

TECHNICAL METHODS FOR HIGHWAYS

TMH10

**MANUAL FOR THE
COMPLETION OF
AS-BUILT MATERIALS
DATA SHEETS**

1993

ISBN 1-86844-032-X

TMH10-1993
Published by the

Department of Transport
P O Box 415
PRETORIA
0001
Republic of South Africa

for the
Committee of State Road Authorities

Funded by:
The South African Roads Board

ISBN 1-86844-032-X

December 1993

*Printed in the
Republic of South Africa
by the Department of Transport*

SYNOPSIS

It is important that as-built materials data is retained for future use by road authorities. The intention is to have this data available for future rehabilitation design purposes and to easily retrieve information regarding problem areas. For that reason, the data should be as comprehensive as possible as it should not be necessary for the designer to tap external sources for information.

This document gives instructions for the storing of as-built data in a standard format.

KEYWORDS

As-built, data, roads, pavements, materials.

SINOPSIS

Dit is belangrik dat soos-gebou materiale data vir toekomstige gebruik deur padowerhede in bewaring gehou word. Die doel daarmee is om die data later in die leeftyd van die pad beskikbaar te hê vir die uitvoering van padvernuwingsontwerpe en om inligting van probleemareas maklik te bekom. Die data moet om daardie rede so volledig moontlik wees sodat die ontwerper dit nie hoef nodig te vind om ander inligtingsbronne te raadpleeg nie.

Hierdie dokument stel voorskrifte daar om sodanige inligting op 'n standaard wyse vas te lê.

SLEUTELWOORDE

Soos-gebou, data, paaie, plaveisels, materiale.

PREFACE

TMH10 : 1993

These instructions are published by the Committee for State Road Authorities to be used during the completion of the as-built data sheets, which are also contained herein, and which have been compiled to ensure uniformity with the preservation of as-built materials data. Only that materials data which could be required during the life time of a road for doing rehabilitation designs and evaluation have been included on the forms. Individual road authorities are, however, free to deviate from the forms or instructions to suite specific requirements. Users of these instructions are requested to liaise with the appointed officer of the road authority involved to determine if any special conditions or deviation should be taken into account during the completion of the forms.

Signed

CHAIRMAN: CSRA

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INSTRUCTIONS FOR THE COMPLETION OF AS-BUILT MATERIALS DATA SHEETS

1 INTRODUCTION

As-built data is retained primarily for the purposes of subsequent rehabilitation and to have data on problem areas available during the service life of roads. This applies to both new and reconstructed roads. *The data is not intended to be used for quality control purposes.* Only information which can be used at a later stage to determine the mode of failure of the road or which may prove useful for overlays or rehabilitation design is, therefore, stored.

The relevant road authority should be consulted regarding possible amendments, the format of presentation, front cover, etc. and those instructions should be regarded as part of this document.

Both to satisfy the above and to ensure that the as-built data is as complete as possible without the designer having to tap external sources of information, the following should be made available:

- (a) A key plan, showing the road and route numbers, kilometre distances, subsurface drainage, bigger structures and borrow pits,
- (b) a long section of road foundation showing fill information and roadbed preparation,
- (c) a cross-section of high fills,
- (d) pavement design information,
- (e) typical subsurface drain designs,
- (f) mix designs,
- (g) layer work data,
- (h) record of sections of road that do not conform to the specified standards but were left in place.

The above items have been listed in the order in which they should appear in the as-built data books, as detailed in the following paragraphs.

2 GENERAL ASPECTS

2.1 Work not conforming to specification

Forms should be completed as comprehensively as possible. Additional information of interest, such as work that does not comply with the specification but which has been left in place, possibly with reduced payment, should be bound into the book in front of the as-built data, after the design sheets for that specific layer. Reasons for acceptance of such work should be included. Work conditionally accepted with reduced payment, with the approval of the Engineer and where the specifications allows for it, does not have to be indicated as such.

2.2 Repetitive information

Where information, such as the material source, remains the same for certain adjacent sections, it is not necessary to repeat the information for each section. The extent to which the information repeats itself may be indicated by means of an arrow (see example, page 46).

2.3 Statistical parameters

For test results, only the mathematical mean ($\bar{x}$) and the standard deviation (s) are reported with the exclusion of outliers. When fewer than four samples per lot have been tested, only the range i.e. the highest and lowest results are reported in the two columns. The magnitude of the second figure will indicate that the range rather than the statistical parameters has been reported.

2.4 Layer thickness

The thickness of the layer in millimetres will be the mean value when thickness control has been done by levelling. Where level measurements are not done, the layer thicknesses can be determined by any other physical measurement.

2.5 Sieve analysis index (SAI)

The sieve analysis index should be given for all layers where grading is important as follows:

For soils, gravels and crushed stone (form AB4):

19,0; 4,75; 0,425 and 0,075 mm sieve

For asphalt (form AB5):

19,0; 4,75; 0,600 and 0,075 mm sieve

Present these percentages as follows e.g. for $\bar{x}$: 98/53/35/12 which means that on average 98 % passes the 19,0 mm sieve, 53 % passes the 4,75 mm sieve, 35 % passes the 0,425 mm sieve for soils (or the 0,600 mm sieve for asphalt) and 12 % passes the 0,075 mm sieve.

100 % passing a sieve, is written as 00, e.g. 00/53/35/12.

Where less than 10 % passes a sieve, a 0 is placed in front of the figure, e.g. 00/59/32/08.

The standard deviation is reported to the first decimal as follows: 00/10,4/4,1/1,9.

If it should be decided for any reason that sieve sizes other or more than those specified above should be used, this should be clearly stated on the as-built sheets in a prominent position to prevent confusion.

2.6 Materials classification

The TRH14 system is used as basis and the materials classification as set out therein should be followed e.g. G1, C2, G6, AC etc.

Where material has been modified by the addition of bituminous materials, chemical stabilizers, etc., the relevant G or C code which indicates the classification of the modified material should be used. Add the following to the TRH14 codes:

< G10: Gravel-soil, CBR <3.

2.7 Completion of fields in forms

The data fields to be completed on each form are marked a, b, c, etc. In the descriptions that follow, reference is made to the particular field with a recommendation of how the data for that field should be treated.

2.8 Lanes, carriageways and strips

Refer to Appendix B for a typical cross section of a road.

Where information concerns lanes or strips on the road, the following convention should be adopted:

When facing in the direction of increasing kilometre distances, refer to the left or right lane, or, in the case of double-carriageways, to the left or right carriageway.

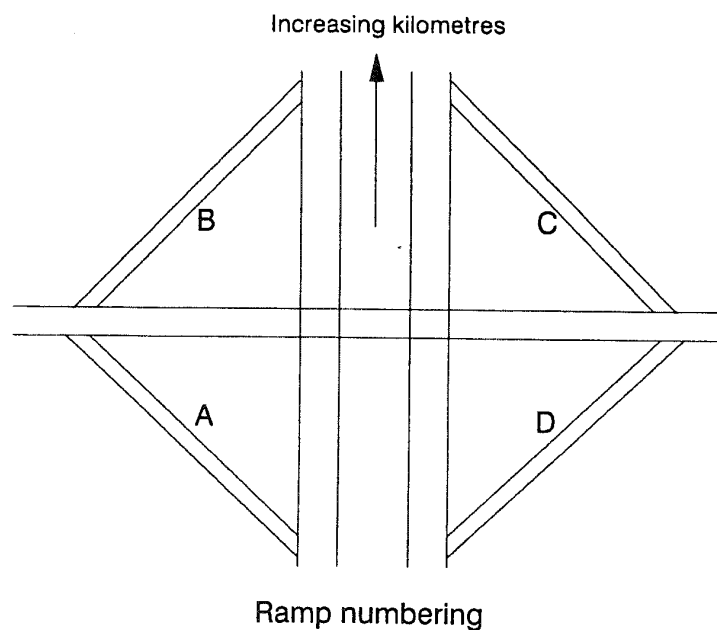
Where more than two strips per carriageway must be described:

- Give the distance from the geometric centreline of the carriageway to the left and right edges of the strip.

For ramps:

- Give the distances to the edges of the strip, measured from the inside (right-hand side) of the on/off ramp.
- Number ramps as per geometric plans (where such plans are unavailable, use the convention depicted in the sketch below).
- Use the kilometreage per geometric plans.

If other conventions of measuring are used, it should be very clearly indicated on the plans.



2.9 Format of documentation

The standard plans and forms should be in A3-format, bound on the left, and provided with front and title pages as required by the specific road authority. The title block on the top of each form should be properly completed.

NB: Blank A3 format master forms of film, paper or sepia, preprinted with the name of the specific road authority, will be available from that source.

If the road authority prefers a format other than A3, the following route may be taken:

A4	Complete the A3 forms and reduce to A4
A2 - A0	Cut the title blocks off and combine the forms horizontally and vertically as required.

Compilation, binding, front page and number of copies required should be discussed with the relevant road authority before the forms are submitted. If the road authority requires the information on computer magnetic or other media, the format, etc., should also be detailed beforehand.

2.10 Abbreviations

Abbreviations used on the forms are given in Appendix A.

3 KEY PLANS

(Example 1)

The first page of the as-built book, just after the title page, should constitute a key plan similar to Example 1, page 39. This key plan can be taken directly from the contract plans and should contain the following information:

- If possible, the adapted kilometre distances, i.e. the kilometreage that will apply for the life of the road, If not, the kilometreage of fixed points, such as larger structures, should be given on the plan.
- The positions and extent of subsoil drains with adjacent reference indicating the type of drain used as given on the drainage schedule in Example 2, page 40.
- The relative positions of borrow pits with accompanying table indicating the purpose for which the material was used. This table could also be given on a separate page with reference to the key plan.
- A realistic scale should be chosen that will make the plans easy to read.

4 SUBSURFACE DRAINAGE

(Example 2)

A data sheet, similar to Example 2, page 40, should be compiled, giving the various subsurface drainage designs. The designs should be marked alphabetically on the key plan for easy reference. If possible, the beginning and kilometreage of the sections of subsurface drains should also be indicated on the key plan.

5 PAVEMENT DESIGN

(Form D1)

The pavement design for any section of road with unique design should be given on Form D1. If different designs are used for certain sections of road, due to, for instance, varying soil conditions or rehabilitation, and it is impractical to indicate specific limits, the various design options could be marked alphabetically and the extent for which a specific design is applicable, indicated on form AB1.

The design should indicate only the pavement layers from final fill to the surface.

The following information is required:

TRH14-class: The TRH14 materials classification e.g. AC, G1, C3, etc. (see 2.6)

The layer thickness in mm.

The reference density, such as: 95 % Marshall, 88 % AMD, 90% MDD (TMH1-A7), etc.

6 LAYERWORK COMPLETION SCHEDULE

(Form AB1)

Form AB1 should be used, for any reason such as construction or reconstruction of only short sections of road or rehabilitation projects where it is impractical to arrange the completion data in chronological order.

The form may be completed in either of two ways:

- (a) When differences occur in the vertical layer works, the vertical axis of the form can be used to indicate the thickness of the various layers for different kilometre distances. Mark each such difference in design alphabetically for cross-reference to Form D1 (see par 5).
- (b) If different surface treatments or patching options are used across the road surface, this should be shown horizontally in one dimension on form AB1. The position of such a patch or strip is determined as described in 2.8. Only operations of more than 100 m in length have to be separately indicated unless required otherwise by the road authority.

If one row of blocks is sufficient to cater for the entire road width, the road centreline (or carriageway centreline) is indicated on the line in the centre of the block. As an alternative, each lane can be covered by a separate row of blocks according to the convention mentioned in 2.8.

The relevant areas are demarcated on the form and the following information written inside this demarcated area:

Cross-reference to the pavement design for this specific area

Date of acceptance

Form and sheet number where the test results for that section can be found.

7 ROAD PROFILE AND ROADBED PREPARATION

(Forms AB2 and AB3)

- (a) Use form AB2 for a longitudinal profile of the roadbed. This should be drawn at the following vertical heights:

Divided dual-carriageway freeways: Centreline of each carriageway

Double or four-lane single carriageway roads: Centreline

- (b) Indicate the method of preparation and materials classification of the in situ roadbed in the relevant rows provided on the form. The following will apply:

- *Roadbed preparation*

Treatment: Use abbreviations such as the following:

RP3 3 pass pneumatic roller compaction

IRP3 3 pass impact roller compaction

RP12 12 pass roller compaction

90 % Compacted to 90 % of MDD (TMH1-A7)

or any other treatment that has been applied (see appendix A).

- *Materials classification*

The top horizon of the in situ material is classified as follows:

Classify the top horizon according to 2.6

For swelling clays: Add (SC) in brackets behind the figure

Collapsing sand: Add (CS) in brackets after the figure

Indicate the depth of the clay or sand in metres as well as any special treatment such as wet to 80 % of saturation, fractured rock, etc. Indicate rock-toe if placed.

- (c) Where side fill or cut and fill or similar construction has taken place and cannot be indicated with a fair degree of accuracy on form AB2, a cross-section of the fill at that point should be drawn on form AB3 as per example.

This cross-section should be drawn for each distance where the information differs significantly from the previous cross-section (see example).

(d) Drainage structures

Where the longitudinal section traverses a drainage structure, this should be indicated by means of a line and the structure number, and pipe or culvert dimensions indicated (see example).

FILLS**(Forms AB2 and AB3)**

It is unnecessary to indicate each fill layer separately in detail on Form AB2 or AB3. Quantify only more or less similar materials. The idea is to inform the user if material of low quality, such as a clay core, has been used in the fill.

The following approach should be used:

Quantify, on Form AB2 or AB3, the material that differ significantly from adjacent materials (see also par 7).

Use the codes in appendix A.

A typical description would be: C - 2,8 which means it is material from the cut at km 2,8.

If there is sufficient space, the above may be written out in full.

9 LAYERWORKS: SOILS, GRAVELS AND CRUSHED STONE

(Form AB4)

9.1 Selected subgrade and subbase

Use Form AB4 to record the data as follows:

- (a) the limits of the lot or section regarded as a single unit, e.g. km 2,15 - 2,45;
- (b) the lane or strip, looking in the direction of increasing kilometres (see 2.8);
- (c) the date on which the layer was placed;
- (d) the source of material, e.g. BP 3,6 (borrow pit at km 3,6) Gamtoos River crushers, etc. (see 2.2);
- (e) the materials classification (see 2.6);
- (f) the type, percentage and source of stabiliser if relevant;
- (h) the layer thickness (see 2.4);
- (i) the mean sieve analysis index (SAI) (see 2.5);
- (j) the standard deviation of the SAI;
- (k) strength test results, i.e. the CBR at the specified density as given in the design, e.g. 53 (at a density of 93 % MDD (TMH1-A7); or the UCS in kPa for cemented materials, e.g. 950 (at the density required by the particular road authority and shown on the design (see par 5); or the Indirect Tensile Strength (ITS) in kPa - as for the UCS;
- (l) the plasticity index (after stabilisation, if stabilised). For slightly plastic material, use a value of 3 and for non-plastic material a value of 1;
- (m) the reference density in kg/m³. For selected subgrade and subbase layers, it would be the maximum density according to TMH1-method A7 or, for cohesionless sand, the TMH1-method A11, or whatever has been specified on form D1;
- (n) the optimum moisture content at which (m) above has been obtained.

- (o) the field compaction as a percentage of the reference density, (m) above.

9.2 Base

For base layers, 9.1 also applies with the following modifications or additions:

- (e) Together with the classification, it should be stated if the material used is G1, G2 or G3 irrespective of what has been specified;
- (k) In most cases, no strength value is specified for G1 bases, in which case the line should be left blank or replaced by weathering test results, such as the ball mill test, and the heading for that line suitably altered;
- (m) For G1 (sometimes also G2) bases, the reference density usually is the apparent maximum or bulk density, or as prescribed on Form D1;
- (n) For G1 bases (and occasionally also G2), the OMC line is left open.

10 ASPHALT BASE AND SURFACING

10.1 Asphalt design

(Form D3)

Use form D3 for reporting the asphalt mix design. The following should serve as guidelines for the completion of the form:

- (a) Under "aggregate", give all the fractions which will be apportioned and mixed by the mixer on site.
- (b) "% in mix" is the percentage of each fraction mentioned in (a) above as a percentage of the total aggregate used.
- (c) Calculate the theoretical design mix from the above for each sieve size and fill in under 'design mix'.
- (d) Complete the following for each aggregate fraction:
 - bulk relative density - also calculated for the design mix
 - sand equivalent - on the sand and mix if required
 - water absorption
 - aggregate crushing value and/or 10 % fine aggregate crushing value (dry)
 - flakiness index
 - stone polishing value
 - aggregate impact value.
- (e) Give the specified design limits.
- (f) Give the type of filler to be used and the percentage e.g. "slaked lime (Northern Lime)".
- (g) Plot the working grading and grading limits.
- (h) Give the following binder properties as indicated on the form:
 - type, e.g. B12 (60/70 pen),
 - source,
 - penetration, as tested,
 - softening point as tested,

- relative density,
 - viscosity at 60 °C and 135 °C,
 - hot flow - only for modified binders,
 - mixing and compaction temperatures derived from the viscosity/temperature curve (see TMH1-C2).
- (i) Plot the required asphalt properties against the percentage binder in the relevant blocks. If two curves are required in the same block, such as Marshall stability and ITS, use different line styles, such as a combination of solid and broken lines. Indicate which line represents which variable.
- (j) Give the required mix properties in the relevant spaces for each binder content used. Determine, from the curves, the mix properties representing the proposed binder content and enter this under "proposal".

10.2 As-built data (asphalt pavement layers)

(Form AB5)

Use the following guidelines for completion of the form.

- (a) the section or lot considered as a unit, e.g. km 3,25 - 3,85;
- (b) the lane or strip; as described in 2.8;
- (c) the date when that specific section was placed;
- (d) source and nature of material used in the asphalt and type of plant e.g.: "Continuously graded quartzite with 4,8 %, B12 (60/70 pen) Natref bitumen, Drummixer". In other words, the description should contain the following information:
mix, type of aggregate, design percentage binder, grade of binder, source of binder and type of mixing plant used. (Should this information remain the same for all the results on a sheet, this need be done only once.);
- (e) the mean and standard deviation or range for the application rate of rolled-in chips (see 2.3);
- (f) the layer thickness (see 2.4);

- (g) the mean sieve analysis index (SAI) as in 2.5;
- (h) the standard deviation of the SAI;
- (i) the mean and standard deviation for binder content determined by testing and represented as a percentage;
- (j) the reference density used for density control (this would be either the Marshall or apparent maximum density). The reference standard should be given on the pavement design form (Form D1);
- (k) Relative compaction constitutes the field density expressed as a percentage of the reference density as indicated in (j) above. The mean and standard deviation are reported as for 2.3;
- (l) the mean and standard deviation of Marshall stability or indirect tensile strength, whichever is specified, as for 2.3;
- (m) the Marshall flow value as for (l) above;
- (n) the mean and standard deviation (or range) for measured paving temperatures;
- (o) the measured tack coat application rate;
- (p) the measured prime application rate;
- (q) the moisture content of the base just before applying the prime layer, determined as described in the standard specification, is given here;
- (r) reference to the page number for asphalt design (once only per sheet).

11 CONCRETE WORKS

11.1 Concrete mix design: Structures

(Form D2)

The concrete mix design is reported on Form D2, which is largely self-explanatory. Thus only a few salient points are discussed here:

- (a) Not all tests subsequent to the aggregate grading necessarily apply to all concrete mixes. Only those required by the standard or project specification should be done.
- (b) The water content plotted on the graph and referred to in the table is the total water content of the mix, including moisture in the aggregate.
- (c) The alpha-value of the cement used is usually obtained from the supplier.

11.2 Concrete mix design: Pavements

(Form D6)

The concrete mix design is presented on form D6. The form is self explanatory and the required information is written on the relevant places on the form. All the tests on aggregate and water are not always applicable and the specific lines on the form should, in such a case, be filled with NA.

11.3 As-built data (concrete pavements)

(Form AB6)

For concrete pavements, the results of the underlying layers are reported on Forms AB2, AB3 and AB4. The deflection of the subgrade, which is essential to the performance of a concrete pavement, and concrete results are reported on Form AB6.

In the title block, the type of pavement is indicated e.g. continuously reinforced, non-reinforced, or non-reinforced with dowels.

(a) to (d) are handled as for the other layers;

- (e) The sources and mix ratios of the aggregates used are given;
- (f) The types of cementing agents used are given;
- (g) The sources and mixing ratios of cementing agents are given;
- (h) Mention the type, trade name and pre-treatment to be used for joint sealants, e.g. 2 parts silicone from Dow Corning with B100 primer;
- (i)&(j) Give the deflection and radii of curvature of the subgrade determined according to the procedure given in the standard specification;
- (k) For layer thickness, see 2.4;
- (l) Give the mean and standard deviation of the 28 day cube strengths;
- (m) (l) also applies for flexural strengths if these have been directly determined. Should the value be determined from cube strengths, this should be placed in brackets;
- (n) Give the average measured slump values;
- (o) Give the texture depth of the completed pavement as determined by the sand patch or any other approved test;
- (p) Any further information deemed to be important;
- (q) Refer to the sheet or page number of the concrete mix design form (form D6).

11.4 As built data: Concrete for structures

No reporting form for concrete for structures is prescribed. If required by the road authority, any suitable reporting format can be used.

12 SEAL WORK

12.1 Seal design

(Form D4)

Form D4 is used to record seal design details. Provision is made for two different road sections or designs. Since this form has not been compiled with any specific design method in mind, it may be necessary to modify the format to suit specific procedures. The form is self-explanatory and is, therefore, not discussed in detail.

The following salient points should, however, be noted:

- Seal type refers to single, double, cape, slurry seal, or whatever type of seal has been used.
- Design method: CPA, TPA, DRTT, etc.
- Information such as climatic region, ball penetration, average E80 per day, etc., need be provided only if required by the specific design method used.
- For certain aggregate tests, the above also applies.
- Type of aggregate: quartzite, dolerite, etc.
- The aggregate application rate should be given in m^2/m^s .
- For the binder "1st spray" represents the first application i.e. tack coat, etc.
- Type of binder: B4 (150/200) bit, An. 65 % Em, etc.
- The binder application rate should be indicated in litres/ m^2 .

12.2 As-built data

(Form A7)

Form A7 is used to record the as-built data. The section, in km, for which information has been included on the sheet, as well as the date of approval of the seal, should be given at the top of the page.

The required information for the various applications is then completed and the range indicated by means of an arrow. This should be done for each strip and the position of the strip should be indicated as per the convention in 2.8. It is not necessary to repeat the design information given Forms D1 and D4.

The form is designed such that data for the layers are filled in from the bottom as they are completed.

13 STABILISATION DESIGN

13.1 Chemical stabilisation

(Form D5)

Chemical stabilisation is when soil or gravel is stabilised or modified with cementitious stabilisers such as hydrated lime, cement, etc.

The stabilization design is given in form D5. On the form provision has been made for two different materials as well as for mixtures thereof.

The form is self explanatory and only a few of the more important aspects are discussed hereunder.

Line no:

- 3 Stab (Type) (ratio): If more than one stabilizer has been used, both are marked and their mixing ratio given in brackets e.g. when lime and slagment have been marked, the ratio is indicated as (50:50), (20:80), etc. The percentage of the stabilizer which occurs first in the list is also given first.
- 10 Mixing (Ratio): Gives the ratio in which the gravel materials are mixed e.g. 1:1 or 50:50. The properties of this mix is then given.
- 18 The stabilization results are entered here. Provision has been made for four different stabilizers although usually only two are used e.g. 2 and 4 %. The test results for two different types of stabilizers can therefore be placed on one form e.g. Cement 2 and 4 % and Lime/Slag 50:50, 2 and 4 %. In such a case the stabilizer being used, say lime/slagment 2 %, should be clearly stated in the line: Stab. type/type x %. As the mixing ratio is given in line 3, it is unnecessary to repeat it here.
- 24 Provision has been made for reporting the strength results at different densities and curing times. Say, for example, that the strength results have to be reported at 100, 97 and 93 %, then the 97 and 98 are deleted in line 24 and the strength result at 100 % written in on the line for the applicable hardening time. The same applies for the 97 and 93 % results by deleting 93 and 95 in line 30 and 90 and 95 in line 36.
- 25 If an accelerated curing procedure is being used, the curing time and temperature should be noted under "notes" for each stabilizer being used, if it differs.

Several aspects are graphically represented such as the degree of saturation. The last mentioned is determined in accordance with clause 8107(d) of the CSRA Standard Specifications for Road and Bridge Works.

13.2 Bituminous stabilisation

No standard form is provided for the design of bituminous stabilised materials. Form D5 may be used where emulsion stabilisation has been done and the appropriate tests have been prescribed. Should Marshall or other asphalt tests be prescribed, the asphalt design form (Form D3), may be used.

APPENDIX A

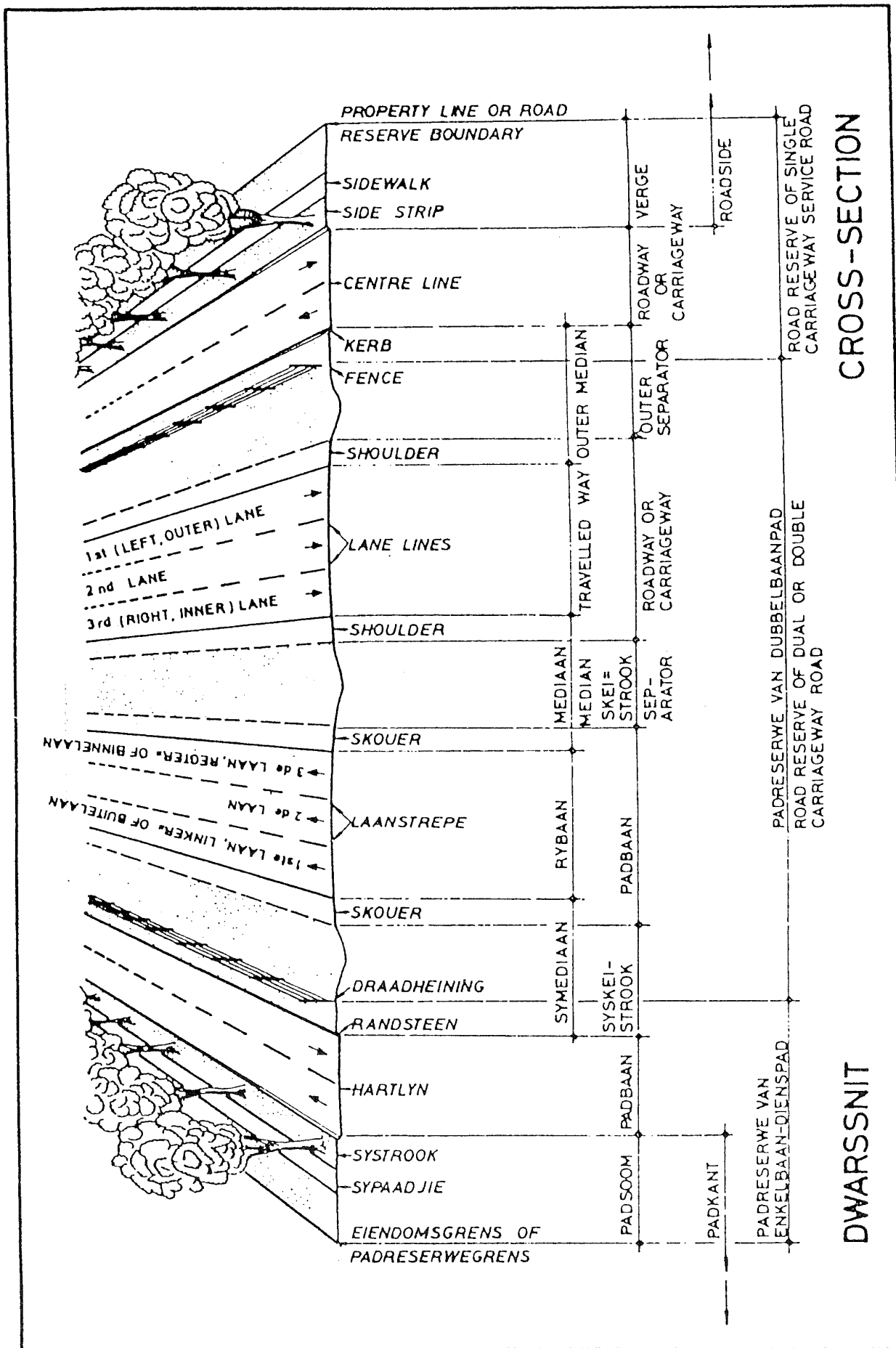
Abbreviations, with Afrikaans equivalents, to be used in the as-built data sheets.

ABBREVIATION	DESCRIPTION	AFKORTING	BESKRYWING
ACV	Aggregate crushing value	AVW	Aggregaat vergruisingswaarde
AIV	Aggregate impact value	AIW	Aggregaat impakwaarde
ALD	Average least dimension	GKA	Gemiddelde kleinste afmeting
AMD	Apparent max density	SMD	Skynbare maks digtheid
Agg	Aggregate	Agg	Aggregaat
An	Anionic (emulsion)	An	Anionies (emulsie)
Anal	Analysis	Anal	Analise
Appl	Application	Aanw	Aanwending
Ave	Average	Gem	Gemiddelde
BC	Box culvert	BC	Kasduiker
BD	Bulk density	BD	Brutodigtheid
BRD	Bulk relative density	BRD	Bruto relatiewedigheid
Bit	Bitumen	Bit	Bitumen
Bp	Borrow-pit	Gr	Groef
Br	Bridge	Br	Brug
C	Cut	D	Deurgrawing
C/W	Cement/water	S/W	Sement/water
C/A	Cement/Aggregate	S/A	Sement/Aggregaat
CBR	California bearing ratio	KDV	Kaliforniese drakragverhouding
CS	Collapsing sand	SS	Swigsand
Cal	Calculate(d)	Ber	Bereken
Cat	Cationic (emulsion)	Kat	Kationies (emulsie)
Cem	Cement	Sem	Sement
Comp	Compaction	Verd	Verdigting
Cond	Conductivity	Kond	Konduktiwiteit
Curv	Curvature	Krom	Kromming
Date	Date	Dat	Datum
Defl	Deflection	Defl	Defleksie
Del	Deleterious	Skad	Skadelik
Dens	Density	Digth	Digtheid
Des	Design	Ontw	Ontwerp
Dev	Deviation	Afw	Afwyking
Dir	Direction	Rigt	Rigting
Dyn	Dynamic	Din	Dinamies
Em	Emulsion	Em	Emulsie
Equiv	Equivalent	Ekw	Ekwivalent
Expans	Expansive (ness)	Uitset	Uitset (ting)
Flex	Flexural strength	Buig	Buig (sterkte)
GM	Grading modulus	GM	Graderingsmodulus
ICL	Initial consumption of lime	AKA	Aanvanklike kalkaanvraag
IRP3	3-Impact roller passes	IRP3	3-Impakrollerdekkings
ITS	Indirect tensile strength	ITS	Indirektetreksterkte
Ind	Index	Ind	Indeks
km	Kilometre	km	Kilometer

Abbreviations, with Afrikaans equivalents, to be used in the as-built data sheets.

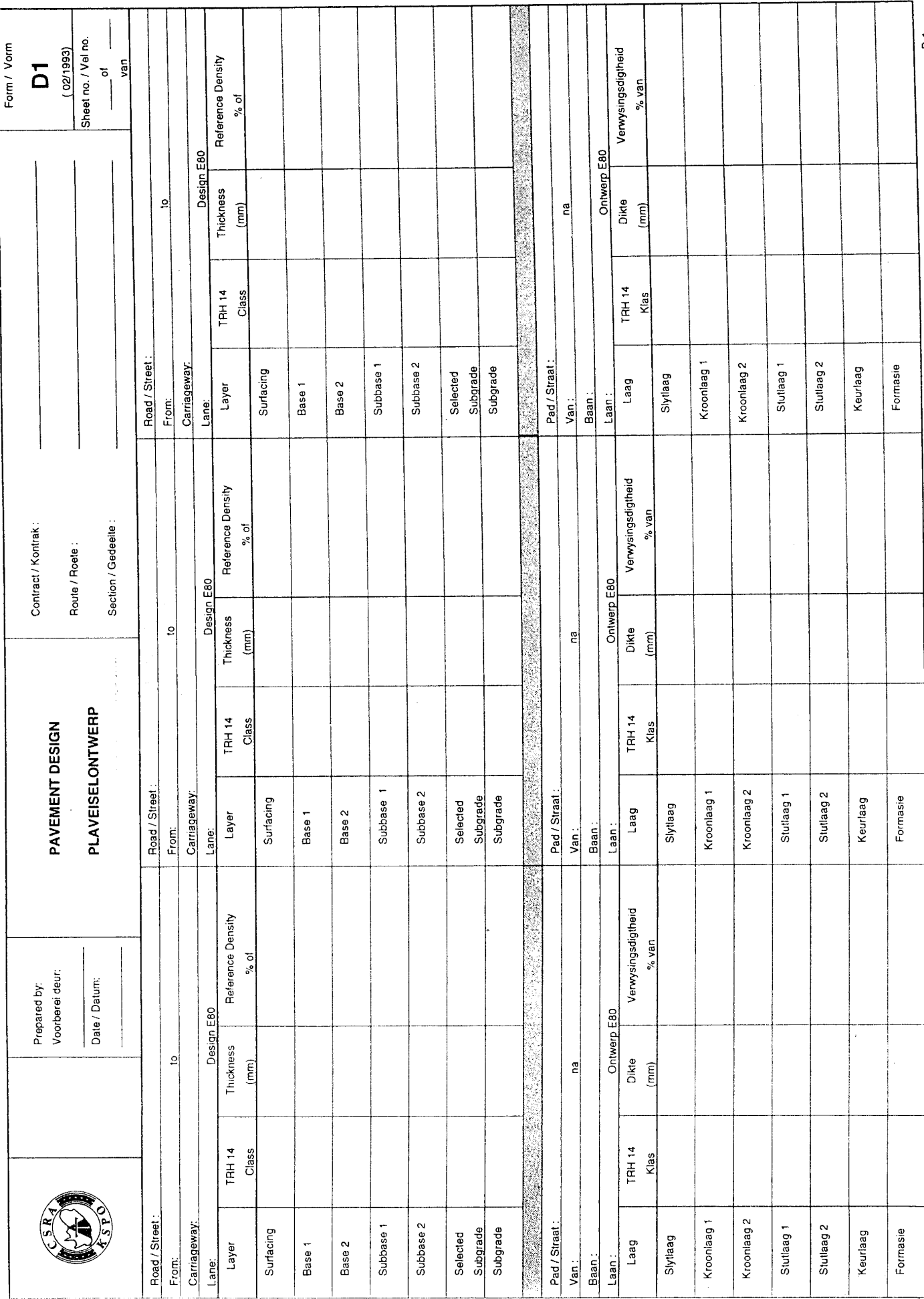
Continued

ABBREVIATION	DESCRIPTION	AFKORTING	BESKRYWING
Layer	Layer	Lg	Laag
Mat	Material	Mat	Materiaal
Mc	Moisture content	Vg	Voggehalte
Meas	Measured	Meas	Gemeet
NA	Not applicable	NVT	Nie van toepassing
Nom	Nominal	Nom	Nominaal
OMC	Optimum moisture content	OVG	Optimum voggehalte
Organ	Organic	Organ	Organiese
P300	300 mm diameter pipe	P300	300-mm deursnee pyp
P600	600 mm diameter pipe	P600	600-mm deursnee pyp
P900	900 mm diameter pipe	P900	900-mm deursnee pyp
PCC	Pre-coated chips	PCC	Voorafbedekte skerwe
PI	Plasticity index	PI	Plastisiteitsindeks
PL	Pioneer layer	PL	Pionierslaag
PSV	Polished stone value	KPW	Klippoleerwaarde
Pol	Polishing	Pol	Poleer
Pos	Position	Pos	Posisie
Prime	Prime layer	Drenkl	Drenklaag
Pt	Point	Pt	Punt
RF	Rock fill	RF	Rotsvul
RIC	Rolled-in chips	IRS	Inrolskerwe
RP12	12 pass roller compaction	RP12	12-rollerdekkings
RP3	3 pass roller compaction	RP3	3-rollerdekking
RT	Rock toe	RT	Rotstoon
Ratio	Ratio	Verh	Verhouding
Ref	Reference	Verw	Verwysing(s)
Rel	Relative	Rel	Relatief
Rep	Repetitions	Rep	Repetisies (herhalings)
Sat	Saturate(d)	Vers	Versadig(de)
SC	Swelling clay	SK	Swellende klei
Soft	Softening	Sagw	Sagwordings
Sol	Soluble	Opl	Oplosbare
Soundns	Soundness	Gaafhd	Gaafheid
Stab	Stability, Stabilising	Stab	Stabiliteit, Stabilisering
Stat	Static	Stat	Staties
Std	Standard	Std	Standaard
Subs	Substance (-s)	Best	Bestandeel (-dele)
TMD	Theoretical max density	TMD	Teoretiese maks digtheid
TMH1-A7	TMH1 method A7	TMH1-A7	TMH1 metode A7
Tack ct	Tack coat	Kleeflg.	Kleeflaag
Temp	Temperature	Temp	Temperatuur
Text	Texture	Teks	Tekstuur
Tot	Total	Tot	Totale
UCS	Unconfined compressive strength	EDS	Een-assige druksterkte
Visc	Viscosity	Visk	Viskositeit



CROSS-SECTION

DWARSSNIT





Prepared by:
Voorberei deur:
Date / Datum:

CONCRETE MIX DESIGN BETONMENGSELONTWERP

Form / Vorm

D 2

(03/1993)
Sheet no. / Vel no.
of
van

Contract / Kontrak :
Route / Roete :
Section / Gedeelte :
Structure / Struktuur :
Pavement / Plaveisel km :
See form D5/Kyk vorm D5 no:

Aggregates Continue / Aggregate Vervolg

Sample / Monster No.	1	2	3	4	5	Air Entrainment / Luginsluiting To / Volgens ASTM C260: Y/J N
Water Demand/Aanvraag [B35]						
Rel. Density / Digtheid [A 12]						Type / Soort
Loose / Los BD [B 9]						Mark / Merk
Compacted/Verdigte BD [B 9]						

Type / Tipe	Source / Bron	RD	Alpha
a			
b			
c			

Mix Properties / Mengseleenskappe

Water	Admix/Bymiddel	Air / Lug
Slump / Sakking (mm)	Slump / Sakking (mm)	Slump / Sakking (mm)
160	160	160
140	140	140
120	120	120
100	100	100
80	80	80
60	60	60
40	40	40
20	20	20
0	0	0

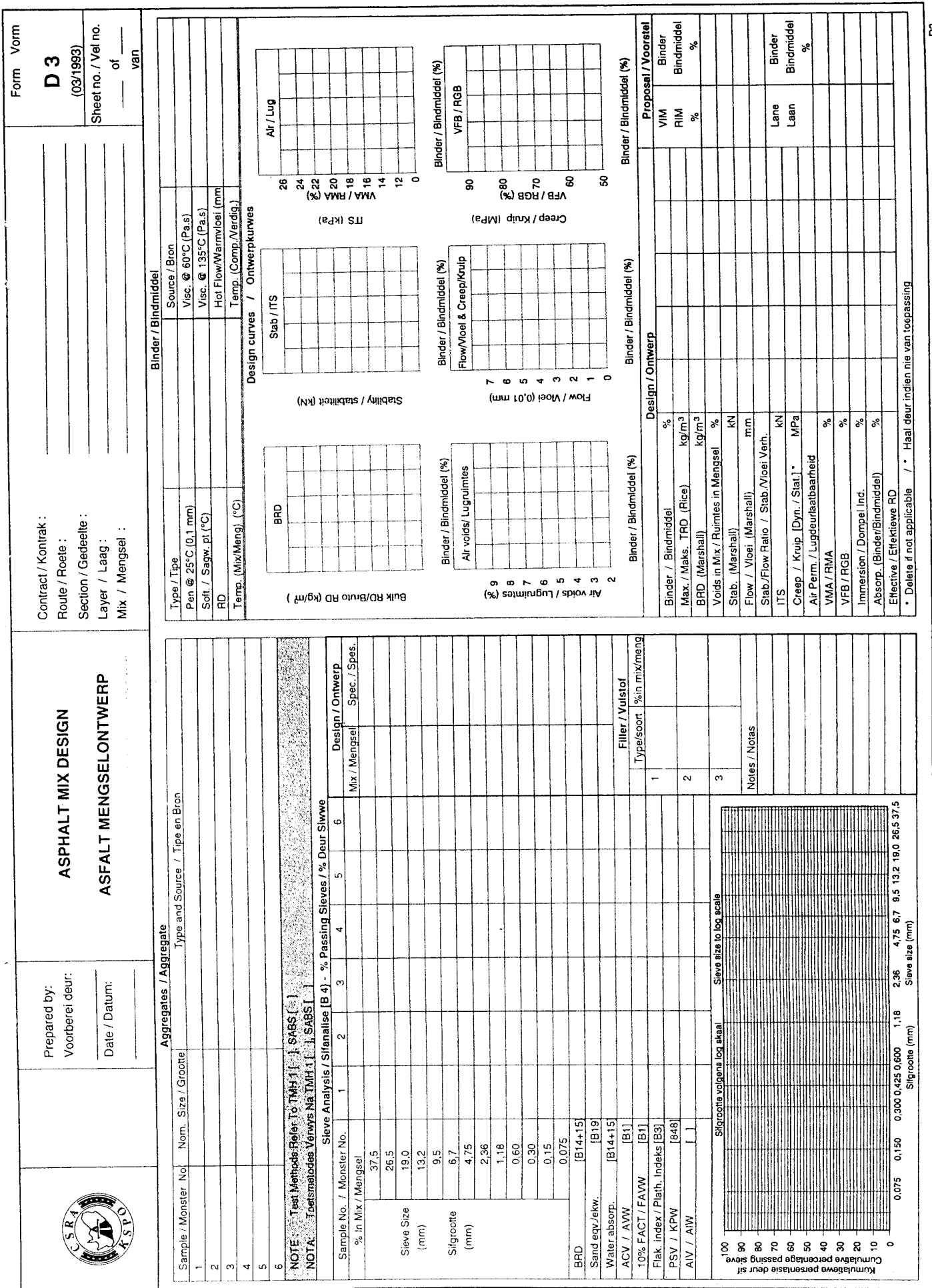
l/m³ m/m³ %

NOTE: Use symbols a, b or c for mixes. NOTE: Gebruik simbole a, b of c vir mengsels

Design targets / Ontwerptekens	a	b	c
Structure Part / Struktuurdeel			
Class / Klas (MPa)			
Aggr. Size / Grootte			
Slump / Sakking (mm)			
C/W(W/C) / S/W (W/S)			
Design / Ontwerp Alpha			
Air / Lug (%)			
Des. Std Dev. / Ontw. Std. Awt.			
% Failure / % Faling			
Placement Method / Plasingmetode			
Mix Proportions / Mengverhoudings			
Per			
Cement / Sement	kg	kg	kg
Slagment or/of Fly Ash / Vliegass	kg	kg	kg
Aggregate	kg	kg	kg
Aggregate	kg	kg	kg
(Dry/Droog)	kg	kg	kg
Water (Maximum / Maksimum)	(liters)	(liters)	(liters)
Admixture / Bymiddel	(ml)	(ml)	(ml)
Air content / Luginhoud	(%)	(%)	(%)
C/W (W/C) Ratio // S/W (W/S) Verhouding			
C/A Ratio // S/A Verhouding			
Fine Aggregate / Fyn Aggregaat (Sand)			
Sacks per m ³ concrete			
Sackage per m ³ beton			
Slagment or Fly ash/of Vliegass			
Slump (Maximum) / Sakking (Maksimum)			
Vibration / Vibrasie	(sec./sek)	(sec./sek)	(sec./sek)
Compr. strength / 3 Days / Dae (MPa)			
Druksterkte / 28 Days / Dae (MPa)			
Target / Teiken (MPa)			

Aggregates / Aggregate

Sample / Monster No.	1	2	3	4	5	Type and Source / Tipe en Bron
1						
2						
3						
4						
5						
NOTE: Test Methods Refer To TMH 11.1 SABS [1] / Toetsmetodes Verwys Na TMH 11.1 SABS [1]						
NOTE: Toetsmetodes Verwys Na TMH 11.1 SABS [1]						
Sample No. / Monster No.	1	2	3	4	5	Mix Grading Mengselgradering
a						a
b						b
c						c
75						
53						
37.5						
26.5						
19.0						
13.2						
9.5						
6.7						
4.75						
2.36						
1.18						
0.60						
0.30						
0.15						
0.075						
0.053						
FM						
Org. Mat. (Y/N) / (J/N)						
Sugar / Suiker						
pH						
Cond. / Geleid. S/m						
Sol. Salts / Opl. Soute (%)						
Sol. Sulph. / Opl. Sulf. (%)						
Chlorides / Chloriedes						
Del. Subs / Skad. best (%)						
M.L.D. / M.L.D. (%)						
Sand Eqv. / Ekw. (%)						
Shrinkage/Krimping (%)						
Expansion / Uitsetting (%)						
Shell Cont. / Skulpinh. (%)						
Flak Index/Plath Ind (%)						
ACV / AVW (%)						
10% FACT / FAVW (kN)						
Pol. Value/Waarde						
MgSO4 Soundns / Gaafhd						
Alkali Reac./Reak. (Y/N)						
Voids/Ruimtes(Shape/vorm)						
Water Absorp. (%)						





Prepared by:
Voorberei deur:

Date / Datum:

SEAL DESIGN SEËLONTWERP

Form Vorm

D4

(02/1993)

Sheet no. / Vel no.

of

van

Contract / Kontrak:

Route / Roete:

Section / Gedeelte:

Type of Construction /

Type Konstruksie:

New / Nuwe:

Rehabilit.

Reseal / Herseel:

Road / Pad (Street / Straat):

Carriageway / Padbaan:

Lane / Laan:

From / Van (km): to / na (km)

Seal Type / Seëltype:

Design method / Ontwerpmetode:

Binder Type / Bindmiddel Type:

General / Algemeen (See Design Sheet/ Sien Ontwerpvoorm)

Traffic Counts / Verkeersstellings

Heavy Vehicles / Swaanvoertuie per hour/uur // day/dag *

E80/ Heavy Vehicle / Swaanvoertuig (Est/Geskat // Del/Bepaal) *

Ave E80 per day/dag

Climatic Zone / Klimaatstreok

Ave Ball Penetration / Gem. Balpenetrasie (mm)

Texture Depth / Tekstuur Diepte (mm)

Traffic Factor / Verkeersfaktor

Aggregate / Aggregaat

Particulars of Aggregate / Besonderhede van Aggregaat

Source / Bron

Type / Tipe

Nominal Size / Nominale Grootte

ALD / GKA (Meas. / Gemet // Calc. / Bereken) (mm)

Flakiness / Plaatagtheid %

AIW / AIW (Dry/Droog // Wet/Nat) %

ACV/AIW (Dry/Droog // Wet/Nat) %

10 % FACT / FAVW (Dry / Droog // Wet / Nat) KN

Triton Value / Tretionwaarde %

Application Rate / Aanwendingskoers (m²/m³)

Binder / Bindmiddel

Spray / Sput

Binder Type / Bindmiddeltype

Required Cold Net / Vereiste Koue Netto l/m²

Spraying Temperature / Spuittemperatuur °C

Recom. Rate/Aanbevole koers alby Spray/Sput Temp. l/m²

Slurry / Flodder

Proportions per 100 kg Aggregate or per m³ mix (Dry)

Mengselverhouding per 100 kg Aggregaat of per m³ Mengsel (Droog)

Crusher Dust / Klipstof (Type/Tipe) kg

Crusher Dust / Klipstof (Type/Tipe) kg

Sand (Type / Tipe) kg

Cement / Sement (Type / Tipe) kg

Emulsion / Emulsie (Type / Tipe) kg or/of liter*

Water liter

Flow of Slurry Mix / Vloei van Floddermengsel mm

* Delete if not applicable

* Haal deur indien nie van toepassing

Road / Pad (Street / Straat):

Carriageway / Padbaan:

Lane / Laan:

From / Van (km): to / na (km)

Seal Type / Seëltype:

Design method / Ontwerpmetode:

Binder Type / Bindmiddel Type:

General / Algemeen (See Design Sheet/ Sien Ontwerpvoorm)

Traffic Counts / Verkeersstellings

Heavy Vehicles / Swaanvoertuie per hour/uur // day/dag *

E80/ Heavy Vehicle / Swaanvoertuig (Est/Geskat // Del/Bepaal) *

Ave E80 per day/dag

Climatic Zone / Klimaatstreok

Ave Ball Penetration / Gem. Balpenetrasie (mm)

Texture Depth / Tekstuur diepte (mm)

Traffic Factor / Verkeersfaktor

Aggregate / Aggregaat

Particulars of Aggregate / Besonderhede van Aggregaat

Source / Bron

Type / Tipe

Nominal Size / Nominale Grootte

ALD / GKA (Meas. / Gemet // Calc. / Bereken) (mm)

Flakiness / Plaatagtheid %

AIW / AIW (Dry/Droog // Wet/Nat) %

ACV/AIW (Dry/Droog // Wet/Nat) %

10 % FACT / FAVW (Dry / Droog // Wet / Nat) KN

Triton Value / Tretionwaarde %

Application Rate / Aanwendingskoers (m²/m³)

Binder / Bindmiddel

Spray / Sput

Binder Type / Bindmiddeltype

Required Cold Net / Vereiste Koue Netto l/m²

Spraying Temperature / Spuittemperatuur °C

Recom. Rate/Aanbevole koers alby Spray/Sput Temp. l/m²

Slurry / Flodder

Proportions per 100 kg Aggregate or per m³ mix (Dry)

Mengselverhouding per 100 kg Aggregaat of per m³ Mengsel (Droog)

Crusher Dust / Klipstof (Type/Tipe) kg

Crusher Dust / Klipstof (Type/Tipe) kg

Sand (Type / Tipe) kg

Cement / Sement (Type / Tipe) kg

Emulsion / Emulsie (Type / Tipe) kg or/of liter*

Water liter

Flow of Slurry Mix / Vloei van Floddermengsel mm

* Delete if not applicable

* Haal deur indien nie van toepassing



Prepared by: _____
 Voorberei deur: _____
 Date / Datum: _____

Form Vorn
D5
(03/1993)

Contract / Kontrak :
Route / Roete :
Section / Gedeelte :
Layer / Laag :
Mix / Mengsel :

Materials / Materials Data

[illegible]

Notes / Notas :- ICL - Initial Consumption of Lime / AKA - Aanvanklike Kalkaanvraag

* Delete if not applicable / Haal deur indien nie van toepassing

30

50



Prepared by:
Voorbereid deur:
Date / Datum:

	Form / Vorm
Contract / Kontrak :	
Route - Section / Route - Sektie :	
Portion between / Gedeelte tussen:	
Carrigeway / Verkeersbaan :	
Lane / Laan :	
Layer / Laag :	
From/Vanaf :	
	to/na km
	No
	Of / Van
	Sheet / Vel
D6 (08/1993)	

Form / Vorm

D6

(06/1993)

Nat / Vel

an

Aggregates / Aggregaat			Cementing Agents / Sementteermiddels				
Sample No. Monster No.	Nominal Size Norm. Grootte	Type and Source Tipe en Bron	Proposed Type and Source Voorgestelde Tipe en Bron	RD waarde	Alpha value	Project Spec. Requirement Projek Spes. Vereiste	
1				1		** Limitations / beperkings %	
2				2			
3				3			
4				4			
5							
Tests / Toetse							
Sample No. / Monster No.	1	2	3	4	5	Particulars of Mixes Besonderhede van Mengsels	
a % In Mix / Mengsel							
b % In Mix / Mengsel							
c % In Mix / Mengsel							
Sieve analysis	75					a b c	
	53						
	37.5						
Sifanalise	26.5						
	19.0						
	13.2						
% Passing	9.5						
Sieves	6.7						
m/m	4.75						
% Deur siwwe	2.36						
m/m	1.18						
	0.60						
	0.30						
	0.15						
	0.075						
	0.053						
Water for Concrete / Water vir Beton							
Sample / Monster	No	Sample / Monster	No	Sample / Monster	No		
						</	

Test Methods Refer to / Toetsmethode Verwys na : TMH1 / SABS

	Prepared by: Voorberei deur: _____ Date / Datum: _____	ROAD FOUNDATION PROFILE AND FILL LAYERS PADFONDAMENTPROFIEL EN OPVULLINGSLAE	Contract / Kontrak : _____ Route / Roete : _____ Section / Gedeelte : _____ Carriageway / Baan : _____ From / Van _____ to / na _____	Form / Vorm AB2 (03/1993) Sheet no. / Vel no. _____ of _____ van _____
Final Road Level Finale Padhoogte	km 0			
Roadbed Preparation / Padbodembewerking Material Classification / Materiaal Klassifikasie	km 0			
Final Road Level Finale Padhoogte	km 0			
Roadbed Preparation / Padbodembewerking Material Classification / Materiaal Klassifikasie	km 0			
Final Road Level Finale Padhoogte	km 0			
Roadbed Preparation / Padbodembewerking Material Classification / Materiaal Klassifikasie	km 0			
Final Road Level Finale Padhoogte	km 0			
Roadbed Preparation / Padbodembewerking Material Classification / Materiaal Klassifikasie	km 0			



Prepared by:
Voorberei deur:

Date / Datum:

ROAD FOUNDATION PROFILE
CROSS SECTION

PADFONDAMENTPROFIEL
DWARSSNIJ

Contract / Kontrak:
Route / Roete:
Section / Gedeelte:
Carriageway / Baan:
Profile No. / Profiel No.:

at km / by km

Form / Vorm

AB3

(03/1993)

Sheet no. / Vel no.

of

van

Metres

Meters

Final Road Level

Finale Padhoogte

Roadbed Preparation

Padbodembewerking

Material Classification

Materialaalklassifikasie

		Prepared by: Voorberei deur: Date / Datum		PAVEMENT LAYERS SOILS AND GRAVELS PLAVEISELLAE GRONDE EN GRUISE		Contract / Kontrak: Route / Roete: Section / Gedeelte: Carriageway / Baan: Layer / Laag:		From / Van km To / Na km		Form AB4 (03/1993) Sheet no. / Val no. of van
a	Section / Seksie : km - km									
b	Lane / Laan									
c	Date placed / Datum geplaas (Lot no.)									
d	Source / Bron									
e	Mat. Class / Klas (Description/Beskrywing)									
f	Slab. Agent / Slab. Middelen %									
g	Mean / Gem. (x) // Std. Dev. / Afw. (s)									
h	Layer thickness / Laagdikte (mm)									
i	SAI (x)	19,0/4,75/0,425/0,075								
j	SAI (s)	19,0/4,75/0,425/0,075								
k	CBR / UCS / KDV / EDS / ITS @									
l	PI (Before/After Treat. // Voor/Na Behand.)									
m	Ref density/Verw. digtheid (kg/m³)									
n	Refer. OMC/Verw. OVG (%)									
o	Compaction / Verdigting (%)									
a	Section / Seksie : km - km									
b	Lane / Laan									
c	Date placed / Datum geplaas (Lot no.)									
d	Source / Bron									
e	Mat. Class / Klas (Description/Beskrywing)									
f	Slab. Agent / Slab. Middelen %									
g	Mean / Gem. (x) // Std. Dev. / Afw. (s)									
h	Layer thickness / Laagdikte (mm)									
i	SAI (x)	19,0/4,75/0,425/0,075								
j	SAI (s)	19,0/4,75/0,425/0,075								
k	CBR / UCS / KDV / EDS / ITS @									
l	PI (Before/After Treat. // Voor/Na Behand.)									
m	Ref density/Verw. digtheid (kg/m³)									
n	Refer. OMC/Verw. OVG (%)									
o	Compaction / Verdigting (%)									

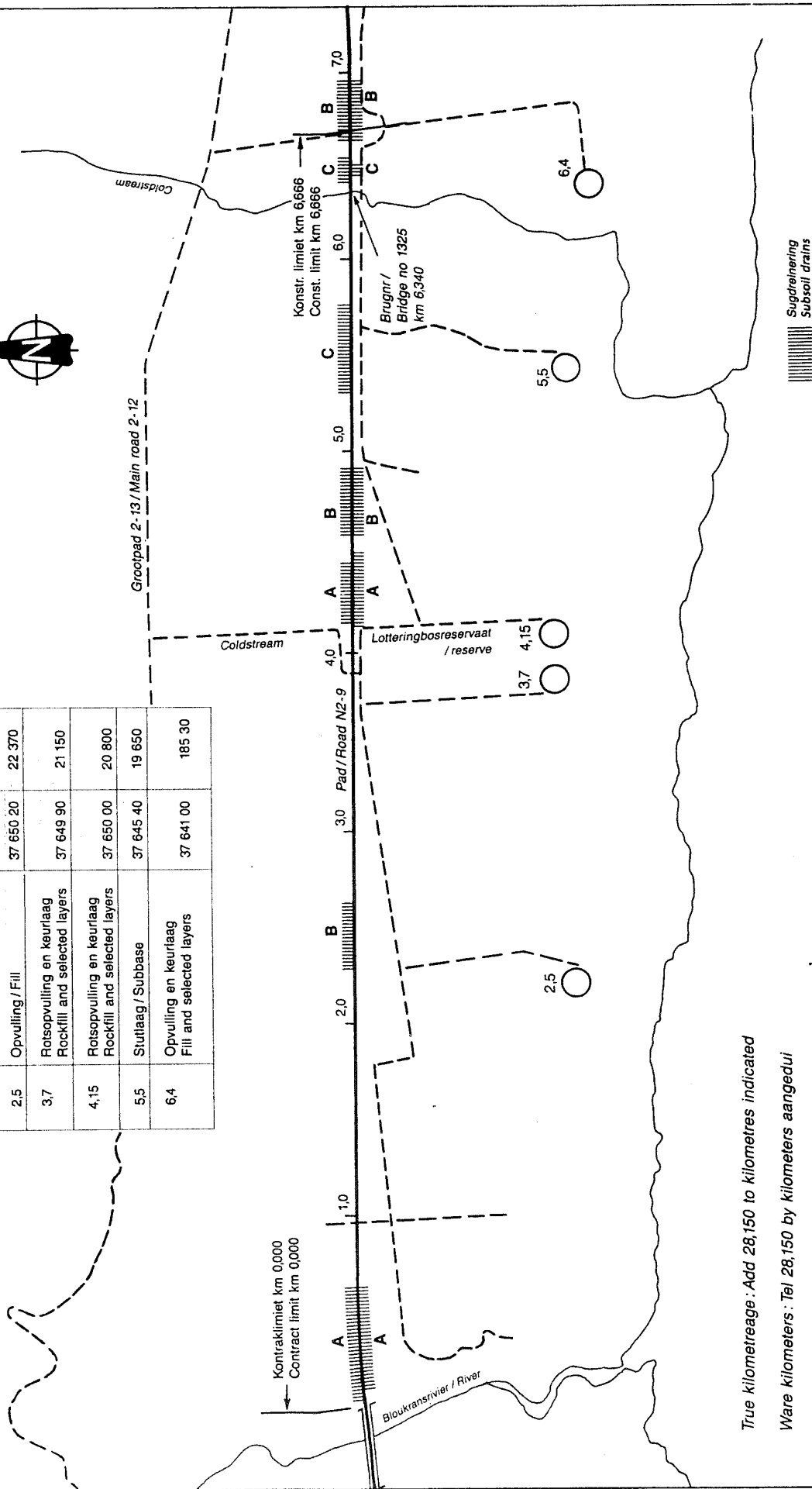
		Prepared by: Voorberei deur: _____ Date / Datum: _____		PAVEMENT LAYERS ASPHALT PLAVEISELLAE ASFALT		Contract / Kontrak : _____ Route / Roete : _____ Section / Gedeelte : _____ Carriageway / Baan : _____ Layer / Laag : _____		From / Van km _____ To / Na km _____		Form \ Vorm AB5 (03/1993) Sheet no. / Vel no. _____ of _____ van _____	
a	Section / Sektie - km - km										
b	Lane + Width / Laan + Wydte										
c	Date Placed / Datum Geplaas (Lot No.)										
d	Mix and Plant / Mengsel en Aanleg										
	Mean / Gem. (X) // Std. Dev. / Afw. (s)										
e	Precoated chips / Inoliskerwe Appl. (kg/m²)										
f	Layer thickness / Laagdikte (mm)										
g	SAI (X) 19.0 / 4.75 / 0.600 / 0.075										
h	SAI (s) 19.0 / 4.75 / 0.600 / 0.075										
i	Binder Content / Bindmiddel Inhoud (%)										
j	Reference Density / Verwysings Digtheid (kg/m³)										
k	Compaction / Verdigting (%)										
l	Marshall Stab / ITS (kN)										
m	Marshall Flow / Vloei (mm)										
n	Temp. (Layer / Laag) (°C)										
o	Tackcoat Appl. / Kleeflaag Aanwending (l/m²)										
p	Prime Appl. / Drenklaag Aanwending (l/m²)										
q	MC before Prime/Vog voor Drenklaag (%)										
r	Design reference / Ontwerpverwysing										
a	Section / Sektie - km - km										
b	Lane + Width / Laan + Wydte										
c	Date Placed / Datum Geplaas (Lot No.)										
d	Mix and Plant / Mengsel en Aanleg										
	Mean / Gem. (X) // Std. Dev. / Afw. (s)										
e	Precoated chips / Inoliskerwe Appl. (kg/m²)										
f	Layer thickness / Laagdikte (mm)										
g	SAI (X) 19.0 / 4.75 / 0.600 / 0.075										
h	SAI (s) 19.0 / 4.75 / 0.600 / 0.075										
i	Binder Content / Bindmiddel Inhoud (%)										
j	Reference Density / Verwysings Digtheid (kg/m³)										
k	Compaction / Verdigting (%)										
l	Marshall Stab / ITS (kN)										
m	Marshall Flow / Vloei (mm)										
n	Temp. (Layer / Laag) (°C)										
o	Tackcoat Appl. / Kleeflaag Aanwending (l/m²)										
p	Prime Appl. / Drenklaag Aanwending (l/m²)										
q	MC before Prime/Vog voor Drenklaag (%)										
r	Design reference / Ontwerpverwysing										

		CONCRETE PAVEMENTS BETONPLAVEISELS		Contract / Kontrak : Route / Roete : Section / Gedeelte : Carriageway / Baan : Type pavement/Soot plaveisel		From / Van km To / Na km		Form / Vorm AB6 (02/1993) Sheet no. / Vel no. of van	
Prepared by: Voorberei deur:		Section / Sektie : km - km							
Date / Datum:		Lane + Width / Laan + Wydie							
		Date Placed / Datum Geplaas (Lot No.)							
		Aggr. (Type / Tipe)							
		Source / Bron (Ratio/Verhouding)							
		Cement/Sement // Slagment // Fly Ash/Vliegass							
		Source / Bron (Ratio/Verhouding)							
		Type of Joint Seal / Tipe Voegseel							
		Mean / Gem. (X) // Std. Dev. / Afr. (s)							
		Defl. (Subgrade Keur/laag)							
		Radius of curv. / Krommingsraal							
		Layer Thickness / Laagdikte							
		Compression Strength / Druksierkte							
		Flex Strength / Biegsierkte							
		Slump / Sakking							
		Texture Depth / Tekstuurdiepte							
		Design Reference / Ontwerpverwysing							
		Section / Sektie : km - km							
		Lane + Width / Laan + Wydie							
		Date Placed / Datum Geplaas (Lot No.)							
		Aggr. (Type / Tipe)							
		Source / Bron (Ratio/Verhouding)							
		Cement/Sement // Slagment // Fly Ash/Vliegass							
		Source / Bron (Ratio/Verhouding)							
		Type of Joint Seal / Tipe Voegseel							
		Mean / Gem. (X) // Std. Dev. / Afr. (s)							
		Defl. (Subgrade/Gondlaag)							
		Radius of curv. / Krommingsraal							
		Layer Thickness / Laagdikte							
		Compression Strength / Druksierkte							
		Flex Strength / Biegsierkte							
		Slump / Sakking							
		Texture Depth / Tekstuurdiepte							
		Design Reference / Ontwerpverwysing							

	Prepared by: Voorberei deur: Date / Datum:	SEAL WORK SEËLWERK	Contract / Kontrak: Route / Roete: Section / Gedeelte: Carriageway / Baan: Seal type / Seëltype:	From / Van km To / Na km	Form AB7 (2/1993) Sheet no. / Vel no. _____ of _____ van _____
Section / Gedeelte (km)					
Date opened to traffic / Datum oopgestel vir verkeer					
Permeability (l/m) / Deurlaat (l/u)					
Type / Tipe					
Strip / Strook					
Slurry/Floeder (kg/m ²) (m ² /m ³)* and len	Total: L: m. m. R: m. m.		Total: L: m. m. R: m. m.		
	2 nd/de (Date / Datum)		2 nd/de (Date / Datum)		
Binder cont obtained bindm.inh.verkry	1 st / 1 ste (Date / Datum)		1 st / 1 ste (Date / Datum)		
	R: m. m.		R: m. m.		
Recommended hot Nett appl // Aanbevole warm Netto aanw. (l/m ²)					
Design/Onwerp - Tot. // Design/Onwerp + Tot. (l/m ²)					
Total hot Nett Obtained Totale warm netto verkry					
m. m. m. m. m. m.					
Final Spray / Finale Sput					
Actual Obtained l/m ²		Type/Tipe // Grad. // Source/Bron // Appl.			
Cold / Koue* Werklik Verkry (Date / Datum)		m. m. m. m. m. m.			
Hot / Warm* Aggr. 2 nd Layer 2 de Laag (m ² /m ³)		Type/Tipe // Size/Grootte // Source/Bron // Appl.			
Actual Obtained Werklik Verkry (Date / Datum)		m. m. m. m. m. m.			
2 nd Spray / 2 de Sput		Type/Tipe // Grad. // Source/Bron // Appl.			
Actual Obtained l/m ²		m. m. m. m. m. m.			
Cold / Koue* Werklik Verkry (Date / Datum)		m. m. m. m. m. m.			
Hot / Warm* Aggr. 1 st Layer 1 ste Laag (m ² /m ³)		Type/Tipe // Size/Grootte // Source/Bron // Appl.			
Actual Obtained Werklik Verkry (Date / Datum)		m. m. m. m. m. m.			
1 st Spray / 1 ste Sput		Type/Tipe // Grad. // Source/Bron // Appl.			
Actual Obtained l/m ²		m. m. m. m. m. m.			
Cold / Koue* Werklik Verkry (Date / Datum)		m. m. m. m. m. m.			
Hot / Warm* MC after prime // Vag na drenklaag Type/Tipe // Grad. // Source/Bron // Appl.		(x / s)			
Prime Drenklaag l/m ²		m. m. m. m. m. m.			
Actual Obtained Werklik Verkry (Date / Datum)		m. m. m. m. m. m.			
MC before prime MC voor drenklaag Type/Tipe // Grad. // Source/Bron // Appl.		(x / s)			
Section / Sekse (km)		Delete not applicable / Skrap nie van toepassing			

Groewe / Borrow pits

Nr / No	Gebruik / uses	Koordinate / Co-ordinate	
		X	Y
2,5	Opvulling / Fill	37 650 20	22 370
3,7	Rotsoopvulling en keurlaag Rockfill and selected layers	37 649 90	21 150
4,15	Rotsoopvulling en keurlaag Rockfill and selected layers	37 650 00	20 800
5,5	Stutlaag / Subbase	37 645 40	19 650
6,4	Opvulling en keurlaag Fill and selected layers	37 641 00	185 30



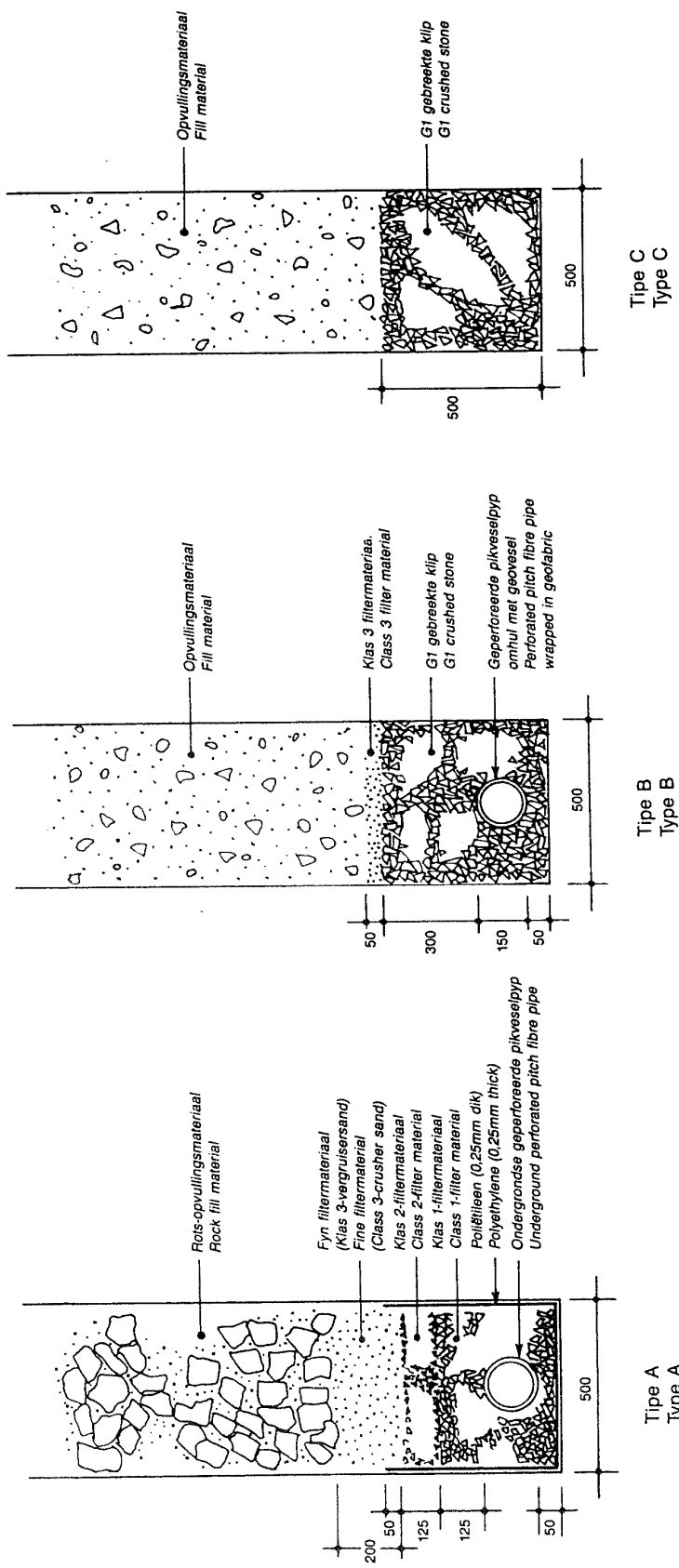
True kilometrage : Add 28,150 to kilometres indicated

Ware kilometers : Tel 28,150 by kilometers aangedui



Nasionale Roete 2, Sektie 9
SOOS-GEBOU MATERIALE-DATA
 National Route 2, Section 9
AS BUILT MATERIALS DATA

Sleutelplan:
Key plan:
Voorbeeld
Example
1



		Prepared by: Voorberei deur: <u>J. Botha</u> Date / Datum <u>1992-08-20</u>		LAYER WORKS COMPLETION SCHEDULE LAAGWERKE VOLTOOINGSSKEDULE																	Contract / Kontrak : Route / Roete : Section / Gedeelte : Carriageway / Baan : From / Van		Form Vorm AB 1 (01/1993) Sheet no / Vel no. <u>1</u> of <u>4</u> van	
Lane / Laan	Pos. or / of Layers / Lae	km	4,6	4,7	4,8	4,9	5,0	5,1	5,2	5,3	5,4	5,5	5,6	5,7	5,8	5,9	6,0	6,1	6,2	6,3	6,4	6,5	6,6	
LINKS			Herbou vanaf stuklaag																					
			Ontwerp Di vel 1 (A)																					
			1992-05-07																					
			AB 4 vel 2, ABS vel 1.																					
REGS			Asfaltoorlaag																					
			Di vel 1 (C)																					
			1992-07-06																					
			ABS vel 1.																					
Lane / Laan	Pos. or / of Layers / Lae	km	6,6	6,7	6,8	6,9	7,0	7,2	7,3	7,4	7,5	7,6	7,7	7,8	7,9	8,0	8,1	8,2	8,4					
LINKS			Asfaltoorlaag																					
			Di vel 1 (C)																					
			1992-07-06																					
			ABS vel 1.																					
REGS			Soos links																					
Lane / Laan	Pos. or / of Layers / Lae	km																						
Lane / Laan																								

		Prepared by: Voorbereider: J. BOTHA Date / Datum: 1992-10-15		ROAD FOUNDATION PROFILE AND FILL LAYERS PADFONDAMENTPROFIEL EN OPVULLINGSLAE		Contact / Kontak: Route / Roete: Section / Gedeelte: Carriageway / Baan: From / Van		SAPP 0703301/1 NATIONAL ROUTE 7 SECTION 2/3 BOTH		Form / Vorm AB 2 (03/1993) Sheet no. / Vel no. 3 of 6 van					
Final Road Level Finale Padhoogte	0,0	6,5	7,0	7,5	8,0	8,5	9,0	9,5	10,0	10,5	11,0	11,5			
Both carriageways. Profile on centre line	0,5	Pavement layers BP 7,8 G6 CS 5 G7 3 x P100 P600 P900 CS 3 G7 BP 11,0 G7 BP 13,4 G5 BP 11,0 G8 BP 13,4 G5 RP 12 G9 RP 12 G8													
Roadbed Preparation / Padbodem Bewerking Material Classification / Materiaal Klassifikasie	0,5	1,0	1,5	2,0	2,5	3,0	3,5	4,0							
Final Road Level Finale Padhoogte	0,5	1,0	1,5	2,0	2,5	3,0	3,5	4,0	12,0	12,5	13,0	13,5	14,0	14,5	14,9
Roadbed Preparation / Padbodem Bewerking Material Classification / Materiaal Klassifikasie	0,5	1,0	1,5	2,0	2,5	3,0	3,5	4,0	BP 13,4 G5						
Final Road Level Finale Padhoogte	0	RP 12 G9 RP 12 G8													
Roadbed Preparation / Padbodem Bewerking Material Classification / Materiaal Klassifikasie	0														
Final Road Level Finale Padhoogte	0														
Roadbed Preparation / Padbodem Bewerking Material Classification / Materiaal Klassifikasie	0														

	ROAD FOUNDATION PROFILE CROSS SECTION PADFONDAMENTPROFIEL DWARSSNIT		Contract / Kontak : Route / Route : Section / Gedeelte : Carriageway / Baan : Profile No. / Profiel No.		Form / Vorm AB 3 (03/1993) Sheet no. / Vel no. : 2 of 7	
	Prepared by: Voorberei deur: J. BOTHA Date / Datum: 1992-11-10		SAPR 0702301/1 NATIONAL ROUTE 7 SECTION 2-3 BOTH 2 at km / by km 9,4			
Metres Meters Final Road Level Finale Padhoogte	0 1 2 3 4 5 6 7 8 9 10	0 1 2 3 4 5 6 7 8 9 10	0 1 2 3 4 5 6 7 8 9 10	0 1 2 3 4 5 6 7 8 9 10	0 1 2 3 4 5 6 7 8 9 10	0 1 2 3 4 5 6 7 8 9 10
Palemdat / layers: BP 8,5 95 BP 11,0 67 BP 11,0 68 PL C 57						
Roadbed Preparation Padbodembewerking Material Classification Materiaalklassifikasie		NONE G10				



Prepared by:

Voorberei deur:

J. BOTHA

Date / Datum

1993-01-25

PAVEMENT LAYERS
SOILS AND GRAVELSPLAVEISELAE
GRONDE EN GRUISE

Contract / Kontrak:

SAPR 070230111

Route / Roete:

NATIONAL ROUTE 7

Section / Gedeelte:

SECTION 2-3

Carriageway / Baan:

BOTH

Layer / Laag:

SUBBASE

From / Van km

6,0

To / Na km

9,3

Sheet no. / Vel no.

2 of 5

Form

Vorm

AB 4

(03/1993)

a Section / Seksie km · km

b Lane / Laan

c Dat. Placed / Geplaas (Lot No.)

d Source / Bron

e Mat. Class / Klas (Description/Beskrywing)

f Slab Agent / Slab Middelen en %

g Mean / Gem. (x) // Std. Dev. / Afw. (s)

h Layer thickness / Laagdikte (mm)

i SAI (x)

j SAI (s)

k CBR / UCS / KDV / EDS / ITS @ Pa

l PI (Before/After Treat. // Voor/Na Behand.)

m Rel MDD / Verv. BRD (kg/m³)

n Refer. OMC / Verv. OVG (%)

o Compaction / Verdigting (%)

a Section / Seksie km · km

b Lane / Laan

c Dat. Placed / Geplaas (Lot No.)

d Source / Bron

e Mat. Class / Klas (Description/Beskrywing)

f Slab Agent / Slab Middelen en %

g Mean / Gem. (x) // Std. Dev. / Afw. (s)

h Layer thickness / Laagdikte (mm)

i SAI (x)

j SAI (s)

k CBR / UCS / KDV / EDS / ITS @ %

l PI (Before/After Treat. // Voor/Na Behand.)

m Rel MDD / Verv. BRD (kg/m³)

n Refer. OMC / Verv. OVG (%)

o Compaction / Verdigting (%)

Borrow pit 8,5

95 Weathered dolerite

Slaked lime ex Norlim: 1,5% + Slagment: 1,5%

Slaked lime ex Norlim: 1,5% + Slagment: 1,5%

Slaked lime ex Norlim: 1,5% + Slagment: 1,5%

Slaked lime ex Norlim: 1,5% + Slagment: 1,5%

Slaked lime ex Norlim: 1,5% + Slagment: 1,5%

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Slaked lime ex Norlim: 1,5% + Slagment: 1,5%

Slaked lime ex Norlim: 1,5% + Slagment: 1,5%

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Slaked lime ex Norlim: 1,5% + Slagment: 1,5%

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Slaked lime ex Norlim: 1,5% + Slagment: 1,5%

Slaked lime ex Norlim: 1,5% + Slagment: 1,5%

Slaked lime ex Norlim: 1,5% + Slagment: 1,5%

Slaked lime ex Norlim: 1,5% + Slagment: 1,5%

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Slaked lime ex Norlim: 1,5% + Slagment: 1,5%

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Slaked lime ex Norlim: 1,5% + Slagment: 1,5%

Slaked lime ex Norlim: 1,5% + Slagment: 1,5%

Slaked lime ex Norlim: 1,5% + Slagment: 1,5%

Slaked lime ex Norlim: 1,5% + Slagment: 1,5%

		Prepared by: Voorbereider: <u>J. Botha</u> Date / Datum: <u>1992-12-14</u>		PAVEMENT LAYERS ASPHALT PLAVEISELAE ASFALT		Contract / Kontrak: Route / Roete: Section / Gedeelte: Carriageway / Baan: Layer / Laag:		SAPR 0702301/1 NATIONAL ROUTE 7 SECTION 2-3 LEFT SURFACING		From / Van km To / Na km		Form \ Vorm AB 5 (03/1993) Sheet no. / Vel no. 1 of 4	
a	Section / Seksie	km	km	6,0 - 6,8	6,8 - 7,7	7,7 - 8,5	8,5 - 9,1	9,1 - 9,8	9,8 - 10,7				
b	Lane + Width / Laan + Wyde	Left 0-3,7											
c	Date Placed / Datum Geplaas (Lot No.)	1992-12-01											
d	Mix and Plant / Mengsel en Aanleg	Dolerite aggregate with 5,2% 60/70 open bitumen ex Colref. Drum mixer. Semi-gap graded with P.C.C.											
e	Mean / Gem. $\bar{x}$	if Std. Dev. / Afw. (s)											
f	Precoated chips / Inolsterwe Appl. (kg/m ²)		9,2	0,4	8,5	0,3	8,6	0,2	8,6	0,3	8,7	0,4	8,5
g	Layer thickness / Laagdikte (mm)		49,6	0,7	50,2	0,6	51,0	0,8	50,5	0,6	49,8	0,7	49,7
h	SAI (s)		001 601 22 108		001 611 23 107		001 631 24 108		991 611 21 106		991 601 22 108		001 631 24 109
i	SAI (s)		001 241 33 114		001 261 28 111		001 311 22 112		001 241 29 111		001 211 19 107		001 412 3 108
j	Binder Content / Bindmiddel Inhoud (%)		5,3	0,25	5,2	0,17	5,4	0,21	5,5	0,30	5,2	0,19	5,1
k	Reference Density / Verwysings Digtheid (kg/m ³)		2385		2402		2413		2401		2411		2392
l	Compaction / Verdigting (%)		95,4	1,2	95,8	0,9	96,1	1,1	95,7	1,0	94,8	0,3	95,9
m	Marshall Stab / ITS (kN)		10,1	78,0	10,0	10,7	9,4	10,8	8,9	10,3	9,2	11,1	9,1
n	Marshall Flow / Vloe. (mm)		2,5	3,1	2,4	3,1	2,7	3,6	2,8	3,9	2,1	2,9	2,1
o	Temp. (Layer / Laag) (°C)		13,5	13,8	13,4	14,1	12,9	14,0	13,7	14,6	13,0	13,4	13,7
p	Tackcoat Appl. / Kleeflaag Aanwending (l/m ²)				0,51				0,49				0,53
q	Prime Appl. / Drenklaag Aanwending (l/m ²)				1,12						1,20		
r	MC after Prime / Vog na Drenklaag (%)		3,1	3,6	2,1	2,8	2,2	2,7	2,0	3,0	2,7	4,1	2,2
s	Design reference / Ontwerpverwysing												
D3 Sheet 1.													
a	Section / Seksie	km	km										
b	Lane + Width / Laan + Wyde												
c	Date Placed / Datum Geplaas (Lot No.)												
d	Mix and Plant / Mengsel en Aanleg												
e	Mean / Gem. $\bar{x}$	if Std. Dev. / Afw. (s)											
f	Precoated chips / Inolsterwe Appl. (kg/m ²)												
g	Layer thickness / Laagdikte (mm)												
h	SAI (s)												
i	SAI (s)												
j	Binder Content / Bindmiddel Inhoud (%)												
k	Reference Density / Verwysings Digtheid (kg/m ³)												
l	Compaction / Verdigting (%)												
m	Marshall Stab / ITS (kN)												
n	Marshall Flow / Vloe. (mm)												
o	Temp. (Layer / Laag) (°C)												
p	Tackcoat Appl. / Kleeflaag Aanwending (l/m ²)												
q	Prime Appl. / Drenklaag Aanwending (l/m ²)												
r	MC after Prime / Vog na Drenklaag (%)												
s	Design reference / Ontwerpverwysing												

CSRA KSPD		Prepared by: Voorbereid deur: <u>H. Venter</u> Date / Datum: <u>1993-02-02</u>		SEAL WORK SEELWERK		Contract / Kontrak: Route / Roete: Section / Gedeelte: Carriageway / Baan: Seal type / Seeltype:		From / Van km <u>3.5</u> To / Na km <u>8.5</u>		Form Vorm AB 7 (2/1993) Sheet no. / Vel no. <u>1</u> of <u>3</u> van	
Section / Gedeelte (km)		Date opened to traffic / Datum oopgestel vir verkeer		3.5		4.0		4.5		5.0	
Permeability (l/m) / Deursigt. (l/u)		Strip / Strook		1993-01-30		6.5		7.0		7.5	
Type / Tipe	Appl. / Aanw.	Total: L: m. R: m.		1993-02-05		8.0		8.5		8.5	
Slurry / Flodder		Total: 2 ndide L: m. R: m.									
(kg/m ²) (m ² /m ³)		Date / Datum									
Binder cont obtained		1 st / 1 ste									
bindm. inh. verkry		Date / Datum									
Recommended hot Nett appl. // Aanbevole warm Netto aanw. (l/m ²)		Design / Ontwerp - Tol. // Design / Ontwerp + Tol. (l/m ²)									
Total hot Nett Obtained		Total hot Nett Obtained									
Totale warm netto verkry		Total warm netto verkry									
Final Spray /		Type / Tipe // Grad. // Source / Bron // Appl.									
Finale Sput		Actual Obtained									
0.8 l/m ²		3.7 m. 7.4 m.									
Cold / Koel		Werklik Verkry									
Hot / Warm		(Date / Datum)									
Aggr.		Type / Tipe // Size / Grootte // Source / Bron // Appl.									
2 nd Layer		0 m. 3.7 m.									
2 de Laag		3.7 m. 7.4 m.									
(m ² /m ³) / 35		Werklik Verkry									
2 nd Spray /		Type / Tipe // Grad. // Source / Bron // Appl.									
2 de Sput		Actual Obtained									
1.27 l/m ²		0 m. 3.7 m.									
Cold / Koel		Werklik Verkry									
Hot / Warm		(Date / Datum)									
Aggr.		Type / Tipe // Size / Grootte // Source / Bron // Appl.									
1 st Layer		0 m. 3.7 m.									
1 ste Laag		3.7 m. 7.4 m.									
(m ² /m ³) / 05		Werklik Verkry									
1 st Spray /		Type / Tipe // Grad. // Source / Bron // Appl.									
1 ste Sput		Actual Obtained									
1.35 l/m ²		0 m. 3.7 m.									
Cold / Koel		Werklik Verkry									
Hot / Warm		(Date / Datum)									
Aggr.		Type / Tipe // Size / Grootte // Source / Bron // Appl.									
MC after prime		0 m. 3.7 m.									
MC after prime // Vog na drenklaag		3.7 m. 7.4 m.									
Prime		Werklik Verkry									
Drenklaag		(Date / Datum)									
l/m ²		Type / Tipe // Grad. // Source / Bron // Appl.									
MC before prime		Actual Obtained									
MC before prime // Vog voor drenklaag		0 m. 3.7 m.									
Section / Sekse (km)		Werklik Verkry									
Delele not applicable / Skap nie van toepassing		(Date / Datum)									
		Type / Tipe // Grad. // Source / Bron // Appl.									
		Actual Obtained									
		0 m. 3.7 m.									
		Werklik Verkry									
		(Date / Datum)									
		Type / Tipe // Grad. // Source / Bron // Appl.									
		Actual Obtained									
		0 m. 3.7 m.									
		Werklik Verkry									
		(Date / Datum)									
		Type / Tipe // Grad. // Source / Bron // Appl.									
		Actual Obtained									
		0 m. 3.7 m.									
		Werklik Verkry									
		(Date / Datum)									
		Type / Tipe // Grad. // Source / Bron // Appl.									
		Actual Obtained									
		0 m. 3.7 m.									
		Werklik Verkry									
		(Date / Datum)									
		Type / Tipe // Grad. // Source / Bron // Appl.									
		Actual Obtained									
		0 m. 3.7 m.									
		Werklik Verkry									
		(Date / Datum)									
		Type / Tipe // Grad. // Source / Bron // Appl.									
		Actual Obtained									
		0 m. 3.7 m.									
		Werklik Verkry									
		(Date / Datum)									
		Type / Tipe // Grad. // Source / Bron // Appl.									
		Actual Obtained									
		0 m. 3.7 m.									
		Werklik Verkry									
		(Date / Datum)									
		Type / Tipe // Grad. // Source / Bron // Appl.									
		Actual Obtained									
		0 m. 3.7 m.									
		Werklik Verkry									
		(Date / Datum)									
		Type / Tipe // Grad. // Source / Bron // Appl.									
		Actual Obtained									
		0 m. 3.7 m.									
		Werklik Verkry									
		(Date / Datum)									
		Type / Tipe // Grad. // Source / Bron // Appl.									
		Actual Obtained									
		0 m. 3.7 m.									
		Werklik Verkry									
		(Date / Datum)									
		Type / Tipe // Grad. // Source / Bron // Appl.									
		Actual Obtained									
		0 m. 3.7 m.									
		Werklik Verkry									
		(Date / Datum)									
		Type / Tipe // Grad. // Source / Bron // Appl.									
		Actual Obtained									
		0 m. 3.7 m.									
		Werklik Verkry									
		(Date / Datum)									
		Type / Tipe // Grad. // Source / Bron // Appl.									
		Actual Obtained									
		0 m. 3.7 m.									
		Werklik Verkry									
		(Date / Datum)									
		Type / Tipe // Grad. // Source / Bron // Appl.									
		Actual Obtained									
		0 m. 3.7 m.									
		Werklik Verkry									
		(Date / Datum)									
		Type / Tipe // Grad. // Source / Bron // Appl.									
		Actual Obtained									
		0 m. 3.7 m.									
		Werklik Verkry									
		(Date / Datum)									
		Type / Tipe // Grad. // Source / Bron // Appl.									
		Actual Obtained									
		0 m. 3.7 m.									
		Werklik Verkry									
		(Date / Datum)									
		Type / Tipe // Grad. // Source / Bron // Appl.									
		Actual Obtained									
		0 m. 3.7 m.									
		Werklik Verkry									
		(Date / Datum)									
		Type / Tipe // Grad. // Source / Bron // Appl.									
		Actual Obtained									
		0 m. 3.7 m.									
		Werklik Verkry									
		(Date / Datum)									
		Type / Tipe // Grad. // Source / Bron // Appl.									
		Actual Obtained									
		0 m. 3.7 m.									
		Werklik Verkry									
		(Date / Datum)									
		Type / Tipe // Grad. // Source / Bron // Appl.									
		Actual Obtained									
		0 m. 3.7 m.									
		Werklik Verkry									
		(Date / Datum)									
		Type / Tipe // Grad. // Source / Bron // Appl.									
		Actual Obtained									
		0 m. 3.7 m.									
		Werklik Verkry									
		(Date / Datum)									
		Type / Tipe // Grad. // Source / Bron // Appl.									
		Actual Obtained									
		0 m. 3.7 m.									
		Werklik Verkry									
		(Date / Datum)									
		Type / Tipe // Grad. // Source / Bron // Appl.									
		Actual Obtained									
		0 m. 3.7 m.									
		Werklik Verkry									
		(Date / Datum)									
		Type / Tipe // Grad. // Source / Bron // Appl.									
		Actual Obtained									
		0 m. 3.7 m.									
		Werklik Verkry									
		(Date / Datum)									
		Type / Tipe // Grad. // Source / Bron // Appl.									
		Actual Obtained									
		0 m. 3.7 m.									
		Werklik Verkry									
		(Date / Datum)									
		Type / Tipe // Grad. // Source / Bron // Appl.									
		Actual Obtained									
		0 m. 3.7 m.									
		Werklik Verkry									
		(Date / Datum)									
		Type / Tipe // Grad. // Source / Bron // Appl.									
		Actual Obtained									
		0 m. 3.7 m.									
		Werklik Verkry									
		(Date / Datum)									
		Type / Tipe // Grad. // Source / Bron // Appl.									
		Actual Obtained									
		0 m. 3.7 m.									
</											