QUEANBEYAN PALERANG REGIONAL COUNCIL

DEVELOPMENT CONSTRUCTION SPECIFICATION

C241

STABILISATION

VERSION 1 – DECEMBER 2018

Amendment Record for this Specification Part

This Specification is Council's edition of the AUS-SPEC generic specification part and includes Council's primary amendments.

Details are provided below outlining the clauses amended from the Council edition of this AUS-SPEC Specification Part. The clause numbering and context of each clause are preserved. New clauses are added towards the rear of the specification part as special requirements clauses. Project specific additional script is shown in the specification as italic font.

The amendment code indicated below is 'A' for additional script 'M' for modification to script and 'O' for omission of script. An additional code 'P' is included when the amendment is project specific.

Amendment Sequence No.	Key Topic addressed in amendment	Clause No.	Amendment Code	Author Initials	Amendment Date
VERSION 1	Requirement for inspections added	C241.01	A	KD	16/03/10
	Standards amended	C241.02	M		
	Hold Point added	C241.03	A		
	Hold Point added	C241.05.4	A		
	Hold Point added	C241.05.5	A		
	Hold Point added	C241.06.3	A		
	Hold Point added	C241.07.3	A		
	Hold Point added	C241.08.3	A		
	Hold Point added	C241.09.3	A		
	Hold Point added	C241.10.4	A		
	Hold Point added	C241.12.1.	A		
	Witness Point added	C241.12.2	A		
	Witness Point added	C241.13(a).1	A		
	Hold Point added	C241.13(b).1	A		
	Witness Point added	C241.13(b).3	A		
	Witness Point added	C241.13(b).4	A		
	Hold Point added	C241.13(b).7	A		
	Hold Point added	C241.14(a).3	A		
	Witness Points added	C241.14(b).4	A		
	Hold Point added	C241.15.2	A		

	Hold Point added	C241.15.3	A		
	Hold Point and Witness Points added	C241.16.2	A		
	Witness Point added	C241.18(c).2	A		
	Hold Point added	C241.19.1	A		
	Annexure added	C241 – B	A		
	Standards Updated	C241.02	M	EE	18/12/2018

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SPECIFICATION C241
STABILISATION – VERSION 1

GENERAL

C241.01 SCOPE

1. This Specification defines the materials requirements for stabilised materials provided by stationary plant production as well as materials and process requirements for in-situ stabilisation.

2. The work to be executed under this Specification consists of the supply and incorporation of stabilising binders with material in a nominated pavement course or subgrade layer (including materials for the selected material zone, and selected backfill), at specified locations in the work and the spreading, compaction, trimming and curing of such materials. ***Scope***

3. This Specification provides the requirements for stabilisation of the types of pavement courses and subgrade zones or layers as shown in Table C241.1.

Pavement Course Or Subgrade Zone Or Layer	Stabilising Binder
PAVEMENT COURSE	
Base and Subbase	Cement Blended Stabilising Agent Hydrated Lime (pugmill) Quicklime (in-situ)
SUBGRADE ZONE OR LAYER	
Selected Material Zone	Cement Blended Stabilising Agent Quicklime (in-situ) Hydrated Lime (pugmill)
Other Subgrade Layers	Cement Blended Stabilising Agent Quicklime (in-situ) Hydrated Lime (pugmill)
Selected Backfill Zone	Cement Hydrated Lime (pugmill)

Table C241.1
Types of Pavement Courses, Subgrade Zones or Layers and Stabilising Binder

4. The pavement course or subgrade zone or layer to be stabilised shall be as specified in the Specifications for FLEXIBLE PAVEMENTS - VERSION 1, or as indicated on the Drawings. ***Associated Specifications***

5. Requirements for quality control and testing, including maximum lot sizes and minimum test frequencies, are cited in the Specification Part for Quality Requirements. ***Quality***

6. The Contractor shall give notice so that inspection may be made of all **HOLD POINTS** and **WITNESS POINTS** documented in this specification and tabulated in Annexure C241-B. Release of **HOLD POINTS** and **WITNESS POINTS** shall be made by the Superintendent, with the concurrence of the Principal Certifying Authority, where stipulated in Annexure C241-B. ***Inspections***

C241.02 REFERENCE DOCUMENTS

1. Documents referenced in this Specification are listed in full below whilst being cited in the text in the abbreviated form or code indicated. ***Documents Standards Test Methods***

(a) Council Specifications

C201	-	Control of Traffic - Version 1
C213	-	Earthworks - Version 1
C220	-	Stormwater Drainage – General - Version 1
C242	-	Flexible Pavements - Version 1

(b) Australian Standards

AS 1141	Methods of sampling and testing aggregates
AS 1141.11.1:2009	Particle size distribution - sieving method
AS 1289	Methods of testing soils for engineering purposes.
AS 1289.4.2.1:1997	Soil chemical tests - Determination of the sulfate content of a natural soil and the sulfate content of the ground water - Normal Method.
AS 1289.5.7.1:2006	Soil compaction and density tests - Compaction control test – Hilf density ratio and Hilf moisture variation (Rapid method)
AS 1289.5.8.1:2007	Soil compaction and density tests - Determination of field density and field moisture content of a soil using a nuclear surface moisture-density gauge - Direct transmission mode.
AS 1289.6.1.1:1998	Soil strength and consolidation tests - Determination of the California bearing ratio of a soil - Standard laboratory method for a remoulded specimen.
AS 2350	Methods of testing Portland and blended cements
AS/NZS 2350.4:2006	Setting time of Portland and blended cements.
AS 2350.9:2006	Fineness of Portland fly ash cement.
AS 3582	Supplementary cementitious materials for use with Portland and blended cement
AS 3582.1:1998-	Fly ash.
AS 3582.2:2001	Slag - Ground granulated iron blast-furnace.
AS 3583	Methods of test for supplementary cementitious materials for use with Portland cement
AS 3583.3:1991	Determination of loss on ignition.
AS 3583.6:1995	Determination of relative water requirement and relative strength.
AS 3583.12:1991	Determination of available alkali.
AS 3583.13:1991	Determination of chloride ion content.
AS 3583.14:1991	Determination of insoluble residue content.
AS 3972	Portland and blended cements

(c) Other Publications

Austroads

Glossary of Austroads Terms

AGPT04D/06:2006 Guide to pavement technology, Part 4D – Stabilised materials

(d) NSW RMS Test Methods

T432:2012 - Rate of Slaking of Quicklime

INSPECTION, SAMPLING AND TESTING

C241.03 MATERIALS PROPOSED FOR USE IN THE WORK

1. The Contractor shall provide a certificate from a laboratory with appropriate NATA registration stating that the stabilisation mix(s) submitted and the mix constituents comply with the mix nominated in Annexure C241-A and that the stabilised material meets the requirements of the Specification for FLEXIBLE PAVEMENTS - VERSION 1 if incorporated into the works as a pavement layer or alternatively the Specification for EARTHWORKS – VERSION 1 or STORMWATER DRAINAGE GENERAL - VERSION 1. This is a **HOLD POINT**. ***Contractor's Responsibility*** ***(HP)***

C241.04 MATERIALS USED IN THE WORK

1. Regular inspection, sampling and testing of pavement and subgrade materials shall be undertaken by the Contractor while stabilisation is in progress in accordance with this Specification. ***Sampling and Testing***

MATERIALS

C241.05 CEMENT

1. The type of cement used as the stabilising agent or a constituent in a blended stabilising agent shall comply with AS 3972. ***Type***

2. Cement shall be from a source included in the New South Wales Government Quality Assurance Scheme at time of production. ***NSW QA Scheme***

3. The Contractor shall nominate the brand and source of all cementitious materials. ***Nominated Brand and Source***

4. Documentary evidence of the quality and source of the cement shall be furnished by the Contractor to the Superintendent upon request at any time. This is a **WITNESS POINT**. ***Proof of Quality (WP)***

5. If the Contractor proposes to use cement which has been stored for a period in excess of three months from the time of manufacture, the Contractor shall arrange a re-test, to ensure the cement still complies with AS3972, before the cement is used in the work. The cost of retesting cement, which has been stored for a period in excess of three months, shall be borne by the Contractor. Test results shall be forwarded to the Superintendent for approval at least 2 days in advance of usage of the material. This is a **HOLD POINT**. ***Storage in Excess of 3 months*** ***(HP)***

C241.06 QUICKLIME

1. Quicklime, consisting essentially of calcium oxide in a highly reactive form, shall have the following properties at the point of spread: ***Properties***

(i) Available Lime The content of calcium oxide, determined by AS 3583.12, shall not be less than 85 per cent.

(ii) Slaking Rate — The active slaking time shall not be greater than twenty minutes and the temperature rise on slaking, determined from the average of four samples tested in accordance with Test Method T432, shall not be less than 40°C in six minutes.

2. The particle size distribution of the quick lime determined by AS 1141.11 shall comply with the following requirements in Table C241.2. ***Particle Size***

3. Provide NATA laboratory test results to confirm that the quicklime supplied conforms with that specified. This is a **WITNESS POINT**. ***Proof of Quality (WP)***

AS Sieve	Per Cent Passing
13.2mm	100
9.5mm	96 - 100
4.75mm	70 - 100
2.36mm	0 - 90

Table C241.2 Particle Size Distribution of Quicklime

C241.07 HYDRATED LIME

1. Hydrated lime, consisting essentially of calcium hydroxide, whether used as the sole stabilising agent or blended with other additives, shall have the following properties: ***Properties***

(i) Available Lime — The content of calcium hydroxide, determined by AS 3583.12, shall not be less than 80 per cent.

(ii) Form — The material shall be in powder form.

(iii) Residue on Sieving (Particle Size) — The residue on a 300 micron sieve, determined by AS 3583.14, shall not exceed 2 per cent.

2. The properties which characterise the particular hydrated lime to be used in the stabilising agent submitted as part of the mix design are:

(a) Percentage of calcium hydroxide

(b) Fineness - Percentage by mass passing the 45 micron sieve (AS 2350.9).

(c) Source.

3. Provide NATA laboratory test results to confirm that the quicklime supplied conforms with that specified. Details are to include percentage of calcium hydroxide, fineness expressed by percentage by mass passing the 45 µm sieve and source. This is a **WITNESS POINT**. ***Proof of Quality (WP)***

C241.08 GROUND GRANULATED BLAST FURNACE SLAG

1. The ground granulated blast furnace slag shall conform to AS3582.2.

2. The properties which characterise the particular ground blast furnace slag to be used in the stabilising agent submitted as part of the mix design are: ***Properties***

(a) Fineness - percentage by mass passing the 45 micron sieve (AS2350.9).

(b) Relative strength (28 days) (AS 3583.6).

(c) Source.

3. Provide NATA laboratory test results to confirm that the slag supplied conforms with that specified. Details are to include fineness expressed by percentage by mass passing the 45 µm sieve, relative strength (28 days) and source. This is a **WITNESS POINT**. ***Proof of Quality (WP)***

C241.09 FLYASH

1. Flyash shall conform to AS3582.1.

2. The properties which characterise the particular flyash to be used in the stabilising agent submitted as part of the mix design are: ***Properties***

(a) Fineness - percentage by mass passing the 45 micron sieve (AS2350.9).

(b) Loss on ignition (AS 3583.3).

(c) Source.

3. Provide NATA laboratory test results to confirm that the flyash supplied conforms with that specified. Details are to include fineness expressed by percentage by mass passing the 45 µm sieve, loss on ignition and source. This is a **WITNESS POINT**. ***Proof of Quality (WP)***

C241.10 BLENDED STABILISING AGENTS

1. The Contractor may utilise a blended stabilising agent. The Contractor shall obtain mill and batch information which will make the blended stabilising agent traceable to the supplier's test results. Handling and storage requirements of the Supplier shall be complied with by the Contractor who shall also arrange for sampling of the agent as required by the Superintendent. ***Requirements***

2. The mass of components of the nominated blended stabilising agent shall not vary by more than ± 3 per cent from the blend percentages nominated in the mix design described in Annexure C241-A.

3. When a blended stabilising agent is produced from a combined grinding of components the following properties will characterise the particular stabilising agent blend: ***Properties***

(a) Source of each component.

(b) Fineness - percentage by mass passing the 45 micron sieve (AS 2350.9).

(c) Setting time (AS2350.4).

4. Provide NATA laboratory test results to confirm that the blended stabilisation agent supplied conforms with that specified. Details to mill and batch information that is traceable to the supplier's source. This is a **WITNESS POINT**. ***Proof of Quality (WP)***

C241.11 WATER

1. Water shall be free from harmful amounts of materials such as oils, salts, acids, alkalis and vegetable substances. The water shall not contain more than: ***Quality***

(a) 600 parts per million of chloride ion, determined by AS 3583.13.

(b) 400 parts per million of sulphate ion, determined by AS 1289.4.2.1.

(c) 1 per cent by mass of undissolved solids.

2. Water accepted as potable and fit for human consumption will not require testing to confirm suitability. ***Potable***

STABILISATION PROCESSES

C241.12 GENERAL

1. The Contractor shall submit details of the proposed equipment (including the mixing plant) and stabilisation procedures to be used in the work 14 days prior to commencement of the work. This submission, hereafter called the Work Plan, will nominate the sequence of operations, widths of stabilisation passes and provision for traffic if appropriate. Submission of a Work Plan constitutes a **HOLD POINT**.

Proposed Equipment and Procedures (HP)

2. Notwithstanding submission to the Superintendent of the Contractor's equipment and stabilisation procedures, the work shall meet all the Specification requirements, and Statutory Requirements for Occupational Health and Safety, and the Contractor shall perform such tests as specified as the work proceeds, to ensure compliance. Costs of such tests shall be borne by the Contractor. This action constitutes a **WITNESS POINT**.

Compliance Contractor's Cost

(WP)

3. Stabilisation of pavement materials shall not proceed during wet weather or if rain is imminent and likely to occur during any stage of the stabilisation process so as to significantly influence the resultant moisture content and uniformity of moisture content in the mix.

Weather Conditions

C241.13 APPLICATION OF STABILISING AGENT

(a) Stationary Mixing Plant

1. Application rate of stabilising agent shall be monitored at the pug mill or equivalent plant utilised as approved by the Superintendent. This is a **WITNESS POINT**.

Application Rate (WP)

2. Application rate measured in kilograms per tonne of product shall be monitored and recorded for every 100 tonnes of production.

Measurement

3. The achieved accuracy of application rate shall be ±10 per cent of the nominated rate nominated in Annexure C241- A.

4. The application rate shall not be allowed to exceed the nominated rate by more than 10 per cent. The stabilising agent incorporated in excess of the nominated rate shall be at no cost to the Principal.

Over Spread Contractor's Cost

(b) In-Situ

1. The incorporation of stabilising agent is to follow a process where stabilising agent is spread on the pavement in advance of the specialist mixing equipment. Where special processes are proposed by the Contractor involving supply of stabilising agent within the mixing bowl of equipment the approval of the Superintendent is required and a demonstration of the process at Contractor's expense is required. This is a **HOLD POINT**.

Application Process

(HP)

2. Spreading shall be carried out using the mechanical spreader nominated in the Work Plan and subsequently approved by the Superintendent. Annexure C241-A nominates the spread rate.

Spreading Rate

3. The actual spread rate shall be within ±10 per cent of the nominated rate. The Contractor shall verify this by testing the spread rate for each lot or 500m^2 of pavement treated (whichever is less) in each application of binder. This is a **WITNESS POINT**. Spread rate testing shall be performed by weighing the contents of a suitable 4 sided tray placed on the pavement and between the wheels of the mechanical spreader. The rate of stabilising agent spread shall be calculated by dividing the mass collected (kg) by the area of the tray (m^2).

Tolerances

(WP)

4. Where spreading vehicles are fitted with load cells, the Contractor shall ascertain the average spreading rate of the stabilising agent by dividing the mass of the stabilising agent spread per run by the area of the run. The Contractor shall record this data for each run and make it available to the Superintendent promptly. Such action will not cancel the Contractor's obligation to undertake prescribed testing of spread rate if required by the Superintendent. This is a **WITNESS POINT**.

Load Cells (WP)

5. The actual spread rate shall not exceed the nominated rate by more than 10 per cent. The stabilising agent spread in excess of the nominated rate shall be at no cost to the Principal.

Over Spread Contractor's Cost

6. Spreading shall not proceed during windy conditions which may cause loss of stabilising agent or cause nuisance or danger to people or property.

Wind

7. Traffic or equipment not involved in spreading or mixing of the stabilising agent shall not pass over the spread material until it has been mixed into the layer to be stabilised. This is a **HOLD POINT**.

Construction Traffic (HP)

8. Any spillage of the stabilising agent on site or at any loading location related to the site shall be removed as soon as possible and within the same work shift of such spillage.

Spillage

C241.14 MIXING

(a) Stationary Mixing Plant

1. The stationary mixing plant shall be purpose built for the process of mixing road making materials. All equipment shall be maintained and calibrated so as to provide a uniformly mixed product without segregation of the aggregate material.

Equipment

2. The plant shall provide for the controlled and metered inclusion of water into the mix.

Control of Water

3. The stationary mixing equipment shall incorporate a delivery system for mix materials capable of producing a uniform mixture to design requirements. This performance shall be confirmed by monitoring of unconfined compressive strength of production, in accordance with AS 1289.6.1.1, with a pair of test specimens tested for each 400 tonnes of production and at full cost to the Contractor. This is a **HOLD POINT**.

Uniform Mixture Contractor's Cost (HP)

(b) In-situ

1. Mixing equipment shall be purpose built for the process of in-situ mixing of road making materials. It shall be capable of mixing to the depth specified for the layer to be stabilised and of distributing the stabilising agent uniformly through the full depth and over the whole area of the layer to be stabilised. A minimum of 2 passes of the mixing equipment is required. As mixing blades or tynes wear they shall be replaced so as to maintain mixing efficiency consistent with that demonstrated during the trial section. The mixing equipment will be capable of supplying a calibrated amount of water to the mixing bowl in such a manner as to provide a uniformly moist mix to a target moisture content.

Equipment

2. The resultant mix shall be uniform over the full depth so that there are no lenses, pockets, lumps or granules of stabilising agent present in the layer or adjacent to it.

Uniform Mixture

3. The procedure nominated in the Work Plan shall minimise disturbance of the distribution of stabilising agent spread in advance of the mixing process.

Disturbance

4. The Contractor shall carry out visual inspections during mixing to ensure uniform mixing is being achieved in the layer. Inspection results shall be recorded as cited in the Specification Part for Quality Requirements. This is a **WITNESS POINT**. The

Additional Mixing (WP)

Superintendent may require that additional passes by the mixing equipment be carried out to improve the visual uniformity of the mix and/or the moisture content. Such additional work shall be carried out at no cost to the Principal. This is a **WITNESS POINT**. ***Contractor's Cost (WP)***

C241.15 FIELD WORKING PERIOD

1. The time period from addition of water during the mixing process until the completion of compaction is nominated as the Field Working Period. This period may vary significantly with variations in the type of stabilising agent. ***Definition***

2. The nominated Field Working Period shall be provided in Annexure C241-A for the stabilising agent approved for the works. The Nominated Field Working Period shall be based on laboratory tests determining the time from mixing until such time as the calculated Wet Density for modified compaction procedures decreases by more than 2 percentage points. This testing shall be undertaken utilising AS 1289.5.7.1 and samples of the materials representative of those to be utilised in the works. This is a **HOLD POINT**. ***Based on Laboratory Tests*** ***(HP)***

3. The Contractor will complete the compaction process within the Nominated Field Working Period unless specific approval is provided by the Superintendent to an adjustment for site and seasonal conditions. This is a **HOLD POINT**. ***Compaction within Field Working Period (HP)***

C241.16 TRIMMING AND COMPACTION

1. After mixing the layer shall be trimmed and compacted in accordance with the Specification for FLEXIBLE PAVEMENTS - VERSION 1 to produce a tight dense surface parallel with the finished wearing surface so that the levels do not vary from the design levels beyond the tolerance for primary trimming specified in Clause C241.18(a). ***Level Tolerance***

2. Subsequent secondary trimming may be undertaken on one or more occasions in preparation for primer seal and with the objective of meeting shape and level requirements. Secondary trimming shall involve cutting to waste. Work methods that lead to the development of laminations in the pavement will not be allowed and surface slurrying will not be accepted. This is a **HOLD POINT**. The Contractor's survey control methods as stated in the Work Plan will be adequate to ensure that the pavement layer thickness is not reduced during secondary trimming to an extent such that it fails to comply with the requirement for layer thickness in accordance with the tolerance specified in Clause C241.18(b). When required by the Superintendent survey results shall be provided to confirm that the pavement layer thickness remains within tolerance after secondary trimming. This survey will be at no cost to the Principal. This is a **WITNESS POINT**. ***Secondary Trimming*** ***(HP)*** ***Contractor's Cost (WP)***

3. All trimmed material having been cut to waste shall be used as fill or spoiled as directed by the Superintendent. ***Trimmed Material***

4. Measurements with a 3 metre straight edge shall be taken at a minimum of 10 randomly selected stations so as to represent each 200 metre lane length or part thereof. Deviation of the surface from the bottom of a 3 metre straight edge placed in any direction will meet the tolerance shown in Clause C241.18(a). This testing will be undertaken immediately prior to sealing or prior to agreed practical completion for any work component. This is a **WITNESS POINT**. ***Straight Edge Test*** ***(WP)***

5. The stabilised layer shall be compacted over the entire area and depth so that the relative compaction determined by AS 1289.5.7.1 is not less than as detailed in the Specification for FLEXIBLE PAVEMENTS - VERSION 1, EARTHWORKS - VERSION 1 or STORMWATER DRAINAGE GENERAL – VERSION 1, as appropriate. ***Compaction***

6. To provide true relative compaction assessments the lots shall be sampled and tested within the nominated field working period in accordance with AS 1289.5.7.1. ***Test Method***

7. The maximum wet density (modified compaction) will be determined by sampling immediately after the determination of field density and testing will be undertaken within 2 hours of sampling. This is a **HOLD POINT**. A determination of maximum wet density (modified compaction) representing the full layer depth is required for each sampling location when calculation of relative compaction is undertaken. ***Wet Density (HP)***

8. The field density may be determined by in-situ sand replacement testing or by single probe Nuclear Density Meter in direct transmission mode in accordance with AS 1289.5.8.1. ***In-Situ Dry Density***

C241.17 JOINTS

1. Joints are defined in this Specification to comprise interfaces between work episodes that are separated in time by more than the nominal field working period for the nominated stabilisation mix design. A longitudinal joint shall be considered to be a joint generally parallel to the road centreline. A transverse joint occurs when a length of work is terminated and extended at a later time after a period which exceeds the nominated field working period. ***Joint Type***

2. All longitudinal and transverse joints shall be formed by cutting back into the previously stabilised and fully compacted sections. A minimum longitudinal overlap of mixing runs shall be 75mm. Transverse joints shall be overlapped by a minimum of 2 metres. The material disturbed during cutting back shall be remixed at full depth and incorporated into the new work. No longitudinal joints shall be allowed within 0.5 metre of the centreline of a typical wheelpath. ***Cutting Back***

3. The level and shape of the joints shall be within the limits specified in Clause C241.18. ***Finish***

C241.18 TOLERANCES

(a) Levels and Surface Trim

1. The surface level after primary trimming shall be within a tolerance of +30mm and +10mm of the levels shown on the Drawings. ***Primary Trimming***

2. The surface level after secondary trimming shall be within a tolerance of +15mm and -15mm of the levels shown on the Drawings. ***Secondary Trimming***

3. The pavement surface after secondary trimming and immediately prior to sealing shall be of a quality such that deviation under a 3 metre straight edge does not exceed 12mm.

(b) Layer Thickness

1. The final thickness of the stabilised layer at any point shall be within a tolerance of +20mm and -10mm of the nominated layer thickness. ***Minimum Thickness***

2. The average thickness of the layer in a lot shall be determined from measurements of six randomly selected locations over any 200m length of a lot. The average thickness shall not be less than that required to meet the specified final thickness tolerances after trimming. ***Average Thickness***

3. The layer thickness shall be measured at the edges of the stabilising run before compaction commences. The layer thickness shall be measured relative to the finished design level. ***Method of Measurement***

(c) Width

1. The width measured at any point of the stabilised layer shall be not less than the specified width as shown in the Drawings by more than 50mm. ***Minimum Width***

2. The average width of the layer shall be determined from measurements at 3 sites selected at random by the Superintendent over any 200m length of a lot and shall be not less than the specified width. This is a **WITNESS POINT**. ***Average Width (WP)***

C241.19 CURING

1. The Contractor shall submit to the Superintendent details of the proposed method of curing as part of the Work Plan. This is a **HOLD POINT**. ***Notice (HP)***

2. The stabilised work shall be protected against rapid drying out by keeping it continuously wet or damp during the period prior to the provision of a subsequent layer or the application of a prime or primer-seal. ***Water Curing***

3. Water curing shall consist of frequent light uniform spraying that will not produce significant run off or flooding on sections of the area. Slurrying of the surface or leaching of the stabilising agent shall be avoided. ***Caution***

4. Under this Specification provision for curing up to the period indicated in Annexure C241-A shall be the responsibility of the Contractor at cost to the Contractor. ***Curing Period***

LIMITS AND TOLERANCES

C241.20 SUMMARY OF LIMITS AND TOLERANCES

1. The limits and tolerances applicable to the various clauses of this Specification are summarised in Table C241.3 below:

Item	Activity	Limits Tolerances	Spec Clause
1.	**Quicklime**		
	a) Available Lime	>85% Calcium Oxide content	C241.06
	b) Slaking Rate	Active Slaking time < twenty minutes, and temperature rise on slaking not less than 40°C in six minutes (for an average of four samples).	C241.06
	c) Particle Distribution	Fraction passing AS Sieve: 100% for 13.2mm Sieve 96-100% for 9.5mm Sieve 70-100% for 4.75mm Sieve 0-90% for 2.36mm Sieve	C241.06
2.	**Hydrated Lime**		
	a) Available Lime	>80% Calcium Hydroxide	C241.07
	b) Particle Size	<2% residue on a 300 micron Sieve	C241.07
3.	**Blended Stabilising Agents**	Blend percentages shall not vary by more than ± 3% from those nominated in Annexure C241A	C241.10
4.	**Water**		
	a) Chloride ion content	<600 PPM Chloride ion	C241.11
	b) Sulphate ion content	<400 PPM Sulphate ion	C241.11
	c) Undissolved solids	<1 percent by mass of undissolved solids	C241.11
5.	**Application of Stabilising Agent**		
	a) Spread Rate or Incorporation Rate for in-situ plant.	Actual spread rate shall be within ± 10% of the nominated rate	C241.13

Item	Activity	Limits Tolerances	Spec Clause
6.	**Trimming and Compaction**		
	a) Surface Level	After primary trimming be within +30mm and +10mm of levels shown on Drawings After secondary trimming be within ±15mm of levels shown on Drawings	C241.18(a)
	b) Layer Thickness	Final thickness of layers shall not vary more than +20mm and -10mm of required thickness	C241.18(b)
	c) Shape	Shall not deviate more than 12mm under a 3m straight edge immediately prior to first sealing	C241.18(a)
7.	**Joints**		
	a) Longitudinal Overlap	> 75mm overlap of mixing runs	C241.17
	b) Transverse Overlap	> 2m overlap of transverse joints	C241.17
	c) Longitudinal Joints	Shall not be allowed within 0.5m of the centreline of a typical wheelpath	C241.17
8.	**Width**		
	a) Width of Stabilised Layer	At any point, the width shall be not less than 50mm short of the width shown on the Drawings with an average width always greater than that shown on the Drawings.	C241.18(c)

Table C241.3 - Summary of Limits and Tolerances

SPECIAL REQUIREMENTS

C241.21 RESERVED

C241.22 RESERVED

C241.23 RESERVED

MEASUREMENT AND PAYMENT

C241.24 PAY ITEMS

1. Payment shall be made for the activities associated with completing the work detailed in this Specification for on-site stabilisation in accordance with Pay Items C241(a) to C241(b) inclusive. Except that where stabilisation is provided by use of stationary plant the supply of the material including the stabilisation service and stabilising agent is measured and paid in accordance with Specification for FLEXIBLE PAVEMENTS - VERSION 1 or EARTHWORKS - VERSION 1 as appropriate for supply of the material as a pre-mix product. Supply in these circumstances includes all testing.

2. A lump sum price for any of these items shall not be accepted.

3. Supply, spread and compact subbase, or base material is measured and paid in accordance with the Specification of FLEXIBLE PAVEMENTS - VERSION 1.

4. Supply, spread and compact select material is measured and paid in accordance with the Specification for EARTHWORKS - VERSION 1.

5. Control of traffic is measured and paid in accordance with the Specification for CONTROL OF TRAFFIC - VERSION 1.

6. If any item for which a quantity of work is listed in the Schedule of Rates has not been priced by the Contractor, it shall be understood that due allowance has been made in the prices of other items for the cost of the activity which has not been priced.

Pay Item C241(a) SUPPLY AND SPREAD STABILISING AGENT (IN-SITU MIXING ONLY)

1. The unit of measurement shall be the square metre.

2. The area shall be determined by the length and width of work as specified on the Drawings or as directed by the Superintendent.

3. No account shall be taken of allowable tolerances.

4. The schedule rate under this Pay Item shall include all the activities associated with the supply, delivery and spreading of the stabilising agent including testing in accordance with this Specification.

Pay Item C241(b) MIXING OF STABILISING AGENT

1. The unit of measurement shall be the square metre.

2. The area shall be determined by the length and width of work as specified on the Drawings or as directed by the Superintendent.

3. No account shall be taken of the allowable tolerances.

4. The schedule rate under this Pay Item shall include all the activities associated with the mixing of the stabilising agent with the designated materials in-situ and to the nominated depth in accordance with this Specification.

ANNEXURE C241 - A

STABILISATION MIX DESIGN

Type of Stabilising Agent .....

.....

.....

Nominal Percentage of Stabilising Agent by Mass ..... %

Spread Rate of Stabilising Agent for contractual purposes ..... (kg/m^2)

Depth of Compacted Layer to be Stabilised ..... (mm)

Nominated Field Working Period ..... (hrs)

Nominated Target Unconfined Compressive Strength (UCS) (7 day accelerated curing) ..... MPa

Nominated Target CBR Value (4 day soaked) for stabilised modified subgrade ..... %

Period for Contractor's Curing ..... (days)

Nominated Granular Material(s) ..... (type)

Source of Nominated Granular Material .....

ANNEXURE C241- B

INSPECTIONS

Give notice so inspection may be made of the following:

Summary of HOLD POINTS

Clause/subclause	Requirement	Notice for inspection	Release by
INSPECTION, SAMPLING AND TESTING			
Materials proposed for use in the work			
C241.03.1 – Contractor's Responsibility	Submit NATA certificate of compliance	14 days prior to commencement of works	Superintendent – PCA concurrence required
MATERIALS			
Cement			
C241.05.5 – Storage in excess of 3 months	Re-test cement stored in excess of 3 months	2 working days prior to usage	Superintendent
STABILISATION PROCESSES			
General			
C241.12.1 - Proposed Equipment and Procedures	Submit Workplan for approval	14 days prior to commencement	Superintendent
Application of stabilising agent			
C241.13(b).1 - In situ –Application Process	Proposals for special processes of supply of stabilising agent into the mixing bowl	7 days prior to mixing	Superintendent
C241.13(b).7 – Construction Traffic	Prevent traffic from passing over spread material until mixing is complete	Progressive	Superintendent
MIXING			
C241.14(a).3 – Stationary Mixing Plant	Submit test results	Progressive	Superintendent
Field Working Period			
C241.15.2 – Based on Laboratory Tests	Submit test results of the proposed Field Working Period	3 working days prior to production stabilisation	Superintendent
TRIMMING AND COMPACTION			
C241.16.2 - Secondary Trimming	Work methods to exclude laminations and slurrying	3 working days prior to production stabilisation	Superintendent
C241.16.7 – Wet Density	Undertake testing within 2 hours of sampling	Progressive	Superintendent
Curing			
C241.19.1 - Notice	Submit details of proposed curing method	As directed	Superintendent

Summary of WITNESS POINTS

Clause/subclause	Requirement	Notice for inspection
MATERIALS		
Cement		
C241.05.1 – Proof of Quality	Proof of quality and source	Progressive
Quicklime		
C241.06.3 – Proof of Quality	Proof of quality and source	Progressive
Hydrated Lime		
C241.07.3 – Proof of Quality	Proof of quality and source	Progressive
Ground Granulated Blast Furnace Slag		
C241.08.3 – Proof of Quality	Proof of quality and source	Progressive
Flyash		
C241.09.3 – Proof of Quality	Proof of quality and source	Progressive
Blended Stabilising Agent		
C241.10.4 – Proof of Quality	Proof of quality and source	Progressive
STABILISATION PROCESSES		
Quality Requirements		
Compaction	Adjustment of Field Working Period for site conditions	Progressive
Application of stabilising agent		
C241.13(a).1 - Stationary mixing plant – Application Rate	Monitoring application of stabilising agent at the plant	Progressive
C241.13(b).3 – In-Situ - Tolerances	Actual spread to be recorded and checked	Progressive
C241.13(b).4 – In-Situ – Load Cells	Record average spreading rate using load cells	Progressive
Mixing		
C241.14(b).4 - In situ – Additional Mixing	Visual inspection to ensure uniform mixing and record	Progressive
C241.14(b).4 - In situ – Additional Mixing	Additional passes of mixing equipment to improve uniformity	Progressive
Trimming and Compaction		
C241.16.2 – Secondary Trimming – Contractor's Cost	Survey to confirm pavement layer thickness remains within tolerances after trimming	Progressive
C241.16.4 -Straight Edge Test	Conform to surface tolerances prior to sealing or practical completion of work component	As directed by the Superintendent
Tolerances		
C241.18(c).2 -Average Width	Random measurement of stabilised layer width	As directed by the Superintendent