Technical Specification

Transport and Main Roads Specifications
MRTS50 Specific Quality System Requirements

October 2016
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1 Introduction

This Technical Specification describes the requirements for the application of a Quality System for the management of all aspects of the Contractor's obligations for construction of road infrastructure projects.

This Technical Specification shall be read in conjunction with MRTS01 Introduction to Technical Specifications and other Technical Specifications as appropriate.

This Technical Specification forms part of the Transport and Main Roads Specifications Manual.

2 Definition of terms

The terms used in this Technical Specification shall be:

a) As specified in Clause 2 of MRTS01 Introduction to Technical Specifications.

b) Where a Technical Specification requires that materials be supplied by a quarry registered under the Quarry Registration System (QRS), a stockpile sublot:
   i. shall apply to all lots greater than 5000 tonnes
   ii. shall be no greater than 5000 tonnes, and
   iii. shall be nominated as part of a lot.

3 Referenced documents

Table 3 lists documents referenced in this Technical Specification.

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4 Quality system requirements

The Contractor shall establish, implement and maintain a Quality System that complies with the Contract.

Construction activities shall be carried out in accordance with the provisions of the Contractor’s Quality System which shall comply with the requirements of AS/NZS ISO 9001.

The quality planning for the project shall be documented in a project specific quality plan.
5 Quality plan

The Quality Plan shall define at least the following:

a) A commitment to achieve the quality objectives contained in the Contract and a statement of the quality objectives the Contractor intends to deliver.

b) The specific allocation of responsibilities and authorities and the management procedures to apply for the delivery of the Contract, including those for selection, engagement and control of Subcontractors and Suppliers, and

c) The name, qualifications and experience of the following Contractor’s supervisory personnel:
   i. Project Manager
   ii. Project Engineer(s)
   iii. Contractor’s Quality Representative
   iv. Safety Officer
   v. Environmental Representative
   vi. Landscape Representative
   vii. Surveyor(s), and
   viii. Works Supervisor(s).

d) The communication processes to be implemented in management of the activities of the Contract.

e) The controls to be applied for management of amendments to the Contract Plan documents as Work under the Contract proceeds.

f) The quality records to be maintained by the Contractor and its subcontractors and those to be submitted to the Administrator, and

g) Schedules of construction procedures and Inspection and Test Plans giving the dates by which these are to be prepared.

The following information shall be added to the Quality Plan in accordance with the requirements of the Contract:

a) at least those construction procedures nominated in the Contract

b) lot numbering and lot identification systems

c) inspection and Test Plans including a copy of the NATA scope of accreditation for the Contractor’s compliance testing laboratories

d) other specific requirements as set out in the Contract, and

e) the interconnections between the documents included in the Contract Plan.

6 Construction procedures

The Contractor shall prepare written procedures for all construction processes, including statement of equipment to be utilised for work processes as warranted and all controls to be exercised to ensure satisfactory achievement of Contract requirements, where the absence of such procedures could
adversely affect quality of the work. Where appropriate, such procedures may be included in the Inspection and Test Plans or other documentation.

The Contractor shall submit to the Administrator all construction procedures nominated in the Contract and any construction procedures requested by the Administrator during the execution of the Contract.

Construction procedures shall be submitted to the Administrator at least 14 days before construction of the relevant work commences unless alternative times are specified elsewhere in the Contract.

Construction procedures shall contain the purpose and scope of the activity, what is to be done and by whom; when, where and how it is to be done; what materials, equipment and documents are to be used; and how the activity is to be controlled and recorded.

7 Identification and traceability

7.1 Lots

The Contractor shall divide the Works into lots for the purpose of:

a) positive identification and traceability of all work activities, measurements and tests
b) monitoring the quality of product
c) submission of work to the Administrator under cover of a conformance report
d) rejection of work
e) application of concession provisions for below standard work, and
f) application of bonus provisions for above standard work.

Lots shall be chosen by the Contractor taking into account any restrictions included in the Contract.

7.2 Lot registration

The Contractor shall define a system of lot registration which is practical for the Works and which shall include:

a) a lot number
b) a description of the lot
c) the location, including where necessary three dimensional surveyed position of the lot
d) a method which ensures traceability of all sampling and test results relevant to the lot
e) the means for recording and/or cross referencing records of compliance or nonconformance related to the lot, and
f) a suitable method of identification for lots which replace nonconforming lots.

The Contractor's system of lot numbering shall be logical, shall suit the specific application and shall be consistent with any specified computerised system. Bridgeworks and similar activities may be identified by plain English titles as used on the drawings (Pier 1, Span 2, and so on).

Each lot shall be recorded in the lot registration system.

Reworked or subdivided lots shall be renumbered and shall be cross referenced to the original lot number.
7.3 **Lot identification**

The physical bounds of each lot and its lot number shall be clearly identified by a system of lot identification. All work and/or activities shall be able to be readily identified with the relevant lot. Work on a lot shall not commence until the lot identification has been established and is understood by all relevant staff.

7.4 **Lot notification and status**

The Contractor shall submit to the Administrator early each working day a list of all lots on which work commenced on the preceding working day, including sufficient information of the relevant lot numbers and lot identification system to ensure timely assessment of completed Works for compliance with the requirements of the Contract.

The Contractor shall also notify the Administrator of all lots which were physically completed on the preceding working day.

7.5 **Traceability**

The lot identification system, Site records and sample numbering system shall allow test results to be positively identified with the lot they represent.

8 **Inspection and testing**

8.1 **General**

Compliance assessment shall apply only within a lot which remains homogeneous.

Where a lot is not homogeneous, it may be divided into separate sublots. Inspection and testing of each sublot shall be undertaken in accordance with the requirements for a separate lot.

The Administrator and/or Principal may have completed lots reviewed for homogeneity.

No material shall be supplied to or used in the Works until written approval is given by the Administrator.

8.1.1 **Material produced and/or sourced from a Quarry Registration System registered quarry**

This clause shall be read in conjunction with Clause 8.1 and applies to material sourced and/or produced from a quarry registered under the QRS.

a) The *Quarry Registration Certificate*’s Testing Frequency Schedule details quarry-specific source rock test properties and the associated testing frequencies for which the quarry is registered. For conformance testing of a source rock property, the test method and property limit or limits are specified, and the following applies:

i. unless otherwise specified, the frequency of testing shall not be less than that assigned in the *Quarry Registration Certificate*’s Testing Frequency Schedule for that source rock test property

ii. the lot size shall be no greater than the maximum material quantity assigned under the *Quarry Registration Certificate*’s Testing Frequency Schedule requirements

iii. test samples for source rock testing shall be taken from the processed nominated product. Where there is insufficient material available in fractions required by a test method, then a sample taken from the same rock as the nominated product shall be sampled for that test
iv. for all properties and characteristics required by the Contract, the material sampled for testing shall be consistent with the product supplied to the Works

v. for each property, a minimum of one test shall be completed for each lot

vi. the QRS provides that testing of each of the property is undertaken as part of the quarry’s ongoing production.

b) A source rock property may not change between the point of manufacture and the point of use including after storage, transport, compaction and finishing.

c) Registration, identification, traceability, notification and status of a stockpile sublot shall be in accordance with that of a lot. Compliance provisions apply to the lot.

d) Prior to the material's use in the Works, the Contractor shall provide the Administrator with a certificate that:

i. identifies the stockpile sublot and lot from which the material is sourced, and

ii. verifies that each property of the material complies with the testing requirements including:
   • test method
   • property limit/s, and
   • maximum lot sizes and minimum testing frequencies.

e) Where more than the following quantity of material is supplied to a single departmental project from a quarry source:
   i. 5 000 tonnes of unbound pavement material
   ii. 1 000 tonnes of cover aggregate, and/or
   iii. 20 000 tonnes of asphalt, leanmix concrete subbase, concrete base and/or structural concrete.

Prior to removal from the quarry of any material to be used in the Works and in addition to testing required as part of the QRS, a sample for each test shall be taken from the product jointly by the Administrator and the Contractor. The sample shall be split into three sub-samples, and:

i. the Contractor and Administrator shall each test one sample, and

ii. the untested third sample shall be held by the Administrator as a reference sample.

f) For a QRS registered quarry source that does not have a testing frequency schedule nominated on the Quarry Registration Certificate, the Default Level testing frequencies stated in the QRS shall apply.

8.2 List of items to be included in Inspection and Test Plan

Inspection and test procedures shall be included in an Inspection and Test Plan and shall include:

a) the work process and associated inspection and test points

b) the allocation of responsibilities for carrying out the inspections and testing

c) the required frequency of the inspections and testing

d) the methods to be used for measurements and tests
e) the criteria for acceptance  
f) measurements or tests which involve use of calibrated equipment  
g) all Witness and Hold Points.

The Administrator and/or Principal may review the Contractor’s Inspection and Test Plans to determine if all compliance sampling and testing methods, acceptance criteria and testing frequencies conform to the Contract between the Principal and the Contractor, and comply with the relevant Technical Specifications.

8.3 Hold Points, Witness Points and Milestones

8.3.1 General

Where a Hold Point, Witness Point or Milestone applies in a Technical Specification, the text is highlighted at the appropriate point and a summary of all such points is included in the Quality Clause of the relevant Technical Specification.

A Hold Point is indicated in the text as **Hold Point**. A Witness Point is identified in the text as **Witness Point**. A Milestone is identified in the text as **Milestone**.

8.3.2 Hold Point

Hold Point means an identified point in a process beyond which the Contractor shall not proceed without written authorisation from the Administrator authorising release of the Hold Point.

Hold Points shall apply as follows:

a) as specified in the Contract or as otherwise nominated by the Administrator  
b) on issue of a nonconformance report, or  
c) on issue of a corrective action request by the Administrator.

To obtain the Administrator’s authorisation to proceed past a specified Hold Point, the Contractor shall provide evidence to the Administrator that all applicable work has been completed and tested and inspected by the Contractor in accordance with the Contract. Following provision of all specified information, the Contractor shall allow at least one working day for a response from the Administrator.

To obtain the Administrator’s authorisation to proceed past a Hold Point associated with a nonconformance or corrective action request, the Contractor shall demonstrate amendments to its Quality System to prevent recurrence of the nonconformance and propose disposition of the nonconforming product, where applicable.

Hold Points specified in the Contract are those required by the Principal. The Contractor may designate additional Hold Points in the Contractor’s Quality Plan and nominate a person responsible for authorisation of continuation past those points.

8.3.3 Witness Point

Witness Point means an identified point in a process where the Contractor is required to give the Administrator prior notice with the option to observe an activity.

Unless specified otherwise, the Contractor shall give the Administrator notice of at least one working day of an approaching Witness Point but may proceed with the activity when the period of notice has expired whether or not the Administrator elects to witness the activity.
8.3.4 Milestone

Milestone means a point in time within a project which marks the start or completion of an activity.

Milestones nominated in the Technical Specifications shall be shown on the Contractor’s construction program prepared in accordance with the Supplementary Conditions of Contract.

8.4 Compliance inspection and testing

Compliance inspections and tests shall be carried out by the Contractor to ensure compliance with the Contract requirements and shall include at least all inspections and tests which are specified in the Contract.

All compliance sampling and testing shall be carried out by laboratories accredited by NATA and certified for the appropriate tests and registered as Construction Materials Testing (CMT) Suppliers.

All compliance assessment, inspections, sampling and testing shall be based on lots. Compliance testing shall be performed on a lot at the time when the lot has been processed in accordance with the Contractor’s construction procedure to comply with the requirements of the Contract.

Assessment of compliance shall be completed by a responsible person at least one remove from the person performing the work.

The Contractor shall advise the Administrator of the location of each compliance test as well as the lot number, prior to the commencement of testing of the lot.

Once compliance testing of the lot has commenced, the compliance test procedures shall be completed and a result reported even if a failure occurs. Testing must be supervised by NATA Level 2 or higher staff with the delegated authority to sign reports on behalf of the registered Supplier.

Results from compliance tests are to be provided to the Contractor and the Administrator at the same time. Corresponding NATA endorsed sampling and testing reports shall be submitted with the conformance report. If the results indicate nonconformance, no further testing shall be permitted until a nonconformance report has been submitted and corrective action has been approved by the Administrator.

8.4.1 Material sourced and/or produced from a Quarry Registration System registered quarry

This clause shall be read in conjunction with Clause 8.4 and applies to material sourced and/or produced from a quarry registered under the QRS. The Contractor shall provide the Administrator with adequate forward notice to enable the Administrator to attend sampling and testing activities for compliance tests.

8.5 Frequency of testing

The frequency of testing for compliance shall not be less than the minimum requirements nominated in the Contract. Minimum testing frequencies and minimum number of tests are stated in the relevant Technical Specifications. Where a minimum testing frequency or minimum number of tests is not given, it shall be nominated by the Contractor and submitted to the Administrator at least 14 days prior to the commencement of testing.

Specified testing frequencies represent a minimum testing requirement. The Contractor remains responsible for performing sufficient tests and inspections to ensure that a lot complies with all requirements of the Contract, including testing during the performance of the work to ensure that processes remain in control.
8.6 **Level of compliance testing**

Testing for compliance shall be carried out at the Normal Testing Level stated in the relevant Technical Specification subject to the requirements of this clause.

The Contractor may adopt any Reduced Testing Level stated in the relevant Technical Specification after no nonconformances have occurred in four consecutive lots and it has been demonstrated that the Contractor's processes are under control and consistent.

Where a Contractor is operating at the Reduced Testing Level and a nonconformance occurs for any requirement for a lot, the Contractor shall immediately revert to the Normal Testing Level for all standards and requirements.

For an offsite continuing process (for example, pavement material production), approval may be given by the Administrator to move to a Reduced Testing Level based on testing undertaken outside the Contract in accordance with the Supplier's Quality System.

8.6.1 **Material produced/sourced under the Quarry Registration System**

This clause shall be read in conjunction with Clause 8.6 and applies to each source rock property detailed on the *Quarry Registration Certificate* for a material sourced and/or produced from a quarry registered under the Quarry Registration System. For each test undertaken as part of the compliance testing requirements:

a) the Normal Testing Level shall be at least the frequency for that test listed in the *Quarry Registration Certificate* Testing Frequency Schedule

b) when a nonconforming test result occurs, two additional tests on other samples obtained from the same lot shall be taken, and:

i. if both additional tests are conforming, the Normal Testing Level may be maintained, and

ii. the Contractor shall provide written notification to the Manager (QRS) in accordance with Guideline QRS1: *Quarry Registration System Outline* of the three test results within three working days of completion of each test.

8.7 **Sampling**

All sampling shall be carried out by laboratories accredited by NATA for sampling specified in the Contract and registered as CMT Suppliers.

Selection of sampling and test locations shall comply with Standard Test Method Q050 *Selection of Sampling and Test Locations* which requires Random Stratified Sampling procedures unless an alternative procedure is specified.

8.8 **Reinstatement**

The Contractor shall be responsible for and reinstate all core holes, test holes, excavations and any other disturbance resulting from control and/or compliance testing. The reinstatement shall be to a standard which is at least equal to the specified requirements for the particular work.

9 **Auditing**

9.1 **General**

The Administrator and/or Principal may conduct system and performance audits at any stage.
The Contractor shall supply any information, documentation, access and assistance requested for the completion of audits. The results of any audits conducted by the Principal separately from the Contract shall be made available to the Administrator.

9.2 Audit testing

Audit testing of completed lots may take one or both of the following forms:

a) sampling and/or testing carried out by the Administrator and paid for by the Principal, or
b) sampling and/or testing ordered by the Administrator and carried out by the Contractor. Where the result of testing indicates compliance, the testing will be paid for by the Principal; otherwise the cost shall be borne by the Contractor.

Where required, the Administrator may request the Contractor to obtain sufficient material when sampling to provide a split reference sample(s) for retention by the Principal.

Excavations caused by audit testing carried out in accordance with this clause shall be repaired at the Principal's cost if the test result indicates compliance. Otherwise, the Contractor shall repair such excavations at its own expense.

9.3 Surveillance

The Administrator and/or Principal may inspect any process or procedure at any time to gain assurance that the Contractor's system, including Subcontractor systems, is in compliance with the Quality System and the Contract. Visual inspections or surveillance may reduce the need for audit testing.

Surveillance activities for laboratories may include but are not limited to:

a) observation of laboratory operations, including storage and handling of samples as well as sampling and testing techniques
b) assessment of test results through analysis of trends and use of other statistical techniques.

CMT Supplier Registration System provides further detail regarding surveillance activities.

10 Conformance and nonconformance

10.1 Conformance

10.1.1 Conformance reports

A Conformance Report shall be prepared for each lot and shall be accompanied by the following:

a) completed inspection and test records
b) analysis of the results to demonstrate compliance with the relevant Technical Specification
c) where there has been an engineering variation during the construction process, As Constructed drawings – with the amended design certified by the Registered Professional Engineer Queensland (RPEQ), and
d) As Constructed surveys.

This clause shall be read in conjunction with Clause 12.3 detailing requirements for the verification and certification of As Constructed drawings and Clause 13 detailing requirements for As Constructed surveys.
10.1.2 Indicative conformance

Where a lot is subject to any of the following requirements:

a) surface evenness (Road Roughness)
b) moisture content (Degree of Saturation)
c) moisture content (General Earthworks), and
d) testing of concrete on the basis of strength.

The Administrator may approve the use of Indicative Conformance procedures for testing and/or analysis. An Indicative Conformance report for the construction lot may be submitted before the listed testing and/or analysis is carried out.

The purpose of Indicative Conformance is to allow work to progress prior to the minimum timeframes required for testing and/or analysis to demonstrate conformance.

Where the Contractor is seeking Indicative Conformance, a separate Indicative Conformance report shall be prepared for each lot. Each report shall contain:

a) a statement acknowledging that test results are not yet available for confirmation of conformance, and
b) a statement accepting risk of rework upon conformance reporting.

The Conformance Report shall be processed as soon as possible after the test results become available.

Notwithstanding Indicative Conformance being achieved, the lot shall still be subject to rework should it subsequently fail to comply with the specified requirements.

However, the conforming construction lots shall still be subject to rework should the special lots subsequently fail to comply with the specified requirements.

10.2 Nonconformance

For every nonconformance which occurs, the Contractor shall promptly initiate the nonconformance and corrective action procedures defined in the Contractor’s Quality Plan.

The Contractor shall notify the Administrator of each nonconformance within one working day of its detection where:

a) there is potential for progress of the work to be seriously affected
b) the proposed action to correct the nonconformance will result in work not complying with the requirements of the Contract
c) the Contractor has failed to comply with the time requirements of the Contract
d) the nonconformance may cause a health and safety hazard
e) the nonconformance has resulted from a deficiency in the drawings or Technical Specification
f) client supplied product is involved
g) the Administrator has directed that specific types of nonconformances be notified
h) material or serious environmental harm has occurred
i) items of cultural heritage significance are discovered, or

j) contaminated land or contaminated materials delivered to the Site are identified.

Each such notification by the Contractor shall include details of the action proposed for correction of the nonconformance or the arrangements made for its disposition and the amendments to its Quality System to mitigate recurrence of the nonconformance.

The Contractor shall not proceed to cover up or otherwise incorporate the nonconforming work or materials before the Administrator has approved of the proposed action in writing.

If the Administrator observes a nonconformance and the Contractor, when informed of such, does not take appropriate action, the Administrator will issue a corrective action request. Within one working day of receipt of the corrective action request, the Contractor shall issue a Nonconformance Report.

Where the proposed action to correct the nonconformance will result in work not complying with the requirements of the Contract, the identification of a nonconformance and the subsequent issue of a Nonconformance Report and/or corrective action request shall constitute a Hold Point in accordance with Clause 8.3.2.

Throughout the Technical Specifications, requirements in the event of a nonconformance which may occur are identified in the text as **Nonconformance**. Areas where the Administrator may have cause to raise a corrective action request are identified as **Corrective Action Request**.

### 11 Quality records

#### 11.1 General

The Contractor shall, from the commencement of the Contract until the Date of Practical Completion, establish, file and maintain at its Site office, or other location approved by the Administrator, for inspection by the Administrator and the Principal up-to-date records which demonstrate implementation of the Contractor’s Quality System including the Contract Plan documents.

Notwithstanding any other nominated timeframe, prior to the issue of the Final Certificate, the Contractor shall have handed over to the Administrator the following records, or certified copies thereof:

a) the lot register that clearly allows forensic location of a lot as described in this Technical Specification

b) test results, analyses, reports, measurements and observations as defined in the Contract or as nominated by the Administrator

c) all conformance and nonconformance reports and

d) As Constructed drawings and surveys for Work under the Contract.

Quality Records retained by the Contractor pursuant to the requirements of the Contractor’s Quality System and the Contract shall be available for evaluation by the Administrator up to and including the time of issue of the Final Certificate.

The Administrator and/or Principal may have sampling and testing records reviewed to determine if all sampling and testing was undertaken by registered CMT suppliers in keeping with the Contractor’s Inspection and Test Plans.
This clause shall be read in conjunction with Clause 12.1 and Clause 12.2 detailing requirements for the preparation of As Constructed drawings.

11.2 Retention of records

The Contractor shall retain all records from the Contract in accordance with the Contractor's statutory requirements and company policy.

If not otherwise required, records shall be kept for at least one year after the date of the Final Certificate.

12 As Constructed drawings

12.1 Preparation and submission of As Constructed drawings

As Constructed drawings are to be prepared that represent the design as it has been constructed, including any design modifications made since the IFC issue of the drawings.

As Constructed drawings shall be provided to the Administrator four weeks after Practical Completion in hard copy and electronic formats.

12.2 Format of As Constructed drawings

The drawings shall be free of clouds and all revision indicators and the text shall be modified to black.

12.3 Verification and certification requirements of As Constructed drawings

Where works are constructed out of tolerance that would affect the engineering intent or functionality, As Constructed information should be included on the As Constructed drawings and shall be certified by the relevant RPEQ design engineer/s. Where the Principal has supplied the IFC drawings this will be the Principal's RPEQ design engineer. In all other cases it will be the Contractor's RPEQ design engineer.

Where the IFC drawings require amendment but the changes do not affect the engineering intent or functionality (for example, a service is located in a different position to that shown on the IFC drawings), As Constructed information should be included but does not require RPEQ certification.

Where the IFC drawings are not required to be amended, or only require the removal of clouds to be reissued as As Constructed drawings, there is no requirement for RPEQ certification.

For all As Constructed drawings the Administrator (in the case where the Principal has supplied the IFC drawings), or Contractor’s Representative (in all other cases), shall sign a statement stating that 'the works shown on the drawings are a factual representation of works constructed' and reissue the drawings as As Constructed drawings.

Transport and Main Roads' Drafting and Design Presentation Standards Manual includes guidance for the preparation of As Constructed drawings.
Purpose

As Constructed Drawings

The purpose of As Constructed drawings is to provide an accurate record and validation that the works were constructed according to the design dimensions, specifications, all other construction details and variations shown on the design drawings.

Definition

As Constructed drawings are design drawings that have been signed to confirm that the works have been constructed according to the design dimensions, specifications, all other construction details and any variations shown on the design drawings. They reflect all on site changes such as dimensions and geometric location of all elements on the design drawings during the construction process. These variations are usually marked up in red ink. Dimensions are usually not validated by on site survey measurements. Hence, they may not reflect a survey accurate representation of the constructed works.

When does the Principal supply the IFC drawings? This is determined by the type of contract that has been used to engage the Contractor. The Principal will supply the IFC drawings to the Contractor in contracts where the design has been finalised and the Contractor has only been engaged to deliver the Works. This is the case for the Transport Infrastructure Contract (TIC) – Construct Only (Road Construction Contract), TIC – Sole Invitation (Roadworks Performance Contract), Minor Works Contract and some Maintenance Contracts. These contract types are the most common ways that Contractors are engaged to deliver works for the Department of Transport and Main Roads.

Other contract types such as TIC – Design and Construct (Design and Construct Contract), Alliance Contract, Collaborative Project Agreement, and Relational Incentive Contracts, will require the Contractor to undertake at least some additional design work and subsequently issue its own IFC drawings. These contracts are more frequently used for large construction projects where the Contractor will have a design team as part of the works delivery. It is therefore appropriate for the Contractor in these situations to retain responsibility for amendments to the design. The table following provides an overview of works delivery methods, contract types, and whether the Principal will supply IFC drawings (further detail on contract types can be found in the department’s Engineering Policy EP150).

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<tr>
<th>Delivery model</th>
<th>Contract types</th>
<th>Issued for Construction drawings supplied by</th>
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</table>
| Design and then Construct | Minor Works Contract  
TIC – Construct Only (Road Construction Contract)  
TIC – Sole Invitation (Roadworks Performance Contract)  
Road Maintenance Contracts | Principal                                           |
### Table: Delivery model and Contract types

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<th>Delivery model</th>
<th>Contract types</th>
<th>Issued for Construction drawings supplied by</th>
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<td>Design and then Document and Construct</td>
<td>Document and Construct – Design Novation</td>
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</table>

### 13 As Constructed survey

As Constructed Surveys are to be undertaken where specified in the contract documentation. These may include works as specified in MRTS91 *Conduits and Pits*, MRTS92 Street lighting and traffic signalisation and MRTS03 Drainage and Retaining Structures or other relevant Technical Specifications that form part of the contract.

Deliverables including the Survey Control Register, Conformance and all As Constructed Survey data shall be provided as specified in Clause 6.7.8 of the *TMR Surveying Standards*, Part 2 February 2016.

#### Purpose

As Constructed Survey works is to provide an accurate spatial record of completed works for record purposes that can be used to validate completion & conformance of works for contractual purposes. They can be used as a basis for future design works and for accurate future location such as in the case of constructed underground assets.

#### Definition

As Constructed Survey refers to detail site survey measurements that accurately record details of completed works. They can reflect real world constructed objects depicting surface shapes in three dimensions (3D) in geospatially referenced location. They also provide descriptive attribute information. The As Constructed Survey can be represented by hard copy drawings and/or in 3D electronic models.

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*Superseded*