

DEVELOPMENT
CONSTRUCTION
SPECIFICATION

CQS

**QUALITY SYSTEM
REQUIREMENTS**



SPECIFICATION CQS - CONTRACT QUALITY SYSTEM REQUIREMENTS

CLAUSE	CONTENTS	PAGE
3	GENERAL.....	1
CQS1	SCOPE	1
CQS2	PREAMBLE	1
CQS3	REFERENCE DOCUMENTS	1
CQS4	DEFINITIONS.....	1
CQS5	ABBREVIATIONS	4
QUALITY MANUAL AND QUALITY PLAN		4
CQS6	QUALITY MANUAL.....	4
CQS7	QUALITY PLAN.....	4
CQS8	ANNEXURES TO QUALITY MANUAL.....	6
	CQS8.1 Organisation Structure	6
	CQS8.2 Addenda to System Element Descriptions	6
	CQS8.3 Register of Method Statements	6
JOB SPECIFIC REQUIREMENTS		6
CQS9	GENERAL.....	6
CQS10	METHOD STATEMENTS	6
CQS11	DOCUMENT CONTROL.....	7
CQS12	MEASURING AND TESTING EQUIPMENT	7
CQS13	PROCUREMENT	7
CQS14	INSPECTION AND TEST PLANS	7
	CQS14.1 Documentation	7
	CQS14.2 Sampling and Testing	7
	CQS14.3 Hold Points	8
	CQS14.4 Content	8
CQS15	INSPECTIONS	9
CQS16	IDENTIFICATION.....	9
	CQS16.1 Lots	9
	CQS16.2 Lot Numbering	9
	CQS16.3 Lot Identification	9
CQS17	TRACEABILITY	10

QUALITY SYSTEM REQUIREMENTS

Contract No.

CQS18	SURVEYING CONTROL	10
CQS19	RECORDS.....	11
CQS20	NONCONFORMANCE	11
CQS21	DISPOSITION OF NONCONFORMANCE	12
CQS22	CORRECTIVE ACTION	12
CQS23	STATISTICAL TECHNIQUES	12
CQS24	QUALITY AUDITS.....	13
CQS27	PAY ITEMS.....	13

ANNEXURES

CQS-A	RANDOM SAMPLING
CQS-B	METHOD STATEMENT REQUIREMENTS
CQS-C	MAXIMUM LOT SIZES AND MINIMUM TEST FREQUENCIES
CQS-D	NONCONFORMANCE REPORT FORM

**SPECIFICATION CQS
QUALITY SYSTEM REQUIREMENTS**

GENERAL

CQS1 SCOPE

1. This Specification covers the contractual requirements for the Quality System documentation and operation. Quality assurance systems shall apply to all projects valued in excess of five hundred thousand dollars. Quality management systems shall apply to all other projects.

CQS2 PREAMBLE

1. The Contractor shall establish, implement and maintain a Quality System in accordance with this Specification and the requirements of AS/NZS/ISO 9000:2000 and AS/NZS/ISO 9001:2000.

Standards

2. The Quality System as expressed in the Quality Plan shall be used throughout the course of the Contract to ensure that the quality of the Contractor's and any sub-contractor's work complies with the requirements of the Contract Documents. This shall apply to all work under the Contract, both on site and off site.

Applicable to Work On and Off Site

3. Notwithstanding any statements to the contrary in the Contractor's Quality Manual or Quality Plan, no part of the Quality System shall be used to pre-empt, preclude or otherwise negate the requirements of any part of the Contract Documents. Quality System elements shall be used as an aid in achieving compliance with the Contract Documents and documenting such compliance. In no way shall they relieve the Contractor of his responsibility to comply with the Contract Documents.

Compliance with Contract Documents

CQS3 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

AS/NZS ISO 9000:2000 Quality Management Systems – Fundamentals and Vocabulary

AS/NZS ISO 9001:2000 Quality Management Systems - Requirements

AS/NZS ISO 9004:2000 Quality management systems - Guidelines for performance improvements

CQS4 DEFINITIONS

Synonym or Abbreviation

1. For the purpose of this Specification, the definitions as in AS/NZS ISO 9001:2000 and those below apply:

Corrective Action

Measures, including preventative measures, taken to rectify conditions that have caused or might cause nonconformity.

Corrective Action

Corrective Action Request

A formal advice/instruction from the Superintendent regarding departures from the Quality

CAR

QUALITY SYSTEM REQUIREMENTS

System or Methods as approved in the Quality Plan. Unless specifically noted, it will not require raising a Non-conformance Report.

Disposition

Action to be taken to resolve nonconformance. (Lot Specific)

Rectification

Hold Point

A defined position in the construction/manufacturing stages of the Contract beyond which work shall not proceed without mandatory verification and acceptance by the Superintendent.

HP

The issue of a Nonconformance Report (NCR) or a Notice of Nonconformance (NNC) automatically creates a Hold Point.

Inspection and Test Plan

The working document that identifies the specific inspections and tests to be carried out for works required by the Contract.

ITP

Lot

A lot consists of any part of the works, which has been constructed/manufactured under essentially uniform conditions and is essentially homogeneous with respect to material and general appearance.

The whole of the work included in a lot shall be of a uniform quality without obvious changes in attribute values.

Method Statement

A document that specifies the key steps and sequence in the manufacture/construction for an activity; what, how and by whom it shall be done; what materials and equipment shall be used to achieve the required quality standards.

**- Procedures
- Technical
Procedures
- Process
- Descriptions
- Specific
Procedures**

Non-conformance Report

A mandatory (standard format) report submitted by the Contractor that details the nonconforming work and the Contractor's proposed disposition of the nonconformance.

NCR

Notice of Non-conformance

Formal instruction from the Superintendent regarding product nonconformance from that specified. It automatically creates a Hold Point and requires a Nonconformance Report from the Contractor.

NNC

Performance Audit

An examination to evaluate whether established methods and procedures are being adhered to in practice.

**- Process Audit
- Technical
Procedure
Audit
- Method Audit**

Product Audit

An assessment of the conformity of the product with the specified technical requirements.

**- Conformance
Audit
- Service Audit**

Quality Assurance

The management actions covering planning, quality control testing, inspection and verification procedures integrated with production to provide a product fit for the purpose. **QA**

Quality Assurance Representative

Appointed by the Principal for a specific project and responsible for the auditing, review and surveillance of procedures and documentation required by the Contractor's approved Quality Plan. **QAR**

Quality Check Lists

Forms completed during the manufacture/construction process verifying key steps, and records required for the Quality Register. Checklists apply to each identified lot of work.

Quality Management Representative

Appointed by the Contractor for a specific project with the authority and responsibility for the implementation and operation of the Quality Plan, to ensure that Quality System requirements are not subordinated to design and productivity. **QMR**

Quality Manual

A document setting out the general quality policies, procedures and practices of an organisation. **QM**

Quality Plan

The Quality Assurance documentation specific to a Contract and comprises of the Corporate Quality Manual with its job specific annexures, method statements, inspection and test plans and check lists. **QP**

Quality Register

The files containing all quality control records such as test results, completed check lists, certificates of compliance, consignment dockets for materials procured. **QR**

Quality System Elements

The administrative activities affecting quality that need to be implemented and controlled to ensure that the product or a service meets specified quality requirements. **- System Element
- Quality Management Element**

Special Processes

Those processes, the results of which cannot be directly examined to establish full conformance. Assurance of satisfactory conformance depends on evidence generated during the process.

System Audit

An examination of the documented Quality System represented by the Quality Manual, Quality Plan and Quality Register to evaluate their effectiveness in meeting the requirements of Australian Standards and the Specification.

Witness Point

A nominated position in the manufacture/construction stages of the Contract where the Superintendent may exercise the option of attendance, after notification of the requirement. **WP**

QUALITY SYSTEM REQUIREMENTS

CQS5 ABBREVIATIONS

1. Abbreviations used in this specification are:

CAR	-	Corrective Action Request
CQS	-	Contract Quality System
HP	-	Hold Point
ITP	-	Inspection and Test Plan
NATA	-	National Association of Testing Authorities
NCR	-	Nonconformance Report
NNC	-	Notice of Nonconformance
QA	-	Quality Assurance
QAR	-	Quality Assurance Representative (Principal)
QM	-	Quality Manual
QMR	-	Quality Management Representative (Contractor)
QP	-	Quality Plan
QR	-	Quality Register
SED	-	System Element Description
WP	-	Witness Point

QUALITY MANUAL AND QUALITY PLAN

CQS6 QUALITY MANUAL

1. The Corporate Quality Manual shall cover and include the requirements as specified in the Quality System Documentation section of AS/NZS ISO 9001:2000.

2. It shall incorporate all applicable System Element Descriptions with reasons for those not regarded as applicable. Additionally, it should include standard Method Statements and Inspection and Test Plans for the activities usually undertaken by the Contractor. It would be normal to have these in separate volumes.

SEDs

CQS7 QUALITY PLAN

1. The Quality System shall be incorporated in the project Quality Plan. The Corporate Quality Manual with its System Element Descriptions, standard Method Statements and Check Lists and the project specific components make up the Quality Plan. This is illustrated conceptually in Figure CQS1.

Content of QP

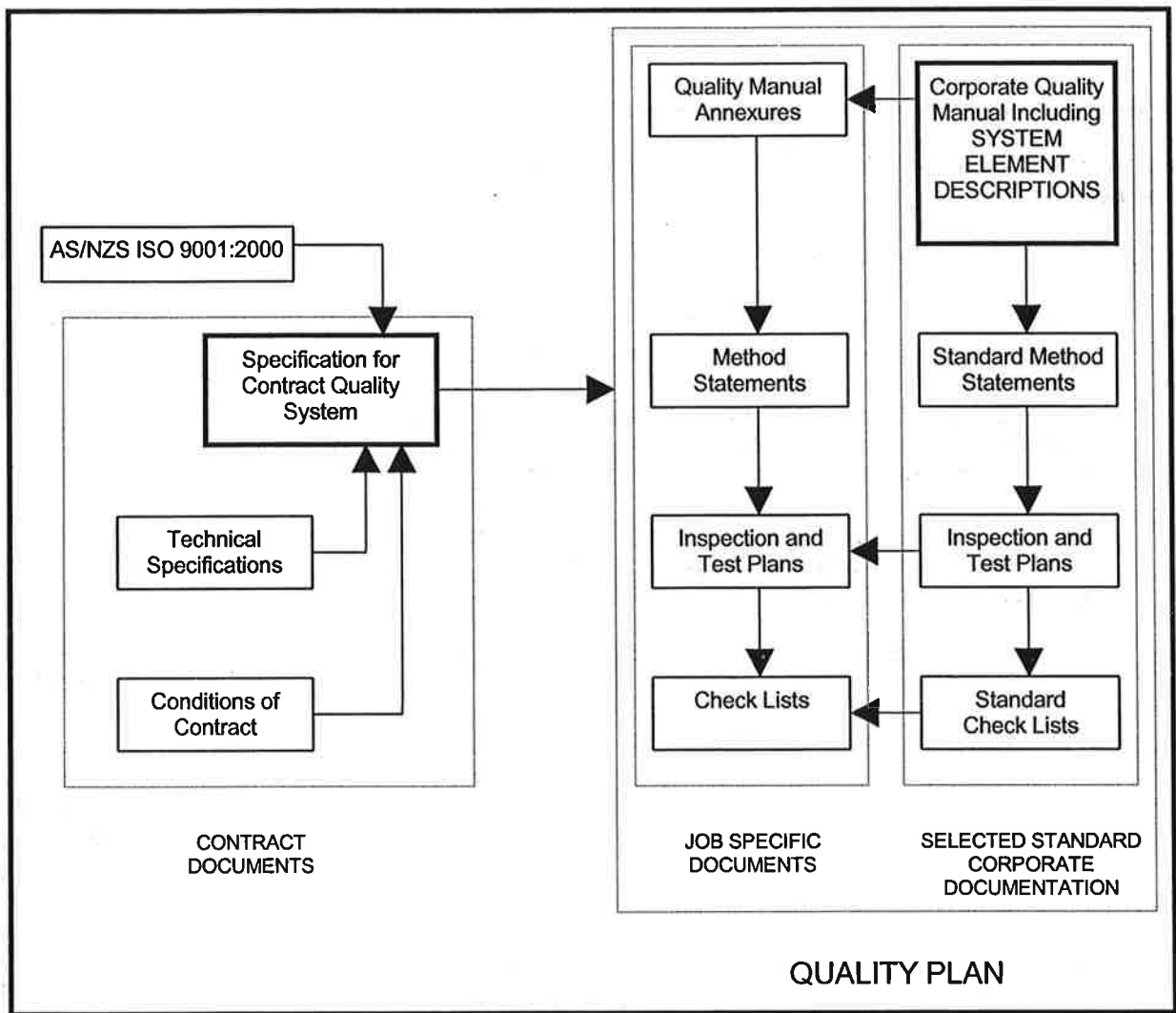


Figure CQS1 - Project Quality System Documentation

QUALITY SYSTEM REQUIREMENTS

CQS8 ANNEXURES TO QUALITY MANUAL

The following details shall be provided by appropriate annexures to the Corporate Quality Manual:

CQS8.1 Organisation Structure

- The organisation structure for the management of the project with details of the specific responsibilities and authorities of the nominated key personnel. **Structure**
- The Quality Management Representative (QMR) including this person's qualifications, technical experience and present position together with responsibilities and authorities to resolve quality matters. **QMR**
- The personnel or contracted testing organisations who will be conducting each type of compliance inspection of testing of completed works, their experience, qualification and responsibilities. **Personnel**
- The person authorised to change construction processes on site. **Authority for Changes**

CQS8.2 Addenda to System Element Descriptions

The System Element Descriptions in the Corporate Quality Manual shall be augmented with suitable addenda to satisfy the requirements of this Specification. **Additional SEDs**

CQS8.3 Register of Method Statements

A Register of Method Statements giving the title, identifier and revision status, shall be provided. This Register shall list all Method Statements that are to be included in the Quality Plan for the Contract and shall include any suitable Method Statements already incorporated in the Corporate Quality Manual. **Content**

JOB SPECIFIC REQUIREMENTS

CQS9 GENERAL

1. In the Quality Plan, the System Element Descriptions in the Corporate Quality Manual will need augmentation to cover the requirements of AS/NZS ISO 9001:2000 and this Specification. This shall be provided in the form of suitable Annexures or where applicable included in the Method Statements or Inspection and Test Plans.

CQS10 METHOD STATEMENTS

1. Method Statements shall be provided for all activities scheduled in Annexure CQS-B. This requirement applies to both contract and subcontracted work. The documentation shall cover, as applicable, planning, methods, verification and control. **Documentation**
2. The presentation of Method Statements may be either descriptive, in the form of flow charts or a combination of both. In either case it must be accompanied by a Check List which shall include the relevant inspection and test points, surveying control points and Hold Points and the officer responsible to verify each check point. **Presentation**
3. The Contractor shall carry out a system audit of each Methods Statement whilst the process is in effect. **System Audit**

4. The absence of a Methods Statement for activities where it has been specified will automatically create a Hold Point. *Requirement*

CQS11 DOCUMENT CONTROL

1. In addition to the requirements of AS/NZS ISO 9001:2000, the Quality Plan shall specify the method of keeping Quality Registers, tracking and handling of NCRs and NNCs and site correspondence. *Records*

2. A copy of AS/NZS ISO 9001:2000 shall be kept on site. *AS on Site*

CQS12 MEASURING AND TESTING EQUIPMENT

1. The Quality Plan shall include the latest NATA advice of the terms of registration and current signatories for the laboratories that will be providing the compliance test reports. *NATA Registration*

2. Inspection, testing and measuring equipment shall be capable of producing the precision and/or degree of accuracy specified in the referenced Test Methods and this shall be demonstrable by records of calibration. *Equipment Accuracy*

CQS13 PROCUREMENT

1. Except where the contract documents already stipulate another quality system standard for specific products or services, the quality assurance provisions detailed in this Specification shall apply to all subcontracted products or services that constitute work under the Contract. *CQS to Cover All Work*

2. The Contractor shall ensure that the requirements of AS/NZS ISO 9001:2000 and the requirements of this clause are included in all such subcontracts. *Subcontracts*

CQS14 INSPECTION AND TEST PLANS

CQS14.1 Documentation

1. The Quality Plan shall include all inspections, tests and documentation necessary to ensure that the Works comply with Contract Documents. *General Inclusions*

CQS14.2 Sampling and Testing

1. All compliance inspections and tests shall be based on lots. *Lots*

2. The Inspection and Test Plans shall include details of the sampling methods. Sampling shall not be restricted to locations dimensioned or otherwise defined for setting out the Works in the Drawings or Specification, but shall be undertaken in a random or unbiased manner, as approved by the Superintendent, at any location within the Works to demonstrate its compliance with the Specification. *Random Sampling*

3. The maximum lot sizes and minimum testing frequencies are listed in the Annexures to the relevant Specifications and/or in Annexure CQS-C to this Specification. Where no minimum frequency of testing or maximum lot size is stated in the Specification, the Inspection and Test Plan(s) shall nominate appropriate frequencies for the Superintendent's approval. *Lot Sizes Frequency of Testing*

4. The Inspection and Test Plans shall also uphold any time limits for testing which the Technical Specifications may impose. *Time Limits*

QUALITY SYSTEM REQUIREMENTS

5. Where Test Methods are nominated in the Technical Specifications, sampling and testing shall be carried out by a NATA registered laboratory that is accredited for those test methods and sampling procedures. Sampling shall be conducted by personnel from the NATA registered laboratory that has been accredited for that sampling procedure and shall be supervised by the approved signatory from that laboratory. Test results shall be reported on NATA endorsed test documentation, which shall include a statement by the approved signatory certifying that the correct sampling procedures have been followed. **Sampling and Testing**
6. In special circumstances the Principal may accredit a laboratory that is not NATA registered for specific tests or inspection procedures. **Special Accreditation**
7. Every testing agency or person providing written test reports for any and all testing undertaken shall use unique consecutive project specific serial numbering of the reports for identification and auditing purposes. **Consecutive Numbering**
8. The Contractor shall reinstate all core holes, test holes, excavations and any other disturbance resulting from any testing activity. The reinstatement shall be to a standard that is at least equal to the specified requirements for the particular work. **Reinstatement**
9. The responsibility for completion of inspections, tests and documentation shall be stated in the Quality Plan. **Testing Responsibility**

CQS14.3 Hold Points

1. To assure compliance with the specified standards and requirements, mandatory Hold Points shall apply. Hold Points are those stages during the construction/manufacturing process where the Technical Specifications require "approval by the Superintendent/Council's Development Engineer" or where a NCR or NNC has been issued. The Contractor shall not proceed past the HP until approval has been received from the Superintendent to proceed. For ease of identification Hold Points may also be annotated on the margins of Technical Specifications. **Superintendent's Approval to Proceed**
2. To obtain the approval to proceed from the Superintendent, the Contractor shall:
- provide the information required by the Technical Specifications
 - ensure and certify that the particular lot/process is conforming;
 - ensure and certify that all underlying and adjacent lots affected by the lot in question are conforming;
 - submit the appropriate form (Check List, NCR or NNC) at least 24 hours prior to the time the Contractor wishes to proceed with the placement/construction of the next lot, unless some alternative arrangements have been agreed with the Superintendent.
3. If the HP has resulted from a NCR or NNC, the Superintendent's approval may be conditional on a Witness Point being included. **Witness Point**

CQS14.4 Content

1. As a minimum, the Inspection and Test Plans shall contain the following information:
- item number/lot type reference(s)
 - activity description
 - specification requirements or where impractical: specification reference
 - sampling method
 - test method
 - test frequency
2. Inspection and Test Plans will typically have an associated Check List which shall require completion for each particular lot. **Information to be Provided**
- Check List for Each Lot**

CQS15 INSPECTIONS

- | | |
|--|---|
| <p>1. Incoming inspections shall be required for deliveries of materials that will be subsequently included in one or more lots. When completing Check Lists for particular Lots the inspection status shall be cited.</p> | <p><i>Incoming Inspections</i></p> |
| <p>2. In-process and compliance inspections shall be completed by a responsible officer nominated in the Check List and certified by the Contractor's QMR indicating that the work has been completed in accordance with the Contract Documents.</p> | <p><i>In-process Inspections</i></p> |
| <p>3. The Contractor shall establish and maintain a system to ensure and demonstrate that all products or parts of products requiring inspection and/or testing are so inspected and/or tested.</p> | |
| <p>4. The Contractor shall also establish and maintain a system for identifying the inspection status for all lots of work.</p> | <p><i>Inspection Status</i></p> |

CQS16 IDENTIFICATION

CQS16.1 Lots

- | | |
|--|---|
| <p>1. All items of work shall be subdivided into lots.</p> | |
| <p>2. Lots shall be chosen by the Contractor but shall be within the limits given in Annexure CQS-C. In general, the size of the lot shall not exceed one day's output for each work process designated for lot testing.</p> | <p><i>Lot Size</i></p> |
| <p>3. Lot numbers shall be used as identifiers on all Quality System data.</p> | <p><i>Lot Numbers</i></p> |
| <p>4. The Contractor shall determine the bounds of each lot before sampling and shall physically identify each lot clearly. The physical identification of a lot shall be maintained until the Contractor has ensured that the lot has achieved the specified quality.</p> | <p><i>Lot Identification</i></p> |

CQS16.2 Lot Numbering

- | | |
|--|--|
| <p>1. Each lot shall be given a unique lot number. The allocation of lot numbers shall be carried out by the Contractor to suit the circumstances, provided the lot numbering system complies with the following requirements:</p> <ul style="list-style-type: none"> • the lot number shall be entered in the Quality Register which shall provide at least the following information: <ul style="list-style-type: none"> - three dimensional location of the lot (chainage of the start and finish points, lateral location and layer location) and/or the particular structure (e.g. pier or abutment number, pour number) - indication of conformance or nonconformance - summary of test results (e.g. characteristic value) and - location of test sites, test identification numbers and test results • for nonconforming lots a new number, or numbers shall be allocated to the resubmitted/subdivided lot(s), but reference shall be maintained to the original lot number. | <p><i>Numbering System</i></p> |
| | <p><i>Non-conforming Lots</i></p> |

CQS16.3 Lot Identification

- | | |
|---|---|
| <p>1. To ensure all site personnel can readily identify where the particular lots are in the field, the Contractor shall implement a field identification system that will clearly identify the bounds of each lot and the lot number. This identification system shall be detailed in the Quality Plan and shall be maintained during all stages of construction of the lot.</p> | <p><i>Field Identification</i></p> |
|---|---|

QUALITY SYSTEM REQUIREMENTS

2. The boundaries of a lot may be changed if subsequent events cause the original lot to be no longer essentially homogeneous. This will require appropriate notation in the Quality Register by the QMR.

Lot Boundaries

CQS17 TRACEABILITY

Clause 4.8

1. The lot identification system, site records and sample numbering system shall allow test results to be positively identified with material incorporated in the works.

2. Tractability is required for concrete loads, asphalt loads and steel plate as follows:

Materials for Traceability

- (a) Concrete used in bridge components, cast-in-place box culverts, retaining walls, road pavement subbase and base. Asphalt used in wearing courses, intermediate courses and drainage layers.

The trace shall start at the batch plant and finish at the location where the concrete or asphalt is incorporated in the Works. Records shall be kept of the batch quantities, mix and dispatch time, testing details and location of placement.

- (b) Steel plate in bridge girders and bridge columns.

The trace shall start at the steelworks and finish at the location of the plate in the girder or column. Records shall be kept of the steel heat number, testing details and location of the plate in the girder or column.

CQS18 SURVEYING CONTROL

1. Surveying Control shall be treated as a separate System Element and shall include all measurement, calculation and record procedures necessary to:

Requirements

- (a) Set out the Works
(b) Verify conformance to the Drawings and Specification in relation to dimensions, tolerances and three dimensional position,
(c) Determine lengths, areas or volumes of materials or products, where required for measurement of work.

2. The Method Statements for Surveying Control shall address the parameters in AS/NZS ISO 9001:2000 for special processes which cannot be fully verified by subsequent inspection and testing.

3. The Contractor shall appoint qualified surveyors who are eligible for membership of the Institution of Surveyors, Australia or the Institution of Engineering and Mining Surveyors, Australia to supervise and take responsibility for all Surveying Control.

Surveyor Qualifications

4. The procedures and equipment used must be capable of attaining the tolerances nominated in the Specification.

Equipment

5. Sampling for conformance verification purposes shall not be restricted to the locations used to set out the Works.

Sampling Locations

6. The Contractor shall submit a Survey Conformance Report for each lot or component where design levels, position and/or tolerances have been specified. The Survey Conformance Report shall show 'specified Vs actual' for position (defined by coordinates or chainage and offset), level and tolerance as appropriate and shall be certified by the qualified surveyor responsible for the verification survey.

Conformance Report

7. Where work is to be covered up after conformance has been achieved, a **HOLD POINT** shall apply until the Survey Conformance Report has been submitted.

Submission of Report

8. All survey records shall be included in the Quality Records and recorded in the Quality Register. Verification field book pages shall be clearly labelled, dated and signed by the surveyor with cross indexed references to equipment used, lot/component identification and associated Survey Conformance Reports. Where automatic data recording systems are used for verification surveys, a printout of both raw (field) data and reduced data shall be retained in a similar manner as conventional field books.

Quality Register

CQS19 RECORDS

1. The Contractor shall keep and maintain all Quality System records as required by AS/NZS ISO 9001:2000 and this Specification. They shall be systematically recorded, indexed and filed so as to be retrievable and accessible to the Superintendent or his appointed Quality Auditor on a job basis within one working day of requisition.

Quality Register

2. Conformance records shall be stored and maintained such that they are readily retrievable and in facilities that provide a suitable environment to minimise deterioration or damage and to prevent loss.

Storage

3. The Contractor shall make the quality records available to the Superintendent at all reasonable times. If requested by the Superintendent, the Contractor shall provide copies of the records or test results at no cost to the Principal.

Copies of Records Contractor's Cost

4. If requested by the Principal, within one month from the date of Practical Completion, the Contractor shall provide the Superintendent with a copy of the Quality Register, or parts thereof.

Finalisation

CQS20 NONCONFORMANCE

1. All nonconforming works detected by the Contractor's Quality System shall be reported to the Superintendent via a Nonconformance Report within one working day of being detected. Nonconformance Reports shall be submitted with all records that indicate a departure from the requirements of the Contract Documents. The NCR shall indicate the proposed disposition.

NCR Within One Day

2. If the disposition of the nonconformance cannot be determined within one working day, the Contractor shall submit a partially completed NCR identifying the nonconformance.

3. The nonconforming product shall not be covered up unless a disposition has been accepted/approved by the Superintendent and implemented by the Contractor.

Disposition

4. Where nonconformance can be overcome by simply reworking the lot with the original process, a NCR will be required but a Hold Point will not apply.

Reworking

5. With the exception of circumstances described in paragraph 3 above, a NCR will automatically create a HOLD POINT, which shall apply until conformance has been achieved and the Superintendent has signed the Authorisation to Proceed.

Authorisation to Proceed

6. The Superintendent will issue a Corrective Action Request (CAR) when he detects nonconformance to the Contractors Quality System or Methods. Unless specifically stated, this will not create a Hold Point.

CARs

7. Where the Superintendent's inspections, surveillance or audits detect product nonconformance, he will issue a Notice of Nonconformance (NNC). This will immediately create a Hold Point and the Contractor is required to submit an NCR in accordance with this Clause.

NNCs

8. Where there is the Superintendent obtain a discrepancy between the test results and those provided by the Contractor, the results from the Superintendent shall prevail except where the Superintendent may determine a specific audit test procedure to resolve

Inspection and Rectification

QUALITY SYSTEM REQUIREMENTS

the discrepancy.

9. The Contractor shall utilise the standard form for use as an NCR. This form is included as Annexure CQS-D to this specification. Authorised representatives of the Contractor and Superintendent as applicable shall sign off all actions.

Standard Form

10. The Contractor shall establish a suitable numbering and registration system for all NCRs and NNCs, including cross-referencing as required.

**Register of
NCRs & NNCs**

11. The Contractor shall nominate a proposed disposition for any nonconformance within five working days or shall show cause to the Superintendent for any further delay. Under no circumstances will the deliberation on disposition of a nonconformance justify an extension of time to the Contract period.

**Disposition in
5 Days**

QCS21 DISPOSITION OF NONCONFORMANCE

1. The Contractor shall advise the Superintendent in the NCR of the proposed disposition of the particular nonconformance. This proposed disposition will constitute corrective action for the lot or lots referred to in the NCR and may comprise one of the following:

**Proposed
Disposition**

- (a) Propose additional works to bring the lot up to the specified standard; or
- (b) Replace all or part of the lot to bring it up to the specified standard; or
- (c) Request utilisation of a lot for a reduced level of service if such a clause exists in the relevant Technical Specification; or
- (d) For incidental defects, request that the Superintendent accept the lot without alteration as an exception with or without alteration to the respective unit rates.

2. Any proposed disposition shall be subject to the approval of the Superintendent. Reworked/replaced lots shall be verified to conform to the specified requirements.

QCS22 CORRECTIVE ACTION

1. The Contractor will be required to indicate on the NCR corrective action appropriate to ensure that the Quality Plan is effective in avoiding recurrence of the nonconformance and continues to be effective.

**QP Corrective
Action**

QCS23 STATISTICAL TECHNIQUES

1. Random sampling techniques shall be used for each lot for the control of compaction of each continuous layer of earthworks, flexible pavement and asphalt.

**Random
Sampling**

2. Annexure CQS-A defines the method to be used for determining test locations of random sampling in each lot.

Test Locations

3. Annexure CQS-C lists the maximum lot sizes and minimum test frequencies for the specified activities.

**Lot Sizes and
Test
Frequencies**

4. For compaction control of processes other than layers of earthworks, flexible pavement and asphalt, the sampling procedure will be proposed by the Contractor in its method statement and will require the approval of the Superintendent. In such cases the samples shall be each considered to be representative and all test results will be required to meet the appropriate tolerances for the lot.

**Sampling
Procedure for
Compaction**

CQS24 QUALITY AUDITS

1. The Contractor's Quality Audit Schedule shall be included in the project Quality Plan. *Audit Schedule*
2. The Audit Reports shall be provided to the Superintendent. *Audit Reports*

MEASUREMENT AND PAYMENT

CQS27 PAY ITEMS

1. Payment shall be made for all activities associated with the planning, establishment, implementation, operation and maintenance of the Quality System for the project. These costs shall include all investigation, inspections, testing, rectification and maintenance of the Quality Register.
2. Cost adjustments, if applicable, will apply the same as to any other Pay Item in the Schedule.

Pay Item QP1 QUALITY SYSTEM DOCUMENTS AND RECORDS

1. A lump sum for this item shall be provided for all costs associated with the preparation and submission of the Quality Plan, the provision of the QMR on site and the maintenance of the Quality Records during the course of the Contract.
2. Progress payments shall be calculated on the basis of 30% of the Lump Sum when the complete Quality Plan is available and the remainder on pro rata based on the monthly value of work done.

Pay Item QP2 QUALITY VERIFICATION AND CONTROL

1. The Lump Sum for this item shall include all costs for inspections, conformance surveys and testing required to verify that all aspects of the work under the Contract comply with the Quality Assurance provisions of the Contract.
2. Payments shall be made pro rata on the monthly value of work done.

ANNEXURE CQS-A

RANDOM SAMPLING

CQS-A1 GENERAL

1. Random sampling of test locations shall be used to control relative compaction of each layer of:
 - (i) Earthworks
 - (ii) Selected material zone
 - (iii) Flexible pavement
 - (iv) Asphalt
 - (v)
 - (vi)
 - (vii)

which are generally rectangular in area.

2. By arrangement with the Superintendent, areas that are not (generally) rectangular may be notionally rearranged to suit the method of determining sample locations as described in hereunder.

CQS-A2 SAMPLING RATES

1. The number of samples (n) shall be as indicated in the specific Specification parts, which are summarised in the Sub-Annexures to this Quality Requirements Specification.

CQS-A3 RANDOM SAMPLING LOCATIONS

1. Sampling locations within a lot for the control of relative compaction shall be determined as follows:
 - (i) Representing the lot as a rectangle, sub-divide the lot lengthwise into equal area sub-lots in accordance with the number of samples selected (n) in accordance with Table CQS-A1.
 - (ii) Establish six grid lines within the lot, as illustrated in Figure CQS-A2;
 - (iii) Throw a die to select a number between 1 and 6. This determines which grid line to use for the sample location in sub-lot 1;
 - (iv) Throw die to select a group (1-6) in Table CQS-A2;
 - (v) Throw die twice to select two random numbers (between 1 and 6) for row and column in Table CQS-A2 and obtain random fraction R;
 - (vi) Length co-ordinate for sample location in Sub-lot 1 = RL/n ;
 - (vii) For sample location in next sub-lot:-
Add L/n to previous length co-ordinate.
Add 1 (on a cycle of 6) to previous grid line.

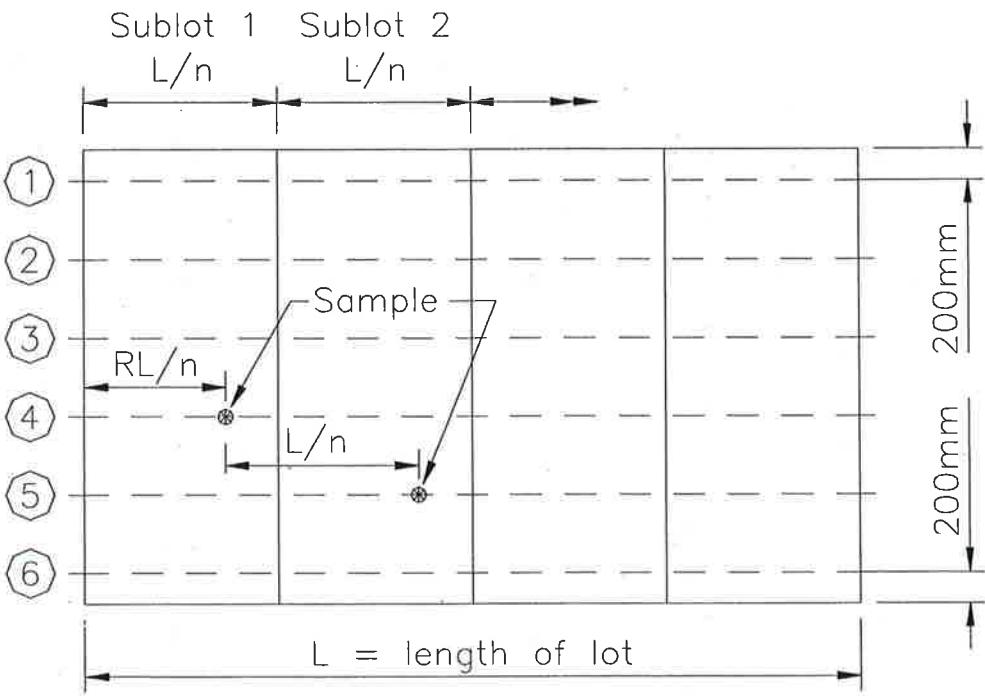


Figure CQS-A2 — Sampling Locations for Rectangular Lot

QUALITY SYSTEM REQUIREMENTS

GROUP	ROW	COLUMN					
		(1)	(2)	(3)	(4)	(5)	(6)
(1)	(1)	0.78178	0.45467	0.00347	0.27296	0.00020	0.36517
	(2)	0.59678	0.67931	0.25434	0.59054	0.32444	0.41504
	(3)	0.14464	0.17269	0.61154	0.18291	0.83242	0.50776
	(4)	0.89010	0.44764	0.07451	0.20428	0.49513	0.91440
	(5)	0.91941	0.47726	0.33160	0.30670	0.65114	0.36852
	(6)	0.51085	0.38148	0.22169	0.66578	0.67050	0.69559
(2)	(1)	0.81891	0.48626	0.88892	0.82994	0.16941	0.81528
	(2)	0.37410	0.60232	0.12070	0.79017	0.32981	0.34908
	(3)	0.45921	0.15648	0.58052	0.37413	0.08124	0.97145
	(4)	0.86614	0.94719	0.78872	0.91972	0.45149	0.15107
	(5)	0.26590	0.41140	0.95477	0.81267	0.24018	0.07324
	(6)	0.95205	0.39438	0.73697	0.59427	0.71146	0.00575
(3)	(1)	0.18694	0.36502	0.17828	0.84312	0.57003	0.58583
	(2)	0.91211	0.86936	0.43030	0.27672	0.47393	0.10342
	(3)	0.80714	0.34295	0.00775	0.90855	0.33368	0.21842
	(4)	0.67579	0.92686	0.18005	0.00645	0.11256	0.05278
	(5)	0.03184	0.69876	0.16676	0.43346	0.86992	0.03275
	(6)	0.15623	0.02905	0.72763	0.19095	0.80847	0.39729
(4)	(1)	0.72109	0.17970	0.22505	0.35561	0.98935	0.27818
	(2)	0.37348	0.19381	0.43331	0.75033	0.99963	0.42232
	(3)	0.12129	0.32386	0.56705	0.87165	0.84460	0.92955
	(4)	0.54948	0.08844	0.47061	0.78419	0.18731	0.93485
	(5)	0.15097	0.44967	0.48759	0.84161	0.19212	0.05146
	(6)	0.32360	0.66850	0.99382	0.94050	0.96449	0.96217
(5)	(1)	0.68091	0.54191	0.10910	0.94237	0.23161	0.15167
	(2)	0.97121	0.83626	0.70896	0.45296	0.69475	0.11264
	(3)	0.19723	0.98260	0.57429	0.94789	0.64457	0.20809
	(4)	0.84036	0.14095	0.29451	0.40256	0.34521	0.64924
	(5)	0.97500	0.98056	0.82276	0.97130	0.77329	0.89855
	(6)	0.83244	0.30828	0.06882	0.68471	0.71081	0.91649
(6)	(1)	0.75892	0.29685	0.70044	0.91238	0.53356	0.45239
	(2)	0.13229	0.19701	0.36074	0.32254	0.62045	0.26691
	(3)	0.34789	0.22179	0.91891	0.87651	0.91011	0.97469
	(4)	0.97211	0.68943	0.12831	0.50006	0.20793	0.61151
	(5)	0.24954	0.17809	0.56093	0.51524	0.69135	0.68967
	(6)	0.10062	0.11852	0.47089	0.64765	0.44644	0.35548

Table CQS-A2 - Table of Random Fractions

**ANNEXURE CQS-B
METHOD STATEMENT REQUIREMENTS**

CQS-B1 GENERAL

1. Method Statements are required to describe the key steps and sequence in the construction activities, how and by whom each step shall be undertaken and what materials and equipment shall be used. Method Statements may include a flow chart to clarify the sequence of key steps. One or more Method Statements may address a Construction Activity.
2. Each Method Statement will be supported by a Check List. The Check List shall identify relevant inspections, test points, materials requirements and Hold Points. Each requirement on the Check List will have an officer responsible identified and will require the nominated officer to sign off the requirement so indicating its satisfactory execution.
3. Method Statements and Check Lists shall be compatible with the appropriate Inspection and Test Plan. Check Lists will be completed for each lot of work during construction and compiled with other documents to comprise the Quality Register.
4. The Contractor shall submit Method Statements and Check Lists to describe the key steps in those Construction Activities listed below that are identified with a preceding asterisk (*).

Table CQS-B1 - Construction Activities

Item	Enter * here if required	Activity	Specification Number
1		Control of Traffic	C201
2		Temporary Roadways and Detours	C201
3		Control of Erosion and Sedimentation	C211
4		Clearing and Grubbing	C212
5		Earthworks - Cut	C213
6		Earthworks - Unsuitable Material	C213
7		Earthworks - Embankment	C213
8		Compaction and Quality Control	C213
9		Siting, Excavation, Bedding, Backfilling and Compaction of Stormwater Drainage	C220
10		Installation of Pipe Drainage	C221
11		Installation of Precast Box Culverts	C222
12		Siting and Installation of Drainage Structures	C223
13		Construction of Lined Open Drains including Kerb and Gutter	C224
14		Stabilisation of Pavement or Subgrade Materials	C241
15		Provision of Subsurface Drainage as subsoil drains, pavement drains or free draining layer	C230-C233
16		Construction of Flexible Pavement Layers	C242
17		Construction of Concrete Pavement Layers	C247-C248
18		Construction of Asphaltic Concrete Pavement Layers	C245

QUALITY SYSTEM REQUIREMENTS

Item	Enter * here if required	Activity	Specification Number
19		Sprayed Bituminous Surfacing	C244
20		Bituminous Microsurfacing	C255
21		Construction of Segmental Paving	C254
22		Pavement Marking	C261
23		Minor Concrete Works	C271
24		Landscaping	C273

ANNEXURE CQS-D

NONCONFORMANCE REPORT

NCR No:

EXAMPLE

Date:

CONTRACT:.....

PRODUCT OR SERVICE:.....

SUB-CONTRACTOR (if appropriate):.....

INSPECTION & TEST PLAN No:

LOT No & DESCRIPTION/LOCATION:

DETAILS OF NONCONFORMANCE:.....

PROPOSED DISPOSITION:

IS A SUPPLEMENTARY REPORT ATTACHED: YES NO

CLIENT APPROVED COMMENT:.....

REJECTED

CLIENT SIGNATURE: DATE:.....

DISPOSITION COMPLETED (CONTRACTOR) DATE:.....

RELEASE OF HOLD POINT (CLIENT)..... DATE:.....

CLOSE OUT OF NONCONFORMANCE REPORT:

CONTRACTOR QMR: DATE:.....

