2. Works Methodology

Scope Summary

The Scope comprises the design and construction for the replacement of the Western Section of the Salt Island Bridge.

The Project is located at Holyhead Ferry Terminal, Irish Ferries Holyhead, Salt Island, LL65 1DR.

The current situation is that the Western Section of the bridge has been removed from operation and all traffic is directed via alternative access to reach Salt Island.

The Western Section is made up of 2 distinct sections:

- Western Section Part 1 – Constructed using jack arch methodology, it is believed this part of the structure was constructed at some point in the 1800's. There is steel transverse girders located on top of the main steel support beams. Between the transverse girders brick arches have been installed, with the running deck located above the arches.
- Western Section Part 2 - The other area of the western side bridge has been constructed of concrete beams resting on steel beams. The concrete beams appear to have been poured in situ rather than prefabricated and listed into place.

As per tender instruction and the specimen design from Stena Line [The Client] for a Compliant Tender, the current proposal is to replace both Western Sections of the Salt Island Bridge with a new bridge.

As part of the tender process, Southbay Civil Engineering Ltd [SCEL] has contracted Mott Macdonald to develop a tender design based on information provided by The Client.

Summary of the adopted solution for our tender design is as follows:

Overall length of structure 25.50mm
Structure width 12.*00m*

Substructure

- 7no. 600mm piles 12.3m long at each end of the bridge.
- Piles to be installed using in-situ boring techniques and temporary casings if required by ground conditions.
- Piles support a reinforced concrete pile cap.
- Diaphragm and stitch required to make piles and pile cap act monolithically with the bridge deck.

Bridge Deck

- Precast beams supporting in-situ reinforced concrete deck.
- Precast beams – Y4 (8no.) / YE4 (2no.) 24.5m long.
- Permanent formwork between beams – e.g. fibreglass or fibre reinforced concrete.
- Minimum 250mm thick cast-in-situ slab.

Finishing Works

- Spray applied waterproofing between deck slab and asphalt.
- Asphalt: 40mm thick HRA 30/14 F SURF 40/60 (SHW 910) + 60mm thick HRA 60/20 BIN 40/60 (SHW 905).
- Bolt down Armco barrier (from specimen design).

- N1 parapet bolted to structure.
- Tie-ins to existing pavement approaches each end of the bridge.
- Existing abutments / sea walls / retained fill cut flush at level under the proposed deck soffit.

Please consult annexed document "25021 - Tender Design Summary.pdf" for further details.

Method Statement

Health & Safety

All personnel will attend the safety inductions required by Stena Line and Southbay, in addition, all personnel will also attend RAMS, lift plan and daily pre-start briefings. We also hold weekly relevant toolbox talks to make personnel aware of any specific dangers on site as the works progress. Personnel will also attend our internal Behavioural Safety training programme conducted by our Health & Safety Department.

All our operatives hold CSCS cards suitable for their position in the company, all plant operators will hold CPCS cards or equivalent for the plant they are operating. All personnel on site will be equipped with the required PPE when entering the site.

Safety boots (steel toe and midsole).	Light-eye protection.
Safety helmet.	Life Jacket 275N.
High-visibility clothing, (vest or coat).	Task specific PPE (e.g. impact goggles, RPE, ear defenders)
Gloves suitable for specific site tasks to be undertaken	

As per the tender instruction, all the site personnel, suppliers and sub-contractors will observe the Stena Line's Suppliers Code of Conduct, particular attention being given to WI 230 Site Rules and WI 235 International Ship & Port Security (ISPS).

Weather constraints

Southbay Civil Engineering is a long-established company with over 20 years' experience in marine projects. The weather, sea conditions and wave action will be assessed on a daily and weekly basis, this will allow us to consider the best time to demolish the existing bridge deck as well as building the new proposed structure with little or no interference from the weather / sea. Weather and sea conditions forecasts will be monitored using the following websites:

- BBC Weather
- Met Office – inshore waters
- Windguru
- Windy Weather – Wave Forecast

Design And Documentation Stage

Please see below a short summary below of the design process and deliverables allowed for in our tender for the successful delivery of the project:

Kick off meeting
Surveys and inspections / Subject to GI provided by client at tender
Topographical survey
~~Sea wall intrusive investigations – not allowed for~~
Project inception (Peer review)
Global stability calculations
Assessment report
CAT II Check
Bridge AiP
Scheme definition, buildability workshop, refinement opportunities
Write AiP
AiP Drawing
Comments and approval (CAT II Checker)
CAT II Sign Off
Issue AiP for Client Acceptance
Comments and acceptance
Client Sign off
Bridge - Detailed Design

Modelling and analysis - geometry and loadings
Modelling and analysis - soil structure interaction
Element design - internal beam
Element design - edge beam
Element design - deck slab
Element design - pile cap and integral stitch
Element design - pile
Element design - parapet stitch and misc details
3D Model
Drawings - GA etc
Drawings – RC, details
Specification
DHEM Report
Project decisions log
Issue to CAT II Check Team
CAT II Check - Bridges
CAT II Checker Issues Comments
Incorporate comments
Sign off CAT II check certificate
Design IFC issued to Client for records

The main procurement items will be contracted during this phase as well, keeping close coordination with the temporary works design and the cranage specialists for the lifting of the main items.

The below considerations have been incorporated in our design cost allowances at tender stage:

- Fortnightly meeting with the client, virtual calls preferable.
- Applications and payment of fees for permits, license etc will be by Stena Line.
- All information required to undertake the detailed design including additional GI, topo survey etc shall be issued prior to commencement of the detailed design stage.
- Bridge geometry including span, deck width and offsets from existing structures are taken from ITT Scope of works PC6884-RHD-XX-XX-SW-C-2002 rev A3/C02.
- Detailed design is based upon the design basis document included as an appendix of the formal proposal.
- Changes to the design at the AiP stage shall be limited to the span and deck width. No additional analysis shall be undertaken at this stage.
- Ship impact loads are not defined in the ITT therefore no allowance for ship impact loads have been made in the design.
- Highway design shall consist of the design of a standard mass concrete transition detail and like for like replacement of pavement. No structural analysis has been allowed for.
- The design assumes no significant change from previous GI information provided at tender stage.
- The design assumes like for like replacement of non-bridge structure elements such port infrastructure, services etc.
- Parapets are assumed to be standard proprietary products as shown on the ITT specimen design drawings.
- The project specification shall be in the form of the relevant appendices from the Design Manual for Roads and Bridges, Specification for Highway Works.
- Production of ground investigation report (GIR) is not part of the scope.
- Standard initial environmental / ecological surveys are allowed for to produce CEMP.
- As per WI 805, we have allowed for undertaking The Principal Designer (PD) and The Principal Contractor roles as defined in CDM regulations.
- Existing abutment and wingwall repairs are not part of the scope.
- Resourcing, rates and checking methodology are based upon the programme dates stated in the ITT. These will be affected should the programme, resources, and methodology change.
- Our tender allows for one design review iteration to address comments to our proposed details.

Construction

The items in the sequencing in the method statement are high-level, a breakdown of these can be seen on the tender programme, during the works more detailed task specific method statements, risk assessments, lift plans will be produced in line with our ISO procedures.

1. Design and documentation stage
2. Mobilisation / Site Establishment
3. Establish site
4. General site clearance, services diverted and security fencing moved by others in advance of the works
5. Install bored pile foundation from existing road level / potentially exposing a localised slit trench
6. Remove existing structure deck, excavate to formation, cast blinding and trim pile heads
7. FRC Construct pile caps (including erecting formwork, fixing reinforcement, casting slab, removal of formwork)
8. Install PPC deck beams and permanent formwork for topping slab
9. FRC Construct in-situ deck slab (including erecting formwork, fixing reinforcement, casting slab, removal of formwork), including the in-situ diaphragm and stitch between pile cap and deck (this can be built in the same pour or poured in advance of the deck slab)
10. Install parapets and traffic barriers
11. Apply bridge deck waterproofing system
12. Install drainage pipes connecting deck drainage to outfall
13. Finalise construction of structural backfill behind both abutments
14. Install asphalt surfacing
15. Finishing works, line marking, tie-ins to existing masonry walls etc.
16. Demobilise site

* FRC - Formwork Reinforcement and Concrete

Mobilisation.

Access onto the site will be from the South, via A5154 / Prince of Wales Rd. For exceptional plant and vehicles required on the North side of the bridge, access will be agreed with Stena Line through the Ferry Terminal roads using the current Causeway East of the bridge and the small roundabout NE of the site to turn back towards the site. Details of the route, the security protocol, measures and the personnel using the North side access will be submitted for approval in advance.

Figure 1 – Site location and Proposed Compound

The North access gate will be locked at all times, except for the vehicle allowed to pass through prior to the gate being locked again. Vehicles will display hazard / flashing beacons when leaving the site and travel at the max allowed speed of the ferry terminal roads. Should any 3rd party vehicle / members of the public be in the vicinity of the vehicle access the banksman will stop the vehicle to allow the public passed. Only when the route is clear will the vehicle advance to the site gates where these will be unlocked, the vehicle allowed to enter then the gates will be locked again. Relevant matters regarding access will be incorporated into our Site Induction.

Enhanced security measures will apply according to WI 235 International Ship & Port Security (ISPS).
Given the live traffic alongside our works, we can deploy as well a solid hoarding extending to a minimum height of 3m above ground level.

As indicated during the tender discussion, the Client is in discussions with the Council for using the nearby car park at South of the bridge for the site compound location. Our tender is based on this approach.

To access the designated site compound, traffic management measures will be implemented. Solid board fencing and lockable gates will be delivered and unloaded at the work area, then erected around the perimeter of both the compound and the working area. Warning notices will be placed on the fencing to alert of construction dangers. Following this, we will set up our welfare facilities, which include office cabins, mess room, changing/drying room, toilet, shower facilities, and site stores.
A smaller satellite compound with welfare cabins will be setup on the North side to be used when this side will be isolated by the main compound once the existing deck is demolished.

Figure 1 – Indicative Compound Arrangement (Picture source Google.com/maps)

The existing road carriageway running behind the South Abutment and alongside the car park will be used to access the works.

Phase 1: General Site Clearance

Immediately after the site establishment and the site condition surveys, we will identify any existing service lines in order to determine exact location and their clear marking prior to excavation/breaking of the ground. We will undertake general site clearance to make room for the piling operations. Any kerbing, bollards and pavement will be removed just enough to make room for the pile line in the first instance. The sections of the existing masonry parapets interfering with the works will be demolished.

Our programme sequence is based on the demolition of the deck structure to happen at a later stage, after completing the piling. We consider this approach provides the advantage that the deck remains in place ensuring stability of the old abutment walls during the piling operations.

Phase 2: Piling Operations

Our tender is based on the following piling design: 2 x 7 piles 600mm diameter cast-in place piles with pile lengths range at 14.0m below PPL TBC.

The proposed methodology is to use bored/rotary percussive drilled and cast in place piles. Based on the soil investigations records provided, we have allowed for using as well an air-flushed rotary percussive drilling technique. Temporary casing 660mm OD to rock head, anticipated at no more than 9.2m below PPL, is allowed as well in our methods.

Our method will use the existing road as piling platform and to drill from the top through the existing ground with a sacrificial length at top to reach platform level. Subject to confirmation from TW design, bog-mats can be deployed to absorb plant vibrations during operations and to protect the existing embankment.

We will use a piling rig Klemm 7093G or similar, 18t weight, which will require platform design pressure 130kPa. Our temporary works designer will confirm platform.

A mobile crane will assist the piling rig for the handling of the temporary casing and the reinforcement cages. Various small plant, water bowser, bob-cat to handle arisings etc will be in attendance during the operations.

Piling operations will start on South abutment pile line and the piles will be installed to their design length or prior practical rig refusal to levels approved by designer

After completing the South Abutment, the piling rig will be redeployed on the North abutment pile line using a low-loader to exit from site, use the public road, enter the ferry terminal grounds and re-enter the site using the North gate. Sufficient notices and approvals will be agreed in advance with Stena Line for any movement using this route.

The same works sequence will be repeated for building the North piles.

After the concrete has gained sufficient strength, testing will be undertaken to assess the integrity and the bearing capacity of the piles.

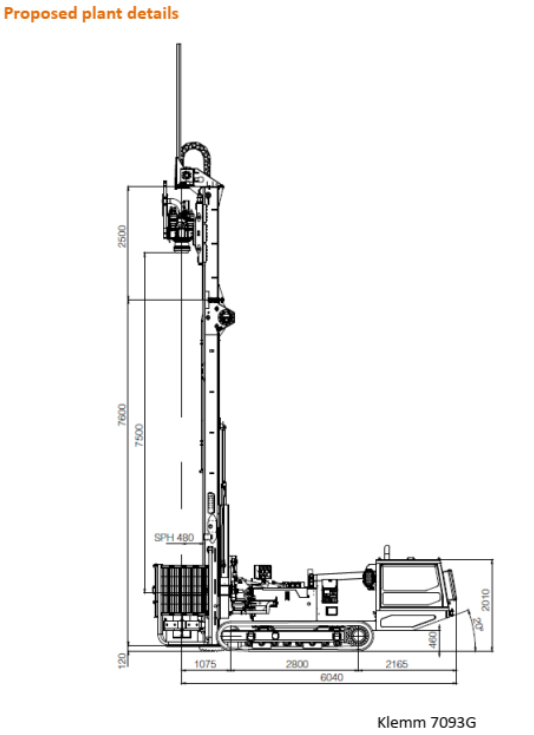


Figure 3 – Proposed Piling Rig (Klemm 7093G TBC)
Please consult annexed datasheet for further details.

Phase 3: Deck Demolition

Plant and equipment resources:

2 x 40t excavators equipped with attachments.
1 x 8t excavator equipped with attachments.
1 x 3t dumper
1x 110t mobile crane TBC - to assist operations

Note: The pile line area will be temporarily backfilled around piles for a level platform to allow traffic over of the demolition plant.
Note: If any large plant requires access to the North abutment, this will use the approved the North gate route through the ferry terminal grounds.

Outline Method

- 40t excavators to be situated at either side of the bridge deck.
- 8t excavator to be used to clear materials from under the bridge deck during the demolition.
- Once equipment has been delivered to site, 40t excavator will remove all overburden from the bridge deck exposing the brick jack arches and concrete deck.

See next page for details for temporary supports of the excavation slopes.

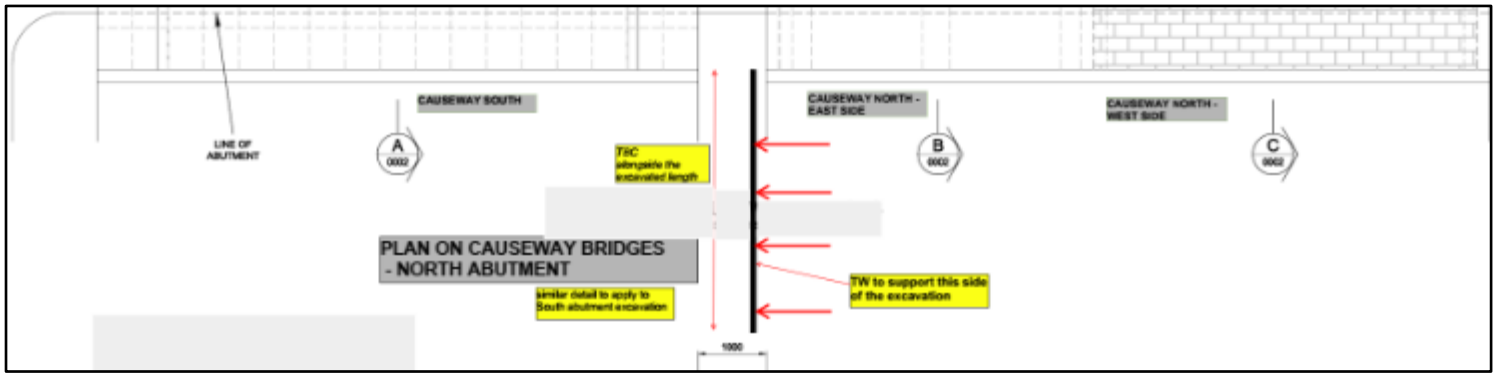


Figure 4 – Line of temporary supports to side of excavation on North Abutment

Note: Given the proximity of the Southbound causeway with live traffic, this side of the excavation will be temporarily supported using a raker bracing system to approved temporary works design and cantilever piles, temporary works design will confirm details.

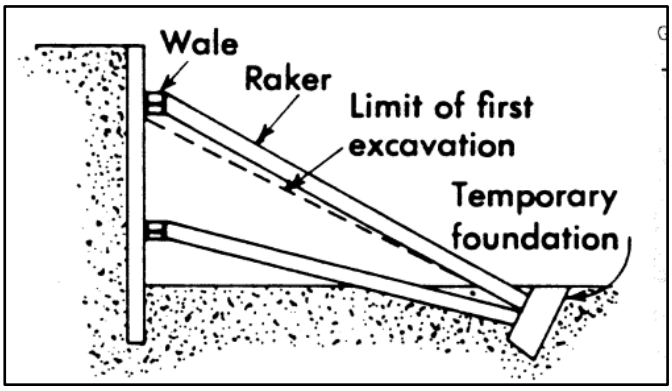


Figure 5 – Typical example of raker bracing system

- The 40t excavator will commence breaking out the bridge decks exposing the steel structure– note these works will be carried out at low tide if required.
- 8t excavator will access the underside of the bridge deck. This will be lifted onto the foreshore using a 110t mobile crane.
- 8t excavator will clear materials which have been broken out using skips which will be lifted by crane and unloaded directly onto lorries to dispose to approved tip off-site. A 3t dumper can assist for disposing arisings from excavation at high level (behind deck / abutments).
- 40t excavators will then use shears to shear cut the steel deck into manageable size and remove.
- To remove the main deck beams, the 2 x 40t excavator will use selector grabs to tandem lift to remove the beams.
- Once all deck beams have been removed, the excavators will trim up the abutment walls ready for the installation of the new bridge deck.

Phase 4: Construct abutment bankseats/ pile caps

Both abutments of the bridge will have pile caps 1250mm wide x 1000mm deep x 12000mm long.

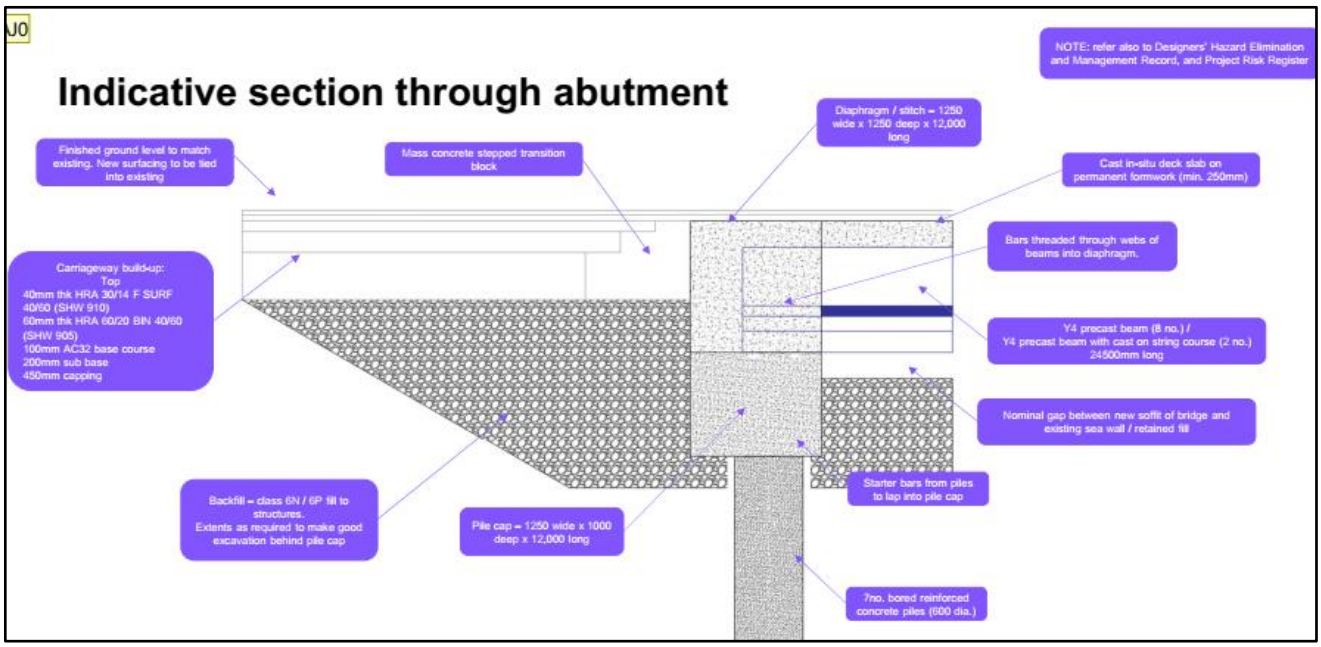


Figure 6 – Indicative section through abutment

Access:

A 70t crawler crane will serve both abutments from the South side of the bridge.
Please consult annexed datasheet for further details.

We have determined that this approach ensures the most efficient way to service the construction works to the North side. This will minimise to access the north side thro the terminal security area.

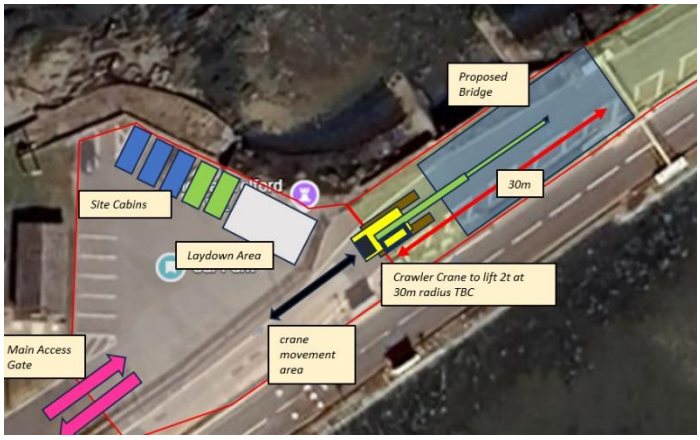


Figure 7 – Proposed location for crawler crane on the South side

Excavation for pile caps:

Once the demolition works are completed, we will excavate the proposed abutment location within the existing ground / road to make sufficient room for constructing the pile cap. The excavation works will be carried out in a careful manner to protect the pile heads installed in the previous stage. Temporary works will be deployed to support the side towards the live traffic road in a similar manner to Fig.5 above.

Once we have prepared the bottom of excavation to the design level, we will crop the pile heads using Hydraulic Pile Breakers attached to the excavator. We will then prepare the formation and lay the blinding concrete.

Reinforcement to pile caps:

The rebar cage will be installed using traditional methods in accordance with the construction drawings incorporating any connection details to the pile reinforcement.

Formwork to pile caps:

To construct the concrete coping, we will use proprietary standard panels (RMD Maxima or similar) clamped together and anchored to the ground in accordance with an approved temporary works design. The TW design will specify details of plywood lining and any timber make-ups, if required. The formwork will be designed to anchor into the blinding concrete at toe and each face against each other using tie-rods. All joints will be sealed with mastic to prevent grout loss during the concrete pour, height laths / chamfers will be installed to ensure the correct levels are achieved. The pour will be cleaned and finally a Pre-Pour Inspection will be carried out by the Temporary Works Co-ordinator (TWC) in accordance with our ISO procedures.

Concrete:

Using a concrete skip the concrete will be placed in a controlled manner ensuring even distribution of the concrete within the formwork. The concrete will be compacted using high frequency vibrating pokers, the concrete will be installed up to CJ level and then be levelled using hand trowels to the specified finish to form the surface to receive the precast beams.

During the pouring of the concrete, concrete samples will be taken by a local testing laboratory, these will subsequently be crushed to confirm the concrete strength.

Following the curing of the concrete the formwork will be removed and any tie holes plugged. The buried surfaces of the concrete will receive a bush/roller applied bituminous coating before backfilling.

Backfill Stage 1:

The structural backfill behind and in front of the abutments will be deposited by the excavator and compacted in accordance with Table 6/4 of SHW. The fill will be paced to the level of the capping beams horizontal joints, to create a suitable working platform 100mm under the beam's soffit level.

We have sequenced the works to prioritise the South abutment pile cap, so that we can construct the crane platform for the next stage to lift the precast beams while works are still ongoing to the North abutment.

Phase 5: Lifting the deck beams

Bridge Deck Tender Design:

- Precast beams supporting in-situ reinforced concrete deck.

- Precast beams – Y4 (8no.) / YE4 (2no.) 24.5m long 24.86t / 52.80t each.
- Permanent formwork between beams – i.e. fibreglass or fibre reinforced concrete.
- Minimum 250mm thick cast-in-situ slab.

Lift Plan:

Once both abutment pile caps are ready to receive the deck beams, we will have a temporary crane platform on the South side of the bridge overlapping the imprint of the current car park. The platform will be built and tested according to TW design.

Our tender allowance is to use a heavy-lift mobile LG1550 Crane SLDB 56M Main Boom 160t / 120t cwt to lift the beams max 55t each at 40m radius. For deployment, a 110t crane will be used for rigging according to the approved temporary works design.

Considering the site layout configuration, we have determined the lift radius to 40m in order to position the crane at further distance from the South abutment towards the existing car park imprint.
This will enable:

- to have enough width to deploy the outriggers
- to keep ground pressure and loads further from the edge of the existing embankment.

We will coordinate with the beam supplier so that beams are delivered to site in the sequence required by installation. The delivery lorries will enter to a pre-established location in range of the crane to lift them directly onto the bridge. Any brackets / edge protection will be attached to the beam at arrival, directly on the truck. Subject to the contracted factory location, we will have the transport route agreed in advance by authorities, including timings and escorts if required. A truck waiting and marshalling area site will be agreed in advance for a suitable location outside the site.

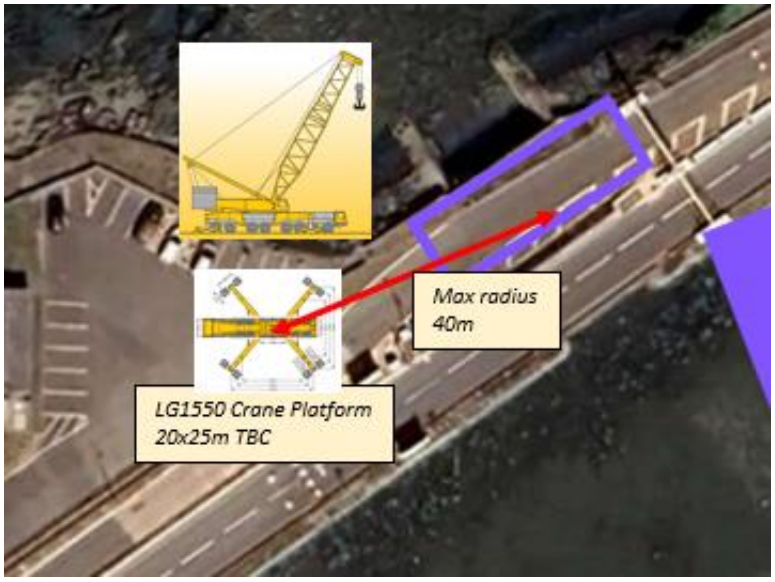


Figure 8 – Indicative location for crane platform
Please consult annexed datasheet for further details.

Edge Beams with precast parapet beams incorporated into the beam:

Our tender approach is to have the TY4 edge beam incorporate the parapet beam / string course from fabrication. The main advantages are:

- the edge protection for de deck works can be attached to the beam from land, before the lift
- no requirement to install temporary works / access brackets to form the cantilevered edge of the deck

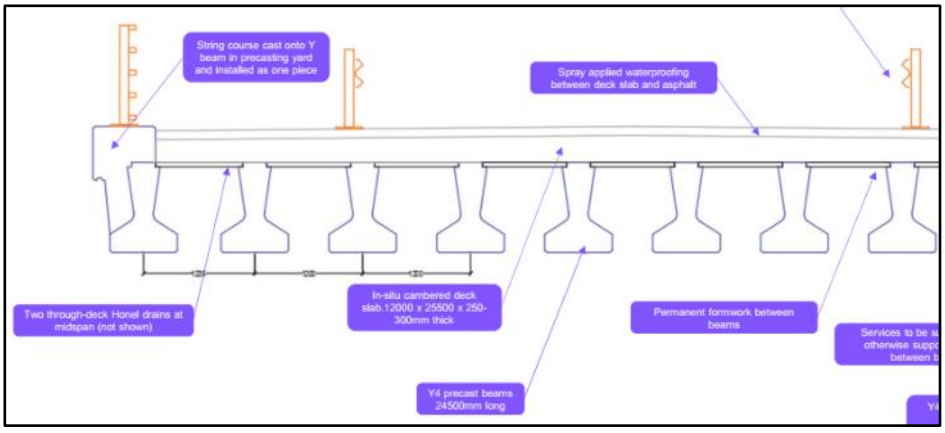


Figure 8 – Indicative section through deck showing the TYE4 beam with the precast string course.

Temporary Works for beam stability:

At tender stage we have developed an indicative temporary works design to ensure the stability of the beams during construction of the deck and diaphragms until they are incorporated into the superstructure by the deck pour.

The bracings will be installed by scaffolders at the end of each beam as these are landed on the bankseats.

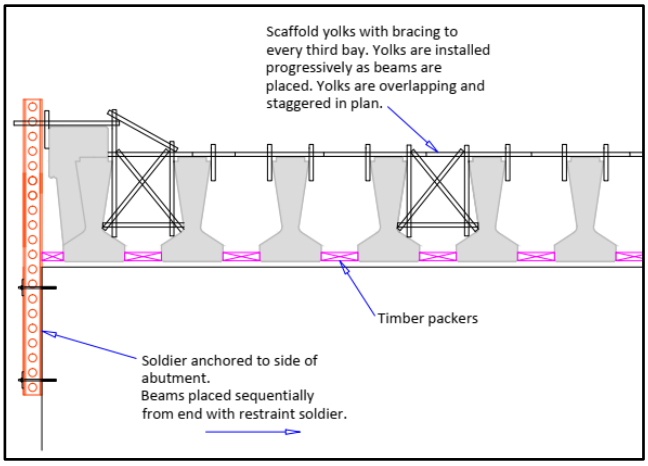


Figure 9 – Indicative location for crane platform
Please consult annexed document "C25044-DRG-100-0 (A3).pdf" for further details.

Phase 6: Building the deck (including diaphragms)

Permanent Formwork – Vertical sides to diaphragm infill between beams:

We will form the vertical sides to diaphragm infill between beams using permanent formwork panels. These will be either in GRP or in precast concrete panels. For fixing, cast-in inserts can be embedded into the concrete beam since fabrication stage.

Advantages:

- Safety: by using these panels, this side of the diaphragm does not require striking the formwork after the pour so it eliminates the need of a person to access the front of the abutments, between the beams.
- Programme: since the diaphragm does not require striking the formwork after the pour, the deck soffit + rebar can proceed as soon as possible not having to wait on the pour and strike of the diaphragm panels (to allow access from above between the beams).
- Programme: backfill + platform under the deck (towards the existing sea + abutment walls) can be completed to final design level in advance of landing the beams.

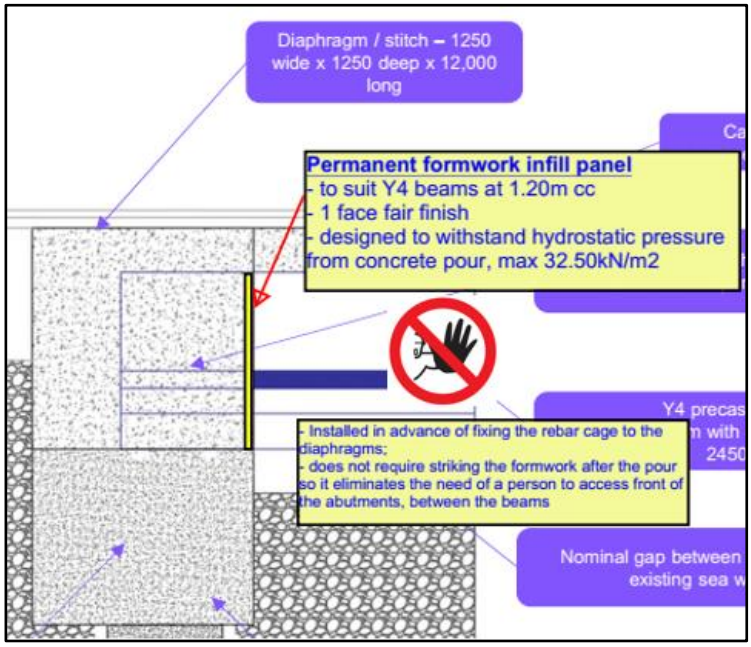
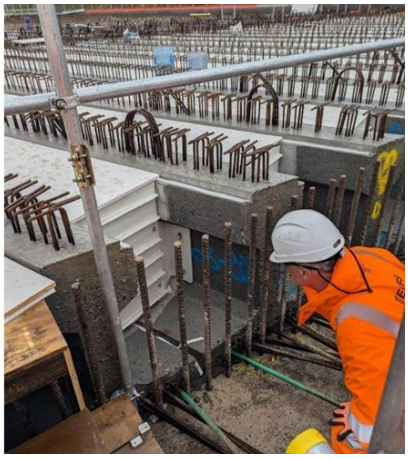
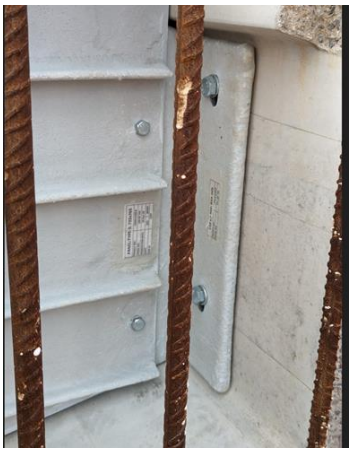


Figure 10 – Indicative section through diaphragm showing the permanent vertical panels





Figures 11 – Examples of vertical permanent panels to form diaphragm / infill between beams

Access to deck works over the diaphragm starter bars

For access to the deck works from the platform level behind each abutment, we will have a suitable modular crossover steps and deck bridge or other approved proprietary system with handrails.

After the bridge beams are landed and secured in place, we will proceed with installation of the permanent formwork panels to deck, GRP or precast concrete panels. The supporting surfaces will be prepared to receive the formwork by applying a sealant.

Figure 12 – Example of fixed crossover steps and platform deck

Permanent Formwork – Horizontal Panels to Deck Soffit Slab

After the bridge beams are landed and secured in place, we will proceed with installation of the permanent formwork panels to deck. The supporting surfaces will be prepared to receive the formwork by applying a sealant strip and butyl bead to the beam's upper flange, or other approved system. As this operation progresses, we will carefully position and secure the formwork panels onto the supporting beams according to the manufacturer's instructions and to the RAMS approved in advance.

Works will start from the South end of the bridge with several beam lanes at a time to create an advancing front. Each panel will be secured in place, ensured for proper bearing and then used by the installation operative(s) to walk over in order to install the next panel. In order to protect the workers on the edge, a portable fall arrest jib system (ALSIPERCHA or similar approved) will be anchored to the beam body and moved as required for the operatives to have the lanyards attached to. Davit cast-in can be can be embedded into the concrete beam since fabrication stage; suitable spacings for these will be determined so that the whole area of the deck will be covered by the jib's reach. All fall-arrest lanyards, systems and secure tie points will be inspected before each operation.

The crawler crane serving the bridge from the South side will supply the panels to work points until the full length of the beams is completed.

Figure 13 – Example of Tie Down ALSIPERCHA Portable Overhead Fall

After placing permanent FW panels onto supporting beams, we will seal the panel joints and the gaps to the supporting beams to prevent grout loss and ensure a watertight deck.

Reinforcement Works to deck slab and diaphragms:

Once the permanent panels have been installed and the deck is now suitable for unrestricted works access by having all edges protected and secured, the next stage of the works will continue with the fixing of the deck reinforcement. The diaphragm cage will incorporate the threaded bars protruding through the webs of the beams. The rebar bundles will be lifted by crane to the work point(s) careful consideration being given to avoid concentrated loads on the deck.

Formwork to deck slab and diaphragms:

We will fabricate temporary shutters to the rear and the sides of the diaphragms by using proprietary standard panels (RMD Maxima or similar) clamped together. The toe will be anchored to the ground and props will be used in accordance with an approved temporary works design. All joints will be sealed with mastic to prevent grout loss during the concrete pour, height laths / chamfers will be installed to ensure the correct levels are achieved. The formwork will be checked by the Temporary Works Co-ordinator (TWC) and signed off when correct.

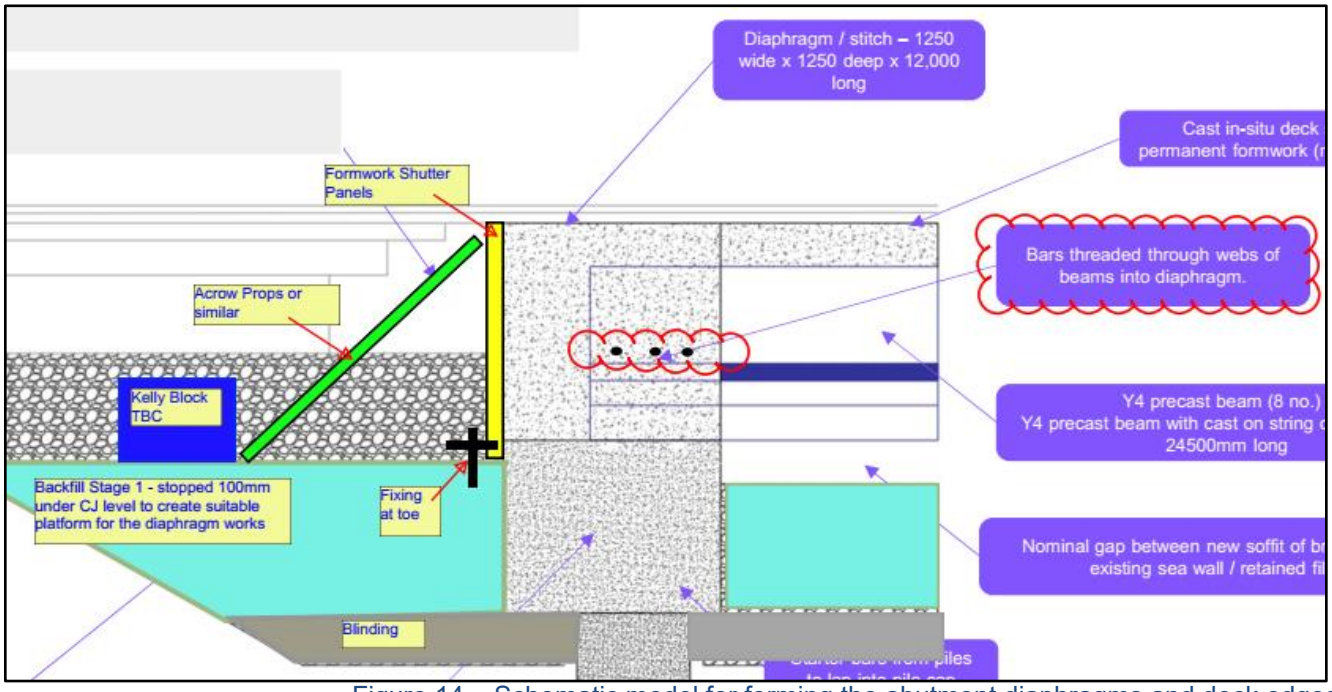


Figure 14 – Schematic model for forming the abutment diaphragms and deck edges

Concrete:

Subject to the chosen sequence on site, the abutment diaphragms can be poured in the same pour with the deck or in separate pour with a horizontal joint at the level of the deck slab soffit TBC.

The pour will be given a final clean and prior to pour a pre-pour inspection will be carried out. The concrete will be poured using a concrete pump with suitable boom, indicative 48m TBC, to reach all deck surface. The concrete will be placed into the pour in a controlled manner ensuring even distribution of the concrete within the formwork.

Consideration will be given to the rate of rise for the concrete pour, not more than 1m / hr in order to control the hydrostatic pressure loading the temporary and permanent formwork systems. The concrete will be compacted using high frequency vibrating pokers, will be installed up to the chosen level and then be levelled using hand trowels to the specified finish. If two-pour method is chosen, the horizontal joint will be treated and prepared for the next pour. The final surface of the deck slab will be levelled and trowelled to reach U4 finish to ensure required adherence for the deck waterproofing layer to be applied in next stage of construction.

Following the curing of the concrete the formwork will be stripped. Buried surfaces of the concrete will receive a 2-layer bituminous coating before backfilling.

Deck waterproofing:

The deck will be cleaned by jet wash prior to deck waterproofing. Depending on the specific product and testing results of the deck slab concrete moisture after curing, a specialist contractor will then apply by spraying a proprietary bridge deck waterproofing to Specification for Highway Works [SHW] Cl. 2003. This system will extend

300mm on vertical faces as well. Subject to sequence for the asphalt works on bridge, a protection layer can be applied.

Phase 7: Backfill – final stage

Drainage behind abutment

The drainage system can be built after the bituminous coating has dried to the buried surfaces of the abutments and diaphragms (its sequence is independent of the deck waterproofing).

Details for drainage system to be confirmed in final design stage. Our indicative tender allowance is for building a permeable drainage layer in acc. with Series 500 of SHW, precast hollow concrete drainage blockwork TBC, stretcher bond, dry joints in walls behind structures with a 300x300mm porous concrete block at bottom with a perforated pipe 150mm diameter to discharge to existing drainage system.

Backfill

The structural backfill will then be deposited by excavator and compacted in accordance with table 6/4 of SHW. The backfill will be completed up to bottom of road capping layer.

Stepped transition block

A mass concrete stepped transition block will then be built alongside the full length of the abutment using traditional formwork methodology.

Phase 8: Asphalt Pavement and Finishing Works

During this stage, we will finish all the pavement layers on deck as well as on the approaches to tie-in to the existing road and bring the carriageway to traffic condition:

- build capping layer and stone subbase to both approaches.
- rebuild kerbing, make good to verges on approaches.
- lay asphalt base, blinder and surface layers.
- an asphaltic plug joint will be installed at each end of the structure.

During the same phase, specialist suppliers will install the safety barriers on bridge (including terminals) and we will rebuild the masonry walls on abutments and also reinstate the gantry foundations.

Road Marking works will be then carried out and traffic signs installed before the final hand-over of the works.

Phase 9: Hand-Over and Demobilisation

To prepare for the final hand-over, we will remove and dismantle the temporary site compound, structures and cabins, remove all materials and equipment, clear the site of debris, remove temporary fencing, and restore the area to its original condition or as agreed upon in the project plan.

Records of site condition surveys at completions will be provided together with as-built records and documentation in preparations for the final completion of the contract works.

List of Supporting Particulars – please consult "Annexed Documents" Folder:

1.	25021 - Holyhead Bridge - Tender Design Summary.pdf	TENDER DESIGN SUMMARY
2.	25021 - Holyhead Bridge - DHEMR.pdf	DHEMR
3.	C25044-DRG-100-0 (A3).pdf	TEMPORARY BEAM STABILITY DRAWING
4.	Klemm 709-3G Spec.pdf	PLANT DATASHEET
5.	LG 1550_mobile_crane - Datasheet.pdf	PLANT DATASHEET
6.	Sennebogen 673E Datasheet.pdf	PLANT DATASHEET