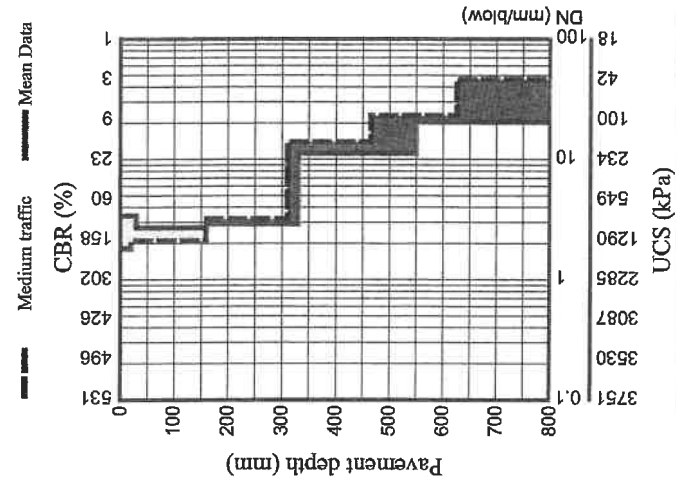
\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)



# DCP Report - Single analysis

Region:  
Project date:

27 June, 2007

Road number:  
Print date:

MR 473  
16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-178	27 June 2007	6 -	33.6	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN<sub>900</sub>):

231

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Base type:

Granular

Structural capacity (MISA):

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Optimum

20mm  
5.6

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 150	1.35	121	0.4	1.8	240	1864	813	357 - 1855
151 - 300	2.81	58	0.8	3.8	110	942	373	164 - 850
301 - 450	8.28	21	2.8	11.9	28	281	118	52 - 270
451 - 600	9.17	16	0.8	10.2	25	251	106	47 - 242
601 - 800	14.17	15	3.1	18.1	14	154	67	29 - 152

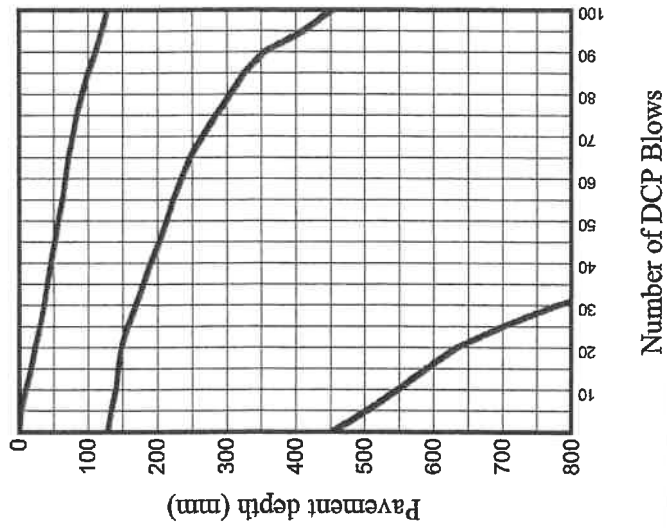
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighed average penetration rate

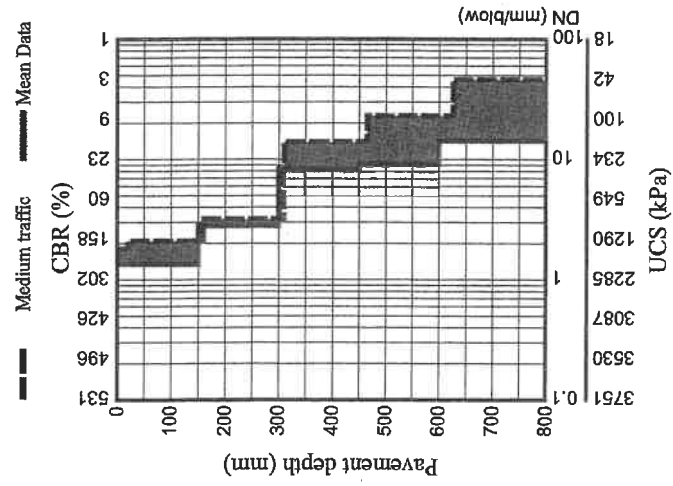
\*\*\* Unconfined Compressive Strength - calculated from weighed average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)





# DCP Report - Single analysis

Region:

Project date: 27 June, 2007

Road number: MR 473  
Print date: 16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-179	27 June 2007	6 -	33.8	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN<sub>800</sub>): 211

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Base type:

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Optimum

20mm  
4.1

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (N/Pa)	E-Moduli Range 10P - 90P (MPa)
0 - 150	1.53	113	0.6	2.2	215	1693	713	313 - 1625
151 - 300	2.63	62	0.7	3.5	120	1013	399	175 - 911
301 - 450	10.64	17	4.0	15.8	20	213	91	40 - 207
451 - 600	16.39	9	2.6	19.7	12	131	57	25 - 131
601 - 800	22.68	9	3.7	27.5	8	91	41	18 - 93

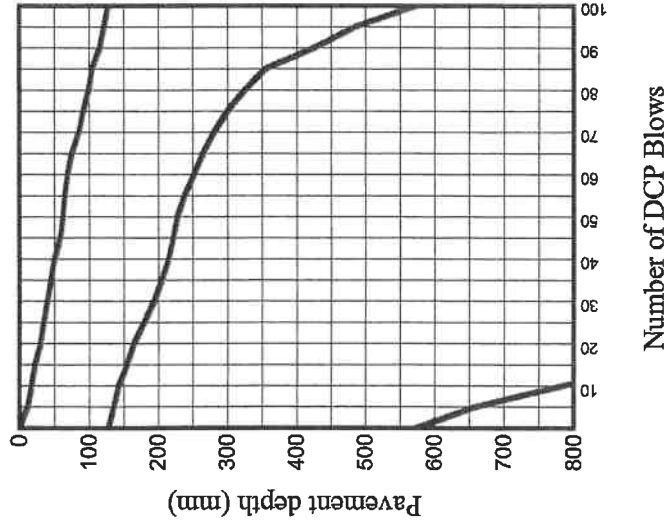
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighed average penetration rate

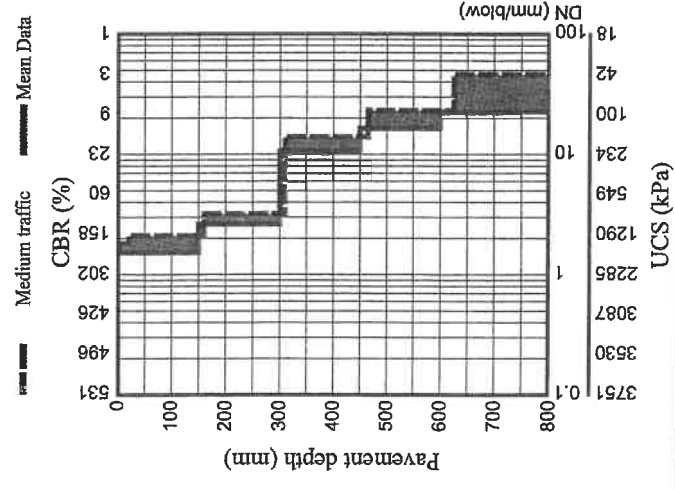
\*\*\* Unconfined Compressive Strength - calculated from weighed average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)



# DCP Report - Single analysis

Region:

Project date:

21 June, 2007

Road number:

Print date:

MR 473

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-181	19 July 2007	2 -	3.4	Sound	Yes	No	No	No	No	No

Design Structure Number in blows (DSN<sub>800</sub>):

176

Selected Design Traffic:

Medium traffic

Rut Limit:

20mm

4.6

Road category

B

Base type:

Granular

Moisture condition of base:

Dry

(MISA = Million Standard Axles, 80 kN)

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 20	1.80	11	0.2	2.1	185	1485	598	262 - 1363
21 - 170	2.44	73	0.9	3.6	132	1102	433	190 - 986
171 - 450	7.45	53	4.0	12.6	32	316	132	58 - 302
451 - 700	11.72	23	2.6	15.0	18	191	82	36 - 187
701 - 800	6.30	17	1.4	8.1	40	382	158	69 - 361

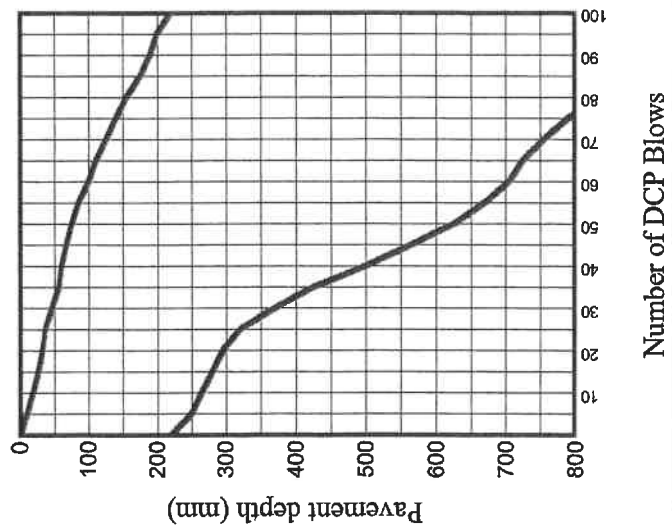
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighted average penetration rate

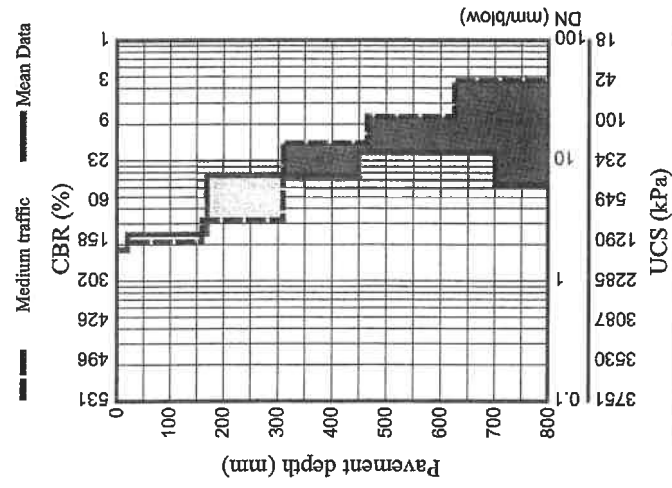
\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)



# DCP Report - Single analysis

**Region:**

Project date:

27 June, 2007

Road number:

Print date:

MR 473

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-184	19 July 2007	7 -	34.6	Sound	Yes	No	No	No	No	No

Design Structure Number in blows (DSN<sub>900</sub>):

228

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Dry

## Average equivalent strength (Existing Pavement Structure)

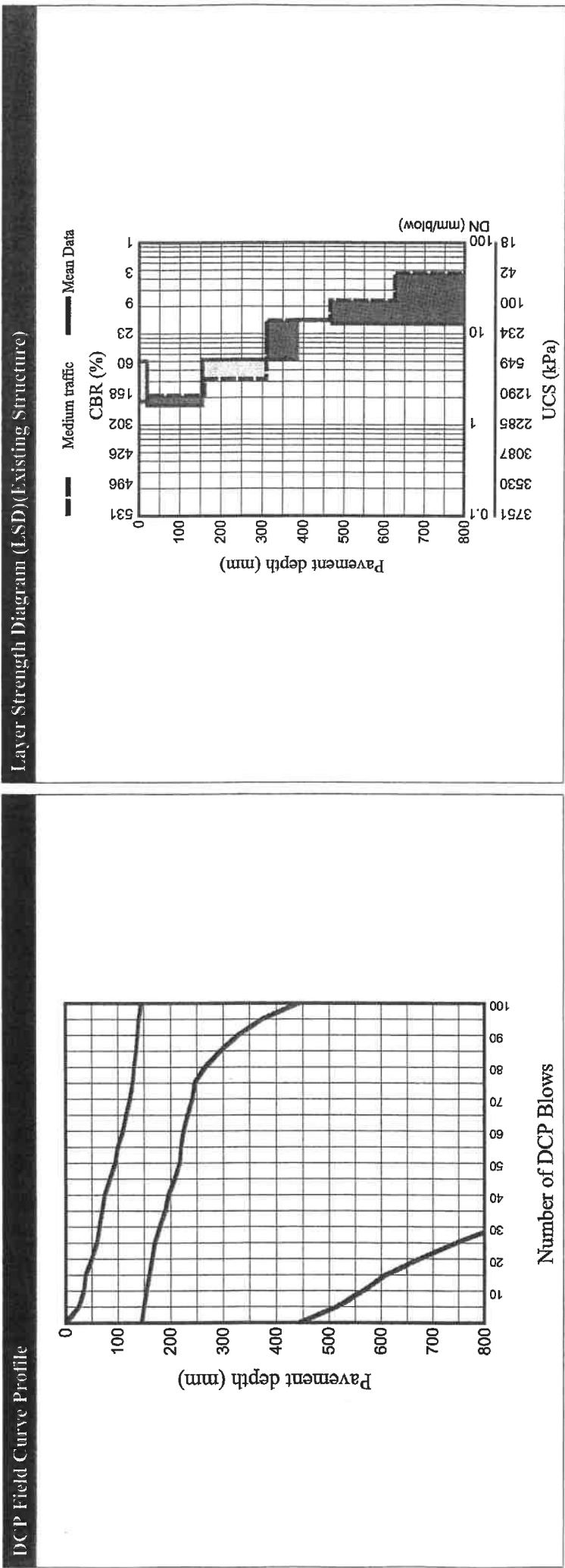
Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 20	5.00	4	0.0	5.0	53	495	202	89 - 461
21 - 155	1.63	106	0.9	2.8	202	1605	664	291 - 1514
156 - 385	5.16	86	3.5	9.6	51	477	195	86 - 445
386 - 470	14.12	6	0.2	14.4	14	155	67	29 - 153
471 - 800	12.89	27	2.4	16.0	16	172	74	32 - 169

\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighted average penetration rate

\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

P = Percentile value in %



# DCP Report - Single analysis

Region:

Project date:

27 June, 2007

Road number:

Print date:

MR 473

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-185	19 July 2007	2 -	34.8	Sound	Yes	No	No	No	No	No

Design Structure Number in blows (DSN<sub>800</sub>):

331

Selected Design Traffic:

Medium traffic

Rut Limit:

Structural capacity (MISA):

(MISA = Million Standard Axles, 80 kN)

Road category

Base type:

Moisture condition of base:

B

Granular

Dry

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 20	1.06	19	0.1	1.2	288	2192	1049	460 - 2392
21 - 160	1.98	85	0.8	3.0	171	1386	540	237 - 1232
161 - 430	2.28	126	0.6	3.0	144	1191	466	204 - 1062
431 - 800	4.18	100	1.6	6.2	67	604	245	107 - 558

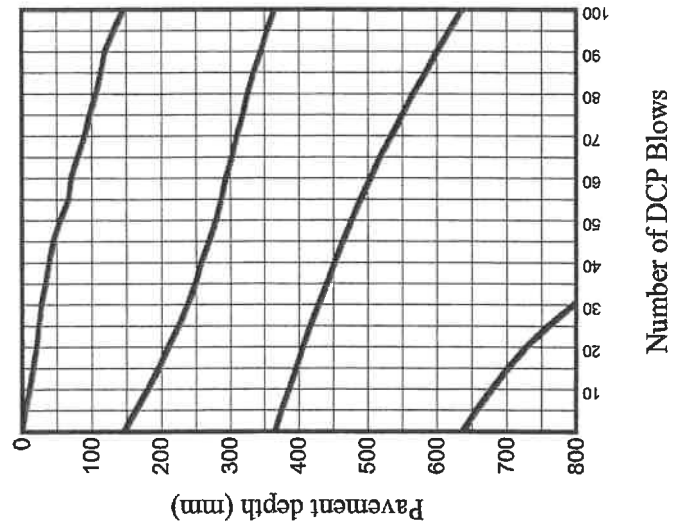
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighted average penetration rate

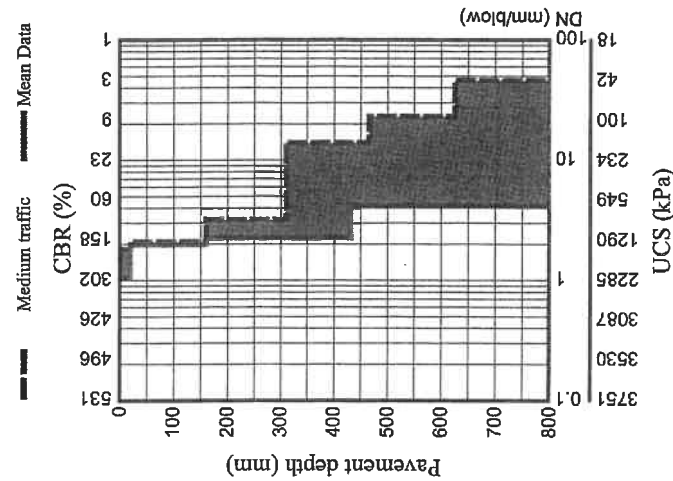
\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)





# DCP Report - Single analysis

Region:

Project date:

27 June, 2007

Road number:

Print date:

MR 473

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croe. Crack	Deform	Other
X65393-186	19 July 2007	7 -	35	Sound	Yes	No	No	Yes	No	No

Design Structure Number in blows (DSN<sub>600</sub>):

211

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Base type:

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Dry

20mm  
8.7

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 30	2.16	17	0.9	3.3	154	1263	493	216 - 1123
31 - 180	1.73	111	0.8	2.7	192	1532	623	273 - 1421
181 - 290	3.21	40	1.2	4.7	93	812	324	142 - 738
291 - 400	11.39	11	2.9	15.1	19	197	84	37 - 192
401 - 800	13.31	32	2.7	16.8	15	166	71	31 - 163

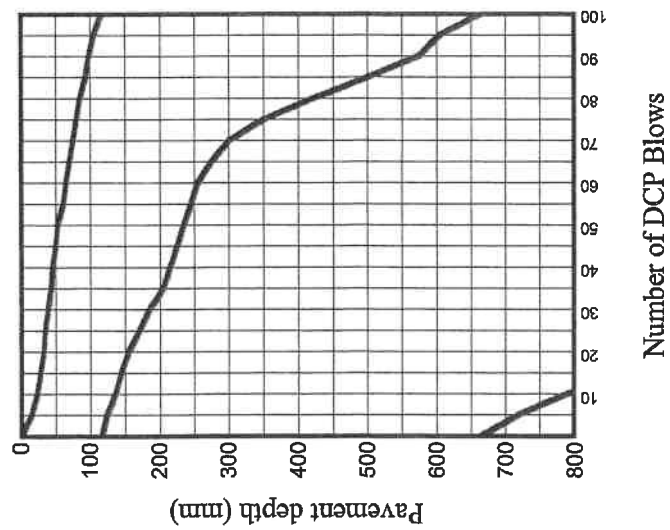
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighed average penetration rate

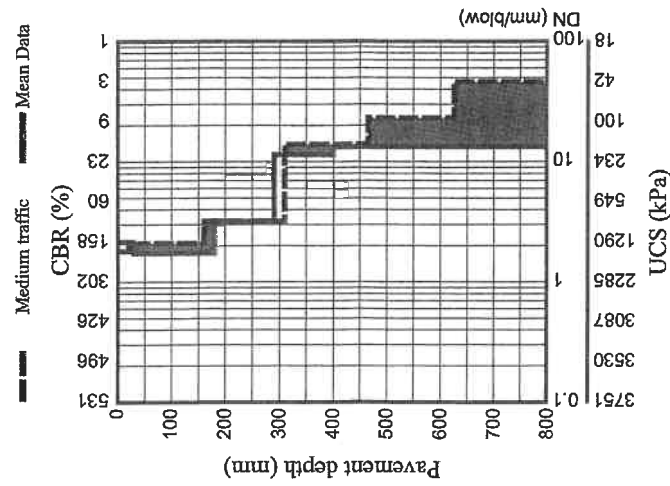
\*\*\* Unconfined Compressive Strength - calculated from weighed average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)



## DCP Report - Single analysis

Region:

Project date:

27 June, 2007

Road number:

Print date:

MR 473  
16 November, 2007

### Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X6593-187	19 July 2007	3 -	35.1	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN<sub>800</sub>):

228

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Dry

 20mm  
11.4

### Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 20	1.38	15	0.2	1.7	235	1830	793	348 - 1807
21 - 200	1.40	146	0.5	2.1	232	1808	779	342 - 1777
201 - 370	5.56	42	3.0	9.4	46	439	181	79 - 412
371 - 800	18.44	25	4.5	24.2	10	115	51	22 - 115

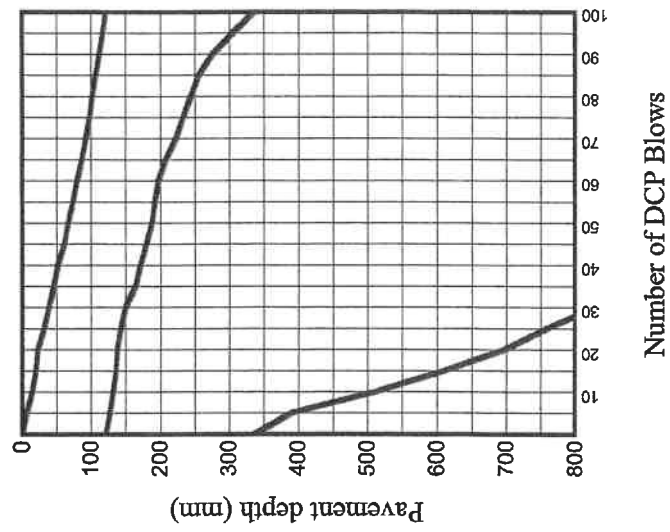
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighted average penetration rate

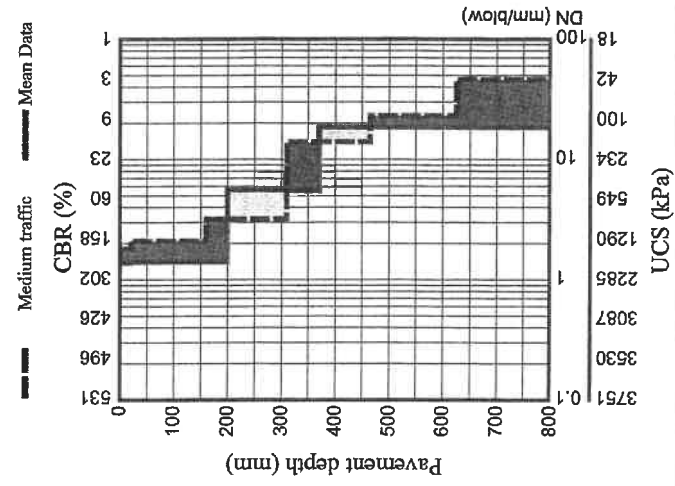
\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)



# DCP Report - Single analysis

Region:

Project date:

27 June, 2007

Road number:

MR 473

Print date:

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-188	19 July 2007	6 -	35.4	Sound	Yes	No	No	Yes	No	No

Design Structure Number in blows (DSN<sub>800</sub>):

185

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Base type:

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Dry

 20mm  
5.5

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 20	2.00	10	0.0	2.0	170	1377	535	234 - 1219
21 - 200	2.32	99	0.9	3.5	141	1168	457	201 - 1043
201 - 370	5.06	44	2.3	8.0	52	487	199	87 - 455
371 - 700	14.94	25	4.8	21.1	13	146	63	28 - 144
701 - 800	13.40	8	0.9	14.6	15	164	71	31 - 162

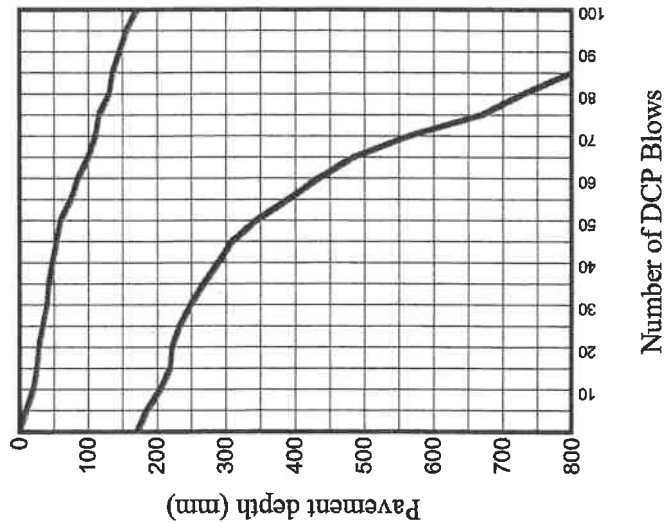
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighed average penetration rate

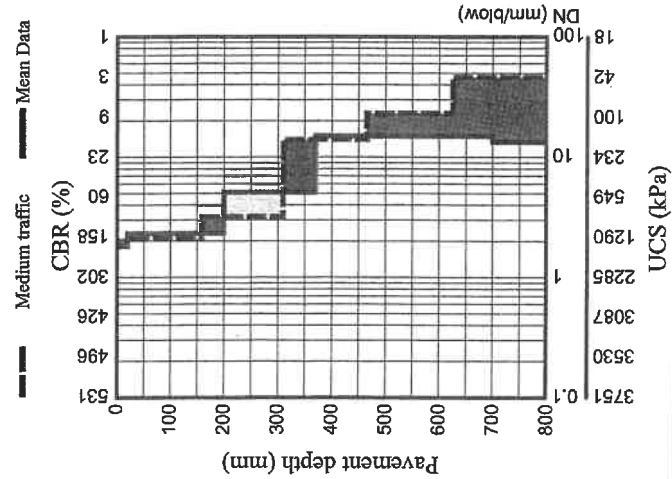
\*\*\* Unconfined Compressive Strength - calculated from weighed average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)



# DCP Report - Single analysis

Region:  
Project date:

27 June, 2007

Road number:  
Print date:

MR 473  
16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-189	19 July 2007	3 -	35.6	Sound	Yes	No	No	Yes	No	No

Design Structure Number in blows (DSN<sub>800</sub>):

257

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Base type:

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Dry

## Average equivalent strength (Existing Pavement Structure)

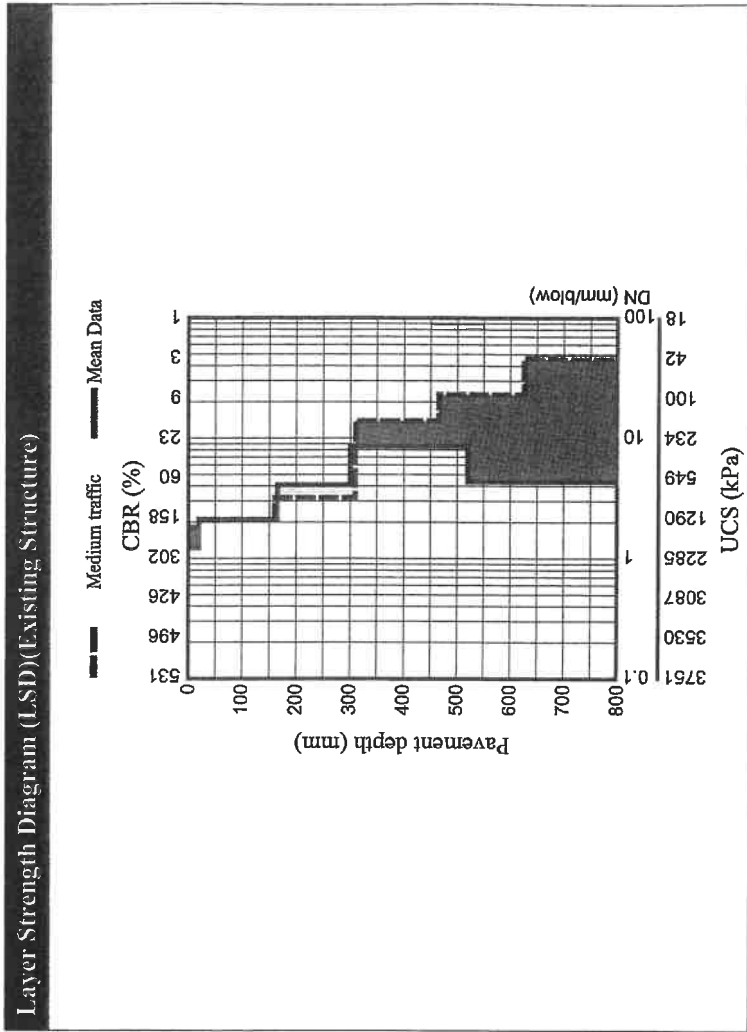
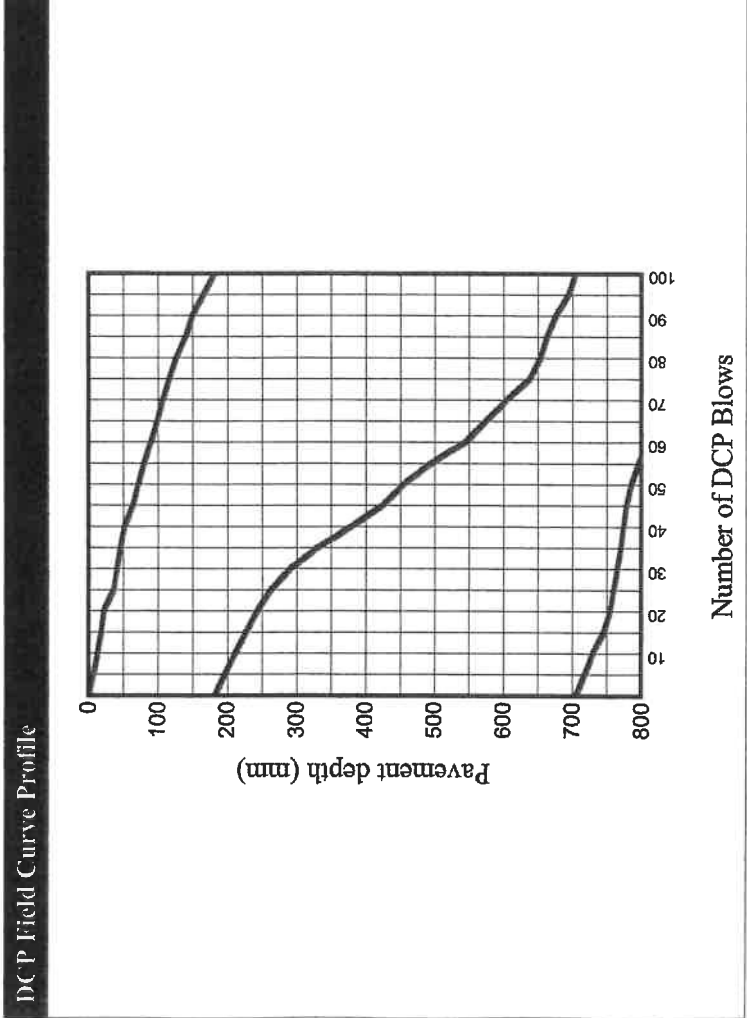
Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 20	1.22	18	0.3	1.6	260	2001	903	396 - 2060
21 - 165	2.10	77	0.7	2.9	160	1302	507	222 - 1156
166 - 300	4.07	36	1.4	5.9	69	622	251	110 - 573
301 - 520	8.56	26	1.3	10.2	27	271	114	50 - 260
521 - 800	4.33	99	2.6	7.6	64	581	236	103 - 537

\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighed average penetration rate

\*\*\* Unconfined Compressive Strength - calculated from weighed average penetration rate

P = Percentile value in %





# DCP Report - Single analysis

Region:

Project date:

27 June, 2007

Road number:

Print date:

MR 473

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-190	19 July 2007	7 -	35.8	Sound	Yes	No	No	No	No	No

Design Structure Number in blows (DSN<sub>600</sub>):

241

Selected Design Traffic:

Medium traffic

Rut Limit:

Road catagory

B

Structural capacity (MISA):

Base type:

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Dry

## Average equivalent strength (Existing Pavement Structure)

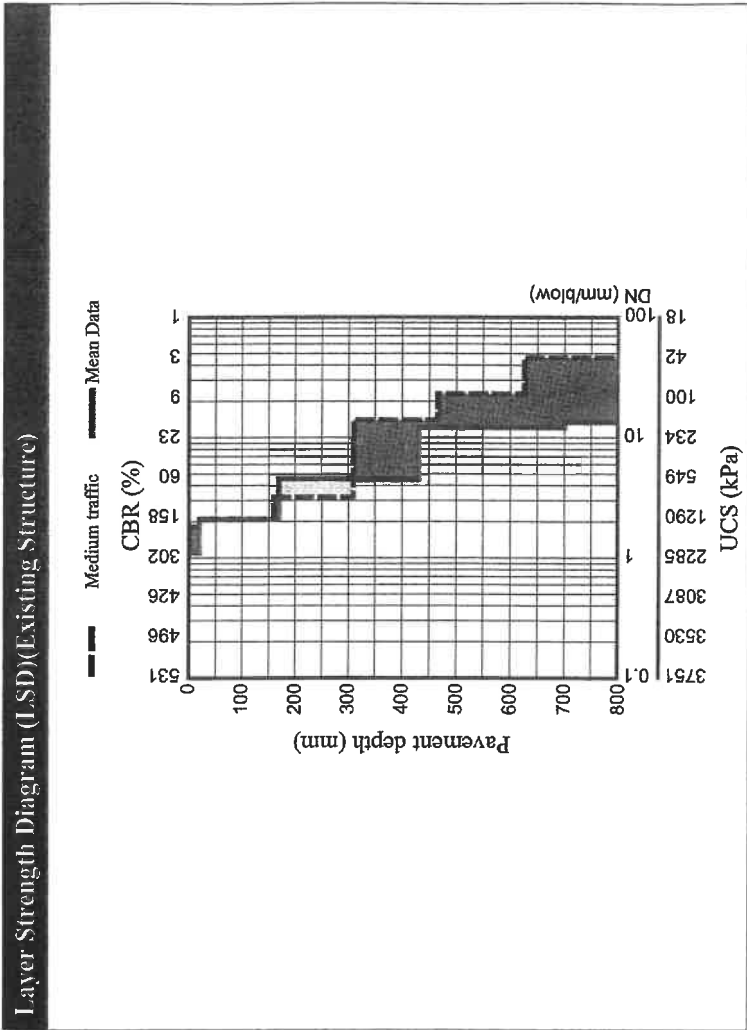
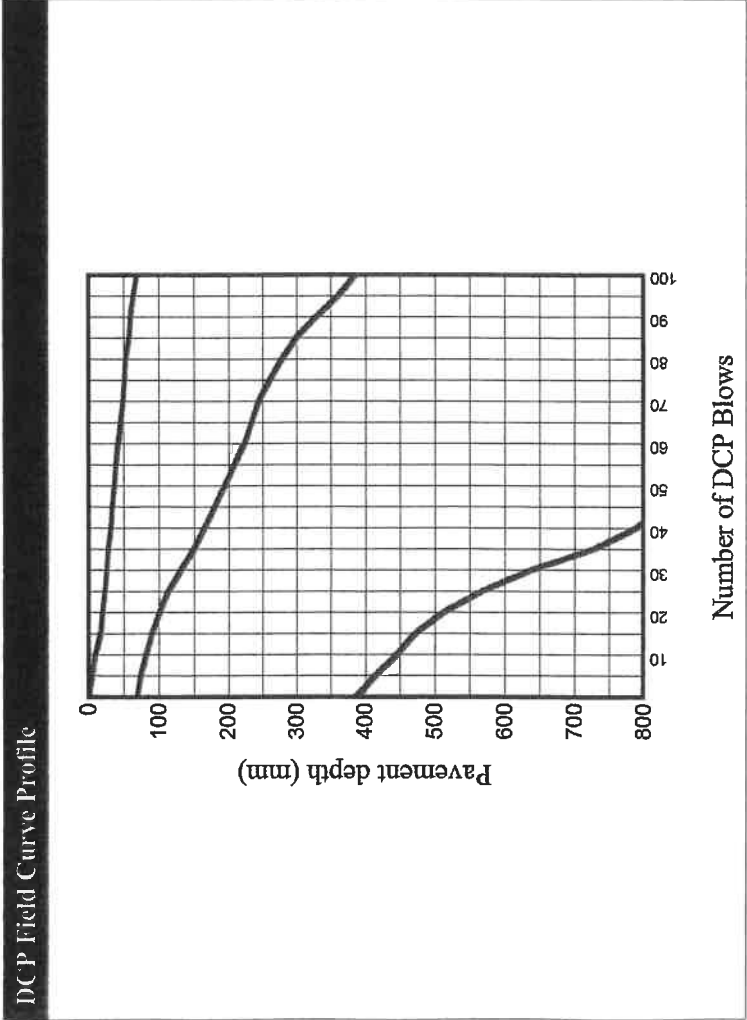
Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 20	1.10	20	0.3	1.5	281	2143	1008	442 - 2300
21 - 170	2.09	122	1.2	3.7	160	1308	509	223 - 1161
171 - 430	4.51	66	1.5	6.4	60	555	225	99 - 514
431 - 700	12.12	26	4.3	17.6	17	184	79	35 - 180
701 - 800	13.36	8	3.2	17.4	15	165	71	31 - 162

\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighed average penetration rate

\*\*\* Unconfined Compressive Strength - calculated from weighed average penetration rate

P = Percentile value in %



# DCP Report - Single analysis

Region:

Project date:

27 June, 2007

Road number:

Print date:

MR 473

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-191	19 July 2007	3 -	36	Sound	Yes	No	No	Yes	No	No

Design Structure Number in blows (DSN<sub>600</sub>):

197

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Base type:

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Dry

20mm

6.8

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 20	1.50	15	0.5	2.2	218	1716	725	318 - 1654
21 - 170	2.15	103	1.4	4.0	155	1272	496	217 - 1131
171 - 300	3.91	38	1.3	5.6	72	650	262	115 - 598
301 - 540	9.48	29	3.9	14.4	24	242	102	45 - 234
541 - 640	18.60	5	1.8	20.9	10	114	50	22 - 114
641 - 800	25.25	6	1.9	27.6	7	81	36	16 - 83

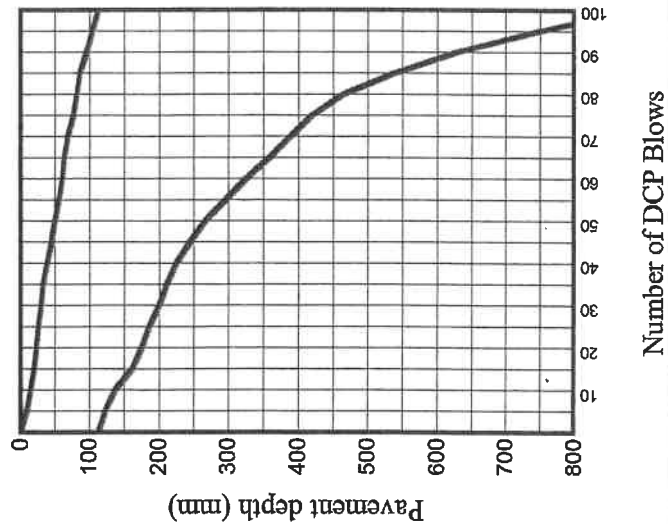
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighted average penetration rate

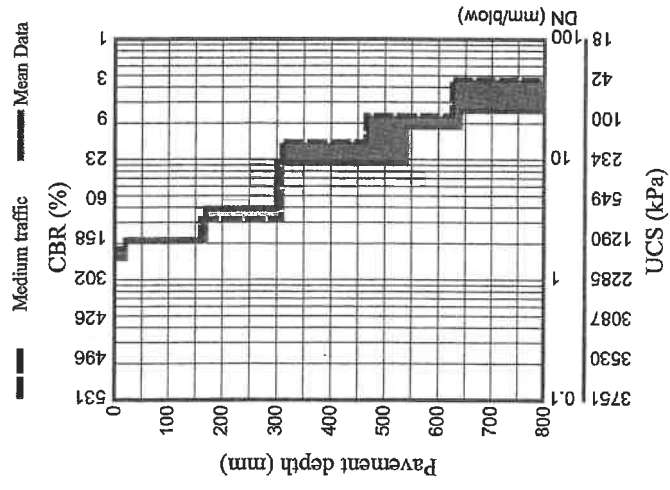
\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)



# DCP Report - Single analysis

Region:

Project date:

27 June, 2007

Road number:

Print date:

MR 473

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-192	19 July 2007	7 -	36.2	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN<sub>600</sub>):

253

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Base type:

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Dry

20mm  
16.5

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 20	1.38	15	0.2	1.7	235	1830	793	348 - 1807
21 - 180	1.84	97	0.5	2.5	182	1464	586	257 - 1336
181 - 460	4.06	85	1.8	6.4	69	623	252	110 - 574
461 - 670	8.83	26	2.6	12.1	26	262	111	48 - 252
671 - 800	4.46	31	1.2	6.0	61	562	228	100 - 520

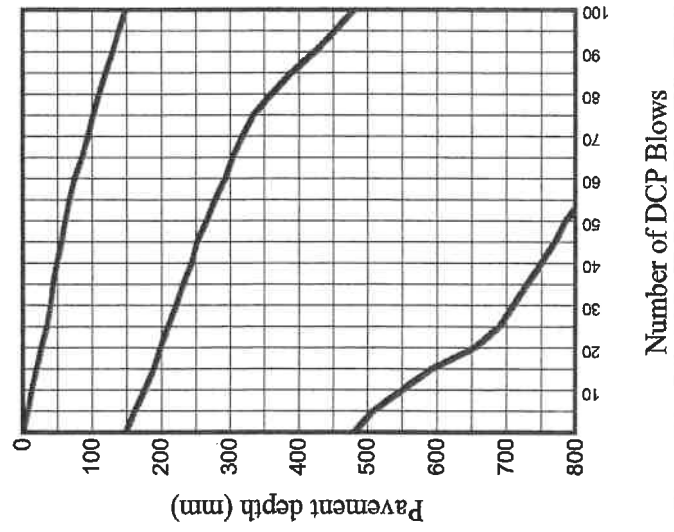
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighted average penetration rate

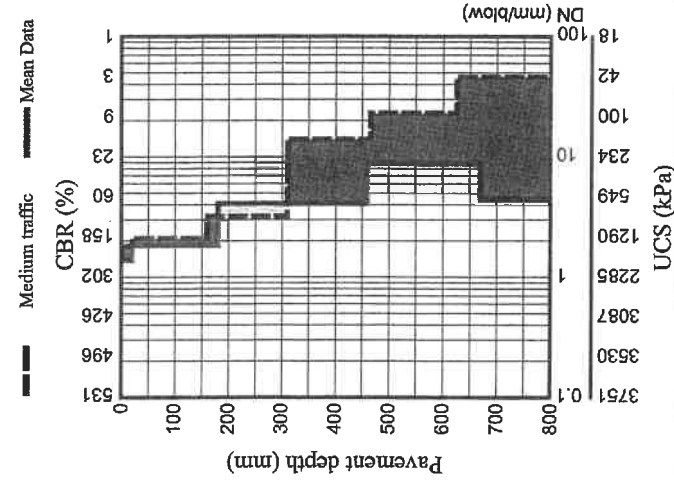
\*\*\* Unconfined Compressive Strength - calculated from weighted average penetration rate

P = Percentile value in %

DCP Field Curve Profile



Layer Strength Diagram (LSD)(Existing Structure)



# DCP Report - Single analysis

Region:

Project date:

27 June, 2007

Road number:

Print date:

MR 473

16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Crc. Crack	Deform	Other
X65393-194	19 July 2007	2 -	36.4	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN<sub>900</sub>):

214

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Base type:

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Dry

## Average equivalent strength (Existing Pavement Structure)

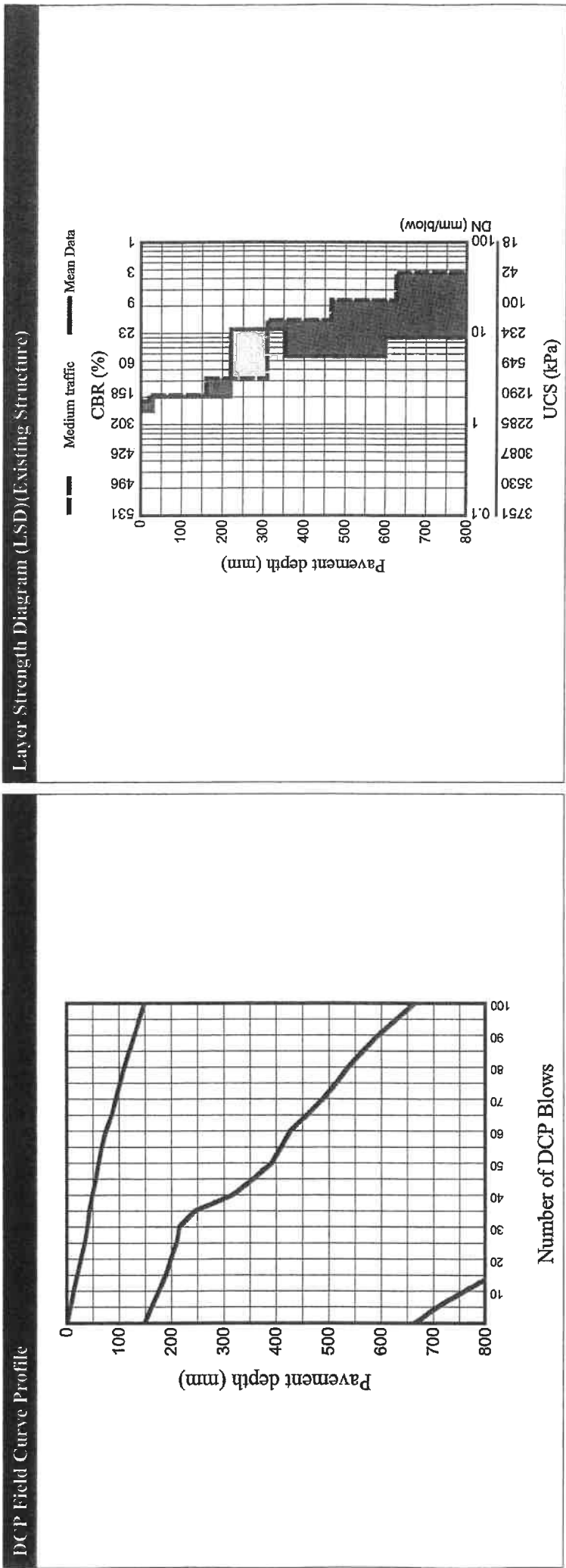
Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 30	1.41	22	0.2	1.7	231	1804	777	341 - 1771
31 - 220	2.01	109	0.8	3.1	169	1370	532	233 - 1214
221 - 355	11.04	14	3.7	15.7	19	204	87	38 - 199
356 - 600	5.60	46	1.1	7.0	46	436	179	79 - 409
601 - 800	9.03	23	1.6	11.1	25	255	108	47 - 246

\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighed average penetration rate

\*\*\* Unconfined Compressive Strength - calculated from weighed average penetration rate

P = Percentile value in %





# DCP Report - Single analysis

Region:  
Project date:

27 June, 2007

Road number:  
Print date:

MR 473  
16 November, 2007

## Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
X65393-196	19 July 2007	2 -	36.8	Sound	Yes	No	No	No	No	No

Design Structure Number in blows (DSN<sub>600</sub>):

252

Selected Design Traffic:

Medium traffic

Rut Limit:

Road category

B

Structural capacity (MISA):

Base type:

Granular

(MISA = Million Standard Axles, 80 kN)

Moisture condition of base:

Dry

20mm  
16.2

## Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P (MPa)
0 - 20	2.96	7	0.5	3.6	103	888	353	155 - 804
21 - 200	2.27	131	1.4	4.0	144	1193	467	205 - 1064
201 - 350	3.53	51	1.2	5.1	83	730	292	128 - 667
351 - 640	8.63	45	4.4	14.2	27	269	113	50 - 258
641 - 800	9.16	18	2.3	12.0	25	251	106	47 - 242

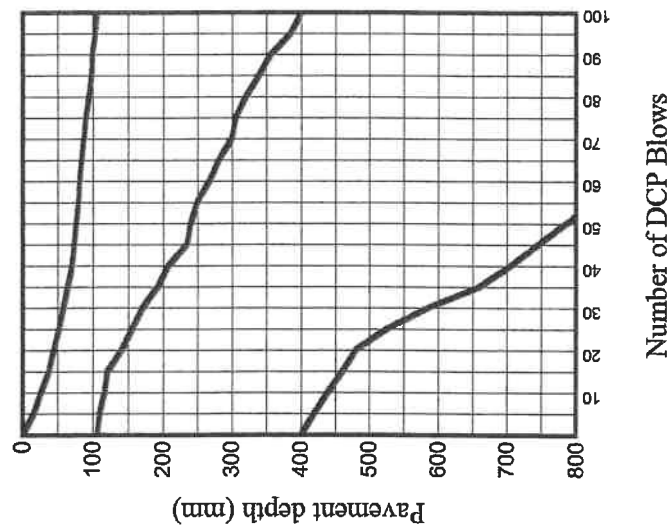
\* Weighted average penetration rate

\*\* California Bearing Ratio - calculated from weighed average penetration rate

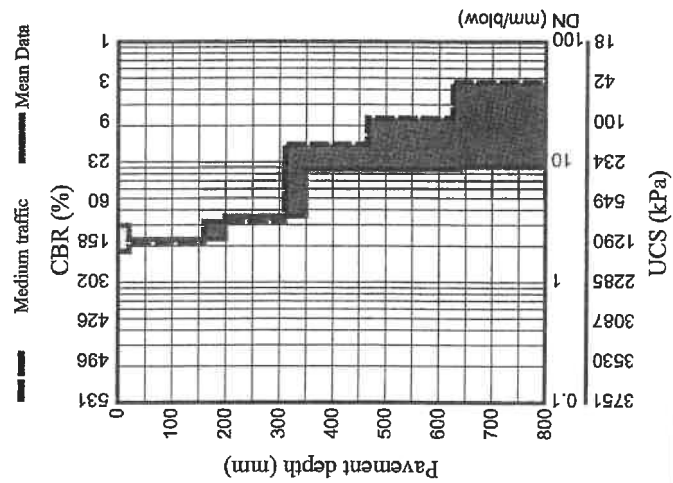
\*\*\* Unconfined Compressive Strength - calculated from weighed average penetration rate

P = Percentile value in %

# DCP Field Curve Profile



# Layer Strength Diagram (LSD)(Existing Structure)



**APPENDIX 7: CORRESPONDENCE FROM THE LOWER SUNDAY'S RIVER WATER USE  
ASSOCIATION**



**Lower Sundays River**

**Water User Association**

**Laer Sondagsrivier**

**Watergebruikersvereniging**

**PO Box / Posbus 10, Belmont Road, Sunland, 6115**

**Tel: 042 234 0038 Fax / Faks: 042 234 0022 • E-mail / E-pos: [info@sundaysriverwater.co.za](mailto:info@sundaysriverwater.co.za)**

**VAT No. 4630120287**

27 November 2018

Aurecon  
P.O. Box 494  
Cape Town  
8000

Good day Mr Abrahams,

With reference to your query regarding supply of water for road construction, we confirm that water will be made available, subject to the following:

1. A written application must be submitted to the Association, stating the purpose, volume, abstraction rate and time frame of the water requirement.
2. The current tariff is R 1088.70 VAT excl. per unit and is for a volume of 3000 cub. m per annum (1 July to 30 June).
3. Application must be done on an annual basis (1 July to 30 June).
4. More than one unit can be applied for, depending on the abstraction rate.
5. Water can only be abstracted from a main canal and at a predetermined point. The main canal does cross the section of road mentioned in your e-mail.
6. Payment is in advance and supply will commence once payment has been received.

Please feel free to contact the Association for further details.

Regards,

  
**N.J. Steenkamp**  
**Technical Officer**



## DISPUTE ADJUDICATION AGREEMENT

between

**THE SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LIMITED**

(Reg No. 1998/009584/06)

(**“Employer”**)

and

---

(Reg No. \_\_\_\_\_)

(**“Contractor”**)

and

---

(**“Member”**)

## 1. DEFINITIONS AND INTERPRETATIONS

- 1.1 In this Dispute Adjudication Agreement, unless the context otherwise indicates :
- 1.1.1 “**Contract**” means Contract SANRAL ... *(insert contract number)* for the *(insert contract description)* entered into between the Employer and the Contractor.
- 1.1.2 “**Contractor**” means ... *(insert contractor's details)* appointed by the Employer under the Contract.
- 1.1.3 “**DAB**” means the three person Dispute Adjudication Board as contemplated in clause 20 of the Conditions of Contract for Construction for Building and Engineering Works designed by the Employer, published by the Fédération Internationale des Ingénieurs-Conseils (hereinafter referred to as “GCC”), in accordance with the terms and conditions as set out in this Dispute Adjudication Agreement.
- 1.1.4 “**Dispute Adjudication Agreement**” means the tripartite agreement between the Employer, Contractor and Member.
- 1.1.5 “**Effective Date**” means the date that this Dispute Adjudication Agreement shall take effect, and unless otherwise stated, it shall be the latest date when the Employer, the Contractor, Member and each of the Other Members have respectively signed a Dispute Adjudication Agreement.
- 1.1.6 “**Employer**” means the South African National Roads Agency SOC Limited, Registration No. 1998/009584/06
- 1.1.7 “**Engineer**” means ... *(insert engineer's details)*.
- 1.1.8 “**Member**” means Mr \_\_\_\_\_, who *(Note to compiler: Delete the following for members other than for the Chairperson's agreement)* will act as chairman of the DAB and who is one of the three persons who are jointly called the DAB.
- 1.1.9 “**Other Members**” means the persons other than the Member, forming part of the DAB
- 1.1.10 “**Parties**” means the Employer, Contractor and Member
- 1.2 In the Dispute Adjudication Agreement, words and expressions which are not otherwise defined shall have the meanings assigned to them in the Contract

## 2. GENERAL PROVISIONS

- 2.1 Following the Effective Date, the Employer and the Contractor shall each give notice to the Member accordingly. If the Member does not receive either notice within six months after entering into the Dispute Adjudication Agreement, it shall be void and ineffective.
- 2.2 This employment of the Member is a personal appointment. At any time, the Member may give not less than 70 days' notice of resignation to the Employer and to the Contractor, and the Dispute Adjudication Agreement shall terminate upon the expiry of this period.
- 2.3 No assignment or subcontracting of the Dispute Adjudication Agreement is permitted without the prior written agreement of all the Parties to it and of the Other Members.
- 2.4 The Dispute Adjudication Agreement shall be governed by the law of the Republic of South Africa.
- 2.5 All disputes will be heard in \_\_\_\_\_, Republic of South Africa, unless otherwise agreed by the Parties.

## 3. WARRANTIES

- 3.1 The Member warrants and agrees that he/she is and shall be impartial and independent of the Employer, the Contractor and the Engineer. The Member shall promptly disclose, to each of them

and to the Other Members, any fact or circumstance which might appear inconsistent with his/her warranty and agreement of impartiality and independence.

- 3.2 When appointing the Member, the Employer and the Contractor relies upon the Members' representations that he/she is:
- a) experienced in the work which the Contractor is to carry out under the Contract,
  - b) experienced in the interpretation of contract documentation, and
  - c) fluent in the language for communications defined in the Contract.

#### **4. APPOINTMENT**

- 4.1 The Employer and the Contractor hereby jointly appoint the Member as a Member of a three-person DAB on the terms and conditions as set out in the Dispute Adjudication Agreement, which appointment the Member by his/her signature hereto accepts;
- 4.2 The conditions of the Dispute Adjudication Agreement comprise the following:
- a) The Dispute Adjudication Agreement together with any addenda or schedules hereto; including the procedural rules;
  - b) The GCC, as amended by any particular conditions, to the extent that it is applicable to the DAB and the Member.

#### **5. GENERAL OBLIGATIONS OF THE MEMBER**

*Note to compiler: Delete this clause for members other than the Chairperson's agreement*

- 5.1 The Member shall act as chairman of the DAB and shall; ensure smooth administration; keep all records; ensure compliance to procedural rules; ensure the ethics of the DAB remain unchallenged; coordinate between the Parties and the DAB; chair meetings and site visits; ensure procedural correctness of all recommendations and decisions of the DAB.
- 5.2 The Member shall have no interest financial or otherwise in the Employer, the Contractor or the Engineer, nor any financial interest in the Contract except for payment under the Dispute Adjudication Agreement.
- 5.3 The Member shall not previously have been employed as a consultant or otherwise by the Employer, the Contractor or the Engineer, except in such circumstances as were disclosed in writing to the Employer and the Contractor before they signed the Dispute Adjudication Agreement.
- 5.4 The Member shall have disclosed in writing to the Employer, the Contractor and the Other Members, before entering into the Dispute Adjudication Agreement and to his/her best knowledge and re-collection, any professional or personal relationships with any director, officer or employee of the Employer, the Contractor or the Engineer, and any previous involvement in the overall project of which the Contract forms part.
- 5.5 The Member shall not, for the duration of the Dispute Adjudication Agreement, be employed as a consultant or otherwise by the Employer, the Contractor, any member/partner of the Contractor or the Engineer, except as may be agreed in writing by the Employer, the Contractor and the Other Members. Notwithstanding this restriction, the Member shall not be restricted to be employed as a consultant or otherwise by the Employer, the Contractor or the Engineer on another contract or matter, but shall disclose to the Employer, the Contractor, and the Other Members, before he/she consult, advises or accepts any instructions from either the Employer, the Contractor, any member/partner of the Contractor, or the Engineer and confirming that such advice, consultation or other instruction taken from such person shall not affect the Member's ability to be unbiased in relation to his/her duties under the Dispute Adjudication Agreement.
- 5.6 The Member shall comply with the annexed procedural rules and Sub-Clause 20.4 of the conditions of Contract.
- 5.7 The Member shall not give advice to the Employer, the Contractor, the Employer's personnel or the Contractor's personnel concerning the conduct of the Contract, other than in accordance with the annexed procedural rules.

- 5.8 The Member shall not while a Member enter into discussions or make any agreement with the Employer, the Contractor or the Engineer regarding employment by any of them, whether as a consultant or otherwise, after ceasing to act under this Dispute Adjudication Agreement.
- 5.9 The Member shall ensure his/her availability for all site visits and hearings as are necessary.
- 5.10 The Member shall become conversant with the Contract and with the progress of the Works (and of any parts of the project of which the Contract forms part) by studying all documents received which shall be maintained in a current working file.
- 5.11 The Member shall treat the details of the Contract and all the DAB's activities and hearings as private and confidential, and not publish or disclose them without the prior written consent of the Employer, the Contractor and the Other Members.
- 5.12 The Member shall be available to give advice and opinions, on any matter relevant to the Contract when requested by both the Employer and the Contractor, subject to the agreement of the Other Members.

## **6. GENERAL OBLIGATIONS OF THE EMPLOYER AND THE CONTRACTOR**

- 6.1 The Employer, the Contractor, the Employer's personnel and the Contractor's personnel shall not request advice from or consultation with the Member regarding the Contract, otherwise than in the normal course of the DAB's activities under the Contract and the Dispute Adjudication Agreement, and except to the extent that prior agreement is given by the Employer, the Contractor and the Other Members. The Employer and the Contractor shall be responsible for compliance with this provision, by the Employer's personnel and the Contractor's personnel respectively.
- 6.2 The Employer and the Contractor undertake to each other and to the Member that the Member shall not, except as otherwise agreed in writing by the Employer, the Contractor, the Member and the Other Members:
- a) be appointed as an arbitrator in any arbitration under the Contract;
  - b) be called as a witness to give evidence concerning any dispute before arbitrator(s) appointed for any arbitration under the Contract;
  - c) be called as a witness or act on behalf of the Employer or Contractor, concerning any dispute that became the subject of litigation under the Contract; or
  - d) be liable for any claims for anything done or omitted in the discharge or purported discharge of the Members functions unless the act or omission is shown to have been in bad faith.
- 6.3 The Employer and the Contractor hereby jointly and severally indemnify and hold the Member harmless against and from claims from which he/she is relieved from liability under the preceding paragraph.

## **7. PAYMENT**

- 7.1 The Member shall be paid a retainer fee of R... (excluding VAT) per calendar month, which shall be considered as payment in full for:
- i) being available on 28 days' notice for all site visits and hearings;
  - ii) becoming and remaining conversant with all project developments and maintaining relevant files;
  - iii) all office and overhead expenses including secretarial services, photocopying and office supplies incurred in connection with his/her duties; and
  - iv) all services performed hereunder except those referred to in sub-paragraphs 7.4, 7.5, 7.6 and 7.7 of this Clause.
- 7.2 The retainer fee shall be paid with effect from the last day of the calendar month in which the Dispute Adjudication Agreement becomes effective; until the last day of the calendar month in which the Taking-Over Certificate is issued for the whole of the Works.
- 7.3 With effect from the first day of the calendar month following the month in which the Taking-Over Certificate is issued for the whole of the Works, the retainer fee shall be reduced by 50%. This reduced fee shall be paid until the first day of the calendar month in which the Member resigns or the Dispute Adjudication Agreement is otherwise terminated.



- 7.4 The Member shall be paid a site visit daily fee of R... (excluding VAT), (reduced to an hourly fee of one eighth the daily fee, for part of a day), which shall be considered as payment in full for:
- i) each day or part of a day up to a maximum of one day's travel time in each direction for the journey between the Member's home and the site or another location of a meeting with the Other Members, as agreed by the Parties.
  - ii) each working day or part of a day on site visits.
- 7.5 The Member shall be paid a dispute analysis daily fee of R... (excluding VAT), (reduced to an hourly fee of one eighth the daily fee, for part of a day), which shall be considered as payment in full for:
- i) each day or part of a day spent on dispute analysis, hearings or preparing decisions; and
  - ii) each day or part of a day spent reading submissions in preparation for a hearing.
- 7.6 The Member shall be paid a pupillage daily fee of R... (excluding VAT), (reduced to an hourly fee of one eighth the daily fee, for part of a day), which shall be considered as payment in full for:
- i) each day or part of a day spent on preparation for pupillage.
  - ii) each day or part of a day spent on offering practical experience and mentoring to assigned pupil.
- 7.7 The Member shall be paid all reasonable expenses incurred in connection with the Member's duties, including the cost of the following:
- i) Travel expenses :-
    - Own car - motor vehicle travel expenses will be recovered at the relevant South African Automobile Association rates,
    - Car hire – group B or similar,
    - Flights – economy class.
  - ii) Accommodation – any type of accommodation up to R1,300.00 per day all inclusive,
  - iii) Subsistence costs.
- 7.8 The Member shall be paid all Value Added Taxes as per the law.
- 7.9 The retainer fee and daily fees shall remain fixed for the 1<sup>st</sup> 24 calendar months and shall thereafter be adjusted by the twelve-month year on year CPI index (as published in the monthly bulletin P0141 of Statistics South Africa under table B) at each anniversary of the Effective Date. The base month shall be the 12<sup>th</sup> month following the Effective Date.
- 7.10 The Member shall be paid in South African Rands.
- 7.11 The member shall submit invoices for payment of the monthly retainer and may include an estimate of the next month's airfares which will be incurred (and which will be reconciled and adjusted in the subsequent invoice). Invoices for other expenses and for daily fees shall be submitted following the conclusion of a site visit or hearing. All invoices shall be accompanied by a DAB fee claim containing records of previous fee claims and a breakdown of activities performed during the relevant period and shall be addressed to the Contractor.
- 7.12 Notwithstanding the fact that the appointment is of the Member in his/her personal capacity the Member may invoice and receive payment to a legal entity of which he/she is a member, shareholder or partner.
- 7.13 The Contractor shall pay the Member's invoices in full within 30 calendar days after receiving each valid invoice, half of which shall be recovered by the Contractor from the Employer.
- 7.14 If the Member does not receive payment of the amount due within 70 days after submitting a valid invoice, the Member may (i) suspend his/her services (without notice) until the payment is received and/or (ii) resign his/her appointment by giving notice under Clause 8.

## **8. TERMINATION**

- 8.1 At any time: (i) the Employer and the Contractor may jointly terminate the Dispute Adjudication Agreement by giving 42 days' notice to the Member; or (ii) the Member may resign as provided for under Clause 2.

- 8.2 If the member fails to comply with the Dispute Adjudication Agreement, the Employer and the Contractor may, without prejudice to their other rights, terminate it by notice to the Member. The notice shall take effect when received by the Member.
- 8.3 If the Employer or the Contractor fails to comply with the Dispute Adjudication Agreement, the Member may, without prejudice to his/her other rights, terminate it by notice to the Employer and the Contractor. The notice shall take effect when received by them both.
- 8.4 Any such notice, resignation and termination shall be final and binding on the Employer, the Contractor and the Member. However, a notice by the Employer or the Contractor, but not by both, shall be of no effect.

## **9. DEFAULT OF THE MEMBER**

- 9.1 If the Member fails to comply with any obligation under Clause 5, he/she shall not be entitled to any fees or expenses hereunder and shall, without prejudice to their other rights, reimburse each of the Employer and the Contractor for any fees and expenses received by the Member and the Other Members, for proceedings or decisions (if any) of the DAB which are rendered void or ineffective.

## **10. DISPUTES**

- 10.1 Any dispute or claim arising out of or in connection with the Dispute Adjudication Agreement, or the breach, termination or invalidity thereof, shall be finally settled by arbitration under the Rules of Arbitration of the Association of Arbitrators of Southern Africa by one Arbitrator appointed by agreement of the Member, the Employer and the Contractor or, failing such agreement, by the Chairman for the time being of the Association of Arbitrators.

## **11. DOMICILIA AND NOTICES**

- 11.1 The Parties choose as their *domicilia citandi et executandi* for all purposes under the Dispute Adjudication Agreement, whether in respect of notices or other documents or communications of whatsoever nature (including the exercise of any option), the following addresses:

11.1.1 Employer (*domicilia citandi et executandi*):

Address: South African National Roads Agency SOC Limited  
48 Tambotie Avenue, Val de Grace, Pretoria, 0184  
Reference: ... CEO

Employer (*General Communication*)

Address: South African National Roads Agency SOC Limited  
... Region, ..., ..., ...  
Fax Number: ...  
Tel. Number: ...  
Reference: ... Regional Manager, ... Region

11.1.2 Contractor:

Address: ...  
...  
Fax Number: ...  
Tel. Number: ...  
Reference: ..., Contract Director

11.1.3 Member:

Address: ...  
...  
Fax Number: ...

Tel. Number: ...  
Reference: ...,

- 11.2 Any notice or communication required or permitted to be given in terms of the Dispute Adjudication Agreement shall be valid and effective only if in writing, but it shall be competent to give notice by telefax or registered mail.
- 11.3 Any Party may by notice to the other Party change the physical address chosen as its *domicilium citandi et executandi* vis-à-vis that Party to another physical address in the Republic of South Africa or its telefax number, provided that the change shall become effective vis-à-vis that addressee on the 7<sup>th</sup> business day from the deemed receipt of the notice by the addressee.
- 11.4 Notwithstanding anything to the contrary herein contained a written notice or communication actually received by a Party shall be an adequate written notice or communication to it notwithstanding that it was not sent to or delivered at its chosen *domicilium citandi et executandi*.

## 12. SIGNATORIES

- 12.1 Signed for and on behalf of the Employer by:

.....  
Name Signature of duly authorised representative  
.....  
Date

In the presence of Witness:

.....  
Name Signature  
.....  
Date

- 12.2 Signed for and on behalf of the Contractor by:

.....  
Name Signature of duly authorised representative  
.....  
Date

In the presence of Witness:

.....  
Name Signature  
.....  
Date

- 12.3 Signed by the Member:

.....  
Name Signature  
.....  
Date

In the presence of Witness:

.....  
Name Signature

.....  
Date

## ANNEXURE 1

### PROCEDURAL RULES

1. Unless otherwise agreed by the Employer and the Contractor, the DAB shall visit the site at intervals of not more than 140 days, including times of critical construction events, at the request of either the Employer or the Contractor. Unless otherwise agreed by the Employer, the Contractor and the DAB, the period between consecutive visits shall not be less than 70 days, except as required to convene a hearing as described below.
2. The timing of and agenda for each site visit shall be as agreed jointly by the DAB, the Employer and the Contractor, or in the absence of agreement, shall be decided by the DAB. The purpose of site visits is to enable the DAB to become and remain acquainted with the progress of the Works and of any actual or potential problems or claims.
3. Site visits shall be attended by the Employer, the Contractor and the Engineer and shall be co-ordinated by the Employer in co-operation with the Contractor. The Employer shall ensure the provision of appropriate conference facilities and secretarial and copying services. At the conclusion of each site visit and before leaving the site, the DAB shall prepare a report on its activities during the visit and shall send copies to the Employer and the Contractor.
4. The Employer and the Contractor shall furnish to each member of the DAB one copy of all documents which the DAB may request, including Contract documents, progress reports, variation instructions, certificates and other documents pertinent to the performance of the Contract. All communications between the DAB and the Employer or the Contractor shall be copied to the other Party.
5. If any dispute is referred to the DAB in accordance with Sub-clause 20.4 of the GCC, the DAB shall proceed in accordance with Sub-clause 20.4 and these Rules. Subject to the time allowed to give notice of a decision and other relevant factors, the DAB shall:
  - a) act fairly and impartially as between the Employer and the Contractor, giving each of them a reasonable opportunity of putting his case and responding to the other's case, and
  - b) adopt procedures suitable to the dispute, avoiding unnecessary delay or expense.
6. The DAB may conduct a hearing on the dispute, in which event it will decide on the date and place for the hearing and may request that written documentation and arguments from the Employer and the Contractor be presented to it prior to or at the hearing.
7. Except as otherwise agreed in writing by the Employer and the Contractor, the DAB shall have power to adopt an inquisitorial procedure, to refuse admission to hearings or audience at hearings to any persons other than representatives of the Employer, the Contractor and the Engineer, and to proceed in the absence of any party whom the DAB is satisfied received notice of the hearing; but shall have discretion to decide whether and to what extent this power may be exercised.
8. The Employer and the Contractor empower the DAB, among other things, to:
  - a) establish the procedure to be applied in deciding a dispute,
  - b) decide upon the DABs' own jurisdiction, and as to the scope of any dispute referred to it,
  - c) conduct any hearing as it thinks fit, not being bound by any rules or procedures other than those contained in the Contract and these Rules,
  - d) take the initiative in ascertaining the facts and matters required for a decision,
  - e) make use of its own specialist knowledge, if any,
  - f) decide upon the payment of financing charges in accordance with the Contract,
  - g) decide upon any provisional relief such as interim or conservatory measures, and
  - h) open up, review and revise any certificate, decision, determination, instruction, opinion or valuation of the Engineer, relevant to the dispute.

9. The DAB shall not express any opinions during any hearing concerning the merits of any arguments advanced by the Parties, unless requested by both the Employer and Contractor. Prior to giving notice to its decision:
- a) it shall convene in private after a hearing, in order to have discussions and prepare its decision;
  - b) it shall endeavour to reach a unanimous decision: if this proves impossible the applicable decision shall be made by a majority of the Members' who may require the minority Member to prepare a written report for submission to the Employer and the Contractor; and
  - c) if a Member fails to attend a meeting or hearing, or to fulfil any required function, the other two Members may nevertheless proceed to make a decision, unless:
    - i) either the Employer or the Contractor does not agree that they do so, or
    - ii) the absent Member is the chairman and he/she instructs the other Members not to make a decision.

Thereafter, the DAB shall make and give notice to its decision in accordance with Sub-clause 20.4 or as otherwise agreed by the Employer and the Contractor in writing.

### COMPULSORY DECLARATION (INCORPORATING SBD4)

The following particulars must be furnished. In the case of a joint venture, separate declarations in respect of each partner must be completed and submitted.

## Section 1: Enterprise details

Section 1. Enterprise details	
Name of enterprise	
Contact person	
E-mail	
Telephone	
Cell	
Fax	
Physical address	
Postal address	

## Section 2: Particulars of companies and close corporations

Company / Close Corporation registration number	
---	--

### Section 3: SARS information

Tax reference number	
VAT registration number	(state Not Registered if not registered for VAT)

#### Section 4: CIDB registration number

CIDB Registration number	
--------------------------	--

## Section 5: Particulars of principals

**Principal:** means a natural person who is a partner in a partnership, a sole proprietor, a director of a company established in terms of the Companies Act of 2008 (Act No. 71 of 2008) or a member of a close corporation registered in terms of the Close Corporations Act, 1984, (Act No. 69 of 1984)

[illegible]

Attach separate page if necessary.

**Section 6: Record in the service of the state:**

Indicate by marking the relevant boxes with a cross, if any principal is currently or has been within the last 12 months in the service of any of the following:

- |  |  |
|--|--|
| <input type="checkbox"/> a member of any municipal council                                     | <input type="checkbox"/> an employee of any department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act 1 of 1999) |
| <input type="checkbox"/> a member of any provincial legislature                                |  |
| <input type="checkbox"/> a member of the National Assembly or the National Council of Province | <input type="checkbox"/> a member of an accounting authority of any national or provincial public entity   |
| <input type="checkbox"/> a member of the board of directors of any municipal entity            | <input type="checkbox"/> an employee of Parliament or a provincial legislature   |
| <input type="checkbox"/> an official of any municipality or municipal entity                   |  |

**If any of the above boxes are marked, disclose the following:**

Name of principal	Name of institution, public office, board or organ of state and position held	Status of service (tick appropriate column)	
		Current	Within last 12 months

Insert separate page if necessary.

**Section 7: Record of family member in the service of the state:**

**Family member:** a person's spouse, whether in a marriage or in a customary union according to indigenous law, domestic partner in a civil union, or child, parent, brother, sister, whether such relationship results from birth, marriage or adoption

Indicate by marking the relevant boxes with a cross, if any family member of a principal as defined in section 5 is currently or has within the last 12 months been in the service of any of the following:

- |  |  |
|--|--|
| <input type="checkbox"/> a member of any municipal council                                     | <input type="checkbox"/> an employee of any department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act 1 of 1999) |
| <input type="checkbox"/> a member of any provincial legislature                                |  |
| <input type="checkbox"/> a member of the National Assembly or the National Council of Province | <input type="checkbox"/> a member of an accounting authority of any national or provincial public entity   |
| <input type="checkbox"/> a member of the board of directors of any municipal entity            | <input type="checkbox"/> an employee of Parliament or a provincial legislature   |
| <input type="checkbox"/> an official of any municipality or municipal entity                   |  |

**If any of the above boxes are marked, disclose the following:**

Name of family member	Name of institution, public office, board or organ of state and position held	Status of service (tick appropriate column)	
		Current	Within last 12 months

Insert separate page if necessary



### Section 8: Record of termination of previous contracts with an organ of state

Was any contract between the tendering entity, including any of its joint venture partners, terminated during the past five years for reasons other than the employer no longer requiring such works or the employer failing to make payment in terms of the contract?

☐ Yes ☐ No (tick appropriate box)

If yes, provide particulars:

----------------------

Insert separate page if necessary

### Section 9: Declaration

The undersigned, who warrants that he/she is duly authorised to do so on behalf of the tendering entity, confirms that the contents of this Declaration are within my personal knowledge, save where stated otherwise in an attachment hereto, and to the best of my belief is both true and correct, and that:

- i) neither the name of the tendering entity, nor any of its principals, appears on:
  - a) the Register of Tender Defaulters established in terms of the Prevention and Combating of Corrupt Activities Act of 2004 (Act No. 12 of 2004); or
  - b) National Treasury's Database of RestrictError! Hyperlink reference not valid.ww.treasury.gov.za);
- ii) the tendering entity or any of its principals has not been convicted of fraud or corruption by a court of law (including a court outside of the Republic of South Africa) within the last five years;
- iii) any principal who is presently employed by the state has the necessary permission to undertake remunerative work outside such employment (attach permission to this declaration);
- iv) the tendering entity is not associated, linked or involved with any other tendering entities submitting tender offers;
- v) the tendering entity has not engaged in any prohibited restrictive horizontal practices, including consultation, communication, agreement, or arrangement with any competing or potential tendering entity regarding prices, geographical areas in which goods and services will be rendered, approaches to determining prices or pricing parameters, intentions to submit a tender or not, the content of the submission (specification, timing, conditions of contract, etc.) or intention to not win a tender;
- vi) the tendering entity has 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;
- vii) neither the tenderer nor any of its principals owes municipal rates and taxes or municipal service charges to any municipality or a municipal entity, and are not in arrears for more than three months;
- viii) SARS may, on an on-going basis during the term of the contract, disclose the tenderer's tax compliance status to the Employer and, when called upon to do so, obtain the written consent of any subcontractors who are subcontracted to execute a portion of the contract that is entered into in excess of the threshold prescribed by National Treasury, for SARS to do likewise.

I, the undersigned .....  
certify that the information furnished in this form above is correct. I accept that the Employer may cancel this agreement should this declaration prove to be false.

.....  
Signature (duly authorised)

.....  
Date

.....  
PositionName of Enterprise

NOTE 1: Section 30(1) of the Public Service Act, 1994, prohibits an employee (person who is employed in posts on the establishment of departments) from performing or engaging remunerative work outside his or her employment in the relevant department, except with the written permission of the executive authority of the department. When in operation, Section 8(2) of the Public Administration Management Act, 2014, will prohibit an employee of the public administration (i.e. municipalities and all national departments, national government components listed in Part A of Schedule 3 to the Public Service Act, provincial departments including the office of the premier listed in Schedule 1 of the Public Service Act and provincial departments listed in schedule 2 of the Public Service Act, and provincial government components listed in Part B of schedule 3 of the Public Service Act) or persons contracted to executive authorities in accordance with the provisions of section 12A of the Public Service Act of 1994 or persons performing similar functions in municipalities, from conducting business with the State or to be a director of a public or private company conducting business with the State. The offence for doing so is a fine or imprisonment for a period not exceeding five years, or both. It is also a serious misconduct which may result in the termination of employment by the employer.

NOTE 2: Regulation 44 of Supply Chain Management regulations issued in terms of the Municipal Finance Management Act of 2003 requires that municipalities and municipal entities should not award a contract to a person who is in the service of the State, a director, manager or principal shareholder in the service of the State or who has been in the service of the State in the previous twelve months.

NOTE 3: Regulation 45 of Supply Chain Management regulations requires a municipality or municipal entity to disclose in the notes to the annual statements particulars of any award made to a close family member in the service of the State.

NOTE 4: Corrupt activities which give rise to an offence in terms of the Prevention and Combating of Corrupt Activities Act of 2004, include improperly influencing in any way the procurement of any contract, the fixing of the price, consideration or other moneys stipulated or otherwise provided for in any contract, and the manipulating by any means of the award of a tender.

NOTE 5: Section 4 of the Competition Act of 1998 prohibits restrictive horizontal practice, including agreements between parties in a horizontal relationship, which have the effect of substantially preventing or lessening competition, directly or indirectly fixing prices or dividing markets or constituting collusive tendering. Section 5 also prohibits restrictive vertical practices. Any restrictive practices that are suspicious will be reported to the Competition Commission for investigation and possible imposition of administrative penalties.

## TAX COMPLIANCE PERMISSION DECLARATION

I, ..... (name)  
the undersigned in my capacity as ..... (position)  
on behalf of .....  
..... (name of company)  
herewith grant consent that SARS may disclose to the South African National Roads Agency SOC  
Limited (SANRAL) our tax compliance status on an ongoing basis for the contract term.

For this purpose, our unique security personal identification number (PIN) is .....,  
our tax reference number is ..... and our tax clearance certificate number is .....

SIGNATURE: .....

DATE: .....

## APPENDIX 9: IMPORTED CONTENT DECLARATION

### ANNEX D: IMPORTED CONTENT DECLARATION – SUPPORTING SCHEDULE TO ANNEX C

(D1)	Tender No.:										
(D2)	Tender Description:										
(D3)	Designated Product(s):										
(D4)	Tender Authority:										
(D5)	Tendering Entity Name:										
(D6)	Tender Exchange Rate:	Pula	P		EU	€		GBP	£	Note: VAT to be excluded from all calculations	

A. Exempted imported content				Calculation of imported content						Summary	
Tender item no's	Description of imported content	Local supplier	Overseas Supplier	Foreign currency value as per Commercial Invoice	Tender Exchange Rate	Local value of imports	Freight costs to port of entry	All locally incurred landing costs & duties	Total landed cost excl. VAT	Tender Qty	Exempted imported value
(D7)	(D8)	(D9)	(D10)	(D11)	(D12)	(D13)	(D14)	(D15)	(D16)	(D17)	(D18)
(D19) Total exempt imported value										R0	
This total must correspond with Annex C - C 21											

B. Imported directly by the Tenderer				Calculation of imported content						Summary	
Tender item no's	Description of imported content	Local supplier	Overseas Supplier	Foreign currency value as per Commercial Invoice	Tender Exchange Rate	Local value of imports	Freight costs to port of entry	All locally incurred landing costs & duties	Total landed cost excl. VAT	Tender Qty	Exempted imported value
(D33)	(D34)	(D35)	(D36)	(D37)	(D38)	(D39)	(D40)	(D41)	(D42)	(D43)	(D44)
(D45) Total imported value by 3 <sup>rd</sup> party										R0	

C. Imported by a 3 <sup>rd</sup> party and supplied to the Tenderer				Calculation of imported content						Summary	
Description of imported content	Unit of measure	Local supplier	Overseas Supplier	Foreign currency value as per Commercial Invoice	Tender Rate of Exchange	Local value of imports	Freight costs to port of entry	All locally incurred landing costs & duties	Total landed cost excl. VAT	Quantity imported	Total imported value
(D33)	(D34)	(D35)	(D36)	(D37)	(D38)	(D39)	(D40)	(D41)	(D42)	(D43)	(D44)
(D45) Total imported value by 3 <sup>rd</sup> party											R 0

D. Other foreign currency payments			Calculation of foreign currency payments		Summary of payments
Type of payment	Local supplier making the payment	Overseas beneficiary	Foreign currency value paid	Tender Rate of Exchange	
(D46)	(D47)	(D48)	(D49)	(D50)	
(D52) Total of foreign currency payments declared by tenderer and/or 3 <sup>rd</sup> party					R 0

Signature of tenderer from Annexure B:  
(SATS 1286.2011)

\_\_\_\_\_

(D53) Total of imported content & foreign currency payments -  
(D32), (D45) & (D52) above

R 0

**This total must correspond with Annex C - C 23**

Date:

\_\_\_\_\_

# ANNEX E: IMPORTED CONTENT DECLARATION - SUPPORTING SCHEDULE TO ANNEX C

(E1)	Tender No.:		Note: VAT to be excluded from all calculations
(E2)	Tender Description:		
(E3)	Designated Product(s):		
(E4)	Tender Authority:		
(E5)	Tendering Entity Name:		

Local Products (Goods, Services and Works)	Description of items purchased	Local suppliers	Value
	(E6)	(E7)	(E8)
<b>(E9) Total local products (Goods, Services and Works)</b>			R 0
(E10)	<b>Manpower costs</b>	(Tenderer's manpower cost)	R 0
(E11)	<b>Factory overheads</b>	(Rental, depreciation & amortisation, utility costs, consumables etc.)	R 0
(E12)	<b>Administration overheads and mark-up</b>	(Marketing, insurance, financing, interest etc.)	R 0
<b>(E13) Total local content</b>			R 0
<b>This total must correspond with Annex C - C24</b>			

Signature of tenderer from Annexure B:  
(SATS 1286.2011)

\_\_\_\_\_

Date:

\_\_\_\_\_

### **Process when requesting exemption letters**

For exemption requests on designated products and the minimum threshold for local content cannot be met for various reasons, bidders must apply for exemption per tender. After checking with the industry, **the dti** will decide whether to grant an exemption or not.

In the official request (signed letter), the following information should be included:

- Procuring entity/government department/state owned company.
- Tender/bid number.
- Closing date.
- Item(s) for which the exemption is being requested for.
- Description of the goods, services or works for which the requested exemption item will be used for and the local content that can be met.
- Reason(s) for the request.
- Supporting letters from local manufacturers and suppliers.

**NB - Exemption letters are tender specific and applications are not transferrable.**

The turnaround time in response to exemption letters for all designated products is five working days with the exception of rail and boats/vessels which is seven working days.

Request for exemption letters are to be directed to:

**Dr Tebogo Makube**

Chief Director: Industrial Procurement

**Tel:** 012 394 3927

**E-mail:** tmakube@thedti.gov.za.

The turnaround time in response to textile, clothing, leather and footwear exemption letters request is two working days and requests are to be directed to:

**Patricia Khumalo**

**Tel:** 012 394 1390

**E-mail:** khumaloP@thedti.gov.za.

## **Guidance Document for the Calculation of Local Content**

### **1. DEFINITIONS**

Unless explicitly provided in this guideline, the definitions given in SATS 1286:2011 apply.

### **2. GENERAL**

#### **2.1. Introduction**

This guideline provides tenderers with a detailed description of how to calculate local content of products (goods, services and works) by components/material/services and enables them to keep an updated record for verification requirements as per the SATS 1286:2011 Annexure A and B.

The guideline consists of two parts, namely:

- a written guideline; and
- three declarations that must be completed:
  - Declaration C: “Local Content Declaration – Summary Schedule” (see Annexure C);
  - Declaration D: “Imported Content Declaration – Supporting Schedule to Annex C” (see Annexure D); and
  - Declaration E: “Local Content Declaration – Supporting Schedule to Annex C” (see Annexure E).

The guidelines and declarations should be used by tenderers when preparing a tender. A tenderer must complete Declarations D and E, and consolidate the information on Declaration C.



Annexure C must be submitted with the tender by the closing date and time as determined by the Tender Authority. The Tender Authority reserves the right to request that Declarations D and E also be submitted.

If the tender is successful, the tenderer must continuously update Declarations C, D and E with actual values for the duration of the contract.

**NOTE:**

Annexure A is a note to the purchaser in SATS 1286:2011; and  
Annexure B is the Local Content Declaration IN SATS 1286:2011.

**2.2. What is local content?**

According to SATS 1286:2011, the local content of a product is the tender price less the value of imported content, expressed as a percentage. It is, therefore, necessary to first compute the imported value of a product to determine the local content of a product.

**2.3. Categories: Imported and Local Content**

The tenderer must differentiate between imported content and local content.

Imported content of a product by components/material/services is separated into two categories, namely:

- products imported directly by the tenderer; and
- products imported by a third party and supplied to the tenderer.

**2.3.1. Imported Content**

Identify the imported content, if any, by value for products by component/material/services. In the case of components/materials/services sourced from a South African manufacturer, agent, supplier or subcontractor (i.e. third party), obtain that information and Declaration D from the third party.

Calculate the imported content of components/materials/services to be used in the manufacture of the total quantity of the products for which the tender is to be submitted.

As stated in clause 3.2.4 of SATS 1286:2011: "If information on the origin of components, parts or materials is not available, it will be deemed to be imported content."

#### 2.3.1.1. Imported directly by the tenderer:

When the tenderer import products directly, the onus is on the tenderer to provide evidence of any components/materials/services that were procured from a non-domestic source. The evidence should be verifiable and pertain to the tender as a whole. Typical evidence will include commercial invoices, bills of entry, etc.

When the tenderer procures imported services such as project management, design, testing, marketing, etc and makes royalty and lease payments, such payments relating to the tender must be included when calculating imported content.

#### 2.3.1.2. Imported by a third party and supplied to the tenderer:

When the tenderer supplies components/material/services that are imported by any third party (for example, a domestic manufacturer, agent, supplier or subcontractor in the supply chain), the onus is on the tenderer to obtain verifiable evidence from the third party.

The tenderer must obtain Declaration D from all third parties for the related tender. The third party must be requested by the tenderer to continuously update Declaration D. Typical evidence of imported content will include commercial invoices, bills of entry etc.

When a third party procures imported services such as project management, design, testing, marketing etc. and makes royalty and lease payments, such payments relating to the tender must be included when calculating imported content.

#### 2.3.1.3. Exempt Imported Content:

Exemptions, if any, are granted by the Department of Trade and Industry (**the dti**). Evidence of the exemptions must be provided and included in Annexure D.

#### 2.3.2. **Local Content**

Identify and calculate the local content, by value for products by components/materials/services to be used in the manufacture of the total quantity of the products.

### **3. ANNEXURE C**

#### **3.1. Guidelines for completing Annexure C: Local Content Declaration – Summary Schedule**

*Note: The paragraph numbers correspond to the numbers in Annexure C.*

**C1. Tender Number**

Supply the tender number that is specified on the specific tender documentation.

**C2. Tender description**

Supply the tender description that is specified on the specific tender documentation.

**C3. Designated products**

Supply the details of the products that are designated in terms of this tender (i.e. buses).

**C4. Tender Authority**

Supply the name of the tender authority.

**C5. Tendering Entity name**

Provide the tendering entity name (for example, Unibody Bus Builders (Pty) Ltd).

**C6. Tender Exchange Rate**

Provide the exchange rate used for this tender, as per the Standard Bidding Document (SBD) and Municipal Bidding Document (MBD) 6.2.

**C7. Specified local content %**

Provide the specified minimum local content requirement for the tender (i.e. 80%), as per the Standard Bidding Document (SBD) and Municipal Bidding Document (MDB) 6.2.

**C8. Tender item number**

Provide the tender item number(s) of the products that have a local content requirement as per the tender specification.

**C9. List of items**

Provide a list of the item(s) corresponding with the tender item number.  
This may be a short description or a brand name.

**Calculation of local content**

**C10. Tender price**

Provide the unit tender price of each item excluding VAT.

**C11. Exempted imported content**

Provide the ZAR value of the exempted imported content for each item, if applicable. These value(s) must correspond with the value(s) of column D16 on Annexure D.

**C12. Tender value net of exempted imported content**

Provide the net tender value of the item, if applicable, by deducting the exempted imported content (C11) from the tender price (C10).

**C13. Imported value**

Provide the ZAR value of the items' imported content.

**C14. Local value**

Provide the local value of the item by deducting the Imported value (C13) from the net tender value (C12).

**C15. Local content percentage (per item)**

Provide the local content percentage of the item(s) by dividing the local value (C14) by the net tender value (C12) as per the local content formula in SATS 1286.

**Tender Summary**

**C16. Tender quantity**

Provide the tender quantity for each item number as per the tender specification.

**C17. Total tender value**

Provide the total tender value by multiplying the tender quantity (C16) by the tender price (C10).



**C18. Total exempted imported content**

Provide the total exempted imported content by multiplying the tender quantity (C16) by the exempted imported content (C11). These values must correspond with the values of column D18 on Annexure D.

**C19. Total imported content**

Provide the total imported content of each item by multiplying the tender quantity (C16) by the imported value (C13).

**C20. Total tender value**

Total tender value is the sum of the values in column C17.

**C21. Total exempted imported content**

Total exempted imported content is the sum of the values in column C18. This value must correspond with the value of D19 on Annexure D.

**C22. Total tender value net of exempted imported content**

The total tender value net of exempt imported content is the total tender value (C20) less the total exempted imported content (C21).

**C23. Total imported content**

Total imported content is the sum of the values in column C19. This value must correspond with the value of D53 on Annexure D.

**C24. Total local content**

Total local content is the total tender value net of exempted imported content (C22) less the total imported content (C23). This value must correspond with the value of E13 on Annexure E.

**C25. Average local content percentage of tender**

The average local content percentage of tender is calculated by dividing total local content (C24) by the total tender value net of exempted imported content (C22).

#### **4. ANNEXURE D**

##### **4.1. Guidelines for completing Annexure D: “Imported Content Declaration – Supporting Schedule to Annexure C”**

*Note: The paragraph numbers correspond to the numbers in Annexure D.*

**D1. Tender number**

Supply the tender number that is specified on the specific tender documentation.

**D2. Tender description**

Supply the tender description that is specified on the specific tender documentation.

**D3. Designated products**

Supply the details of the products that are designated in terms of this tender (i.e. buses).

**D4. Tender authority**

Supply the name of the tender authority.

**D5. Tendering entity name**

Provide the tendering entity name (i.e. Unibody Bus Builders (Pty) Ltd).

**D6. Tender exchange rate**

Provide the exchange rate used for this tender, as per the Standard Bidding Document (SBD) and Municipal Bidding Document (MBD) 6.2.

**Table A. Exempted Imported Content**

**D7. Tender item number**

Provide the tender item number(s) of the product(s) that have imported content.

**D8. Description of imported content**

Provide a list of the exempted imported product(s), if any, as specified in the tender.

**D9. Local supplier**

Provide the name of the local supplier(s) supplying the imported product(s).

**D10. Overseas supplier**

Provide the name(s) of the overseas supplier(s) supplying the exempted imported product(s).

**D11. Imported value as per commercial invoice**

Provide the foreign currency value of the exempted imported product(s) disclosed in the commercial invoice accepted by the South African Revenue Service (SARS).

**D12. Tender exchange rate**

Provide the exchange rate used for this tender as per the Standard Bidding Document (SBD) and Municipal Bidding Document (MBD) 6.2.

**D13. Local value of imports**

Convert the value of the exempted imported content as per commercial invoice (D11) into the ZAR value by using the tender exchange rate (D12) disclosed in the tender documentation.

**D14. Freight costs to port of entry**

Provide the freight costs to the South African Port of the exempted imported item.

**D15. All locally incurred landing costs and duties**

Provide all landing costs including customs and excise duty for the exempted imported product(s) as stipulated in the SATS 1286:2011.

**D16. Total landed costs excl VAT**

Provide the total landed costs (excluding VAT) for each item imported by adding the corresponding item values in columns D13, D14 and D15. These values must be transferred to column C11 on Annexure C.

**D17. Tender quantity**

Provide the tender quantity of the exempted imported products as per the tender specification.

**D18. Exempted imported value**

Provide the imported value for each of the exempted imported product(s) by multiplying the total landed cost (excl. VAT) (D16) by the



tender quantity (D17). The values in column D18 must correspond with the values of column C18 of Annexure C.

**D19. Total exempted imported value**

The total exempted imported value is the sum of the values in column D18. This total must correspond with the value of C21 on Annexure C.

**Table B. Imported Directly By Tenderer**

**D20. Tender item numbers**

Provide the tender item number(s) of the product(s) that have imported content.

**D21. Description of imported content:**

Provide a list of the product(s) imported directly by tender as specified in the tender documentation.

**D22. Unit of measure**

Provide the unit of measure for the product(s) imported directly by the tenderer.

**D23. Overseas supplier**

Provide the name(s) of the overseas supplier(s) supplying the imported product(s).

**D24. Imported value as per commercial Invoice**

Provide the foreign currency value of the product(s) imported directly by tenderer disclosed in the commercial invoice accepted by the South African Revenue Service (SARS).

**D25. Tender rate of exchange**

Provide the exchange rate used for this tender as per the Standard Bidding Document (SBD) and Municipal Bidding Document (MBD) 6.2.

**D26. Local value of imports**

Convert the value of the product(s) imported directly by the tenderer as per commercial invoice (D24) into the ZAR value by using the tender exchange rate (D25) disclosed in the tender documentation.

**D27. Freight costs to port of entry**

Provide the freight costs to the South African Port of the product(s) imported directly by the tenderer.

**D28. All locally incurred landing costs and duties**

Provide all landing costs including customs and excise duty for the product(s) imported directly by the tenderer as stipulated in the SATS 1286:2011.

**D29. Total landed costs excl VAT**

Provide the total landed costs (excluding VAT) for each item imported directly by the tenderer by adding the corresponding item values in columns D26, D27 and D28.

**D30. Tender quantity**

Provide the tender quantity of the product(s) imported directly by the tenderer as per the tender specification.

**D31. Total imported value**

Provide the total imported value for each of the product(s) imported directly by the tenderer by multiplying the total landed cost (excl. VAT) (D29) by the tender quantity (D30).

**D32. Total imported value by tenderer**

The total value of imports by the tenderer is the sum of the values in column D31.

**Table C. Imported by Third Party and Supplied to the Tenderer**

**D33. Description of imported content**

Provide a list of the product(s) imported by the third party and supplied to the tenderer as specified in the tender documentation.

**D34. Unit of measure**

Provide the unit of measure for the product(s) imported by the third party and supplied to tenderer as disclosed in the commercial invoice.

**D35. Local supplier**

Provide the name of the local supplier(s) supplying the imported product(s).

**D36. Overseas supplier**

Provide the name(s) of the overseas supplier(s) supplying the imported products.

**D37. Imported value as per commercial invoice**

Provide the foreign currency value of the product(s) imported by the third party and supplied to the tenderer disclosed in the commercial invoice accepted by SARS.

**D38. Tender rate of exchange**

Provide the exchange rate used for this tender as per the Standard Bidding Document (SBD) and Municipal Bidding Document (MBD) 6.2.

**D39. Local value of imports**

Convert the value of the product(s) imported by the third party as per commercial invoice (D37) into the ZAR value by using the tender exchange rate (D38) disclosed in the tender documentation.

**D40. Freight costs to port of entry**

Provide the freight costs to the South African Port of the product(s) imported by third party and supplied to the tenderer.

**D41. All locally incurred landing costs and duties**

Provide all landing costs including customs and excise duty for the product(s) imported by third party and supplied to the tenderer as stipulated in the SATS 1286:2011.

**D42. Total landed costs excluding VAT**

Provide the total landed costs (excluding VAT) for each product imported by third party and supplied to the tenderer by adding the corresponding item values in columns D39, D40 and D41.

**D43. Quantity imported**

Provide the quantity of each product(s) imported by third party and supplied to the tenderer for the tender.

**D44. Total imported value**

Provide the total imported value of the product(s) imported by third party and supplied to the tenderer by multiplying the total landed cost (D42) by the quantity imported (D43).

**D45. Total imported value by third party**

The total imported value from the third party is the sum of the values in column D44.

**Table D. Other Foreign Currency Payments**

**D46. Type of payment**

Provide the type of foreign currency payment. (i.e. royalty payment for use of patent, annual licence fee, etc).

**D47. Local supplier making the payment**

Provide the name of the local supplier making the payment.

**D48. Overseas beneficiary**

Provide the name of the overseas beneficiary.

**D49. Foreign currency value paid**

Provide the value of the listed payment(s) in their foreign currency.

**D50. Tender rate of exchange**

Provide the exchange rate used for this tender as per the Standard Bidding Document (SBD) and Municipal Bidding Document (MBD) 6.2.

**D51. Local value of payments**

Provide the local value of each payment by multiplying the foreign currency value paid (D49) by the tender rate of exchange (D50).

**D52. Total of foreign currency payments declared by tenderer and/or third party**

The total of foreign currency payments declared by tenderer and/or a third party is the sum of the values in column D51.

**D53. Total of imported content and foreign currency payment**

The total imported content and foreign currency payment is the sum of the values in column D32, D45 and D52. This value must correspond with the value of C23 on Annexure C.



## **5. ANNEXURE E**

### **5.1. Guidelines to completing Annexure E: “Local Content Declaration-Supporting Schedule to Annexure C”**

*The paragraph numbers correspond to the numbers in Annexure E*

#### **E1. Tender number**

Supply the tender number that is specified on the specific tender documentation.

#### **E2. Tender description**

Supply the tender description that is specified on the specific tender documentation.

#### **E3. Designated products**

Supply the details of the products that are designated in terms of this tender (for example, buses/canned vegetables).

#### **E4. Tender authority**

Supply the name of the tender authority.

#### **E5. Tendering entity name**

Provide the tendering entity name (for example, Unibody Bus Builders (Pty) Ltd) Ltd).

#### **Local Goods, Services and Works**

#### **E6. Description of items purchased**

Provide a description of the items purchased locally in the space provided.

#### **E7. Local supplier**

Provide the name of the local supplier that corresponds to the item listed in column E6.

#### **E8. Value**

Provide the total value of the item purchased in column E6.

**E9. Total local products (Goods, Services and Works)**

Total local products (goods, services and works) is the sum of the values in E8.

**E10. Manpower costs:**

Provide the total of all the labour costs accruing only to the tenderer (i.e. not the suppliers to tenderer).

**E11. Factory overheads:**

Provide the total of all the factory overheads including rental, depreciation and amortisation for local and imported capital goods, utility costs and consumables. (Consumables are goods used by individuals and businesses that must be replaced regularly because they wear out or are used up. Consumables can also be defined as the components of an end product that are used up or permanently altered in the process of manufacturing, such as basic chemicals.)

**E12. Administration overheads and mark-up:**

Provide the total of all the administration overheads, including marketing, insurance, financing, interest and mark-up costs.

**E13. Total local content:**

The total local content is the sum of the values of E9, E10, E11 and E12. This total must correspond with C24 of Annexure C.

## **APPENDIX 10 – CONTRACT PARTICIPATION GOAL (CPG) PLAN FORMAT**

Refer to Appendix 10 folder of the tender documentation.

## **APPENDIX 11 – SANRAL PROJECT LIAISON COMMITTEE GUIDELINES**

Refer to section D1000.



## **APPENDIX 12 – CHECKLIST FOR PLCS AND PLOS**

Refer to section D1000.

## **APPENDIX 13 – PROFORMA SUBCONTRACT DOCUMENT FOR TARGETED ENTERPRISES**

To be provided upon award.

## **APPENDIX 14 – EXISTING TARGETED ENTERPRISE DATABASE**

Refer to Appendix 14 of the tender documentation files.

## **APPENDIX 15: HEALTH AND SAFETY OBLIGATIONS**

Upon award, as requirement of the work permit application, the Contractor will be required to provide a breakdown of the amounts under payment item C1.2.5 or other payment items allowed for his health and safety obligations as provided in Appendix 4 of Part C4

# **BILL OF QUANTITIES FOR OCCUPATIONAL HEALTH AND SAFETY**

ITEM NO	DESCRIPTION	UNIT	QTY	RATE	TOTAL
1	Preparation of the Contractor's site-specific Health and Safety Plan	lump sum			
2	Principal Contractor's initial obligations in respect of the Occupational Health and Safety Act and Construction Regulations	lump sum			
3	Principal Contractor's time related obligations in respect of the Occupational Health and Safety Act and Construction Regulations	month			
4	Provision of Personal Protective Equipment (PPE)				
	(a) Reflective vests	Item			
	(b) Hard hats	Item			
	(c) Protective foot wear	Item			
	(d) Earplugs	Item			
	(e) Dust masks	Item			
	(f) Gloves	Item			
	(g) Overalls	Item			
	(h) waterproof clothing	Item			
	(i) gum boots	Item			
	(j) welding masks	Item			
	(k) welding goggles	Item			
	(l) Fall Arrest Equipment	Item			
	m) High visibility overalls to SARTSM Chapter 13 Level 3	Item			
	(n) Ear Defenders SABS approved	Item			

5	Provision of a full time Construction Health and Safety Officer registered with SACPCMP	month			
	Provision of a Full Time Traffic Safety Officer	month			
6	Cost of medical certificates and medical surveillance				
	(a) Initial (baseline) medical examinations	Item			
	(b) Periodic and exit examinations	Item			
	(c) Contractor's charges to allow for handling costs and profit in respect of sub items 6 (a) and (b)	%			
7	Induction training	Item			
8	Environmental Monitoring				
	a) Air Sampling in Situ	Item			
	b) Analyzing Samples	Item			
	c) Tests on Workers	Item			
9	Noise monitoring per item of equipment or plant				
	(a) Establishment of noise zones (plant)	Item			
	(b) Audiograms (personnel)	Item			
10	Payment for H&S representatives at meetings	Hour			
11	Provision of First Aid Boxes to GSR requirements	Item			
12	Transportation of workers	Lump Sum			
13	Submission of a Health and Safety File in electronic format.	lump sum			

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## PART C5: ANNEXURES

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*Note to compiler: Part C5 is only to be utilised after tender closure to include minutes of clarification meeting, correspondence with successful tenderer during the tender evaluation stage as well as Addenda issued*