River Till Viaduct | QS-7B |
Delivery Methodology | Construction Methodology for the River Till Viaduct

4. Your construction methodology for the River Till viaduct shall provide the following information as a minimum:
    4.1. a detailed breakdown and description of the stages of construction for the viaduct including:
        4.1.1 the substructure construction methodology, including piling methods;
        4.1.2 the deck construction methodology;
        4.1.3 construction and/or application of the structural finishes;
    4.2. the temporary works and temporary structures including:
        4.2.1 locations and details of all hoarding and temporary fencing;
        4.2.2 the location, principal dimensions, general arrangement and construction methodology of any temporary crossings over the River Till;
    4.3. protective measures and ecological mitigation which will be implemented for environmental and heritage assets during construction including:
        4.3.1 measures to ensure there are no adverse impacts to the River Avon SAC, the River Till SSSI and to protected species;
        4.3.2 measures to ensure the fluvial floodplain continues to function effectively;
    4.4. an explanation of how the alignment and access of the existing Winterbourne Stoke Byway WST04 will be maintained during construction of the viaduct;
    4.5. the key construction risks that are uniquely associated with the construction of this Scheme area and the proposed mitigation.

4. Introduction

The release of the present Construction Methodology of the River Till Viaduct is done in accordance with:

- ITPD Volume 2 Part 2 – Design and Technical Requirements
- OEMP
- DAMS
- Environmental Statement

4.1. Temporary works and temporary structures required

4.1.1. Location and details of hoarding and temporary fencing (ITPD ref 4.2.1)

The location for temporary fencing and hoardings to be installed in the River Till working area is shown in the diagram below:

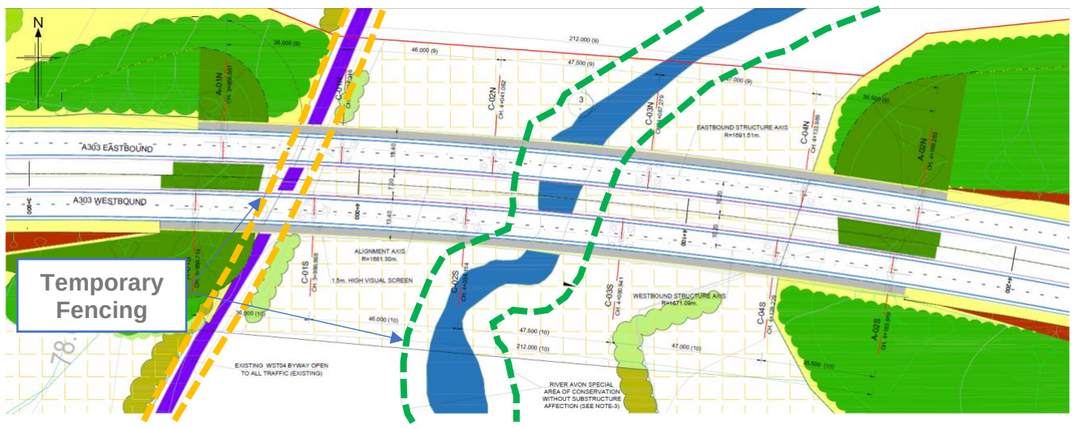
The temporary fencing and hoardings will provide during construction:

- Safety and security
- Livestock control
- Protection of heritage and environmental features

Hoarding and fencing features include:

- Colour to aid integration into the landscape
- Will be no more than 4m in height
- Will be kept free from graffiti and posters
- Will be kept well maintained
- Will not contain advertising or promotional information
- Fencing and hoardings in areas at risk of flooding will be permeable to floodwater, unless otherwise agreed with the Environment Agency, to ensure that the fluvial floodplain and areas liable to other sources of flooding continue to function effectively for storage and conveyance of floodwater.
- Fencing will protect existing water features from degradation and physical damage during construction.

The temporary fencing and hoardings will be installed on both sides of the River Till and at the edge of the existing byway (WST04) located on the west side of the river, protecting the road users from any possible risk coming from the worksite.



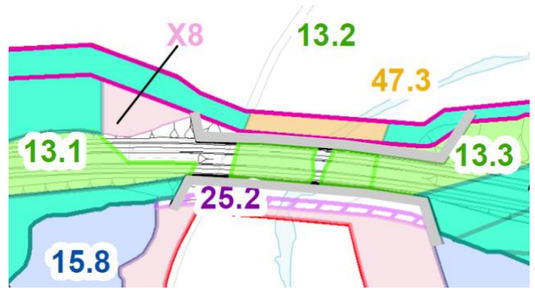
4.1.2. The location, principal dimensions, general arrangement and construction methodology of any temporary crossings over the River Till (ITPD Ref. 4.2.2)

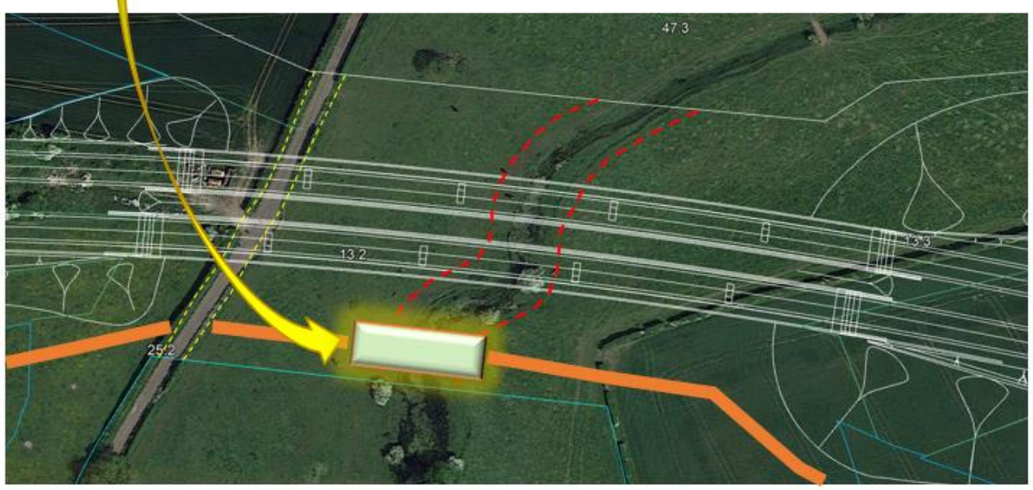
A temporary access crossing of the River Till Valley will be required to permit early continuous access along the line of the new works. A pre-fabricated temporary crossing bridge system 6m wide will be employed, positioned on the south side of the new proposed permanent bridge. The foundations for the temporary bridge will consist of reinforced concrete bank seats. The bridge section will be launched from one side using a temporary nosing or directly installed by crane.

The approach ramps to the temporary bridge will be constructed using compacted stone laid onto a geogrid system over a layer of High-Viz Orange Geotextile, which will be laid directly onto the existing topsoil.

Construction of the river crossing will require targeted archaeological monitoring and recording and/or archaeological excavation and recording where topsoil is required to be stripped, such as bank seat locations (Site 13, Appendix D). BADGER will prepare a Method Statement in consultation with Wiltshire Council and Historic England, and approved by Wiltshire Council (in consultation with Historic England).

The location for our proposed temporary crossing over the River Till will be within DAMS Action Area 25.2 (Appendix D) and BADGER will ensure compliance with Preservation of Archaeological Remains area.





Our temporary bridge will be:

- Pre-assembled for rapid installation minimising work in the valley
- No impact piling will be considered for the construction of the temporary bridge
- Our purpose will be to minimise impacts to the River Till valley as much as possible
- The temporary bridge will not be in the same location for a period of more than 2 years. (In the event that it was necessary to extend the use of the temporary bridge beyond 2 years, the condition of the vegetation would be assessed and there would be consultation with the Environmental Agency and Natural England as to whether the bridge should be retained in place for the minimum additional time necessary or re-positioned).

Our temporary bridge will be:

- Mixed Structure
- Strong
- Durable
- Quickly installed
- Easily maintained
- Environmentally friendly

Principal Dimensions

- Low profile (picture above) reducing the need for long approach ramps
- A minimum of 1m height above the valley floor will be granted.
- Supports will be located outside of the river channel, at least 8m from the boundary of the River Till section of the River Avon SAC.
- The required span of the temporary Bridge will be approximately **35m** long
- Constructed in accordance with our temporary works consent
- Maximum width will be 6m

The construction methodology for the temporary Bridge will follow the next steps:

1. Access ramps with suitable filling material
2. Foundations execution (Reinforced concrete bank seats)
3. Pre-assembly of temporary bridge beams and guardrails
4. Temporary bridge installation
5. Foundation backfilling
6. Placing of Precast slabs

4.2. Detailed breakdown and description of the stages of construction for the Viaduct

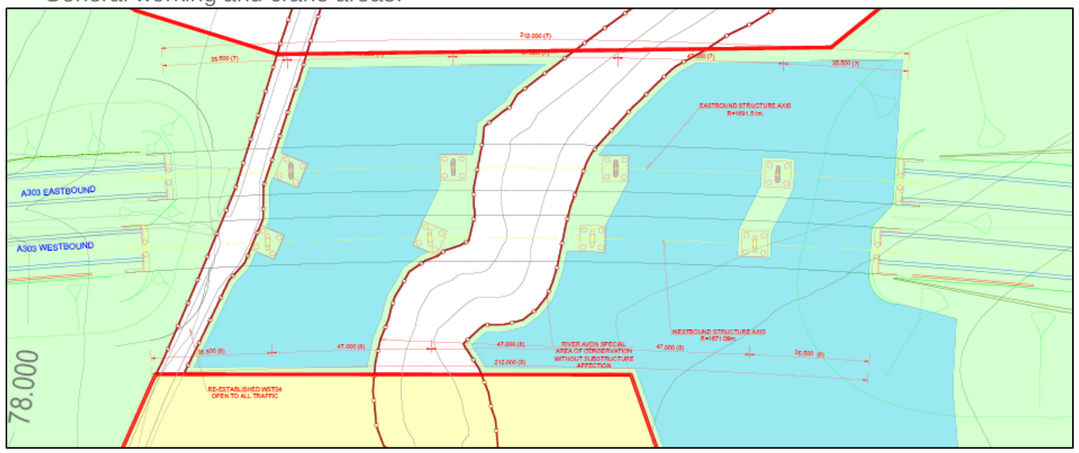
River Till Viaduct Main Features	
South Abutment	Reinforced Concrete bankseat on a piled foundation
North Abutment	Reinforced Concrete bankseat on a piled foundation
Foundation	Piled foundation
Pier Max. Height	9 m approx.
Carriageway level	Minimum 10 m above the River Till
Span	212 m divided in 5 spans (35,5m + 47m + 47m + 47m +35,5m)
Deck	Twin deck. Steel beams
Weight	Approx. 2,5 ton/lm
Slab	0.25 m in situ concrete
Visual barrier	Timber effect texture finished

The construction of the River Till Viaduct will be supported by the following temporary works:

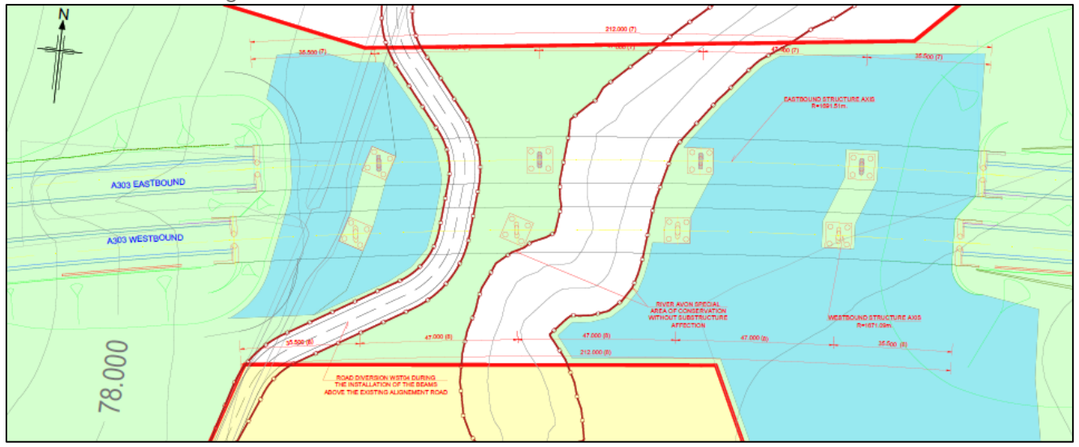
- Working areas/Platforms
- Crane areas/Platforms
- Beam assembly areas/lifting

A tentative general layout arrangement for these temporary works is shown below:

- General working and crane areas:



- Working and crane area during the diversion of the WST04 Byway for the installation of the western beam segments:



LEGEND

- WORKING AREA / PLATFORM
- CRANE AREAS / PLATFORM
- EXCLUSION AREAS
- SECURITY FENCE
- SITE BOUNDARY

By using this layout we demonstrate that construction methodology is the lowest risk to minimise flood risk and control of surface runoff. We will always keep protected 8m from the boundary of the River Till section of the River Avon SAC, working outside of the area of risk of flooding. Additionally, the alignment and access of the existing Winterbourne Stoke Byway WST04 will remain open at all times, and our construction activities will not interfere with the road users, protecting them from any possible risk coming from the worksite. The excavation around the pile caps in the River Till valley and at the western end of the viaduct (WST04 byway) will not intrude into the 8m exclusion zone from the boundary of the River Avon SAC or into the existing alignment of the existing byway.

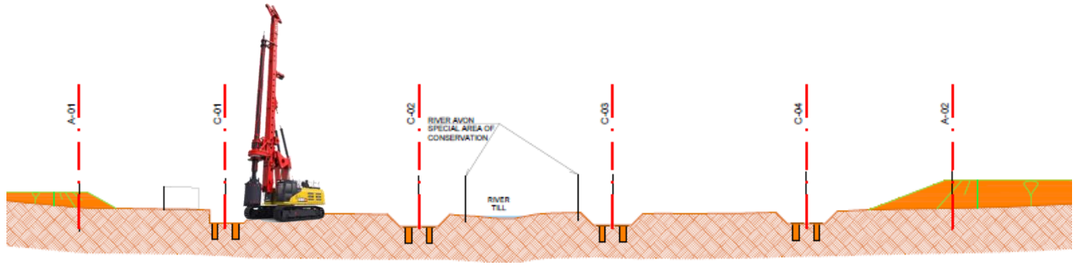
4.2.1. Piling

BADGER's design will include piled foundations, with 4 piles in each foundation and a depth around 30m for the piers, and around 40m depth for the abutments. The diameter will be 1.5m. The piling on the abutments will take place once the partial filling of the ramps has been completed (shown in **4.2.2** foundations).

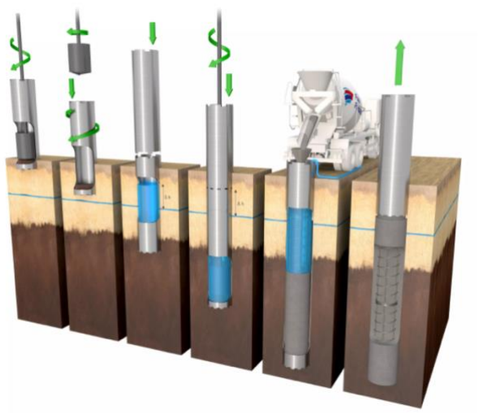
Non-impact piling will be considered for the construction of the viaduct in order to reduce the vibration and noise impacts on the aquatic ecology within the river.

A temporary working platform for the piling and crane operations will be laid on each side of the floodplain during the construction of the viaduct; As reflected in Paragraph 5.2.46 of the DAMS this will consist of approximately 400mm of stone laid on a High-Viz Orange Geotextile placed directly on the existing ground surface. Its extension is shown in the sketches of the 4.2 of the document (page 2).

BADGER will prepare a method statement in consultation with Wiltshire Council and Historic England and approved by Wiltshire Council where technical details such as loading, compaction, and so on will be defined.



In order to deal with groundwater issues and to prevent the inflow of water during the construction of the piles, the excavation of the bores will be supported with full depth recoverable steel casing following the next sequence:



1. Positioning and drilling of the first section of the drill casing (recoverable steel casing as temporary support during the boring process)
2. While drilling, the drill casing – inside equipped with a drilling head fixed on a rod - is oscillated into the soil. (back and forth movement / twisting in place)
3. & 4. As the drilling process progresses, soil is removed from the borehole by the excavating tool (« bucket barrel » excavating the pile shaft) and additional sections of casing are jointed (added) to protect the soil from collapsing into the borehole during drilling. When drilling in soils below the groundwater level, the temporary casing will prevent from any eventually inflow of water inside the pile bore.
5. After reaching the design depth, the site team will clean-up the borehole front, remove the drilling tool and in the presence of water, it will be pumped out from the bore.

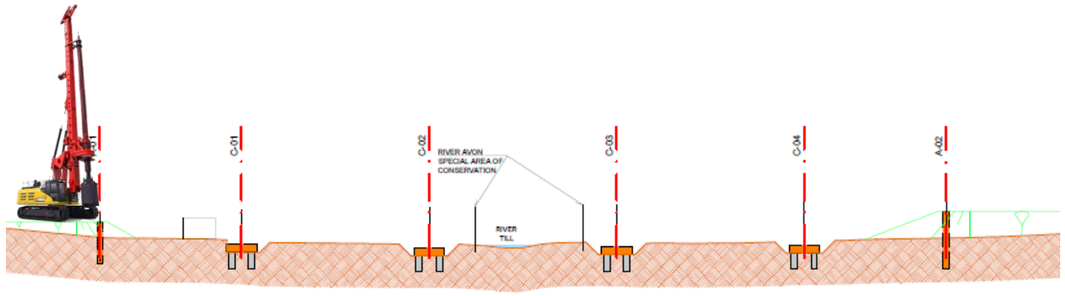
Formation of the pile: insertion and lowering of the reinforcement cage, pouring of the concrete. In the event of presence of water, concreting will be carried out by means of a plunger tube to avoid segregation of the concrete (tremie pipe technique). As the pile is being poured the grey water will be pumped into a dirty water plant, cleaned, pH corrected (< 9) and discharged into the permitted areas according to the Water Management Plan that we will develop during the delivery stage and according the OEMP Requirements MW-WAT1-15.

6. During the continuous concreting process, the temporary casing elements will be progressively withdrawn whereby the concrete forms the pile shaft.

The use of bentonite will not be considered.

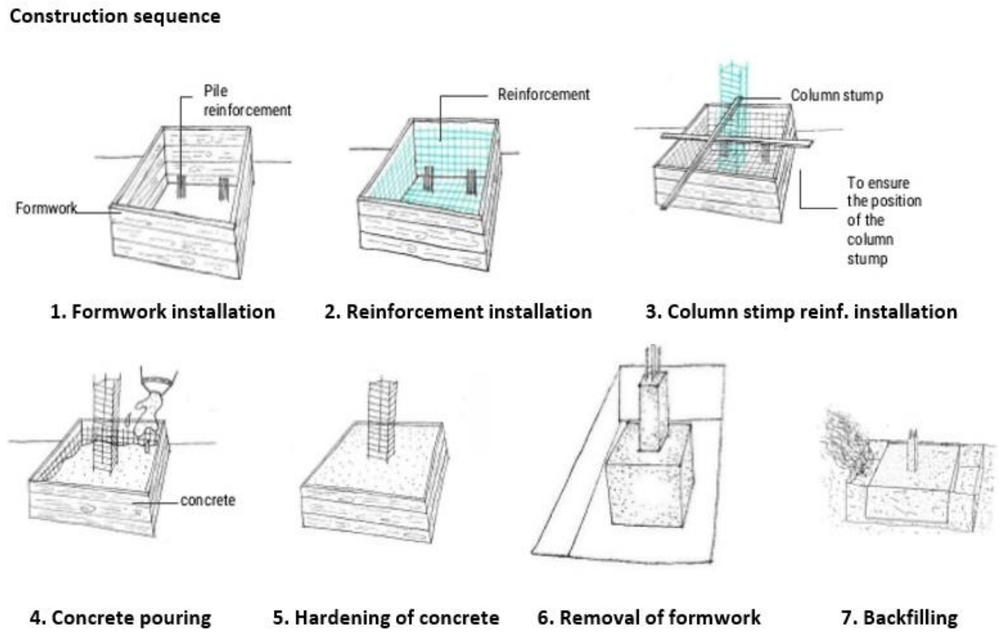
Protective measures for the control of disturbed sediment within the Till valley will be applied according to the OEMP.

4.2.2. Foundation



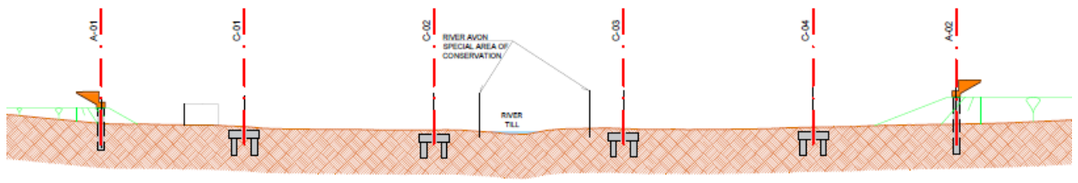
There will be no permanent foundation works within 8m of the boundary of the River Till section.
The execution method will follow the next sequence:

- Formwork installation, considering special mitigation to not occupy the exclusions zones of the river and the existing byway.
- Reinforcement steel installation
- Concrete pouring
- Hardening of concrete
- Removal of formwork
- Backfilling

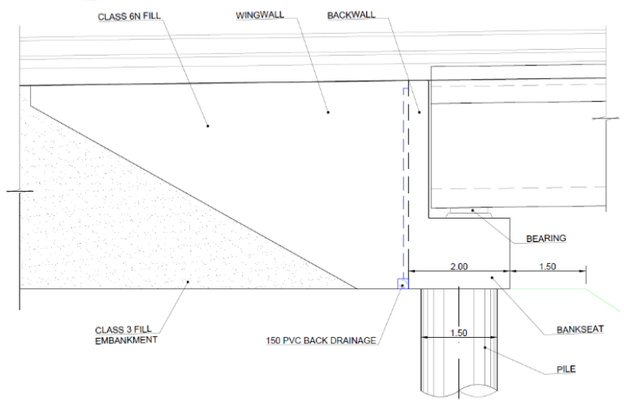


4.2.3. Abutments

Our design approach to the abutments is considering a cast in situ reinforced concrete bankseat on a piled foundation.

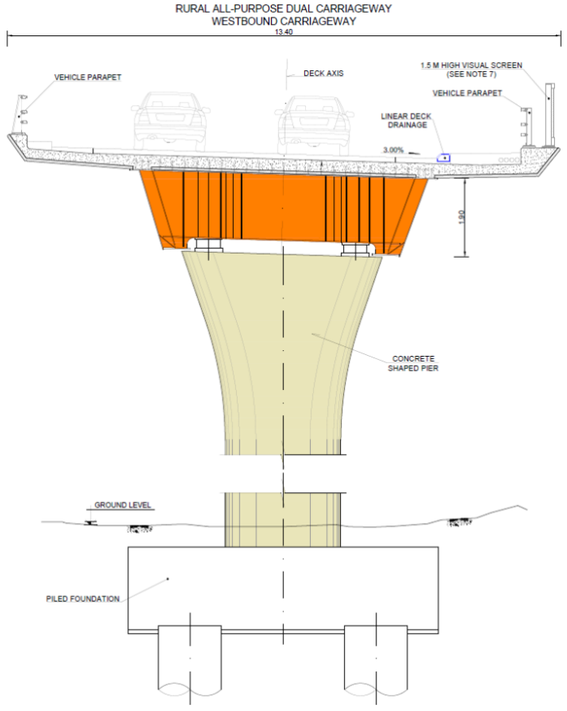


1. Partial backfilling of the ramps
2. Execution of piling
3. Bank seats construction
4. Construct drainage routes to the back of the wall
5. Final backfill is required for stability prior to deck loading.
6. Bearings installation
7. Install the pre-cast parapet detail

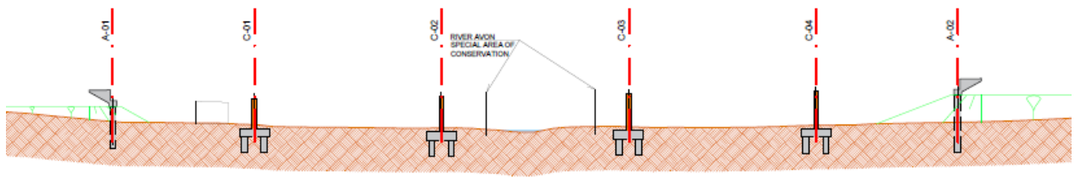


4.2.4. Piers

Pier stems will be approximately 9m high from foundation level up to deck level (including pierhead) and they will be reinforced concrete sections.

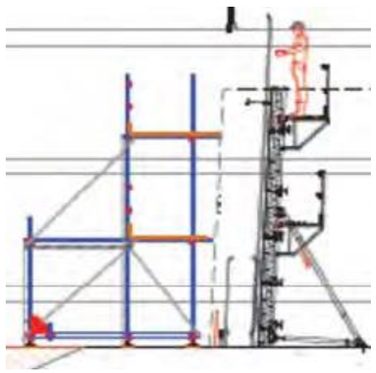


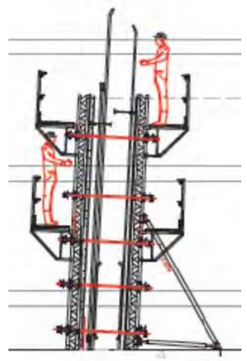
First Phase:



Backfilling around the foundation will be completed.

The corners of the pier will be marked by the surveyor on the surface of the foundation. We will deliver the formwork panels and reinforcement to site.





The first item to be installed will be one of the faces of the external formwork. With the assistance of the crawler-crane, the external formwork panels will be posted in position and then fix the props to the ground and plumb the panels.

When the formwork panels are fixed and stabilised, slinger will access the concreting platform to remove the crane lifting chains.

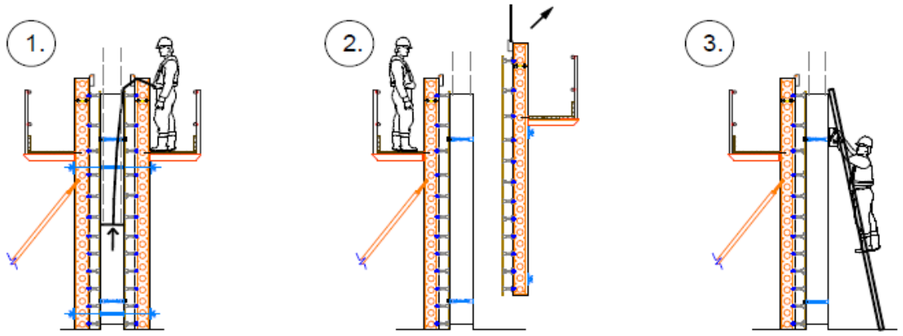
Scaffolding will be placed around the pier marks to enable assembly of the reinforcement at the top points. At this point the reinforcement can be installed. Steel fixers will be in the scaffold or in the concrete platforms when they are at a high level.

When the placing of the reinforcement steel is finished, scaffolding will be removed, the interior of the pier will be cleaned, and the remaining formwork panels will be put in place with assistance of the crawler-crane.

When the panels are fixed and stabilised, slinger will access the concreting platform to remove the crane lifting chains.

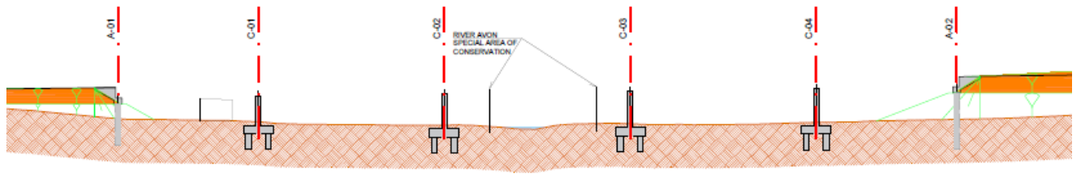
Tie rods will be put in place to connecting opposite faces of the formwork. These bars will avoid formwork opening during the concrete pouring. Formwork platforms will be used to do this work. When the formwork is completed and correctly fixed, concrete pouring may start.

Concrete pouring will be done with assistance of a concrete pump.

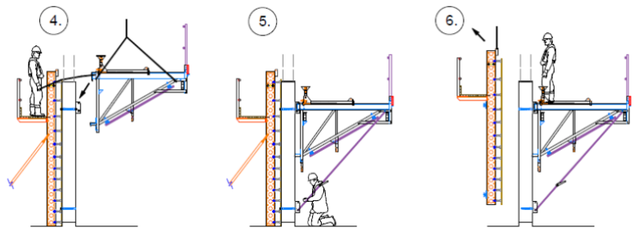


1. Concrete pouring will be done with the assistance of a concrete pump and allow curing.
2. Removal of the the ties from the formwork will be done the morning after concreting. We will leave 2 ties loosely in place at the top of the forms. If bolts have been used to fix the anchors to the form face they will be removed. We will strike the formwork from the side remote to the alignment props, clean, oil and store ready for reuse.
3. The anchor bolts will be installed to assembly the formwork for the 2nd Phase (Pier head formwork).

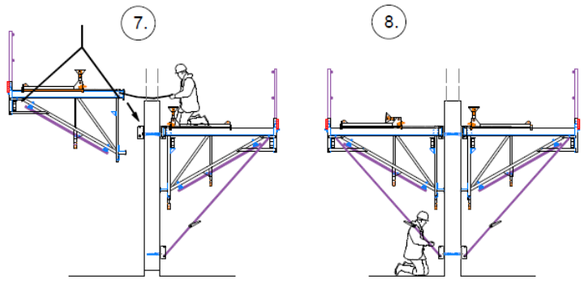
Second Phase: Pier Head



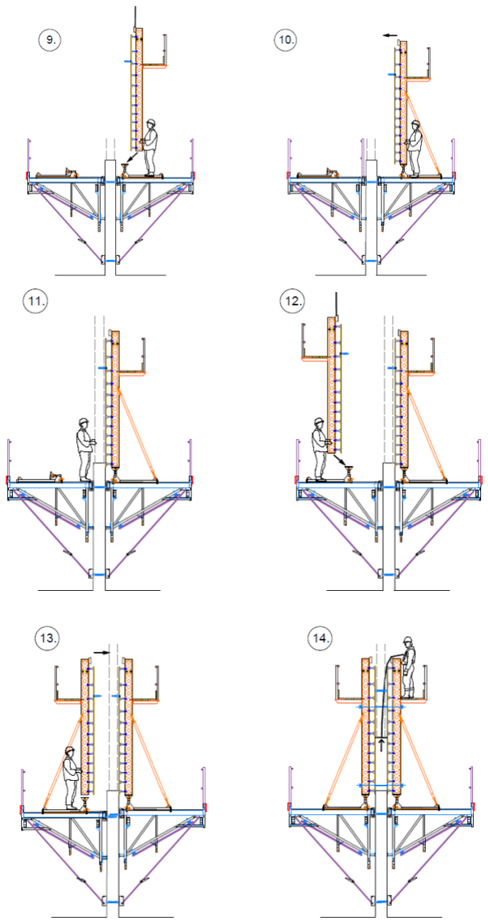
While pierhead is being executed, final backfilling in the abutments will be completed.



4. Working platforms will be installed (coupled with anchor bolts) in the pier. Ropes will used to assist the placing of the platforms
5. Fit the wind ties
6. Remove the formwork from the other side of the wall clean, oil and store ready for reuse.



7. Add the platforms to the other side of the wall and secure with the safety pins.
8. Fit the wind ties



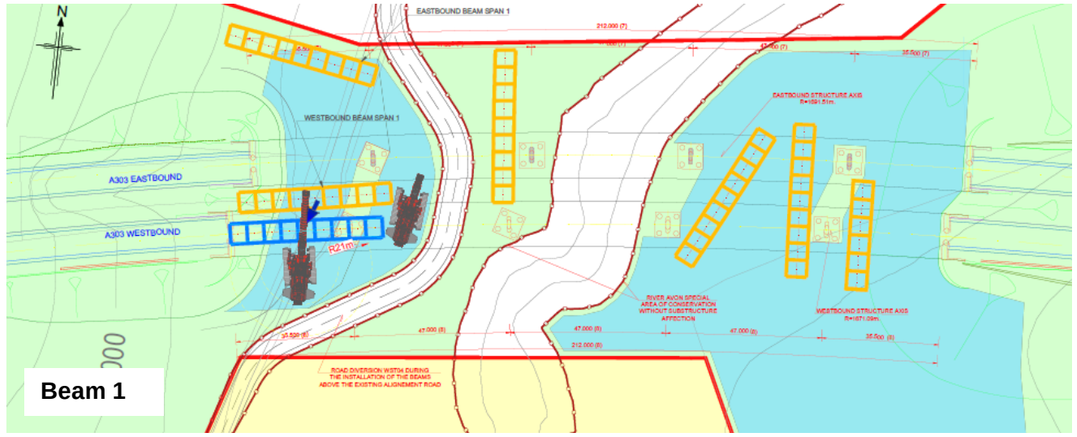
9. Engage the wedge brakes on all Trolleys. Crane in the formwork to one side of the wall and bolt to the plumbing jacks. Add the plumbing turnbuckles ensuring that all are orientated with the right hand thread end at the bottom. Plumb the formwork and release the crane.
10. Release the wedge brakes and advance the formwork to contact the wall and lock the trolley.
11. Fix the reinforcement against the formwork and secure. Place the tie rods and spaced tubes leaving the ties retracted into the tubes at this stage.
12. Crane in the other form, fix, plumb and align it as before.
13. Advance the formwork as before inserting the ties through the pre-drilled holes with the process.
14. Tighten the ties, place the concrete and allow curing.

4.2.5. Beams Installation

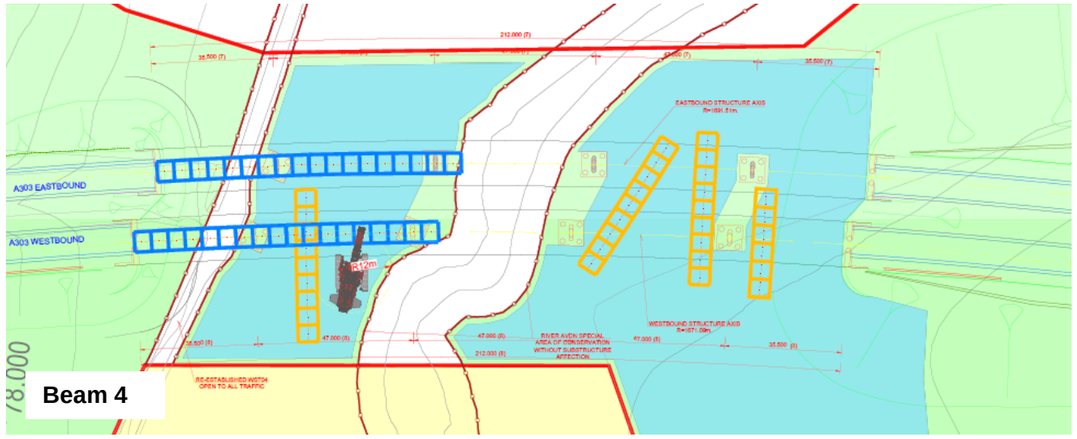
The main beams will be erected in different span lengths according to the design: the total length of the beams will be suitable for delivery to site so they may be split in two pieces. This will simplify the transport from factory to site. The steel beams will be delivered in two sections and will be assembled on site. They will be assembled right in the lifting position. When assembled they will be ready for lifting.

In order to have a safe lifting procedure and keep the existing WST04 byway opened at all times, temporary diversion of the WST04 byway is proposed for the installation of the western span main beams. This temporary diversion will be open the minimum necessary time.

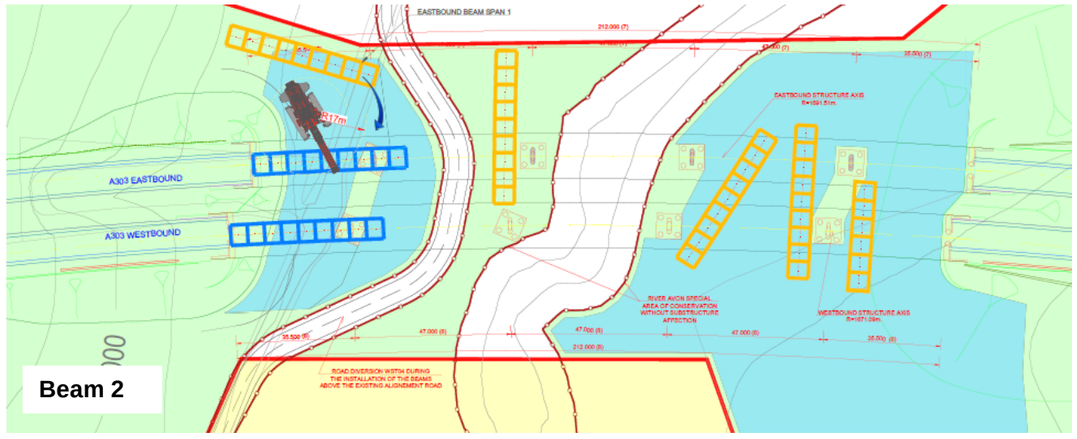
The tentative lifting position for the cranes and installation sequence of all the spans is shown below:



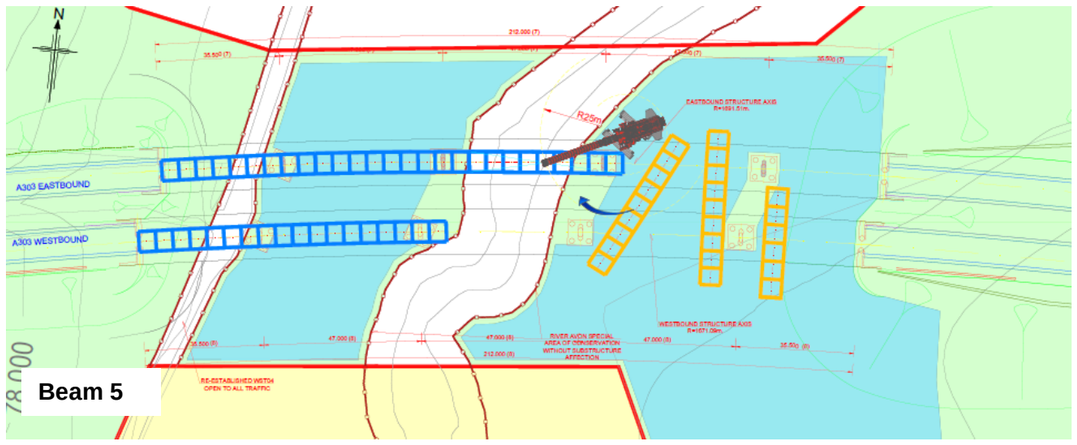
Beam 1



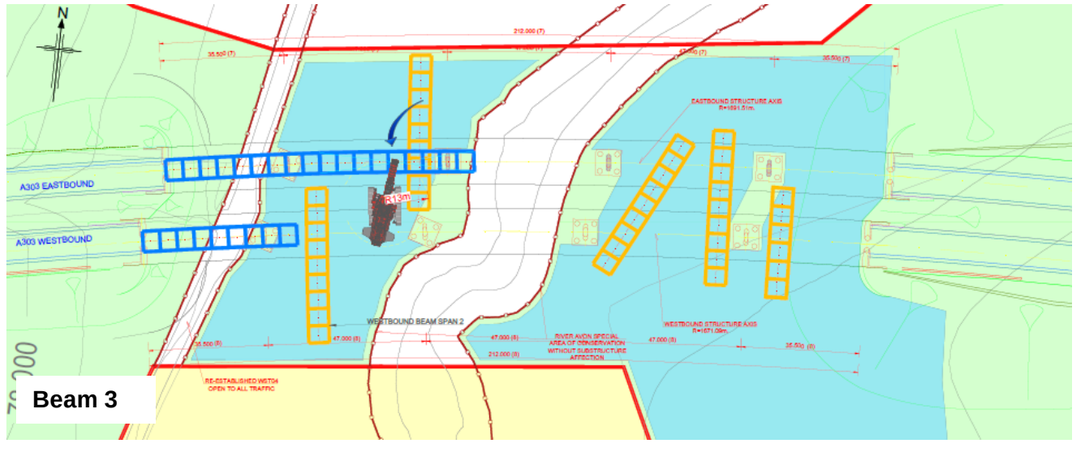
Beam 4



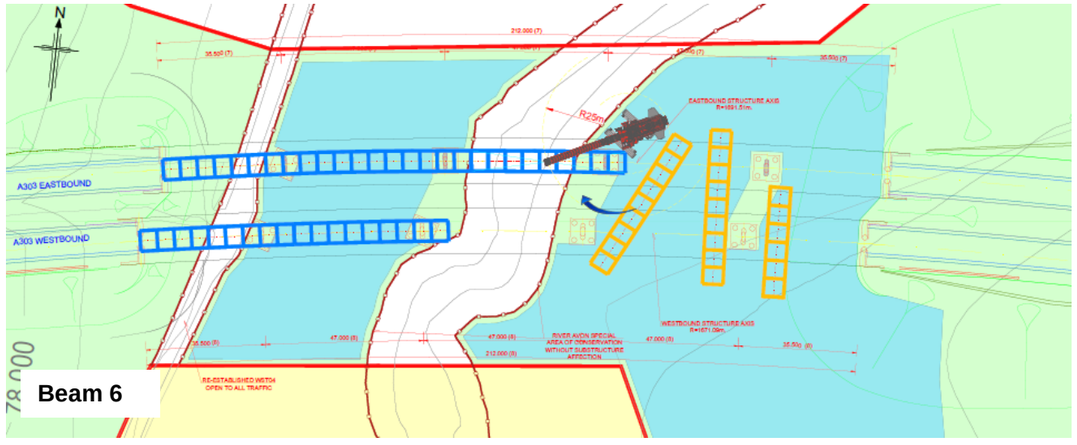
Beam 2



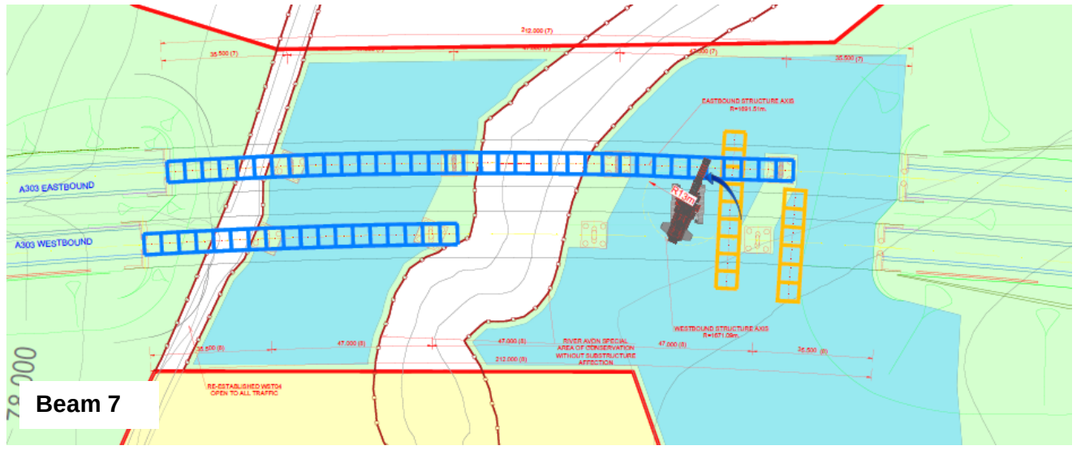
Beam 5



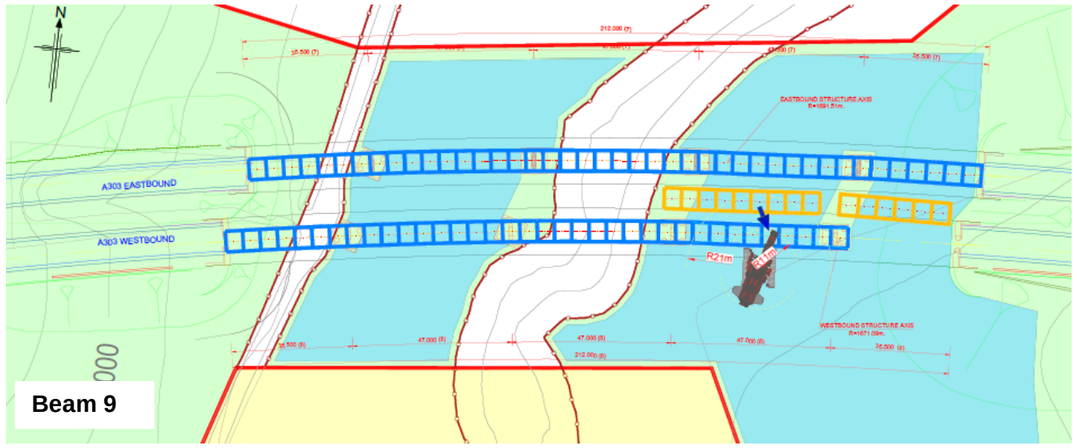
Beam 3



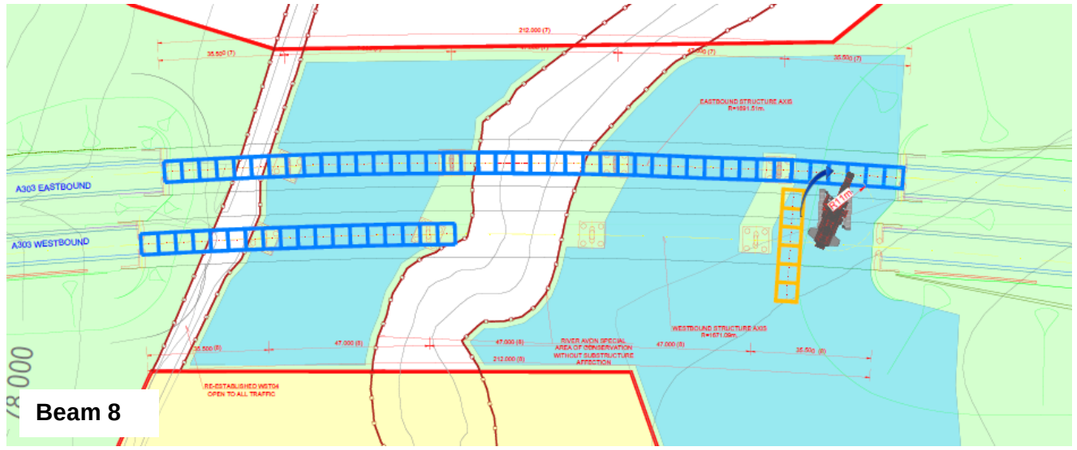
Beam 6



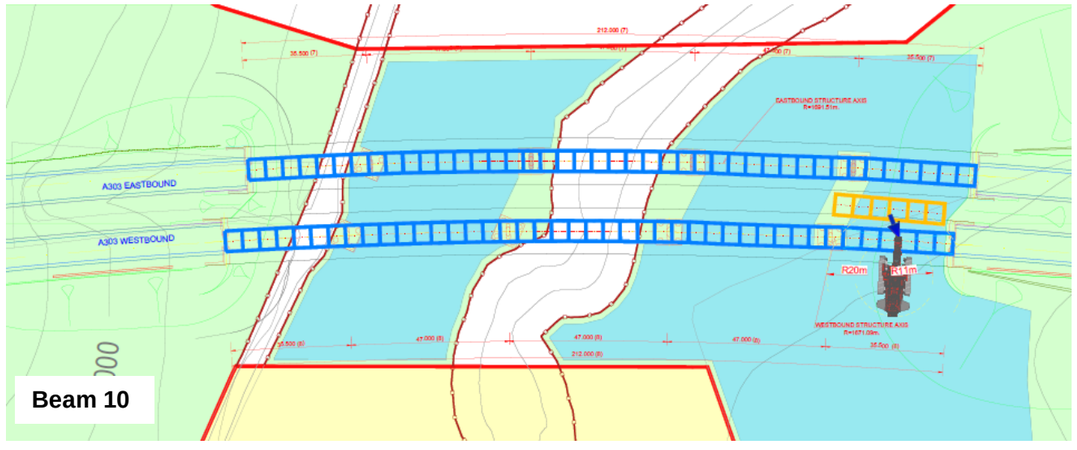
Beam 7



Beam 9



Beam 8

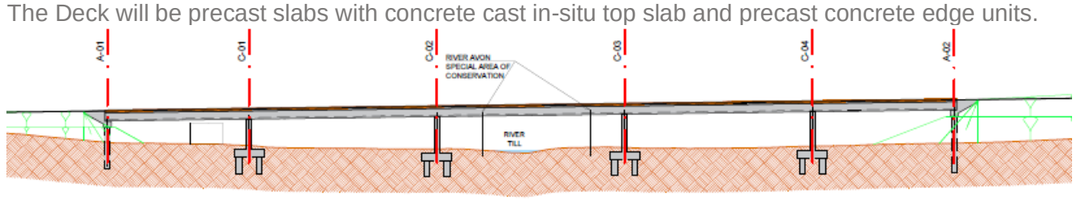


Beam 10

Longitudinal beams will be site welded during its installation.

4.2.6. Deck

The Deck will be precast slabs with concrete cast in-situ top slab and precast concrete edge units.

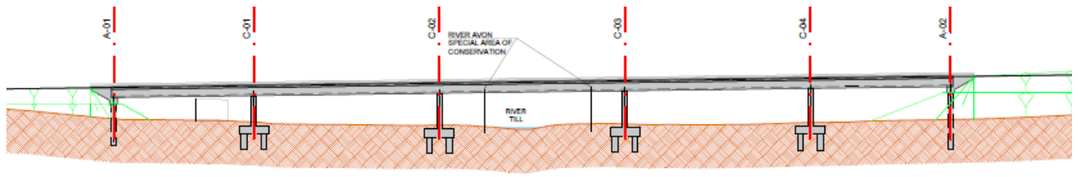


On completion of the beams installation the deck will be formed from precast slabs placed by crane and following the sequence:

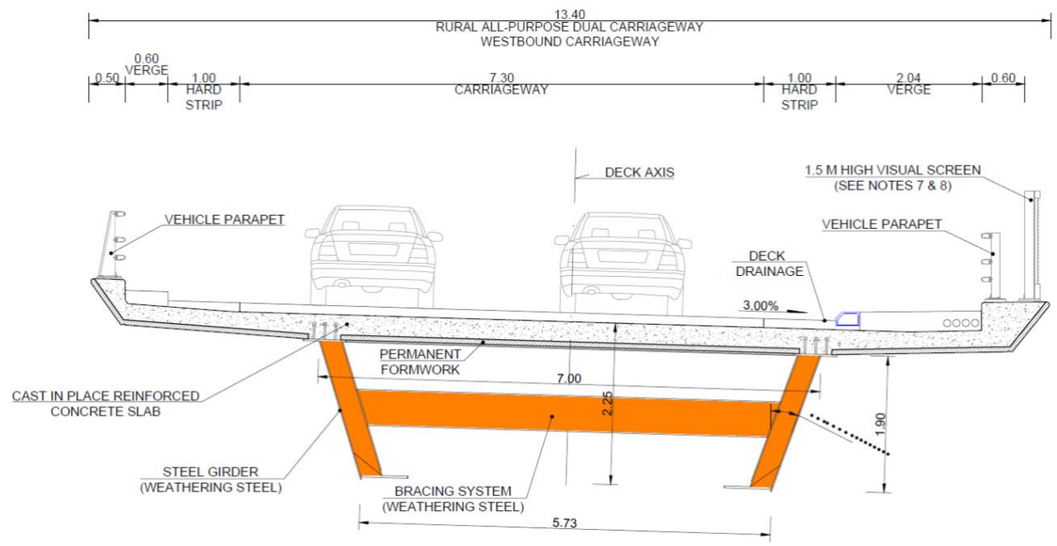
- Precast concrete slabs installation
- Top slab reinforcement installation
- Formwork installation for edge units
- Concrete pouring

We will lay the precast deck slabs, then install the reinforcement on top slab, followed by the formwork installation in those locations where it is needed and final concrete pouring.

4.2.7. Finishes



Once deck work is finished we will process with the parapet installation (including visual screen), followed by the waterproofing, service ducts, kerbs and pavement.



4.3. Protective measures and ecological mitigation which will be implemented for environmental and heritage assets during construction

4.3.1. Measures to ensure there are no adverse impacts to the River Avon SAC, the River Till SSSI and to protected species

The potential impacts of construction would be:

a) habitat degradation due to changes in water quality and shading impacts
b) disturbance of Annex II species (fish species, e.g. bullhead).

Habitat degradation: The potential risk to water quality of the River Till from pollution during construction is anticipated to be somewhat greater than for the River Avon. This is because the crossing of the River Avon involves resurfacing and maintenance works on the existing bridge, whereas the River Till involves the construction of a new viaduct. There are likely to be works on existing embankments near the River Avon Bridge, although this will be outside of the SAC within the existing highway boundary.

Construction activity adjacent to the River Till, but wholly outside the SAC, will involve installing a temporary haul road across the valley, including a temporary single lane bridge; construction of the viaduct itself and associated embankments, removal of the temporary haul route, followed by reinstatement of grassland in the valley.

Control measures incorporated within the OEMP and the integrated design of the Scheme will avoid adverse effects on the SAC. As such, the effect would be neutral.

The proposed viaduct over the River Till has the potential for indirect impacts on the SAC/ SSSI, due to the permanent shading associated with the River Till viaduct. The shading would be expected to result in a variation in aquatic and terrestrial plant growth. The River Till viaduct would be approximately 10m high over the River Till. To minimise shading of vegetation under the viaduct, the design is a twin-deck structure, with each deck being approximately 14m wide with a gap of approximately 7m between the decks. Variations in the growth of grasses and other plants are expected according to location under the viaduct, due to changes in the shading and micro-climate. Continuity of vegetation within the SSSI will be maintained and hence it would not result in an impact on the integrity of the SAC. As such, the impacts of shading are considered to result in a neutral effect.

There will also be a temporary bridge over the River Till SSSI during the construction phase (approximately two years). The temporary bridge will be a single lane bridge approximately 6m wide, in order to reduce the temporary shading impact on the habitat below. Adverse shading effects on vegetation generally rely on a lengthy period of exposure, typically in excess of two growing seasons or longer. Therefore, the temporary bridge, while it would cause localised shading, would not be present for long enough to cause an irreversible adverse effect on the integrity of the habitats present within the SAC and SSSI. The short term reversible impact would temporarily affect 6m of the River Till SSSI, which is 12.9km in length. It would result in a neutral effect on the integrity of the biodiversity features of the SAC. No significant effects are expected on biodiversity features.

Disturbance to Annex II species: The River Till viaduct will require construction of supports for the viaduct. Short-term disturbance during construction of the supports is not likely to affect spawning of salmon (an Annex II species of the SAC designation) because salmon have not been recorded as breeding in the winterbourne section of the River Till or upstream of the crossing. Bullhead (Annex II) has been recorded in the section of the river at low abundance. Noise and vibration from construction of the bridge supports would not affect fish if carried out when the river is seasonally dry (as is provisionally planned). It would have the potential to affect behaviour of fish in the immediate vicinity, if it occurred when there was flow in the Winterbourne (winter to early summer) (Ref 8.61). Construction of the piers, the nearest of which is more than 8m from the channel, will use low vibration and noise piling methods, as described in the OEMP. As such the disturbance impacts are likely to result in a neutral effect on fish.

No direct impacts on Desmoulin's whorl snail (an Annex II species of the SAC designation) within the River Avon are anticipated as no construction works are planned within or immediately adjacent to the River Avon. The river crossing will be on the existing bridge, which will be re-surfaced. No indirect impacts on Desmoulin's whorl snail populations at the sites downstream of the bridge are anticipated, because the high, stable groundwater on which they depend would not be affected by the construction of the tunnel (see Chapter 11 Road Drainage and the Water Environment). Desmoulin's whorl snail is considered to be absent from the River Till (Appendix 8.8) so would not be affected by the River Till crossing.

There will be no barrier to the movement of groundwater from the construction of the supports for the River Till viaduct and dewatering would not be necessary for the construction of the supports. Mitigation that has been integrated into the design of the Scheme to avoid impacts from changes in groundwater levels has been outlined in Chapter 11 (Road Drainage and the Water Environment) and the OEMP.

Protection of watercourses

No work in the channels of either the River Till or River Avon is planned, and measures will be taken with regard to works in the rivers' wider floodplains to limit the release of suspended sediment and solids into the water column.

Permanent foundation works
We will ensure that there will be no permanent foundation works within 8m of the boundary of the River Till section of the River Avon SAC. **(OEMP_MW-BIO3)**

Piling
We will ensure non-impact piling will be used for the construction of both the temporary bridge and the permanent viaduct. This measure will be taken in order to reduce the vibration and noise impacts on the aquatic ecology within the river. **(OEMP_MW-BIO3)**

Vegetation
We will ensure that on completion of construction works, plant, materials, equipment, temporary installations and vehicles not required during subsequent activities are removed from the site and that land is restored to its former use or in accordance with the requirements of design as appropriate. Temporary access points will be removed or downgraded as required and established.

Once the construction of the River Till Viaduct has finished, we will re-establish any habitats lost as a result of temporary land-take in the River Till valley (chainage 3+800m to 4+300).

BADGER will monitor vegetation during both the construction and operation phases by our ecologist specialist. This monitoring will end when the habitat has been restored to the satisfaction of the Authority. **(OEMP_MW-BIO3)**

Wildlife
Where reasonably practicable and when water is flowing, we will allow the proper measures for the passage of otters along one or both banks of the River Till within the temporary works arrangements. **(OEMP_MW-BIO3)**

4.3.2. Measures to ensure the fluvial floodplain continues to function effectively

BADGER will take the relevant measures in order to ensure the fluvial floodplain continues to function effectively:

- We will ensure that the existing watercourse will be protected and uninterrupted during all construction works
- Temporary fencing will be located outside of the river channel, at least 8m from the boundary of the river
- This temporary fencing will be permeable to floodwater in order to ensure that the fluvial floodplain continue to function effectively for storage and conveyance of floodwater
- As previously stated, fencing will protect existing water features from degradation and physical damage during construction
- The temporary bridge across the River Till will be installed in order to guarantee a correct pass over the river. The temporary bridge will minimise the affections to the River Till valley as much as possible
- We will ensure non-impact piling will be used for any of the construction elements within the valley
- We will ensure that there will be no impact to the wildlife present in the valley
- Only biodegradable hydraulic oils will be used in equipment working in or over the watercourse, and appropriate measures will be taken to protect erodible earthworks surface.

4.4. Explanation of how the alignment and access of the existing Winterbourne Stoke Byway WST04 will be maintained during construction of the viaduct

The River Till Viaduct will be designed and constructed as a twin-deck, five (5) span viaduct structure to carry the new A303 over the River Till, its floodplain and the existing Winterbourne Stoke BOAT (WST04).

The carriageway level on the River Till Viaduct will be a minimum ten (10) metres above the River Till where it crosses the river channel. This will allow for a minimum headroom clearance of 5300 mm plus sag curve compensation over the existing Winterbourne Stoke BOAT (WST04).

The WST04 will be located beneath the westernmost span of each bridge deck of the River Till Viaduct, its existing alignment will be maintained and it will remain opened throughout the construction period. These will be achieved as the main structural elements of the new River Till Viaduct will not clash with the WST04 current alignment. Temporary edge protection such as fencing or hoarding will be installed at both sides of the WST04 protecting the users of the road from any possible risk coming from the worksite.

A temporary crossing will be installed on the route of our internal haul road in order to gain access from our compound to the construction locations along the River Till viaduct. Safety boom barriers controlled by a banksman will be installed as safety measures in order to avoid collisions between WST04 traffic and construction site traffic. These measures and all the additional ones will be recorded in the Site Traffic Management Plan.

In order to have a safe lifting procedure for the installation of the western span beams and keep the existing WST04 byway opened at all times, temporary diversion of the WST04 byway is proposed as shown in the previous sketches. This temporary diversion will be open the minimum necessary time and once the beams are installed the WST04 byway will be redirected to its original position.

For the installation of the deck precast elements on the top of the beams, concrete, pavement and finishing works, a steel frame to protect the existing byway and moving traffic underneath will be installed around the headroom standard to keep safe the crossing of the site works by of the road users.

4.5. They key construction risks that are uniquely associated with the construction of this Scheme area and the proposed mitigation

BADGER will apply a strategy to proactively manage risk from the outset, which will enable us to safeguard the integrity of HE´s goals and objectives for the project.

The key construction risks that are uniquely associated with the construction of the River Till Viaduct and the proposed mitigation measures are shown in the table below:

Document Title	Construction Methodology for the River Till Viaduct
Work Scope covered by this document	River Till Viaduct construction works

KEY RISK	PROPOSED MITIGATION MEASURE
Direct habitat loss associated with the construction activities planned near to the River Till SSSI section of the SAC	Construction of the River Till viaduct and a temporary bridge would be undertaken a minimum of 8m from the River Till channel and outside of the SAC within the existing highway boundary.
Risk of potential impact to protect species (wildlife)	Noise and vibration from construction of the bridge supports would not affect fish if carried out when the river is seasonally dry (as is provisionally planned). It would have the potential to affect behaviour of fish in the immediate vicinity, if it occurred when there was flow in the winterbourne (winter to early summer). Construction of the piers, the nearest of which is more than 8m from the channel, will use low vibration and noise piling methods, as described in the OEMP. As such the disturbance impacts are likely to result in a neutral effect on fish. Where reasonably practicable and when water is flowing, we will allow the proper measures for the passage of otters along one or both banks of the River Till within the temporary works arrangements.
Risk of intrusions in the protected areas (River till 8m exclusion zone and footprint of existing byway).	Special protection will be applied in the areas around the cuttings (foundation excavation) which are very close to the protected areas. We will ensure that key objectives and procedures outlined in the DAMS are communicated to all site personnel initially via the Site Induction and then by regular toolbox talks. Only trained personnel will manage particular tasks in terms of preservation of archaeological remains. Our trained people will ensure that all site personnel are aware of the importance to respect these measures before to start any type of activity and earthworks.
Risk of flooding	Close coordination with Authorities and main stakeholders to share in real time the hydrology of the region and control of areas in risk of flooding. Mitigation measures will be applied in compliance with OEMP MW-WAT13.
Risk of closures in the WST04 for safety reasons due to some works activities with high risk for users (Installation of the beams, precast elements and concrete pouring on top of the road).	We will minimise as much as possible these risk activities and they will be executed during the time of least road usage. Ref to MW-G12 & MW-NOI 12. In order to have a safe lifting procedure for the installation of the western span beams and keep the existing WST04 byway opened at all times, temporary diversion of the WST04 byway is proposed as shown in the previous sketches. This temporary diversion will be open the minimum necessary time and once the beams are installed the WST04 byway will be redirected to its original position. For the installation of the deck precast elements on the top of the beams, concrete, pavement and finishing works, a steel frame to protect the existing byway and moving traffic underneath will be installed around the headroom standard to keep safe the crossing of the site works by of the road users. (As explained in 4.4 of the document).
Risk of not achieve 6P/6Q material with chalk class 3 for the abutment fill (bank seat beam).	Additional geotechnical investigation of the in situ material, laboratory test, mock-up simulations, stabilization and trial embankment test will be done in order to achieve a suitable fill material.
Transport of the beams	Due to the huge size of the beams, they will be delivered split in pieces and will be assembled on site in order to facilitate the transport from factory to site and on our haul roads.