

Draft methodology for Installing Sheet Piles with Concrete Capping Beam as Scour Protection to Pier 7 Neath River Bridge

Sheet Pile Installation

The sheet piles will be installed using a silent hydraulic press in rig - (e.g. Giken ECO140 or equivalent) see fig 1 as example



Fig 1 Silent Piling Rig

All works will be carried out from the existing road/pile cap with no plant entering the watercourse.

Prior to utilising the Silent Piling Rig the first few piles will be installed using a guide frame and vibro- pile hammer fixed to an excavator. Once sufficient piles have been installed for the rig to sit on top of the installed piles the following sequence will be followed.

Step 1 – Pile Pitching

- Lift and align the first sheet pile using the service crane and guide frame.
- Engage the pile with the reaction frame or reaction piles.
- Ensure pile is vertical and aligned before pressing begins.

Step 2 – Pile Pressing

- Engage silent piling rig on top of the previously driven or reaction piles.
- Apply hydraulic pressure to press the pile into the ground using static load (no vibration).
- Monitor press-in pressure and penetration rate in real time.

Step 3 – Subsequent Piles

- Insert the next pile into the interlock of the previous pile.
- Use guide frame and rig's built-in sensors to ensure correct alignment and verticality.

- Continue pressing sequentially along the alignment.

Step 4 – Monitoring

- Record the press-in pressure, pile penetration, and verticality for each pile.
- If resistance becomes excessive, use limited pre-auguring or water jetting (with engineer's approval).
- Verify top-of-pile level after each installation.

This sequence will continue until all the sheet piles have been installed to the proposed alignment.

Capping Beam Construction

Once the piles have been installed a proprietary access platform will be installed affixed to the sheet piles. (fig 2)



Fig 2 Proprietary Access and Formwork System

This access platform will allow the formwork and reinforcement to be installed to form the concrete capping beam.

Once the reinforcement is fixed the formwork will be checked and all interfaces with the sheet piles sealed to ensure there is no grout loss when the concrete beam is poured.

Prior to placing the concrete water and silt management protection measures will be in place. These will consist of but not be limited to silt mats/ curtains, silt booms securely fixed around the works area and spill kits. An emergency spill response plan will be developed and vigorously enforced prior to the works commencing.

The concrete for the beam will be poured using a concrete pump located on the existing roadway.

Following sufficient curing the formwork and access platforms will be removed.

Cementitious Grout Infill

On completion of the capping beam, the void between the sheet piles and the pile cap will be filled with cementitious grout.

Prior to the placement of the grout the sheet piles will be inspected externally to ensure there are no gaps visible that may allow the grout to leak out. Any gaps will be welded to ensure no grout loss occurs.

The grout will be placed utilising a grout pump situated on the existing roadway with the same pollution control measure in place as previously employed for the concreting works.

The works will be carried out at low tide to ensure any leaks are identified and dealt with prior to any grout entering the watercourse.