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2020 AWARD FOR SIGNIFICANT CONTRIBUTION TO UTILITY PIPELINE PROJECT

Entry Form

Entry Deadline: Friday, 17th April 2020

1. Brief title of entry:

Malpas SR Isolation

2. Company name:

Mott MacDonald Bentley (MMB)

3. Precis of your entry for inclusion in the Awards Lunch booklet (50 words):

As part of a scheme to provide facility to isolate the existing Malpas Service Reservoir, MMB designed and constructed a solution to install under-pressure connections on to the 3 lines of the existing Vyrnwy aqueduct, 1000mm pipelines up to 120 years old.

4. Summary of entry:

United Utilities (UU) had a DWI objective to facilitate the isolation of the existing Malpas SR1 to allow inspection, cleaning and maintenance. Malpas SR1 is a key asset as it sits on the Vyrnwy aqueduct, a major supply line for UU feeding up to 360Ml/d of potable water from Oswestry WTW to Liverpool, also feeding a large proportion of Cheshire, Merseyside and the surrounding areas. The aqueduct consists of 3No. parallel pipelines, each approximately 1000mm diameter constructed in the late 19th century. The site is also located in very close proximity to residential areas on two sides, with a history of customer complaints from the property immediately adjacent.

<u>The original proposal</u>

The agreed solution required the installation of manifold cross-connections to allow transfer of water between the aqueduct lines, then utilising an existing bypass pipe around the SR from 'Line 3' only. The original proposal from the client was to carry out these cross-connections by traditional open-cut methods, isolating and draining each line in turn and digging down on each line in turn to cut in and install a tee / valve arrangement with flange adaptors onto the main. This would require an outage on each line and would have led to time-consuming and higher-risk pipe cutting, as well as installing couplers onto the 100+ year-old aqueduct lines where the ovality may vary. Each individual line required a 6-week drain-down and re-charge time, which added a significant programme constraint. In addition, the lines would require a full flush on re-charge which is a volume of over 6,000m^3 between the next upstream and downstream isolation points.

<u>Optioneering</u>

During the optioneering phase, to help reduce both risk and programme impact, MMB developed an innovative proposal to make the connections to the aqueduct lines for the manifold using 'hot-tap' tees. This mitigated the requirement for a full aqueduct drain-down and open-cut installation. The construction team excavated onto each line individually and installed a tee 'clamp', then cast the thrust-block that was required to resist the force of the vertical off-take, which doubled-up to provide the support required for the under-pressure drilling rig. The lines were then back-filled immediately up to the top of the new tee to reduce the risks of damage when exposed. The aqueduct remained in full operation at all times during this phase.

<u>Drilling</u>

For the drilling works, each aqueduct line was isolated in turn. Draining down of the aqueduct was not required but it was agreed with UU to isolate the line to eliminate any risk to supply in the extremely unlikely event of any issues such as debris dropping into the mains. The tee connections were thoroughly cleaned and disinfected and a gate valve installed on the top flange. MMB's specialist drilling subcontractor, UPS, undertook the drill set-up and connection successfully completing the connection works for each line in less than one day with no impact on supply or and no reduction in water quality.

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Innovative methodology

The benefits of the innovative under-pressure installation methodology included:

- **Programme reduction of approximately 9 weeks, ensuring that the regulatory output date of 31 March was achieved (this would not have been achieved otherwise)**
- **Reduced impact on customers from shorter times on site and less intrusive pipe cutting techniques**
- **Drain-down and re-charge of the aqueduct not required, reducing the impact to the Client and saving over 6000m^3 of water from a single volume flush**
- **Open cut connections into the aqueduct not required, so risks of ingress and contamination were eliminated and also no need for cleaning and disinfection of the large diameter mains**
- **No new couplers/adaptors installed on network lines, which may have been a potential location for leakage or ingress in the future**
- **Health and safety benefits from reduced working in excavations as the under-pressure connection works were carried out from above-ground.**

The project started on site in August 2019 and was constructed and commissioned ahead of the March 2020 regulatory output date.

4. **Signed:** ***Emma Mitchinson***

5. **Date:** **05 May 2020**

6. **Company contact name:** **Emma Mitchinson, Design Manager**

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   Email: **emma.mitchinson@mm-b.co.uk**

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Detailed Description of Entry

(Entry restricted to normal type face and font size on this form plus one page A4 drawings or photograph)