

# Western Road Bridge

## Determination of Assessment Capacity In The Absence of Records





# Scheme Details

- Existing reinforced concrete portal – no record drawings available, only inspection records.
- Portal of 1930's construction.
- Carries single carriageway over Grand Union Canal
- Commission covered; inspection, investigations, record drawing production, and assessment works.
- Total value – circa £66,300 comprising:
  - i) Planning, project management, consents, & environmental surveys - £6,500
  - ii) Inspection (incl. topographical survey & pontoon) - £6,000
  - iii) Intrusive investigations and laboratory testing - £20,000
  - iv) Trial pits and reinstatement - £15,300
  - v) Drawing production - £3,500
  - vi) Assessment works - £15,000
- Project delivered within 9 months of contract award



# Planning Works (Key Activities)

Planning Activity	Purpose								
Reconnaissance visit and environmental survey	<ul style="list-style-type: none"> <li>To determine: <ul style="list-style-type: none"> <li>i) Structure type and outline.</li> <li>ii) Preliminary geometric survey (plant access).</li> <li>iii) Site constraints (services, canal, highway).</li> <li>iv) Identification of key stakeholders.</li> <li>v) Launch site for pontoon and supporting rigid inflatable boat.</li> <li>vi) Determine preliminary traffic management requirements</li> </ul> </li> </ul>								
Consents / Licences	<ul style="list-style-type: none"> <li>Canal trust consent: <ul style="list-style-type: none"> <li>i) Form 1 – Notification</li> <li>ii) Form 2 – Cost Undertaking</li> <li>iii) Form 3 – Indemnity (to be completed by test house / consultant)</li> <li>iv) Form 4 – Permit for site access</li> </ul> </li> </ul> <p>Application requires:</p> <table> <tr> <td>COSHH Assessments</td><td>Drawings / Plans / Maps</td></tr> <tr> <td>Tow Path diversion (if applicable)</td><td>Copies of other consents</td></tr> <tr> <td>Details of utilities affected</td><td>Works programmes</td></tr> <tr> <td>Copies of insurances</td><td>EIA or other environmental assessment</td></tr> </table> <p>Application periods: 3 months (navigation unaffected)  12 months (navigation prevented)  5 months achieved on Western Road</p>	COSHH Assessments	Drawings / Plans / Maps	Tow Path diversion (if applicable)	Copies of other consents	Details of utilities affected	Works programmes	Copies of insurances	EIA or other environmental assessment
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The image shows four forms from the Canal & River Trust, labeled FORM 1 to FORM 4. FORM 1 is a 'NOTIFICATION FORM' with fields for project details. FORM 2 is a 'COST UNDERTAKING' form. FORM 3 is an 'INDEMNITY FOR WORKS AFFECTING THE TRUST' form. FORM 4 is a 'PERMIT FOR SITE ACCESS' form. A large 'SAMPLE' watermark is overlaid on the forms.

# Planning Works (Key Activities)

Planning Activity	Purpose
Utilities Enquiries / Meetings	<ul style="list-style-type: none"><li>• C2 Service Returns (10 working days statutory, 20 days achieved).</li><li>• Site meetings regarding investigation locations &amp; service protections.</li><li>• Key reference are MCHW standards SA10/05 and SA11/05 which provide process guidance and standard letters</li></ul>
Traffic Regulation Order / Streetworks Licence	<ul style="list-style-type: none"><li>• Traffic Management (TM) design</li><li>• Application to local highway authority (cost £500 to £3,000)</li><li>• Process can take up to three months if both traffic regulation order and streetworks licence are required.</li></ul>
Other	<ul style="list-style-type: none"><li>• Consider whether an environmental review / scoping is required.</li><li>• Asbestos surveys, is a management survey required?</li><li>• Asbestos <b>WATCH-IT</b> areas include:<ul style="list-style-type: none"><li>i) Concrete (fibres released during drilling)</li><li>ii) Bearing shelf drainage channel liners</li><li>iii) Drainage downpipes</li><li>iv) Service pipe wrapping</li></ul></li><li>• Consider embedded forces and elements (pre-stressing and post tensioning cables)</li></ul>



# Site Access

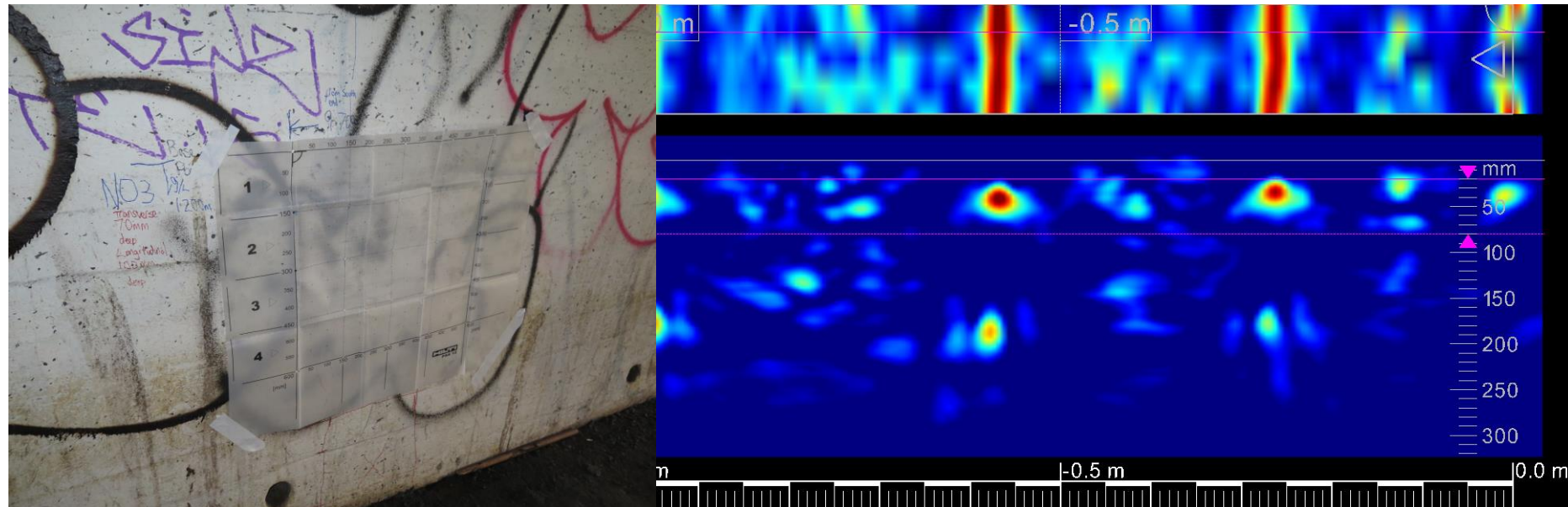
- Modular pontoon sourced from Pontoonworks.
- Pontoon maneuvered using a Rigid Inflatable Boat (RIB). Maneuverability maintained navigation on canal.
- Tethers used to anchors in tow path to hold position of pontoon during drilling.
- Launching site to be identified as part of preliminary works
- Signage used for visibility to canal users.
- Lookout additionally stationed on raft.





# Non Intrusive Investigations

- Principal Inspection to DMRB Standard BD63/07 including full geometrical survey to support the assessment, and delamination (Hammer-tap) survey.
- Reinforcement scanning / mapping – Hilti PS1000 unit



Unit accuracies: Position +/- 10mm

Depth +/- 10mm where cover < 100mm (+/- 15% > 100mm)

Requires minimum distance of 40mm between adjacent bars

300mm maximum effective depth

# Non Intrusive Works

- Topographic Surveys - Traditional techniques, scanning, mobile mapping
- Surveys to supplement geometry survey and provide key levels.





# Intrusive Works

Intrusive workscope included:

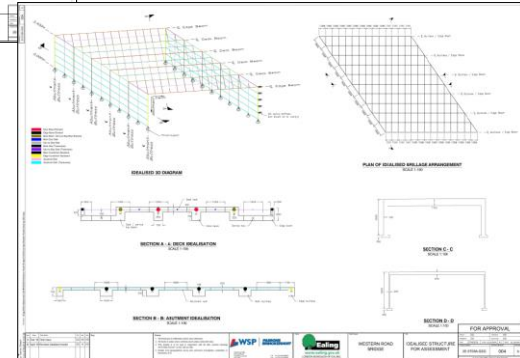
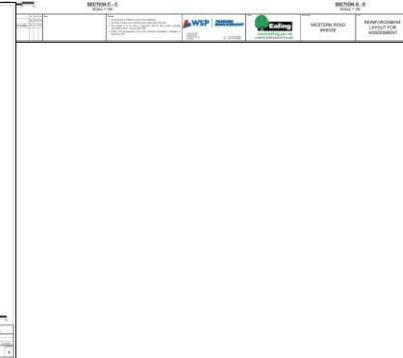
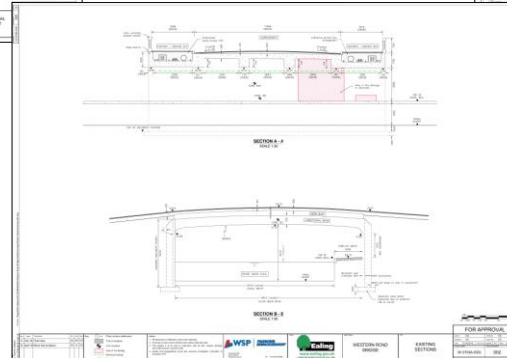
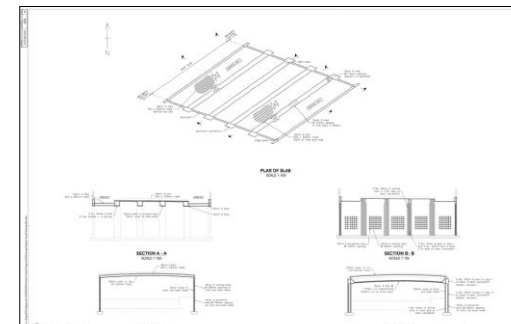
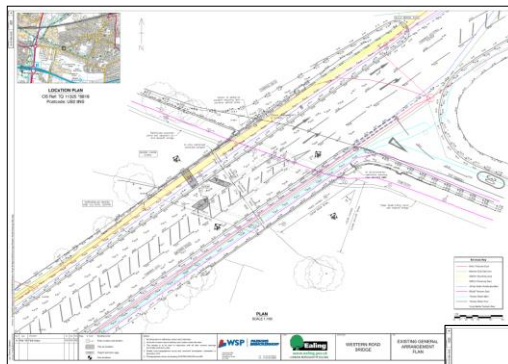
- i) 3 No. topside trial pits (to determine deck and abutment details / profiles)
- ii) 1 No. canal side (to determine spread footing detail)
- iii) 10 No. concrete cores (from deck, deck beams, haunch, abutment, & foundation), 75mm diameter cores ( $> 3.5 H_{agg}$  minimum for testing)
- iv) 7 No rebar samples to determine yield testing.
- v) Backfill recovery and sampling
- vi) Plate bearing tests at abutment founding level
- vii) Laboratory testing by WSP's UKAS accredited laboratory.





# Interpretation Of Results

- Number of activities include:
  - i) Interpretation of rebar scan plots to determine rebar details and covers
  - ii) Calculation of worst credible strength of concrete using EN 12504-1 (as required by clause 2.10 of DMRB Standard BD44/15) and on basis of concrete laboratory tests.
  - iii) Calculation of worst credible strength of reinforcement using BS EN ISO 6892-1:2016, using yield testing results.
  - iv) Laboratory tests of backfill to determine design parameters for backfill.
  - v) Translation into record drawings for structure to permit assessment.



# Conclusions

- Relatively simple intrusive and non-intrusive techniques can be used to determine construction details in the event of as-built records not being available.
- Cost of such works is comparatively small when compared to other measures including; load testing, strengthening or reconstruction.
- Information can be sourced relatively quickly and simply with short timeframes where third party consent procedures permit.





## Useful Links

### **Canal and River Trust Applications**

<https://canalrivertrust.org.uk/business-and-trade/undertaking-works-on-our-property-and-our-code-of-practice>

### **DMRB Standards and Manual of Contract documents for Highway Works (MCHW)**

<http://www.standardsforhighways.co.uk/ha/standards/>

### **Pontoon Works**

<http://pontoonworks.co.uk/listed-bridge-repairs/>

### **WSP**

<http://www.wsp-pb.com/en/WSP-UK/>

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# Thank you!

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