Project Background

Geographical Location

ELR	Mileage	Name	OS Ref	Nearest Postcode
SDI1	207m63c	River Neath Swing Bridge	SS 730 963	SA10 6EX

The River Neath Swing Bridge was originally constructed as a centrally-pivoted swing bridge in 1892. It is a Grade II listed six-deck underbridge carrying the two non-electrified lines of the Swansea District Line (SDI1) railway over River Neath at 207m 63ch. It has undergone substantial maintenance including repairs to steel superstructure and cylindrical caissons in 1914 as well as a partial reconstruction in 1973.

Five of the six decks are simply supported. Each of the five simply supported spans comprises two longitudinal, half through, steel plate girders, cross girders, rail bearers, and a steel deck. Four of these simply supported spans are welded steel and the last high mileage span is riveted. The deck construction is riveted steel and is supported by rows of intermediate wrought iron cylindrical piers and masonry abutments. At each intermediate support row, there are three concrete infilled cast iron piers with steel transverse bracing that was added at a later date. The piers are part of the original 1892 structure and are listed.

The former balanced cantilever swing span deck was originally designed to pivot open on the central support. The swing span comprises a rivetted steel bowstring through truss, cross girders, and a steel deck with overhead lateral restraints at midspan. The swing span is centrally supported on a circular cluster of nine wrought iron caissons / piers with concrete infill, masonry abutments and wingwalls. After declining use of the swing facility, the central span was permanently welded shut in 1985.

Existing Conditions

The structure is in generally fair to poor condition, mainly due to significant corrosion to structural elements. The overhead elements and the underslung gangway are severely corroded. Defects include:

- Corrosion to rivets.
- Varying section loss of deck plates.
- Loss of section to Main Truss Members with cracking to individual cover plates.
- Widespread corrosion steelwork and seams of columns.
- There are various holes to the webs to the Crossheads.
- Failures in the paint system resulting in pitting and corrosion
- The bearing at LM end is free floating with swing span not fully supported and merely rests on the bearing assembly.
- The bearing at the HM end is free floating with swing span not fully supported and merely rests on the bearing assembly. The deck is moving 60mm under live loading.
- The Roller bearing housing severely delaminated throughout.
- HM underside welds attaching angle irons to bottom flange have broken and separate 5mm under load.
- Complete loss of section of flange angle horizontal that connect to the bearing at corner.
- Waterproofing seems to have failed, wet patches and isolated water dripping.
- Isolated areas of deep open joints to wingwall and abutments.
- Various brickwork repairs.
- Cylinder banding has failed or is loose.
- Dilapidated/decayed and ineffective timber fenders.
- Heavy paint loss to in-water piers.
- The paint system to the caissons is failing, resulting in corrosion.

Project Scope

- Steelwork strengthening and repairs to achieve the specified rating of RA8 (at 20 mph) and heavy axle rating RA10 (at 20mph)
- Swing span bearing repairs
- Re-painting of the steel superstructure steelwork to provide a surface protection system with a minimum 15-year design life for trackside areas and 25 years for the remaining superstructure.
- Steelwork repairs to the cylindrical piers
- Waterproofing of the swing span
- Masonry repairs to both abutments
- Removal of redundant fenders to swing span
- Replacement of corroded gutters and downpipes
- Vegetation clearance within 3m of the structure.

Project Overview

The project will be split into distinct site phases which we have detailed below and will discuss further in this document. This will also be detailed on our Tender Programme which will be issued for approval prior to works commencing on site:

Surveys

Initial survey and site investigation phase for:

- Buried services,
- Laser gauging survey,
- Permanent way Topo,
- Ecology,
- Asbestos,
- Steelwork survey,
- Permanent way Trial Holes,
- Temporary works design surveys
- Track condition surveys

Works Package Plan

Centregreat Rail will prepare and gain approval of WPP for the Survey Phase of the design and prepare sufficient Task Briefings to be able to undertake the works in a safe manner. Details of these will are included later in this document

Temporary Works

We will carry out Temporary Works design Forms 002/003 for elements of works which require it., details of this process are included later in this document.

Below are details of the temporary works envisaged for this project:

- Temporary Rivet Replacement
- Scaffold Loading Bay & Davit Arm
- Scaffold and Encapsulation FOR Spans 1, 2 ,3, 5 & 6
- Swing Span 4 Bracing for overhead bracing replacement
- Phased scaffold and encapsulation to span 4
- Temporary stability analysis for span 4 repairs and strengthening
- Temporary support to allow bracing replacement
- Permanent Way ESR

Permanent Works Design

Centregreat Rail to prepare & gain approval of the following. Details of this process are included later in this document

- Report on existing information
- BEP Level Zero
- Survey strategy
- F001 Validation
- Permanent works design Form 002/F003
- Form B Track Design
- Undertake IDC
- Issue AFC drawings
- Issue ECC GRIP 5
- AFC.

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Consents

The following consents will be required:

- Section 61 application, this will be confirmed after discussion with local authority.
- Crown consent
- MMO
- LBC
- Harbour Master

Cable Management Plan

Centregreat Rail to prepare and gain approval of this document.

Critical Rail Temperature Management Plan

Centregreat Rail to prepare & gain approval of this document.

Track Monitoring Plan

Centregreat Rail to prepare & gain approval of this document.

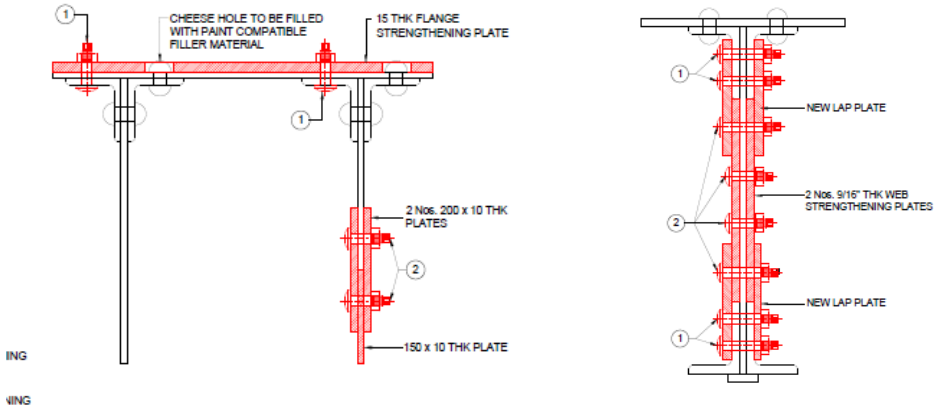
Site Establishment

- Site establishment of welfare / offices and plant storage areas.
- Installation of works footpath accesses to the viaduct.
- Vegetation clearance works.
- Installation of track monitoring equipment during possessions.
- Targeted repairs to steelwork to allow phased scaffold erection.
- Installation of scaffold walkways and laydown areas.
- Installation of scaffolding walkways and working platforms on the viaduct.
- Full encapsulation works to scaffolding.

Steelwork Strengthening & Overplating Works

Steelwork strengthening and repairs to achieve the specified rating of RA8 (at 20 mph) and heavy axle rating RA10 (at 20mph).

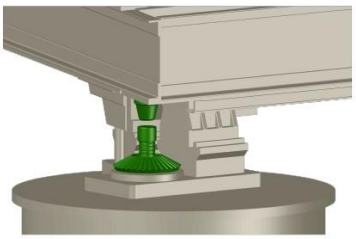
- The extent of the works will include multiple items, please see attached tender programme for detailed report.
- The drawings below give an example of proposed strengthening work.



Swing Span Bearing Repairs

To remove the “free floating” aspect to the bearing assemblies.

- Remove old levers & brackets
- Install restraint to sliding bearing.
- New steelwork to replace screw jack & bevel gear wheel.
- Pack plate on top of bearing block for cross girder.

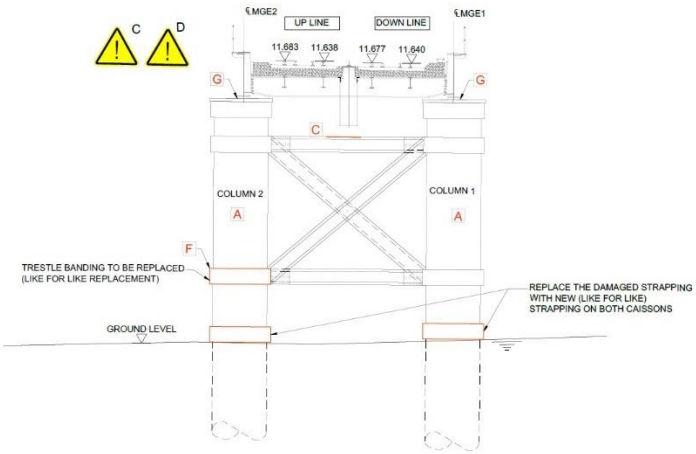


3D MODEL - EXISTING ARRANGEMENT
SCALE: (N.T.S)

3D MODEL - PROPOSED ARRANGEMENT
SCALE: (N.T.S)

Steelwork Repairs to the Cylindrical Piers

- Surface preparation & prime – 1m above / below HW level
- Paint – 1m above / below HW Level
- Replace of trestle banding / strapping with like for like as required
- Installation of new strapping / banding as required.



S&T Route

- Place S&T in split Ducts
- Relocate split duct to outside ballast plate – swing span
- Reinstate trough route – span 1, 2, & 3, 5 & 6
- Install steel brackets – swing span

- Install new trough route – span 4
- To be completed under NR supervision.

Surface Preparation & Painting

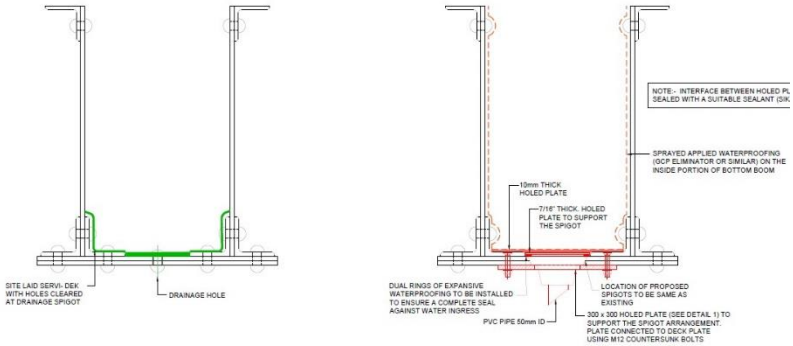
- Grit-blast and Re-painting of the steel superstructure steelwork to provide a surface protection system with a minimum 15-year design life for trackside areas and 25 years for the remaining superstructure.

Marine Works to Remove Redundant Fenders

- Marine works to remove debris,
- To remove redundant fenders as required.

Track & Ballast Removal & Waterproof Swing Span

- This will be completed during the 2 No. abnormal possessions on weeks 49 and 50.
- Remove track, sleepers and excavate ballast.
- Remove existing waterproofing and prepare the deck mechanically prep steelwork and apply paint system to ballast plates.
- Install new waterproofing and spigots.
- Re-establish track formation.
- Install rail and sleepers.
- Undertake tamping operations.
- A specific possession programme will be developed for these works.



Masonry, Paths, Fences & Walls Work

- Masonry substructure elements repointed and repaired in accordance to NWR standards (NR/CIV/SD/101)
- Cleaning of the masonry abutments and wingwalls to remove moss growth and debris.

Ancillary Works

- Corroded gutters and missing downpipes will be replaced where required.
- Vegetation clearance within 3m of the structure.

Fencing/Parapet Repairs as Required

Remove All Temporary Works Scaffolding & Encapsulation

Demobilise From Site

Key Considerations & Risks for Works

Key Considerations	Mitigation Arrangements
Out of Hour Workings/ Disruption to Passengers/ Nuisance to Local Residents & General Public	• Liaison with local authority prior to works commencing and Section 61 agreement issued as required • Information letters and signs erected prior to works commencing to inform local residents of the upcoming work. • Works areas to be physically segregated from members of the public
Working Over Water	• Fully trained and experienced scaffolders • Rescue boat in attendance • Emergency rescue plan in place • Carry out practice rescue drills • Daily pre works start inspections • Mandatory weekly scaffold inspections • Water levels to be visually monitored
Confined Space Working	• Workforce to have undertaken appropriate confined space training. • Work force tool box talk and safe method detailed in task briefing. • Tide height to be monitored during every shift • Emergency evacuation plan.
Working with Existing Lead Coating	• Hand preparation methods utilised wherever possible to minimise air borne particles. • Correct breathing apparatus, disposable overalls, correct gloves and PPE will be worn. • Decontamination unit on each site with ‘clean’ and ‘dirty’ areas to prevent contamination • Good hygiene will be promoted on site. Tarpaulins laid and drapes erected to catch any paint that falls. • Hazardous waste will be bagged and disposed of in correct manner. • Health surveillance carried out on all operatives that may be exposed.
Plant Movements	• Banksman with plant at all times • Flashing beacons • Plant segregation from workforce • Plant daily, weekly, 6 monthly and annual inspections • ALO plans in place when working adjacent to the railway
Working at Height	• Work force tool box talk and safe methods detailed in task briefing • Use of aluminium tower access, with PASMA trained operative inspecting prior to every use • PASMA tower check sheet completed prior to use • IPAF trained operative to use MEWPS

	• Scaffold erection and modification by CISRS qualified scaffolders • All scaffold subject to temporary works F002/F003 design • Temporary works inspections • Weekly mandatory scaffold inspections
Control of Hand Arm Vibration Exposure	• Work force tool box talk and safe methods detailed in task briefing • Occupation health surveillance for operatives • Rotation of workforce using tools to reduce exposure times. • Exposure levels calculated for tools. • Exposure levels monitored on site to ensure exposure values stay below minimum safe levels
Lifting Operations	• Certified and competent operatives – CPCS or equivalent • Certified plant that compiles with PUWER and LOLER regulations • Inspection test certificates for lifting plant (12 months) and lifting accessories (6months) • Lifting plans/RAMS • Exclusion zones around operations and slung loads • Certified and competent Slinger/Signaller in attendance • Exclusion zone
Damaging Track Side Infrastructure	• Workforce to be briefed on appropriate methods of working. • Suitable protection measures to be put in place.
Risk of Collapse of Fenders Due to Poor Conditions And Continual Decay	• All timber fenders are in poor condition and are to be removed as part of the works.
Third Party Neighbours	• Access routes in proximity to River Neath Swing Bridge to be always maintained for all neighbours during the works.
Overhead/Buried Services	• NR to provide information on buried services. • Cables in a trough on the downside of the structure • The existing cable route affected by the proposed works shall be surveyed to identify the condition, quantity and type of cables within. • Cable Management plan to be produced, approved and implemented.
Noise Pollution	• Excessive noise over long periods must be avoided. • Plant will be well maintained and shrouded where possible.
Environment Impact	• Works to be planned and undertaken to minimise the impact on the environment. • Neath Port harbour master to be consulted during the detailed design development. • Consents to include MMO and Crown Consent.
Listed Buildings	• Network Rail to investigate whether Listed Buildings Consent will be required and the requirements incorporated as part of the detailed design development.

Construction Phase Plan

We shall prepare and gain approval of a Construction Phase Plan in accordance with: NR/L2/OHS/0044 - Planning Construction Work.

Works Package Plans

we work... when it's safe

- WPP/001 – Site investigation and survey works
- WPP/002 – Site Establishment & access routes
- WPP/003 – Scaffold & encapsulation
- WPP/004 – Surface prep and painting
- WPP/005 – Steelwork Repairs
- WPP/006 – Marine works
- WPP/007 – Permanent way and waterproofing
- WPP/008 – Track Monitoring & CRT
- WPP/009 – Masonry steps, paths and walls

Other Documentation

The following documentation will be prepared:

- Cable Management Plan
- Critical Rail Temperature Management Plan
- Track Monitoring Plan
- Asset Management Plan

Possessions, Line Blockages

The required possessions, line blockages shall be booked within the PPS and GZAC systems by our possession planners. We will attend planning meetings: T – 10, T-7 and PICOP meetings on the lead up to any published line blockage or possession works. All line blockages will utilise additional protection in the form of detonator protection.

Before the planned possessions or line blockages white board meetings will be held on site to discuss the possession arrangement prior to the works taking place, PICOP pack, phasing and safe work packs would be briefed and discussed.

Quality Management Plan

In line with our integrated Quality Management System (QMS) that is compliant and accredited to the requirements of BS EN ISO 9001 and 14001 and OHSAS 18001, we would ensure quality assurance is considered from the outset to allow successful delivery of the project to specification.

Quality Management Plans would be prepared that set out the processes and procedures that we shall adopt through the delivery phase to ensure quality assurance.

An Engineering Management Plan will be prepared to ensure engineering assurance through the construction, testing and commissioning phases of the project.

We will prepare inspection and testing documentation in compliance with requirements, standards and the specification provided as part of the Detailed Design to cover all aspects of the permanent and temporary works.

We will prepare - NR/L2/CIV/003/F005 - Certificate of fitness to be taken into use, for any significant parts of the permanent or temporary works.

Environmental and Sustainability Management Plan

As we develop the delivery methodology our Environmental and Sustainability Manager will provide advice and support to the project teams on delivering legal compliance, complying with NR/L2/ENV/015 and delivering on our internal environmental ambitions.

On each project environmental considerations form a vital part of preconstruction meetings to gain a deeper understanding of how our operations impact on the environment. This ensures that environmental considerations form part of the delivery methodology. Following receipt of the Environmental and Social appraisal we will develop an Environmental Risk Assessment, determining all impacts and requirements for further investigation and surveys. An ecology survey will also be completed prior to the start of any works on site to identify and ecologically sensitive flora and fauna, the recommendations from this survey will feed into the Environmental & Social Management Plan form part of our targeted environmental tool box talks.

Stakeholder Management Plan

As we develop the delivery methodology, we will prepare a stakeholder management plan. The plan will identify all stakeholders and assess their needs, interests and interdependencies. This information will be logged in our communications plan. Appropriate strategies and mitigations will be developed to ensure successful project outcomes.

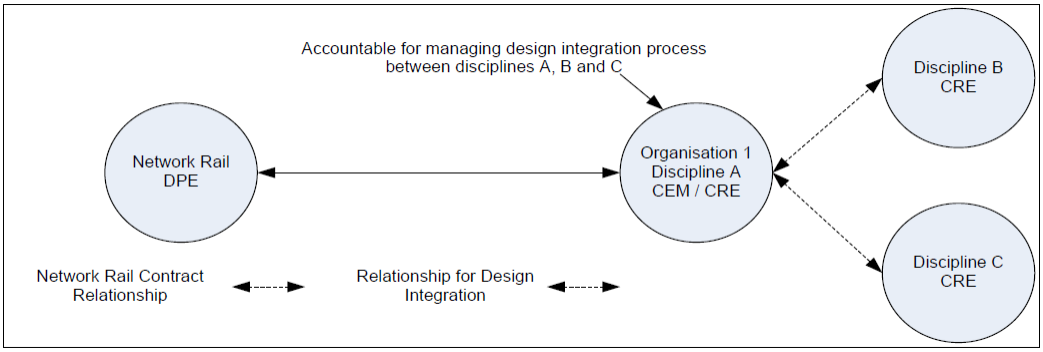
Stakeholder	Key Interests & Issues	Communication Method(s)	Frequency	Responsibility

Permanent & Temporary Works Design

Philosophy of Design

Following our internal processes and procedures along with the procedures enclosed within NR/L2/INI/02009 Centregreat shall nominate our suitably qualified persons to manage, co-ordinate and integrate the design process. This project will follow Design Integration Option 1 - Centregreat Rail will manage all design work associated with the project. Centregreat will nominate a suitably qualified CEM for the project who will be accountable for the implementation of the process that integrates all designs for a project; including the management of the IDC process.

The CEM will also nominate suitably experienced Contractor Responsible Engineers, for approval by the Network Rail DPE, to manage and co-ordinate the design process with the CEM.



A CRE Construction will also be appointed for the above disciplines during the construction phase of the works. In addition to the above Centregreat Rail will nominate a temporary works co-ordinator TWC and Temporary works supervisors. The Temporary Works Co-ordinator nomination will be made by the company Designated Individual and endorsed by the CEM nomination form NR/L2/INI/02009/F0040 for Network Rail approval.

In accordance with the CR-T the design production will be managed using the ProjectWise integration software and will be developed to BIM Level 0. The details of this will be captured BIM execution plan that will be produced at the inception of the design process.

The following permanent works design documents and design checks will be produced during the design phase of the works.

- Civils
  - F001 validation
  - F002
  - F003 Including IDC
  - IDR in conjunction with NWR
  - Approval of submission
    - **HOLD POINT**
      - Issue AFC Design
        - Construct the works

- Temporary Works
  - Prepare Form 002/003
  - Issue IDC / IDR certificates
  - Submit Form 002/003 design
    - Approval of Form 002/003
      - **HOLD POINT**
        - Issue AFC Design
          - Construct the temporary works

Methodology

Access

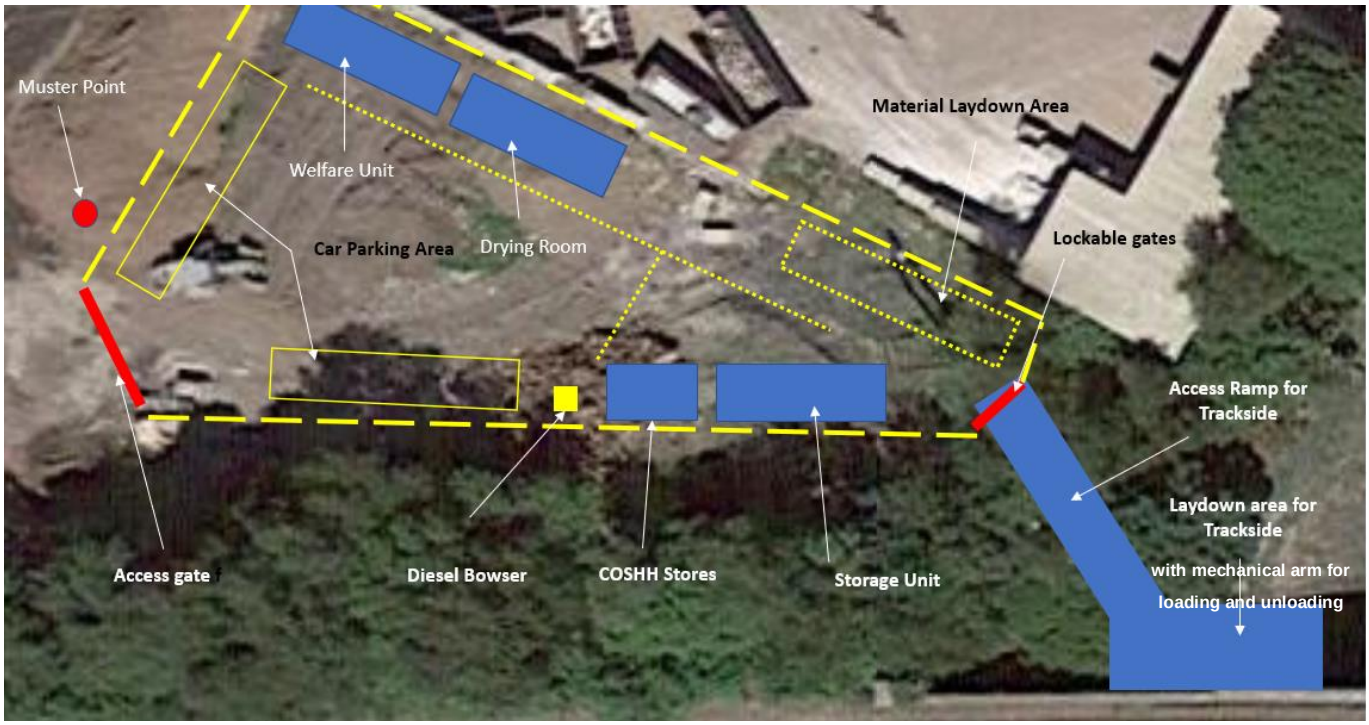
Centregreat Rail will set up site compounds within the Express Asphalts boundary. The proposed option has been shown below. Security Heras fencing will then be installed to the perimeter of the compounds to secure. These compounds will consist of Welfare cabins per NR standards. Plant will be delivered to the

site and offloaded into designated positions using a Hiab wagon under guidance of a Slinger/banksman. All plant movements will be strictly in accordance with an approved ALO plan. Pedestrian access is recommended for site workers to access onto the scaffolding without the need of boats and working within the tide times. A plant laydown area will be constructed. The location and details of the proposed site compounds to carry out the works is shown in the drawings below.

Compound Sites

Main Compound Location & Set-up

The proposed location of the compound will be situated within Express Asphalt's boundary.



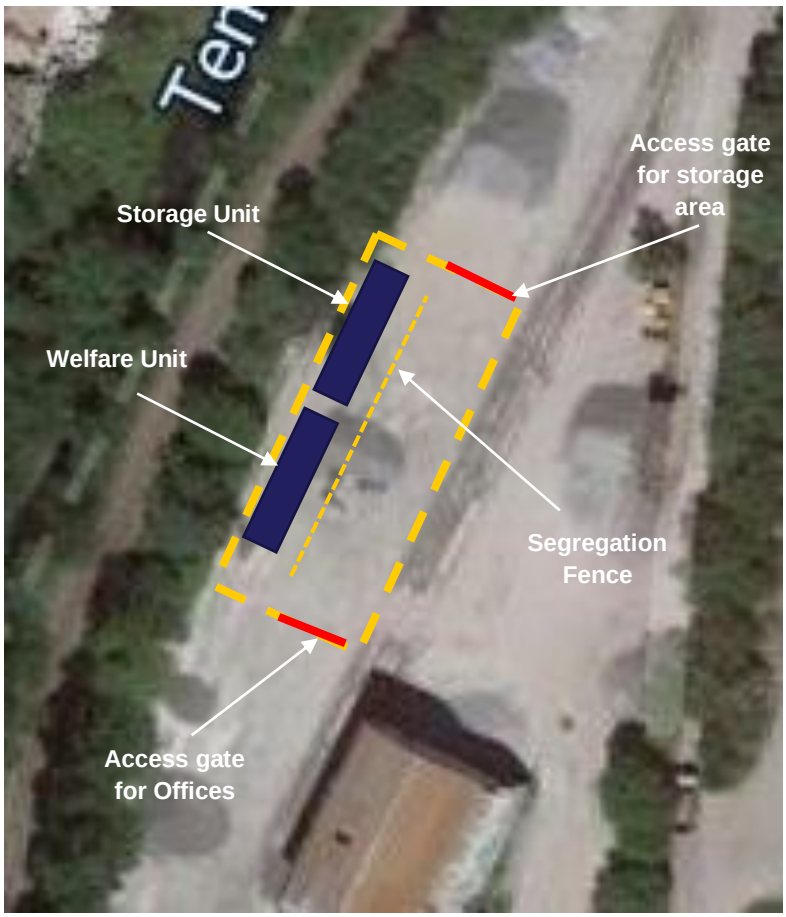
Proposed Access to Railway Track from Main Compound

A scaffold access ramp will be installed from the compound to trackside. A mechanical loading / unloading arm will be installed at the laydown area to assist with the movement of plant & equipment.

Scaffold Access Ramp – Typical

Materials Storage Compound

The proposed location of a materials storage compound will be situated within Express Asphalt's boundary.



Proposed Access to Railway Track from Materials Storage Compound

There is a dis-used railway track shown in the compound options drawing that runs into the compound area from the rail infrastructure.

Investigations will need to be carried out to ascertain the condition of these rails. NR using access to infrastructure.

Dis-used Railway Track

Site Security

Remote CCTV masts will be utilised to monitor site areas & compound.

Prestart Site Investigation & Surveys

- The site layout plan above indicates the area required at Neath River Swing Bridge for the site compound and access to the works area. As part of our stakeholder management process these will be discussed and agreed with the NR Project Team and Local Authority.
- Prior to the commencement of the main works pre-start surveys and site investigation works will be undertaken.

Surveys

Buried Services Survey
Existing service within the works area will be identified and surveyed, with suitable temporary protection then installed for the duration of the contract works. The stats suppliers will be contacted and any necessary stats protection works will be mutually agreed beforehand

Laser Gauging Survey
Will investigate the width of the track along the works.

Permanent Way Topo
A topogrpahical survey will be carried out to of the site and surrounding area to help facilitate the development of the option designs and understand the adjacent ground profiles.

Ecology
Ecology of the overbridge and surrounding area. This survey will indicate the overall ecological impact of the works and will highlight any ecologically sensitive flora and fauna along with any invasive species that could be impacted by the works.

Asbestos
An asbestos survey of the overbridge will identify whether asbestos is present on the site.

Steelwork Survey
General condition survey of the existing viaduct, steelwork, access routes, Neath River Swing Bridge and surrounding area to be undertaken.

Permanent Way Trial Holes

The track sleepers and ballast trial holes wil check the depth and condition of the ballast to facilitate potential sleeper requirements.

Vegetation Clearance & Masonry Repairs

- The viaduct structure and three metres around will be cleared of vegetation.
- The areas of masonry repairs will be identified and agreed with the NR site manager prior to works commencing
- Working at height will be undertaken from traditional tube and fitting scaffold working platform & from a bespoke scaffold cantilever platform
- The tube and fitting scaffolds will be erected by trained and competent scaffolders in accordance with TG:20 with the mandatory weekly inspections undertaken
- Repointing works will be undertaken throughout the viaduct abutments and retaining walls
- The existing mortar will be mechanically raked out from the abutments and retaining walls to the specified depths and refilled with suitable mortar.
- Attention will be paid to weather conditions to ensure the ambient temperature is suitable for the repointing works while the works are being completed

Signals & Telecoms Route / Relocations

- Completed in line with the cable management strategy
- Cables will be removed from troughing and placed within split ducts to allow works to be completed.
- All relocation works to be completed under NWR S&T Supervision.

Marine Works to Remove Redundant Fenders

- Marine works to remove debris,
- To remove redundant fenders as required.

Erection / Dismantle of Scaffold Access & Encapsulation to Viaduct

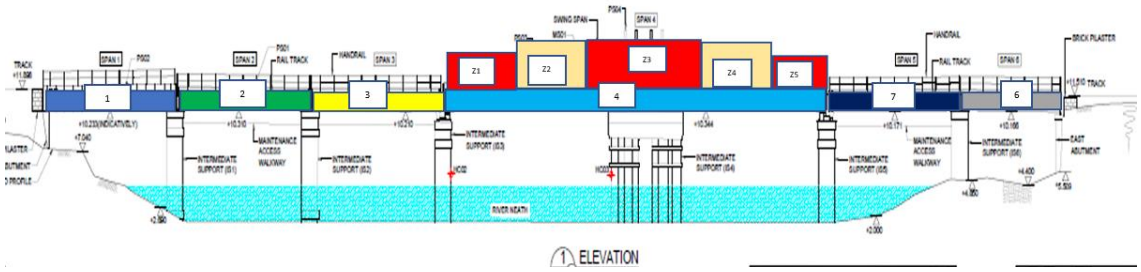
- The design of the scaffold will be subject to a Form 002/003 submission, the TWC / CEM internal approval, and NR approval prior to the commencement of works.
- The scaffolding will be erected by trained and competent scaffolders.
- The forecast tide levels will be regularly reviewed and works to erect the scaffold to the underside of the Viaduct will be undertaken during times of low tide.
- A safety boat will be in attendance on the Neath river during the erection of scaffold to the viaduct.
- Once all scaffold has been erected an air extraction system and encapsulation sheeting in sections will be installed and the final seal of the scaffold completed.
- The scaffold access and encapsulation in sections will enable the viaduct to be grit blasted and steel work repairs to be undertaken as well as the application of new paint to be applied to the bridge steelwork.
- The scaffolding top flange walkways to be installed will not compromise any signal sighting.
- During erection the scaffold will be checked to ensure adequate gauge clearance is maintained at all times for both up and down lines. A F005 will be issued prior to handing back the line to confirm this.

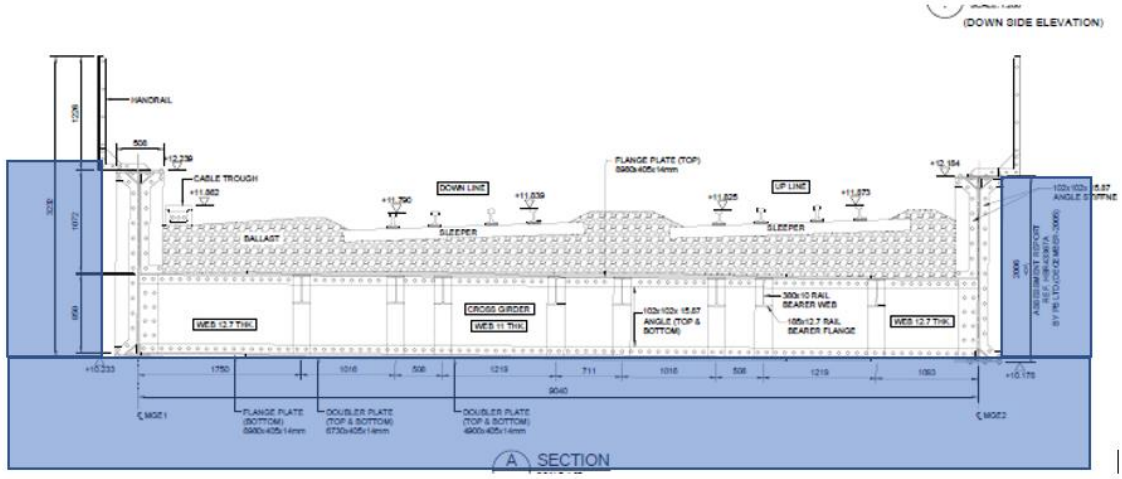
Unforeseen Conditions

- If during erection any unforeseen items are discovered which mean that the scaffold cannot be erected as per the agreed temporary works design drawing the scaffold supervisor will stop works and contact the site manager who will raise the query with the CRE Construction. The CRE construction will then discuss the issue with the temporary works designer and the NWR DPE.

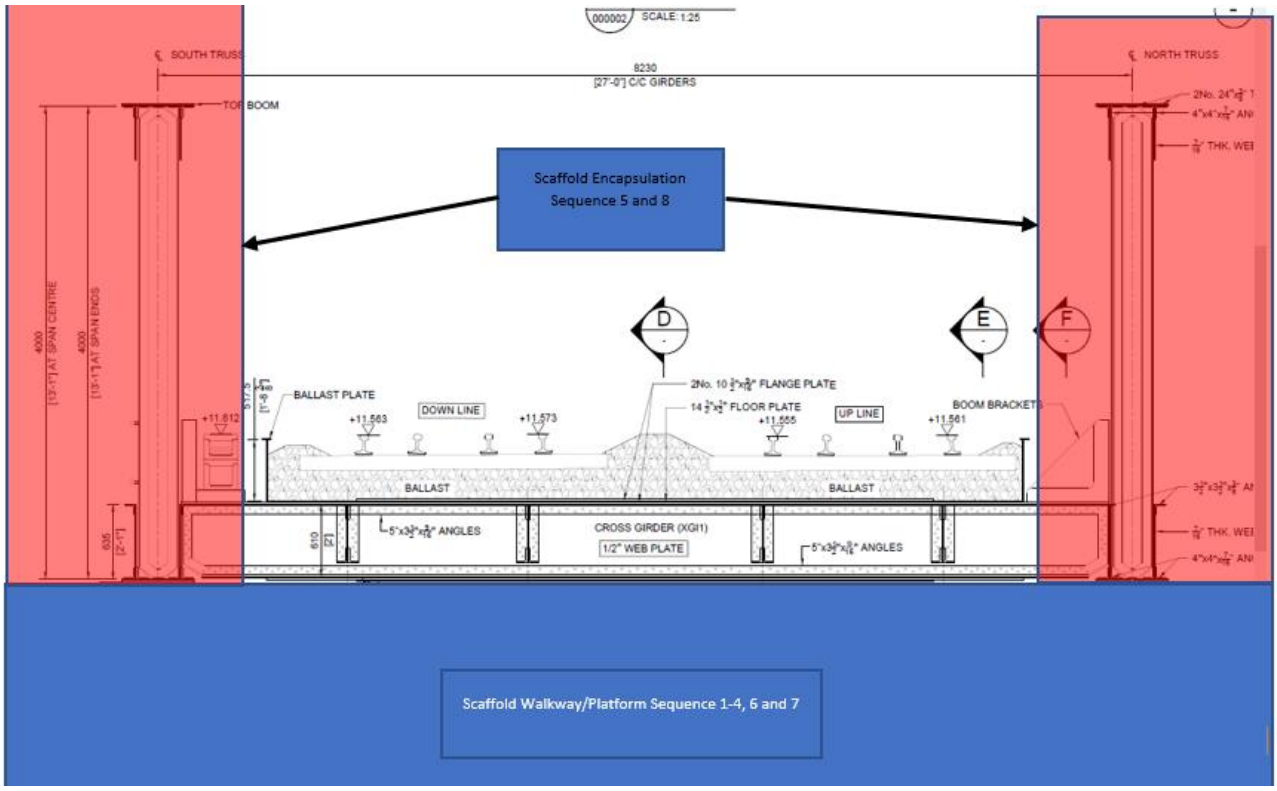
Once agreement has been reached between all parties on how to deal with the change the temporary works designer will issue a sketch/email confirming the modification which will be endorsed by the NWR DPE. The sketch will then be issued to site and the scaffold erection works allowed to proceed incorporating the modification to the original sketch.

- The scaffold access will be erected in the sequence shown on the diagrams below.





Scaffold Walkway/Platform Sequence 1-4, 6 and 7



Grit Blasting & Paint Application to Bridge Steelwork

- Once all scaffolding and encapsulation works have been completed, then commence grit blasting and priming of all accessible areas.
- The preparation and painting of the underside of the structure under the operational railway lines will be completed in day time low tide conditions.
- Carry out inspection of the grit blasted steelwork with NR and agree extent of remedials and any additional repairs as necessary.
- When steelwork repairs have been completed carry out priming and final painting of the steelwork using an approved NR paint system

Steelwork Strengthening & Repairs

General

- All new steel repair plates will be surveyed, fabricated, drilled, blasted and primed prior to delivery to site.
- All HAV's monitoring will be undertaken to ensure operative compliance and non-exceedance of the allowable exposure times.
- Post grit blasting the conditions of the all steelwork will be inspected / surveyed to determine the full extent of the steel repairs required.
- All repairs will be carried out as detailed within the repair table detailed.
- Any additional repairs will be agreed with NR after grit blasting works have been completed.

Bolt & Rivet Replacement Using A Rivet Buster

- A large number of the rivets that connect the steel members of the underbridge are corroded and are to be replaced with Tension Control Bolts, either as a standalone life expired replacement or as part of the specified repairs detailed.
- Rivet replacement following the 'one out/one in' process can be completed with trains running in normal working days (where trackside access is not required) using a pneumatic rivet buster, hand tools and a TCB shear wrench
- The existing bolts and rivets to be replaced will fall into two groups
    1) Replacement of existing rivets/bolts with temporary tension control bolts/grade 8.8 bolts in preparation for the fitting of new steelwork repairs plates and angles
    2) Replacement of life expired rivets/bolts with new tension control bolts (TCB)
- All rivets/bolts that need to be replaced as part of the above works will be marked up prior to works commencing using the references on the drawings along with any additional rivet replacements agreed during the post blast survey
- Access to the areas of rivet replacement will be gained in the following ways via the access scaffold
- ¾" hoses with whip check checks and 110V cables will be rolled out from the compressor and generator to the work area. Care will be taken to position the hoses and cables so as not to create any tripping hazards
- The operatives carrying out the rivet/bolt removal will wear ear plugs/defenders, gloves and face visors to protect against the noise, vibration and flying particles created by the rivet busting process
- Hand arm vibration calculations for the proposed rivet busting equipment will be completed and HAV monitoring forms completed prior to the rivet busting works commencing
- ALL RIVET & TEMPORARY BOLT REPLACEMENTS WILL BE COMPLETED USING A 'ONE OUT - ONE IN' PROCESS
- A hot works permit will be completed before any rivet removal operations commence
- The rivet buster with a chisel steel will be offered up to the existing rivet head and the rivet head will be sheared off using a rivet buster.

- Where an existing bolt is to be removed a 4½" grinder with a slitting disc will be used to slice the head off of the existing bolt
- The remaining barrel of the rivet/bolt will then be driven out using the rivet buster with a punch tool.
- The hole will then be checked to see if it has the correct clearance for the new tension control bolt to be inserted. If the hold is too small to insert the specified bolt or the plies of the steel are misaligned then the hole will be reamed using an air reamer to create a hole with a 2mm bigger diameter than the bolt detailed on the F003 drawings for example
    - 18mm hole for 16mm TCB
    - 22mm hole for 20mm TCB
    - 24mm holes for 22mm TCB
- Insert the new tension control bolt/temporary 8.8 grade bolt into the hole and put on the nut and washer.
- Fully tighten the bolt using the following methods
    - Using an impact wrench for the bolts replaced in preparation for the new bracing or bearing stiffener repairs
    - Using a tension control bolt wrench for the life expired rivet/bolt replacement.
- Carry out the above procedures on all rivet/bolts to be replaced.
- Ensure all old rivet heads and barrels and cleaned up leaving the scaffold in a safe condition.
- At the end of each working period the area will be checked by the CGR supervisor to ensure that no rivet holes are left open and all replacement bolts are tightened
- A Form 005 - Certificate of Fitness to be Taken into Use – Rivet Replacement will be completed prior to the hand back of the possession
- A rivet replacement installation check sheet will be completed recording the completion of the above sequence

Feather Edging Repairs

- These repairs only involve the removal of feather edge corrosion or existing elements and can be completed during normal weekday working shifts.
- Angle crank defects and bottom flange corrosion will be determined on a case-by-case basis post grit blast. It is envisaged that any losses of section will be cut back to sound material.
- 110v Grinders or oxygen/propane burning equipment maybe used to cut back the existing knife edged steel. (Oxy/prop to be stored in a cage when not in use)
- Cut back the steel to a minimum oof 3mm in thickness and apply a 4mm radius to all edges using a 110v 4.5" or 9" grinder.
- Carry out necessary checks as instructed in the hot works permit.

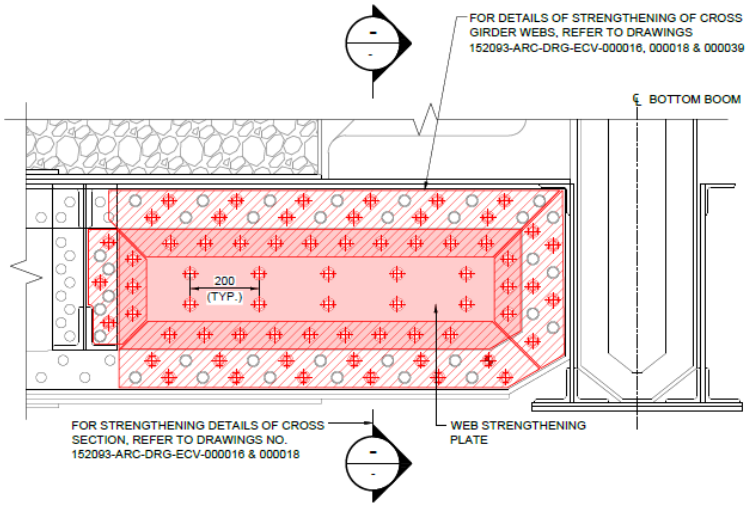
Flange Repairs

- Lightly Grind back existing sharp edges to a minimum of 3mm in thickness then apply 4mm radius to all edges using a 4.5" Grinder.
- The steel will arrive to site pre-fabricated based on the site measurements derived from the CGE Survey.
- During Live Load Restrictions, Remove temporary bolts from rail bearer angles.
- Install the new steel to the corroded side and tighten bolts
- Apply Structural filler Devcon / Sikadur or similar approved product at interface between corroded steelwork and new plates. (Mix to manufacturers guidelines)
- Lift the flange plate in to position manually and clamp to new and existing angles.
- Drill M18 holes through the existing flange angles with a magnetic drill using the new pre-drilled repair plate as a guide.

- Tension control bolts (TCB's) will be installed and Bedding Torques will be applied before final torque. Approved Shear wrenches to be used.
- Ensure all bolts are installed and fully tensioned prior to live loading restrictions being lifted.
- Clean the work area and dispose of any waste in the appropriate skips.

Web Plate Repair & Strengthening

- The steel will arrive to site pre-fabricated based on the site measurements derived from the CGE Survey.
- During Live Load Restrictions, Remove temporary bolts from existing angle.
- Lift outer web plate in to position manually and bolt the web plate to the existing angle then tighten the nuts.
- Drill M24 holes through the existing girder web with a magnetic drill using the new pre-drilled repair plate as a guide and sound surface for the magnetic.
- Once all the holes are drilled remove the plate and clean away the swarf
- Apply Structural filler Devcon/Sikadur or similar approved product at interface between corroded steelwork and new plates. (Mix to manufacturers guidelines)
- Bolt the packer plates and the repair cover plate to both sides of the web
- Tension control bolts (TCB's) will be installed and Bedding Torques are to be applied before final torque. Approved Shear wrenches to be used.
- Ensure all bolts are installed and fully tensioned prior to live loading restrictions being lifted.
- Clean the work area and dispose of any waste in the appropriate skips.
- Coating system application will be carried out as per designer's instructions

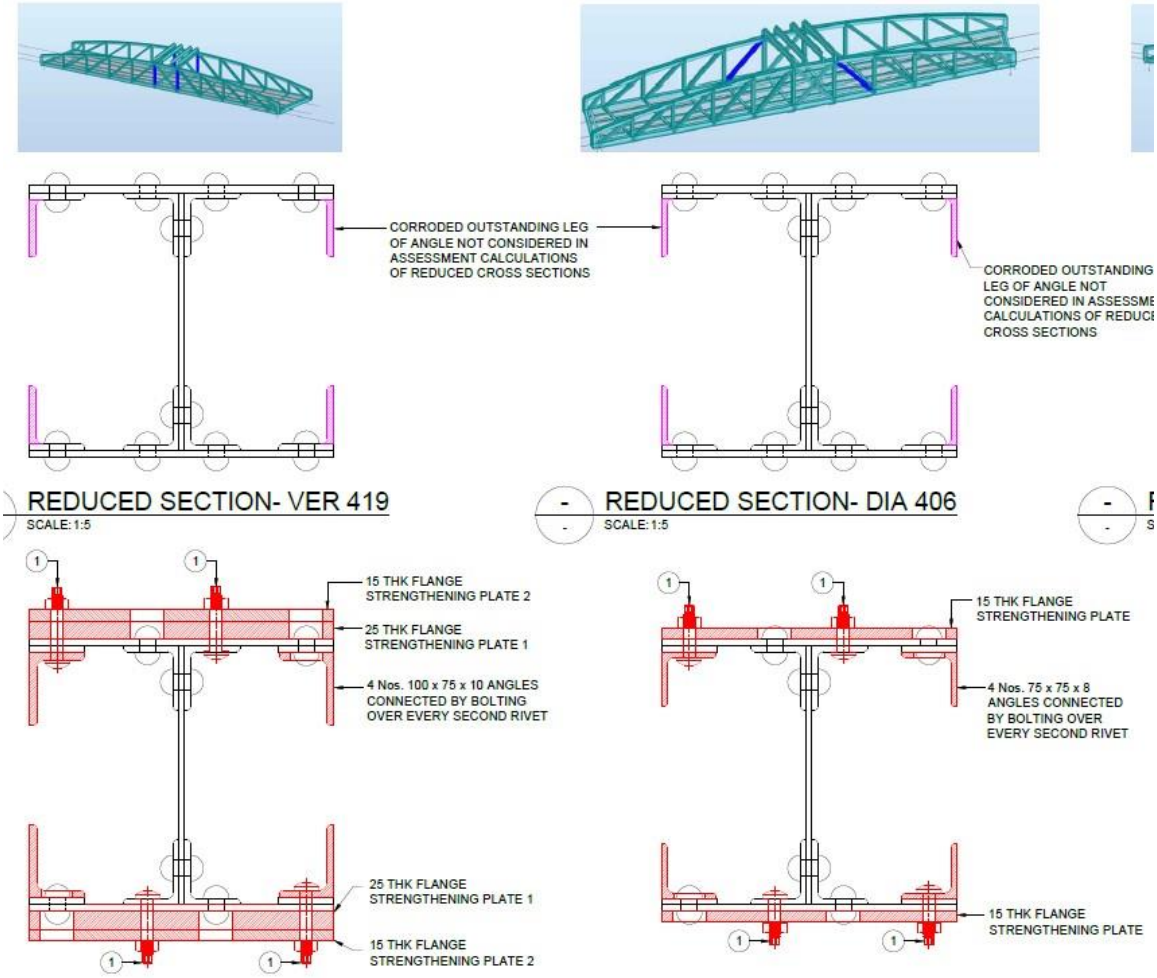


XGI1 -WEB STRENGTHENING DETAIL
SCALE: 1 : 10

Over-Plating & Steel Strengthening

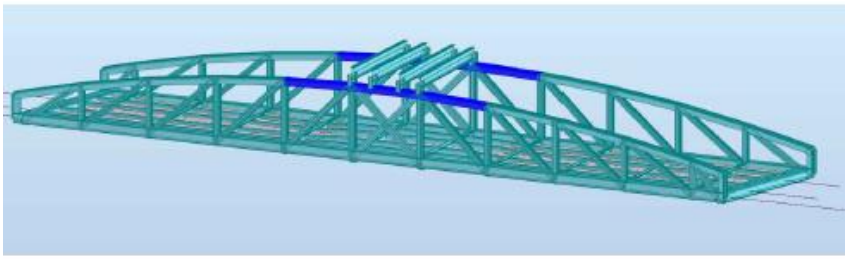
- The legs of any corroded angles will be cut off as required.
- New angles will be installed as required.
- The steel will arrive to site pre-fabricated based on the site measurements derived from the CGE Survey.
- During Live Load Restrictions, Remove temporary bolts from bottom flange.
- Apply Structural filler Devcon/Sikadur or similar approved product at interface between corroded steelwork and new plates. (Mix to manufacturers guidelines)
- Lift the repair plates in to position and clamp in place.

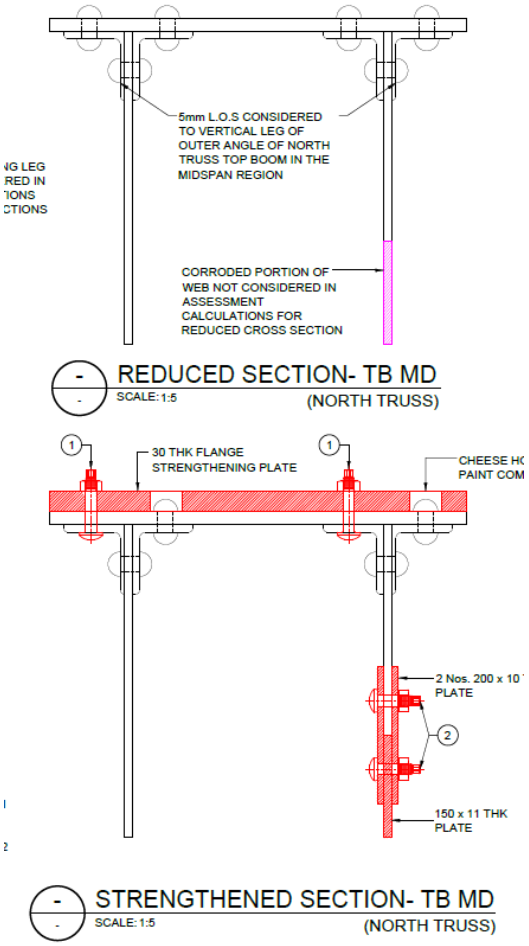
- Tension control bolts (TCB's) will be installed and Bedding Torques will be applied before final torque. Approved Shear wrenches to be used.
- Ensure all bolts are installed and fully tensioned prior to live loading restrictions being lifted.
- Clean the work area and dispose of any waste in the appropriate skips.
- Coating system application will be carried out as per designer's instructions



Swing Span Overhead Bracing Repairs

- Remove existing overhead bracings.
- The new overhead bracing will be fabricated into 1 unit.
- Using the mechanical arm, the plate will be positioned onto the track.
- It will be jacked into position using a tirfor.
- It will be bolted down into position.





Swing Span Bearing Repairs

To remove the “free floating” aspect to the bearing assemblies.

- Remove old levers & brackets
- Install restraint to sliding bearing.
- New cylindrical block with welded top plate to have slotted holes to allow for thermal movements to replace screw jack & bevel gear wheel.
- Pack plate on top of bearing block for cross girder.

Caisson Repairs

- Mechanically prepare all caissons up to and including 1m above high water level.
- Grit blast all caissons above the mechanically prepared area.
- Apply quick-drying protective system to all caissons.
- Undertake repairs / replacement to straps / banding and caissons as required.

Track & Ballast Removal & Waterproof Swing Span

- This will be completed during the 2 No. abnormal possessions on weeks 49 and 50.
- Remove track, sleepers and excavate ballast.
- Remove existing waterproofing and prepare the deck mechanically prep steelwork and apply paint system to ballast plates.
- Install new waterproofing and spigots.
- Re-establish track formation.
- Install rail and sleepers.
- Undertake tamping operations.

- A specific possession programme will be developed for these works.

Masonry, Paths, Fences & Walls

- Undertake vegetation clearance and masonry repairs to abutments.
- Masonry works and similar to high / low mileage abutment
- Install King Post wall
- Install steps & paths to low mileage
- Install path to high mileage

Track Monitoring & CRT

- Track monitoring & CRT plan will be developed and agreed during the pre-construction phase.
- Remote track monitoring will be completed during the works in line with the current NWR standards and daily reports issued to confirm no movement has occurred.

Demobilise from Site

- Issue AMP014 document
- Complete inspection with client and Issue AMP015 document
- Remove site compounds, all plant and equipment, welfare facilities, fencing and aggregates will be removed from site.
- Complete H&S file and submit to NR Works Delivery Team

Summary of Activity & Site Risks Associated with the Works at Neath River Swing Bridge

Activity Risk	Contingency Arrangement
Use of Plant	• All plant to be certified and comply with PUWER regulations. • Plant maintenance regime. • Competent and experienced operatives [CPCS, IPAF or equivalent] • Daily checks • Exclusion zones and banksman attendance
Working in The Hours of Darkness	• Cap lamps to be used • Suitable site and task lighting to the set up •
Working at Height	• Edge protection to delivery wagons. • Designed and Certified access and encapsulation scaffold • Tower scaffold erected in accordance with manufacturer's instructions, with PASMA inspection prior to use
Accidents	• Adequate numbers of trained first aiders and first aid boxes on site. • Accident reporting forms on site. • Close call reporting system in place • Emergency and accident reporting plans in place.
Slips, Trips & Falls	• All access / egress routes will be planned and accessed, any tripping hazards with be removed. • Site to be kept safe clean and tidy at all times.

	• Workforce awareness. • Regular inspections
Protection from Personnel Injury	• All personnel and visitors to wear the minimum requirement for PPE including: hard hat, safety boots, hi visibility waist coat or jacket, hi visibility trousers safety glasses and gloves.
Installation / Removal of Scaffold	• Temporary scaffold will be subject to NR Form 002/003 design process including IDC/IDR where required. • CISRS certified scaffolding operatives • Scaffold install as per approved design drawings • Temporary works inspections, scaffolders handover certificate and permits to use required • Anchor pull testing to be undertaken • CGR CRE Construction or nominated deputy shall complete – Form 005 – Certificate of Fitness to be Taken into Use – Fixed Scaffold – upon completion each shift to confirm scaffold, ties and anchors and been installed and tested in accordance with the approved Form 002/003
Installation & Removal Of Encapsulation	• Suitable ventilation for toxic fumes released by heat forming encapsulation • Hot works permit in place • Competent and experienced operatives • CGR CRE Construction or nominated deputy shall complete – Form 005 – Certificate of Fitness to be Taken into Use – Encapsulation – before the blasting operations commence to ensure it has been installed in accordance with the approved Form 002/003 and final seal has been checked
Use of Hand Tools	• Suitable fit for purpose tools. • Competent & trained operatives. • Use of correct task specific PPE. • Electrical tools to be 110v & have current PAT test • Daily checks
Working with Dust	• Suitable dust masks. • Face fit testing to be undertaken • Exclusion zones • Encapsulation areas
Manual Handling	• Kinetic lifting. • No more than 20kg per man. • Correct P.P.E. to be worn • Manual handling assessments to be produced for awkward or repetitive manual handling tasks and briefed to operatives.

High Velocity Flying Debris	• Correct PPE, full googles • Exclusion zones.
Cutting & Grinding Operations [Hot Works]	• Flame retardant overalls to be worn • Suitable gloves and face shield to be worn • Exclusion zone in place • FFP3 masks for fumes • All works subject to Hot works permit control • Fire extinguishers at works area • Fire watchman in place
Working with Vibration	• Use hand tools that have low HAV characteristics. • Wearing of gloves and correct PPE for the task. • Tool Trigger times to be monitored • Rotation of workforce using tools to reduce exposure times. • Complete a HAV register for each operative, ensuring maximum exposure times are not exceeded.
Working with Noise	• Use noise reduced / silenced plant. • Fit for use plant under PUWER regulations. • Use of hearing protection and correct PPE for the task. • Ear protection zones to be set up as required
COSHH Substances	• Specific PPE to be used • Correct bunded and caged storage of all COSHH items • COSSH Data sheets for all COSHH items to be on site and briefed to workforce as required
Hot Works	• Hot works permit system in place • Fire watchman • Fire extinguishers. • Fire blankets
Blasting Operations	• Dead man handle on blast hose at nozzle end for emergencies. • Air fed blasters helmet. • Certified and competent operatives. • Decontamination unit for working with lead paint • Emergency rescue plan in place
Confined Space	• Certified and competent operatives. • Certified plant and equipment. • Permit to enter. • Atmospheric monitoring. • Emergency rescue plan in place

Mixing Paint	• RPE in accordance with COSHH assessment. • COSHH Data Sheet • Face fit testing. • Gloves and disposable coveralls. • Full googles or face shield • Natural ventilation. • Designated mixing area. • Paint mixed in accordance with manufacturer's instructions. • Protection of ground at mixing site
Pollution	• Daily plant and machinery inspections. • Refuelling of plant in designated areas. • Adequate numbers of spill kits on site. • Fuel bowsers to be bunded. • Small fuel containers and hand-held plant to be stored on drip trays. • Encapsulation to be removed from scaffold prior to high tide conditions, to prevent grit blast materials getting into the watercourse • Anchor drilling wet arisings will be prevented from entering the watercourse
Hand Application of Paint	• RPE in use and daily check sheets completed • RPE in accordance with COSHH assessment. • COSHH Data Sheet. • Face fit testing. • Gloves and disposable coveralls. • Full googles or face shield. • Natural ventilation. • Paint applied in accordance with manufacturer's instructions. • ICATS certified operatives. • Exclusion Zone
Paint Application Spray	• RPE in use and daily check sheets completed • RPE in accordance with COSHH assessment • COSHH Data Sheet • Face fit testing • Gloves and disposable coveralls • Full googles or face shield • Forced extraction – Air change calculations • Paint applied in accordance with manufacturer's instructions • ICATS certified operatives • Atmospheric monitoring • Encapsulated working area • Flashpoint calculations • Forced Extraction

	• Explosive atmosphere calculations to demonstrate that forced extraction can maintain an atmosphere below 10%LEL
Temporary Works Scaffold	• CEM / NR approved form 002/ 003 design • TWC / TWS regular periodic inspections • Mandatory weekly inspections to be carried out as required • A Permit system to be used for bringing temporary works into use / out of use • The project temporary works register to be maintained throughout the works • Weekly inspections to be completed by trained and competent person

Site Risk	Contingency Arrangement
Working on an Operational Railway	• All operatives on or near the line to be PTS trained. • All works to comply with rule book GE/RT8000 • All line blocks or possessions will be pre-booked and approved by Network Rail prior to the shift dates using the GZAC system. • All the works will be planned and in accordance with the Safe Work Pack (SWP). The SWP will be created, verified, authorised and accepted by the relevant persons prior to the shift. • All works to be carried out by competent personnel under the supervision of a Safe Work Leader (SWL1). There will be a briefing prior to each shift that will be signed by all members to acknowledge understanding. • The SWL1 Will take the line block or possession from the signaller or SWL2 respectively. The signaller or SWL2 will authorise the line block or possession. No one will go on or near the track until this had happened. • Allow plenty of time to vacate the track and make the site safe for the passage of trains within the line block or possession times.
Access & Egress to Work Site	• Along pre-determined routes from authorised access points. • Attention to be paid to road traffic and pedestrians at access points.
Sharps/Needles on Site	• Workforce awareness. • At works commencement a specialist contract will be appointed to undertake a full needle sweep survey and collection.
Public / Pedestrians Interface	• Site works area to be segregated from the general public at all times.

Local Residents	• Liaison with local authority with implementation of Section 61 agreement if required • Communications with local residents as required • Noise letters to be posted 7 days prior to works commencing
Working Over Water	• Fully trained and experienced scaffolders • Rescue boat in attendance • Emergency rescue plan in place • Carry out practice rescue drills • Daily pre works start inspections • Mandatory weekly scaffold inspections • Water levels to be visually monitored • No works to be carried out from the scaffold in high spring tide conditions
Dysentery Within Work Area	• Pre-works disinfectant of areas. • Disposal of overalls. • Good personal hygiene.
Infestation & Contamination by Rodent, Vermin & Other Wildlife (Weils Disease)	• Staff trained in problems such as Weils Disease and associated hygiene requirements. • Protect cuts and damaged skin.
Reptile Presence (Slow Worm, Grass Snake, Lizard)	• Workforce awareness of possible reptile presence, stop works if discovered. • Reptiles presence to form part of induction

Covid-19	• All personnel briefed to self-isolate if they have any of the symptoms of Coronavirus / COVID-19.
	• All personnel briefed on symptoms, and ‘Catch it, Bin it, Kill it’.
	• Wet wipes provided in welfare unit
	• Minimum distance of 2m separation from each individual during works must be kept at all times.
	• If safe minimum distance of 2m cannot be maintained then additional control measures will be put in place, these are
	• No skin to skin contact
	• RPE/FFPS/Full face visors
	• Coveralls
	• From date of diagnosis, the following self-isolation time should be confirmed with:
	• Individual living alone – 7 days
	• Individual living with family – 14 days
	• If a worker develops a high temperature or a persistent cough while at work, they should:
	  ○ Return home immediately
	  ○ Avoid touching anything

	○ Cough or sneeze into a tissue and put it in a bin, or if they do not have tissues, cough and sneeze into the crook of their elbow. ○ Escorted off site by the CGR Supervisor / Site Manager • Wherever possible workers should travel to site *alone using their own transport. • *Exception to the rule is where they are family members and they spend time living together. • More regular wipe down of surfaces within welfare unit and office. • Government guidance on social distancing and NWR standards CP008 and CP009 to be adhered to • Use of Alcohol based hand sanitisers to be kept away from heat, sparks, open flames and hot surfaces. Users to ensure they do not breath in the vapours.