



# Steel Piling Group | Case Study

Maritime | **Highway** | Rail | Buildings | Sustainability | Specialist Work

## WHADDON ROAD BRIDGE

MILTON KEYNES, ENGLAND (2003)



English Partnerships and Pell Frischmann agreed on a novel design for an integral bridge, breaking the mould of typical Milton Keynes bridges. An open structure was chosen with “unique” steel piles, continuing upwards to form the piers and then being cast directly into the bridge deck, providing a moment connection. This design was economic, adventurous and sustainable as steel piles can be extracted and re-used.

Site ground conditions comprised stiff becoming very stiff glacial boulder clay, with lenses of silty sand. Ground water, sustainability and above ground surface finish issues precluded

the use of concrete augured piles. An existing housing development was only 50m from the site, hence precluded the use of percussive driven piles. A new system for installing high capacity steel piles was required. Dawson Construction Plant Ltd had developed a quiet and vibration-less push-pull piling system for installing high capacity piles. This system was chosen for this contract and is described further. Long term client maintenance liability was reduced, because the bridge has no bearings or expansion joints within the deck.

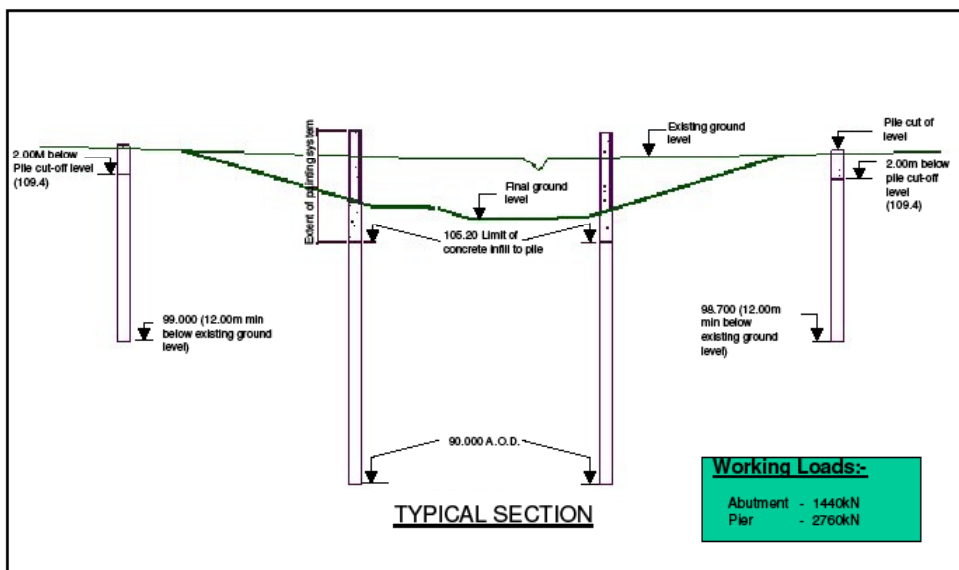


## Technical Specifications

High capacity box piles/piers and abutments were formed from four Hoesch Larssen 43 sheet piles clutched together. These were pushed in sequence using the Dawson push-pull system. The system has four hydraulic cylinders, each generating 1965kN (200t) of pressing force mounted on a Liebherr LRB255 leader rig. As one cylinder pushes down on a sheet, reaction is provided by the weight of the rig and by gripping the other three piles, thereby mobilising ground skin friction.

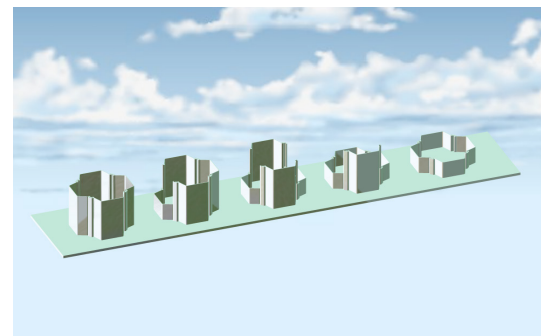
A piling frame was used to ensure that the piling tolerances of  $\pm 25\text{mm}$  (1") in position and 1 in 200 on verticality could be met. The eight pier piles were pushed 14m (46ft) into the ground and the eight abutment piles 9m (30ft). Dawson Contract Piling carried out vertical and lateral load tests (shown above right) to the satisfaction of the Engineer. The vertical working loads on the piles were: abutment piles = 1440kN (147t), pier piles = 2760kN (281t).

## Pile Elevation



### ADVANTAGES OF THE BOX PILE PUSH-PULL SYSTEM

- Quiet, vibration-less, with no soil removal to landfill
- No ground heave, piles are removable and recyclable
- Fast rate of driving for high productivity
- Factory quality material with low mass/volume material transport costs
- Measured load capacity and can be loaded immediately-
- Cost effective and quick method of construction
- Variety of sheet piles sections can be used (and H piles)
- Steel piers offer a more certain surface finish than concrete



**DAWSON**  
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