National Asset Delivery
Technical Surveys and Testing

Works Information for 605475 M5 J11a Roman Villa MP86.8 – Concrete Testing

CONTENTS AMENDMENT SHEET

Amend. No.	Revision No.	Amendments	Initials	Date
0	0	Original version issued with tender	ET	19/03/21

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LIST OF ANNEXES

1 DESCRIPTION OF THE WORKS

1.1 Project objectives

1.1.1 The principle objective of this project is to determine condition of concrete and to undertake concrete testing at trial holes 1 to12 as shown on drawings HE605475-KIER-SBR-M5_BR_21298-DR-CB-010003.

1.1.2 The specification that applies to the *works* is included in Section 6

1.2 Scope of works

1.2.1 The *works* to be provided under this contract are:

(1) Visual Inspection of the exposed deck and abutment ballast wall cantilevers concrete surfaces and concrete testing at trial holes 1 to 12.

1.3 Deliverables

1.3.1 The *Contractor* is required to produce the following deliverables:

(1) A general comment on the condition of the concrete on top surfaces of abutment ballast wall and deck. Any evidence of the concrete cracking should also be noted on the logs with pictures to support the findings. The information to be provided whenever possible, should include width, depth length of cracks, condition of the concrete (e.g. loose, solid, …).

(2) Concrete testing report including photos as detailed in section 6 – specification.

(3) Programme

(4) Risk Assessments and Method Statements

2 EXISTING INFORMATION

2.1.1 The M5 J11a Roman Villa bridge carries the M5 J11A northbound off-slip over the Barnwood Bypass at Marker Post 86.80 adjacent to the village of Hucclecote in Gloucestershire. The carriageway at this location comprises of two running lanes with varying concrete verges on each side.

OSGR: 387865E, 217540N

2.1.2 An Asbestos Action Plan exists dated November 2007 following a Type 3 Survey though the AAP only covers the wing wall expansion joint. One sample was tested in which no asbestos containing materials were found. Presumed ACMs are the parapet plinth joint/filler mastics. The existing waterproofing on the structure which was installed in 1995 is Servi-Dek with 3mm Servi-Pak. Waterproofing manufacturer has confirmed that it does not contain asbestos or tar.

2.1.3 Structure was constructed in 1995. Therefore, tar is not expected to be present in the deck surfacing.

2.1.4 The Drawings and Documents listed below apply to this contract. Refer to the site information for details of existing site conditions including ground conditions, limitation on access, position of existing structures etc.

Drawing Number	Title	Revision / Date
HE605475-KIER-SBR-M5_BR_21298-DR-CB-010001	Location Plan	P01
HE605475-KIER-SBR-M5_BR_21298-DR-CB-010002	Statutory Undertakers Information	P01
HE605475-KIER-SBR-M5_BR_21298-DR-CB-010003	Trial Pit Location Plan	C02
21298 - AAP	Asbestos Action Plan	P1

3 Constraints on how the Contractor Provides the Works

3.1 General

3.1.1 The *Contractor* Provides the Works in such manner as to minimise the risk of damage or disturbance to or destruction of third party property.

3.1.2 The *Contractor* complies with the constraints and meets with the requirements outlined in Appendix 1.

3.1.3 The *Contractor* submits information detailing how the *Contractor* will provide the Works to the *Employer* prior to the *works* commencing. This information will include any lifting plans, risk assessments, method statements, the *Contractor's* staff training information and any other relevant Health and Safety requirements.

3.2 Working hours & site specific constraints

3.2.1 The *Contractor's* working hours for site works shall be at nights between 2100 - 0500

3.2.2 Works to be undertaken under full closure of the slip road.

3.3 Health, Safety and Environment & Risk Management

Health and Safety requirements

3.3.1 In Providing the Works the *Contractor* meets the requirements of Annex 2 of the supplementary constraints in relation to health and safety duties.

3.3.2 When implemented, the *Contractor* shall comply with the requirements of Highways England's safety passport scheme and ensure that all of his employees, and any of his subcontractor's, are registered in accordance with the implementation of the scheme.

3.3.3 For details of the CDM duty holders, refer to the pre-construction information which pre-construction information provided as part of the TST Pack.

3.3.4 Before commencing the construction phase of the *works*, the *Contractor* confirms to the *Employer* that adequate welfare facilities are in place. Where the facilities detailed in section 5 are not deemed adequate, the *Contractor* provides all necessary facilities to Provide the Works and to comply with the minimum requirements set out in HSE guidance document L153.

Environmental requirements

3.3.5 In Providing the Works the *Contractor* meets the requirements of Annex 2 of the supplementary constraints in relation to environmental duties.

Risk Management

3.3.6 The *Contractor* identifies, manages and mitigates risks in accordance with the principles of ISO31000.

3.3.7 The *Contractor* submits a risk register, which captures all risks associated with the delivery of the *works* including those identified by the *Employer*, with his tender and maintains it for the contract period.

4 REQUIREMENTS FOR THE PROGRAMME

4.1.1 The *Contractor* submits programme to the *Employer* with his tender.

4.1.2 The *Contractor* Provides the Works taking into account the following programme constraints:

(i) The *starting date* and *completion date* and any post site works, reporting and review period

(ii) The services and other things provided by *Employer* (see Section 5)

(iii) The timing of the works will be subject to the availability of road space, traffic management and any site-specific environmental constraints.

(iv) The survey report should be available within two weeks of the completion of the fieldwork.

(v) The contractor should notify Kier Engineer [redacted] at least one week prior to start of works.

4.1.3 The programme should be in the form of an activity and time related bar chart, produced as a result of a critical path analysis.

4.1.4 The programme should preferably be provided in either a PDF or MS Excel format and cover the full contract period including post site activities. Activities should be clearly defined and named, and the programme should detail the following:

(i) Dates and times associated with the project, including the *starting date*, *completion date* & *Contractor's* planned completion, and any other dates or times that will specifically impact the delivery of the project.

(ii) For each activity, the proposed resources (plant & labour) expected to deliver each activity should be shown on the programme.

(iii) Review periods for any reporting requirements.

(iv) Key dates for the Client to provide 'services and other things.

(v) Key dates for co-ordination with Others.

(vi) When information will be provided back to the *Employer*

4.1.5 The *Contractor* updates the programme every week. The *Contractor* submits an updated programme to the *Employer* upon request.

5 SERVICES AND OTHER THINGS PROVIDED BY THE *EMPLOYER*

5.1.1 The following temporary traffic management will be provided by the *Employer* to allow the *Contractor* to Provide the Works:

(1) Works to be undertaken under full closure of the slip road at nights. Working window will be between 2100 - 0500.
(2) Traffic management requirements will be finalised during mobilisation

5.1.2 The other things that will be provided by the *Employer* are as follows:

(1) Welfare facilities will be provided by the principal contractor.

6 SPECIFICATION FOR THE WORKS

6.1.1 The *Contractor* shall undertake the works in accordance with:

MCHW Volume 5, Section 3, Part 4, Chapter 6 'Contract Documents for specialist activities – Ground Investigation – Specification – Pits and Trenches

6.1.2 Requirements for concrete investigation:

1) Visual Inspection & Hammer Tap Survey

The visual inspection and hammer tap survey shall be completed at each trial pit and cover all exposed concrete. The extent and nature of defects found shall be recorded, including delamination, crack widths and spalling. The contractor shall record the size and location of each defect and provide a copy to the Overseeing Organisation on completion of works.

Comment on the condition of the exposed concrete and details of any concrete defects (number of cracks, length, width, depth), spalling, loose or details of any exposed reinforcement protruding through concrete (number of bars, diameter, length of exposed bar etc.)

2) Covermeter Survey

All covermeter surveys shall be carried out using an accurate meter and in accordance with BS1881-204. The survey grid shall cover the whole area of the exposed concrete in the trial pit (for more information see (V4) Series NG 5700 Clause 5706 – Contractor Investigation). It shall be marked out on the test surfaces and provided with a set of arbitrary grid coordinates. The covermeter shall be calibrated by measuring the cover at a location where the reinforcement is exposed, or by limited breakout and exposure of reinforcement.

3) Half-cell Electro-potential test (to be confirmed following visual inspection & hammer tap survey)

- Half Cell potential testing to be undertaken in accordance with ASTM C876-09, Concrete Society Technical Report 60 and ASTM C876-15 "Standard Test Method for Corrosion Potentials of uncoated reinforcing steel in concrete".
- The test apparatus shall comprise of a voltmeter and either a copper-copper sulphate half-cell reference electrode or a silver-silver chloride half-cell reference electrode. The dimension of the survey grid shall be 300 x 300 with electrical connection, with electrical connection to the

reinforcement at either the exposed area or the broken-out area made for the covermeter survey. The Contractor shall make a written record of the survey results for each test area and shall record the survey results of the testing in tabular format using the grid coordinates and as contour plots.

4) Chloride-ion content test (to be confirmed following visual inspection & hammer tap survey)

- In-situ testing for Carbonation to be undertaken in accordance with BSEN 14630.
- In-situ testing for Chlorides to be undertaken in accordance with BSEN 14629.
- Concrete dust samples shall be taken from each trial pit. Samples to be taken from original construction concrete.
- The concrete dust samples shall be taken at positions which coincide with the grid used for the half-cell test. Sample positions should take into account the General Arrangement shown on contract drawings, with the samples being taken in those areas with the most negative electro-potential.
- The positions, for a maximum number of 6 samples per trial pit to be taken, shall be agreed with Kier Engineer (Stuart Watkins, stuart.watkins@kier.co.uk, mobile No: 07712 240016) present on site.
- Dust samples shall be taken at depth increments of 5mm to 25mm, 25mm to 50mm and 50mm to 75mm, with an additional deep drilling to 100mm depth for measurement of the background chloride.
- The chloride-ion content results shall be stated in comparison to the mass of cement.
- The testing laboratory shall hold appropriate UKAS accreditation for testing of the chloride-ion content in accordance with BS 1881: Part 124.

5) Cement Content Test (to be confirmed following visual inspection & hammer tap survey)

- Concrete dust samples shall only be taken from each trial pit. Samples to be taken from original construction concrete.
- The testing laboratory shall hold appropriate UKAS accreditation for testing of the cement content in accordance with BS 1881: Part 124.

6) Concrete Resistivity Test (to be confirmed following visual inspection & hammer tap survey)

- Concrete resistivity shall be measured on site as a non-destructive test e.g. four-probe method/ two-probe method.
- A minimum of five readings of resistivity should be taken at each test location.
- In areas of concrete with high reinforcement probes should be positioned at right angles to the reinforcement.
- The testing laboratory shall hold appropriate UKAS accreditation for testing of concrete resistivity in accordance with BS 1881: Part 201 “Guide to the use of non-destructive methods of test for hardened concrete”.
- These may not be necessary as normally only used to confirm any intact but excessively contaminated concrete to be removed in addition to the delaminated concrete. It isn't necessary to remove intact but contaminated concrete, if galvanic anodes are used within repairs.

7) Requirements for reporting.

Reports including photos and investigation findings should be provided in a PDF format on completion of the works. Sampling and lab testing reports should also be provided.

Test	**Location**	**Total Quantity**
Visual and Hammer Tap Survey	1 per trial pit	12
Covermeter Survey	1 per trial pit	12
Half Cell Test	1 grid per trial pit	12
Chloride Ion Test	6 per trial pit	72
Cement Content Test	1 per trial pit	12
Resistivity Test	5 per trial pit	60
Reinstatement of drilled holes. Max depth 75mm	1 per trial pit	12

6.1.3 Reinstatement of drilled holes:

All drilled holes on concrete surfaces to be filled with non-shrink, high strength cementitious grout.