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A494 RIVER DEE BRIDGE REPLACEMENT SCHEME

Environmental Statement

Volume 1: Technical Assessment Report

Chapter 2: The Project

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Mott MacDonald Limited
First Floor, Bryn Eirias,
Abergele Road, Colwyn Bay, LL29 8BY

Richards, Moorehead & Laing Ltd
Office 1, Llys Clwyd, Cwrt Y Dderwen
Ffprdd Celyn, Ruthin, LL15 1NJ

Llywodraeth Cymru / Welsh Government

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Contents

2. The Project

2.1 Introduction

2.1.1 This chapter provides a description of the Scheme together with the process of construction, which forms the basis for the environmental assessment described in this Environmental Statement (ES).

2.1.2 The preferred option (best performing option E) has been selected from a shortlist of four options that have been taken through the WelTAG (Stages 0,1, 2 and 3) appraisal process. This option scored well in the WelTAG appraisal due to the following key aspects:

a) Strong alignment with the priorities and requirements of the Wales Transport Strategy.

b) Minimised construction impact with the bulk of the construction undertaken without disrupting current traffic using the A494.

c) Better opportunities to minimise the level of carbon during construction and reuse existing land for biodiversity improvement.

d) Reduced impact on third party assets such as the North Wales Coast Railway and public utility supplies such as electricity, water/sewage and gas supply cables and pipes.

e) Improved active travel facilities with new links and connections.

f) Lower construction carbon and capital cost.

2.1.3 The preferred option consists of constructing a new replacement bridge of a similar length to that of the existing bridge to carry two lanes of eastbound and westbound traffic and a shared use path for cyclists and pedestrians. The replacement bridge would be located approximately 12 metres to the southeast of the existing A494 River Dee Bridge, construction works are proposed to take place ‘offline’ of the existing highway and allow the A494 to remain open during the majority of construction period.

Key features of the preferred option

2.1.4 The key features of the preferred option are:

i) A new bridge to replace the existing bridge that is in a poor and deteriorating condition.

ii) A new shared use path for pedestrians and cyclists running along the southeast side of the westbound carriageway. This would connect to the Wales Coast Path and other active travel routes in the area.

iii) Improvements to the existing A494 to the east of where the road passes under the North Wales Coast Railway Line. This would include introducing a new hard shoulder in each direction connecting to the existing hard shoulders to the east of the River Dee, alignment improvements and sustainable drainage systems.

iv) A new and improved left in / left-out priority junction from the westbound carriageway of the A494 connecting to the Riverside Gypsy Travellers site, commercial properties and the river pumping station located on the southwest bank of the River Dee. Diversion of the Queensferry Drain (a Natural Resources Wales main river), which is situated on the southeast side of the A494 and currently flows in a culvert beneath it, west of the North Wales Coast Railway Line and in open channel east of the railway line. New sections of open channel would be provided either side of the railway with a section of existing culvert beneath the railway line being retained.

v) A new river pumping station and drainage outfall to the River Dee.

vi) Environmental mitigation and biodiversity enhancement works with earthworks and areas of soft estate including wildflower verges, swales, native woodland plantations and amenity grassland.

vii) Removal of the existing A494 River Dee Bridge deck, cross heads and abutments and retention of the two existing river piers in-situ.

2.1.5 A more detailed description of the Scheme proposals is set out below along with environmental mitigation measures and a description of the construction techniques that are considered likely to be needed to construct the scheme safely. A more detailed description of the options and alternatives to the preferred Scheme selected are set out in Chapter 3 of this ES and also in the WelTAG reports for stages 0,1, 2 and 3.

2.2 Context

2.2.1 The River Dee is a major river that originates in the hills of Snowdonia National Park and flows through the Vale of Llangollen and the city of Chester, before continuing downstream through the Dee Estuary to the Irish Sea. At the point where the A494 bridge crosses, the river is tidal and has been canalised upstream for the most part from Connah's Quay to Chester and Chester Weir. The river is designated as both a Site of Special Scientific Interest (SSSI) and Special Area of Conservation (SAC), primarily for its range of habitats and migratory fish.

2.2.2 Historically, the river served as a vital trade route to Chester. However, navigation was often hindered by build-up of sediment on the river bed. To address this, the river was canalised in the early 1700s to ensure the river was navigable for ships to reach Chester. The canalisation works were designed and carried out by Dutch engineers, funded by local merchants and Chester Corporation. Their goal was to ensure larger vessels to reach Chester more reliably. The new canal portion opened for river traffic in 1737. This engineering effort also enabled the reclamation of former marshland in the Shotton and Queensferry areas with the excavated material used to create embankments on both sides of the river.

2.2.3 The River Dee Bridge is a strategic component of the A494 road corridor where it crosses the river. The bridge was originally constructed in 1960 and this section of the A494 opened to traffic in 1962. Since then, the nearby settlements of Queensferry and Garden City have expanded significantly along with other forms of urban and industrial development. As a result, the A494 road corridor has become increasingly constrained by development on both sides of the river with the exception of land to the south-east which remains as agricultural land. These constraints have had a major influence on the design of the new Scheme. Due to the limited space available elsewhere, the only viable option was to consider a replacement bridge to the south-east—an area with fewer constraints and where connections to the existing A494 could be made on both sides of the river.

2.2.4 South of the A494 road corridor and Dee Bridge, the southern bank of the River Dee is almost entirely in urban use and comprising of industrial sites, utilities, commercial properties and residential areas.

2.2.5 Adjacent to the existing A494 road corridor are terraced residential properties forming the edge of Queensferry. The backs of the closest houses look out across the A494 with their gardens and garages backing onto an alleyway and brick wall immediately adjacent to the A494 carriageway and footway. Further north-eastwards along the A494 lies the Expressway Business Park, reached via the B5441.

2.2.6 To the north of the existing Dee Bridge are residential streets, including Claremont Avenue and Riverside Park, both part of Garden City, running parallel with the A494. These are separated from the A494 by a highway noise barrier, strip of vegetation and existing trees on the embankment supporting the existing A494 above the level of these streets. The residential properties of Claremont Avenue were built following the completion of the A494 on land formerly occupied by Sealand Nurseries.

2.2.7 The North Wales Coast Railway Line runs parallel with the River Dee, approximately 250m to the south-west. Its embankment forms a visual barrier and divide between the commercial – industrial riverside land and the residential – retail centre of Queensferry, beyond which is the rising land to the south.

2.2.8 Beyond Queensferry, and to the west of the Dee Bridge, is an extensive residential area around the urban centres of Shotton and Aston. These areas contain a wide range of community facilities, including primary and secondary schools, play areas, community centres, Deeside Community Hospital, banks, post offices, public houses, places of worship and Shotton Railway Station. The 2021 census indicates that the settlement population of Flintshire was 155,812.

2.2.9 To the south of the existing bridge and south-west side of the river lies a permanent gypsy traveller site and a transport yard. Further west towards Queensferry lie Dŵr Cymru Welsh Water's treatment works and several industrial sites at the western end of Sandycroft Industrial Estate.

2.2.10 Ferrybank Farm and the community of Sealand are located to the north and east of the existing bridge and River Dee. This area is largely agricultural with large fields set to arable land and with extensive areas designated as green wedge in the Flintshire LDP.

2.3 Description of the Scheme

Replacement Bridge

2.3.1 The Scheme is for the replacement of the existing bridge with a similar structure and span of approximately 140 metres and an increased width of 36.5 m. The bridge would be at a similar height above the River Dee with the surface of the deck circa 7.3 m above the river level (Mean High-Water Spring - MHWS) due to the need for reconnecting to the existing A494 road corridor on both sides of the river.

2.3.2 There would be two lanes of traffic in each direction and a hard shoulder on both the east and westbound carriageway. A shared use path for active travel provision would run along the southern side of the bridge.

2.3.3 The bridge would be supported by two sets of river piers. Each river pier would be constructed using 12 no. piles approximately 1.5 m in diameter. The river piers would be in a similar orientation as the existing and distance from the top of each riverbank but approximately 6 metres further upstream to the south-east.

A494 Road Corridor

2.3.4 There would be improvements to the existing A494 road corridor either side of the replacement bridge to connect to the existing east and westbound carriageways. The existing highway network would be modified at the tie-ins where the proposed re-aligned carriageway would re-join the existing carriageway.

2.3.5 A new left in/left out access from the westbound carriageway of the A494 to the Riverside Gypsy Travellers site, commercial properties and to a new river pumping station.

Active Travel and shared use routes

2.3.6 Up to 3km of new and improved walking and cycling routes are proposed as part of the Scheme. The improvements include a new full traffic free route for cyclists and pedestrians over the River Dee connecting the Wales Coast Path east of the River

to Queensferry Interchange and the centre of Queensferry in the west. New and improved links are also proposed to Station Road and Factory Road.

2.3.7 The new routes will provide safer new connections between communities and places of interest and works, facilitating alternative journey options to using cars for local journeys and for longer distance journeys with connections to the Wales Coast Path and National Cycle Route 568.

2.3.8 The active travel proposals will open up greater opportunities for Flintshire Council to deliver more active travel routes in future years and speed up delivery of active travel facilities in the surrounding areas. A traffic free route over the River Dee will allow people and businesses on both sides of the river to connect to one another more sustainably.

Public Rights of Way

2.3.9 Existing footpaths, bridleways and private means of access that would be affected by the Scheme would be suitably diverted. The following public rights of way would require modification: -

a) Footpath between B5441 Station Road and River Dee alongside the A494 eastbound carriageway, passing between Territorial and Army Volunteer Reserve(TAVR) Centre and Lindop Toyota, would be improved to cater for all users.

b) Footpath on western bank of River Dee beneath existing bridge would be connected to the new path across the River Dee.

c) Footpath – cycleway alongside the westbound carriageway, north-east of the River Dee, would be modified to connect to the new shared use route across the river on the new bridge.

d) Public right of way between Chemistry Lane / Factory Road junction and the River Dee would be maintained as part of the proposed new access road.

Demolition of property and existing bridge

Demolition of properties

2.3.10 The following properties would be demolished as a result of the Scheme:

- Haulage business workshop, building and yard situated immediately southeast of the existing A494 and on the west bank of the River Dee.
- NRW river pumping station and Scottish Power sub-station (within the same building) situated to the northeast of the existing Riverside Way junction.
- Old Flintshire Depot and storage yard on Chester Road East, adjacent to the railway line.
- Four former residential properties, known as 1 – 4 Bridge Houses, located on Chester Road East, approximately 200m east of Queensferry Interchange. These properties have been vacant since approximately 2006-2008, and are substantially vandalised despite being boarded up.

Demolition and removal of existing bridge

2.3.11 Following completion of the replacement bridge and opening to traffic, the existing bridge deck would be removed but the existing river piers would remain in-situ. A temporary 'crash deck' platform would be installed under the existing bridge (mounted on existing abutments and piers and steel beams) to capture any loose materials during removal of the deck. This would involve breaking out the concrete from the centre of the span towards the abutments, with materials removed for recycling. The crash deck located beneath the beams would then be dismantled, although sections around the piers and abutments would be retained.

2.3.12 Working from a jack-up barge the existing pier concrete crossheads would be demolished and removed. The existing river piers would remain in-situ and may be modified in the future to improve their aesthetic appearance.

2.3.13 The existing gantry that spans the A494 road corridor on the east side of the bridge would also be removed as along with the existing carriageway. The bridge abutments would also be demolished, and the adjacent embankments regraded to tie in with the surrounding landscape.

Site Compounds

2.3.14 The extent of the Scheme includes two areas that will be needed for the construction phase of the project. These include a derelict area of land for the main site compound south-west of the River Dee and gypsy and traveller site at

Riverside, and another area that is currently agricultural land on the eastern bank of the river and south of the existing bridge along with access off the existing A494 westbound carriageway.

2.3.15 These areas would be acquired temporarily for the construction period and returned to their previous land use following completion subject to agreement with the landowner.

Highway Drainage

2.3.16 The Queensferry Drain (NRW “Main River”) currently flows in a culvert below the existing A494 (west of the railway line) and in open channel (east of the railway line) immediately to the southeast of the A494. Surface water runoff from both the proposed new carriageway and existing re-profiled carriageway will be collected and disposed of using a combination of underground piped drainage systems and open ditches.

2.3.17 To the west of the North Wales Coastline railway, existing gullies/outfalls along with run-off from the new active travel route will discharge into a newly created open channel (ditch) that replaces a length of the existing Queensferry drain between Chester Road East and the railway bridge. At the northern end of the open channel, a new pipe will then connect to the existing culvert that sits within the southern verge of the A494 and passes below the railway bridge. The existing culvert will be extended, and its outfall relocated on the north side of the railway to outfall to a further length of open channel that will replace the existing Queensferry ditch alignment running northwards towards Riverside Way. The ditch will be designed to accommodate the existing and proposed highway drainage, and the existing watercourse flows.

2.3.18 The ditch will outfall to a new culvert which would then pass through a new pumping station and outfall at the River Dee. The discharge rate from the pumping station would be agreed with National Resources Wales (NRW) as this will replace their existing pumping station. Due to the scale of the changes in the alignment of the carriageway, the existing drainage network along the A494 between the North Wales Coastline railway and the River Dee will be replaced. New surface water

carrier drains will be installed east of the railway up to the replacement bridge within the north and south verge of the new carriageway. A new drainage swale is proposed to the north of the new road for attenuation and treatment of surface water drainage.

2.3.19 Surface water collection on the river bridge would be in the form of a bridge deck drainage system which will discharge to the highway drainage system. The surface water collection on the carriageway will be in the form of traditional kerbs and gullies. An existing swale located to the south of the A494 (north of the River Dee) is to be reprofiled as part of the scheme proposals. Where no carriageway modifications will be undertaken, the existing drainage will be retained and any existing outfalls will be incorporated into the new network.

Basic Spillage Control and Water Treatment

2.3.20 To protect the Queensferry Drain, River Dee and Manor Drain in the event of an accident or spillage on the carriageway, penstocks would be fitted to the swales at the point of discharge to the surface watercourses. Spillages and/or contaminated water could then be isolated for controlled removal or treatment. The swales would also provide some attenuation and biological treatment of contaminants, as well as settlement / filtration of particulate matter, from the highway before the run-off reaches the watercourses.

Fencing

2.3.21 Fencing would be provided where there is a requirement to discourage pedestrian access and to delineate the Welsh Government land ownership. Further fences would be required to discourage access to hazardous locations such as culverts, the tops of retaining walls and steep slopes. Indicative alignments of proposed fences are shown in the General Arrangement Drawing at Figure 2-1 and the Environmental Masterplans included in Figures 2-2A, 2-2B, 2-2C and 2-2D.

Lighting

2.3.22 The existing bridge lies within the built-up area of Queensferry that is generally well lit with the lighting environment classified as E3 suburban and with a medium district

brightness. The existing A494 road corridor is also lit either side of the existing bridge. The Scheme would be lit throughout its length in accordance with current highway lighting standards and to make connections with the existing road corridor and footpath network.

Signs and Communications

2.3.23 The proposed section of road would incorporate signs in relation to junctions and destinations. Subject to further design, provision would be made for the installation of Intelligent Transport Systems (ITS) on the Scheme.

Utilities

2.3.24 The main utility companies with assets in the area are Dŵr Cymru Welsh Water, Wales and West Utilities, Scottish Power Energy Networks and BT Openreach. Key utility diversions within this scheme include:

a) Diversion of existing rising mains currently on the Dee Bridge (to be demolished) and along the A494. These mains would be diverted under the River Dee, to the south-east of the bridge. (Dŵr Cymru Welsh Water)

b) Diversion of 33kV cables to the north of Dee bridge, across the A494. (Scottish Power Energy Networks)

c) Diversion of a medium pressure gas main to the south of the Dee bridge, across the A494. (Wales and West Utilities)

d) Diversion of 11kV and low voltage cables across the scheme. (Scottish Power Energy Networks)

e) General BT diversions across the scheme. (BT Openreach)

2.3.25 The diversion works are anticipated to be undertaken directly by the utility companies and include gas mains, water and sewer mains, electricity cables and communications cables. The Welsh Government and the appointed contractor may carry out additional protection works and other civil engineering works to assist the utility companies.

Works to Watercourses

2.3.26 A new drainage outfall to the River Dee will be created to replace the existing as this currently falls within the construction footprint of the Scheme. A new Queensferry Drain Pumping Station facility would be provided to the west of the River Dee at the end of Chester Road East in Riverside.

2.3.27 Queensferry Drain is classified as a main river and is situated on the southeast side of the A494(T) and flows in a culvert beneath the road and in open channel east of the North Wales Coast Railway Line.

2.3.28 This would be diverted to enable the construction of the replacement bridge and the A494 road corridor, new sections of open channel will be provided either side of the railway with a section of existing culvert beneath the railway line being retained.

Soft Estate

2.3.29 Existing areas of soft estate north of the existing A494 that have developed since the road was constructed in the 1960s and now contains well established trees and other vegetation, would be retained and protected.

2.3.30 New areas of soft estate would be integrated within the Scheme with earthworks and areas of soft estate including wildflower verges, swales, native woodland plantations and amenity grassland. These areas are limited to the south-eastern sides of the Scheme where new embankments are needed to support the new sections of the A494 as they rise on the approaches to the bridge.

2.3.31 An area of intertidal habitat classified as salt marsh on the eastern bank of the River Dee would be affected by the construction of the replacement bridge. This would likely to be impacted by the over shadowing effect caused by the new bridge. The north-eastern bank of the river beneath the existing bridge is a concrete revetment devoid of any vegetation. This would be either removed or adapted to encourage a growing medium to form and encourage natural recolonisation of plants from the adjacent riverbanks.

Mitigation Measures

2.3.32 It is a requirement of DMRB LA104[1] that the environmental assessment should report on the following categories of mitigation:

i) embedded mitigation: project design principles adopted to avoid or prevent adverse environmental effects; and

ii) essential mitigation: measures required to reduce and if possible offset likely significant adverse environmental effects, in support of the reported significance of effects in the environmental assessment.

2.3.33 Embedded and essential mitigation measures have been integrated into the Scheme proposals for the purpose of minimising likely adverse environmental effects. Embedded mitigation is described in the project description and not repeated in each environmental factor assessment. The following embedded mitigation measures are integrated into the Scheme proposals and described below. Some would be incorporated into the physical design elements and others would be a requirement of the appointed contractor and incorporated into the contractor's Scope as a mandatory requirement.

Saltmarsh Habitat

2.3.34 The potential loss of the vegetation classified as saltmarsh that would lie beneath the replacement bridge and within the River Dee National Sites Network (formerly SAC) is difficult to mitigate against. The intertidal habitat would become over-shadowed by the new bridge, and it is likely that for this reason, the habitat would gradually deteriorate and in the long term, fail to survive. Therefore, the provision for off-site mitigation is proposed at Greenfield Marsh, a site some fifteen kilometres downstream to the north-west on the southern side of the Dee Estuary.

2.3.35 The foreshore of Greenfield Marsh near Walwen contains areas of saltmarsh habitat of variable condition including patches of rubble left as vestiges from an old landfill on the foreshore. The proposal is to remove these patches of rubble to encourage the natural colonisation of the adjacent habitat. This is considered

[1] DMRB LA 104 Environmental assessment and monitoring

proportionate to that lost as a result of the Scheme. Welsh Government would collaborate with Flintshire County Council (FCC) and NRW to progress with these proposals should the Scheme be consented.

River Dee and timing of the 'in river' works

2.3.36 The most sensitive environmental asset potentially affected by the Scheme is the highly protected River Dee and the embedded mitigation measures required to protect the river are crucial to the Scheme being consented. During the preparation of the EIA, a particular concern raised by the statutory environmental body (NRW) is "*the potential for underwater noise and vibration to cause disturbance and potential disruption of fish features migration on the Dee*"[2].

2.3.37 The noise and vibration associated with piling to form the foundations for the replacement bridge could have a direct effect on salmon and lamprey if conducted during the migration season and at night-time. For this reason, it has been agreed with NRW that the piling works would be restricted to daylight hours only to minimise the risk of disturbance to migrating fish. To construct the proposed bridge a piling rig mounted on a temporary platform or on a 'jack-up' barge would be used to drive thin steel tubes into the riverbed. When the tubes reach the required depth, bored piles will be constructed by positioning an auger inside the steel tube. This way the disturbance of the silt and vibration at the riverbed will be kept to a minimum and restricted only to the steel tube-driving operations thus reducing the quantity of suspended particulates and noise within the watercourse which may indirectly affect fish. This construction method would be classified as an embedded mitigation measure and a mandatory assumption.

Essential Mitigation Measures

2.3.38 In the development of the Scheme proposals, it was identified that to secure biodiversity enhancements as required by the Section 6 Duty of the Environment (Wales) Act 2016, additional land would be needed to provide opportunities for increased areas of soft estate that in turn could deliver net biodiversity benefits.

[2] NRW response (21-02-2025) to request for Scoping Opinion

The areas of soft estate provide opportunities for habitat creation such as provision of native species hedgerows, tree and shrub planting, swales, open ditches and species rich grasslands. The additional lands identified would run parallel to, and south of the A494 and contiguous with the areas of soft estate of the immediate road corridor. These areas would be secured through the implementation of the Scheme and long-term management arrangements put in place to improve biodiversity.

2.3.39 Essential mitigation measures are outlined within the relevant chapters of this ES. These measures are also summarised in the Record of Environmental Actions and Commitments (REAC), which forms part of the Outline Construction Environmental Management Plan (CEMP) in Appendix 18A.

2.4 Long Term Management

2.4.1 On completion of the construction phase, there would be a five-year aftercare period to ensure the establishment of the landscape and ecological elements of the Scheme. The environmental requirements for this period would be implemented through a Construction Environmental Management Plan (2nd iteration of the Environmental Management Plan (EMP) as set out in Chapter 18 of this ES.

2.4.2 At completion of the five-year period, responsibility for management of the soft estate and environmental mitigation measures would pass to Welsh Government together with a 'Handover Environmental Management Plan' (third iteration of the EMP) guiding the long-term management.

2.4.3 On completion of construction, the main components of the Scheme such as the replacement bridge and A494 road corridor would be owned and maintained by the Welsh Government. However some elements such as local roads, active travel routes, the diverted Queensferry Drain, and the river pumping station would be maintained by other public bodies, namely FCC and NRW.

2.4.4 General inspections and maintenance of the trunk road, structures, highway drainage and landscape/soft estate areas would be undertaken on a regular basis in accordance with the Design Manual for Roads and Bridges (DMRB) and maintenance manuals. More detailed maintenance would be undertaken as and

when required. The inspections and maintenance on and adjacent to the trunk road may involve traffic management for access and to ensure the safety of the workforce.

2.5 Scheme Land Take

2.5.1 A number of existing properties and buildings would require demolition to accommodate the proposed Scheme. Further land would be required along the new section of road for works to rights of way and means of access.

2.5.2 For clarity in this Environmental Assessment, the land taken for the Scheme is that shown within the boundaries on the Environmental Master Plans Figures 2-2A to 2-4D in Volume 2. As the design is refined, the land required for permanent and temporary use will also be refined and shown on the Compulsory Purchase Order drawings published alongside this Environmental Statement.

2.6 Construction Programme

Overall programme

2.6.1 The construction programme is dependent on several key constraints such as the diversion of utilities and any seasonal limits for works in the River Dee that may be imposed by NRW. Advance works to establish construction compounds, access points and to divert utilities are likely to begin before the main works. The construction activities and programme would be subject to modification during both the detailed design and the construction phases.

2.6.2 The key dates for construction are currently as follows:-

i) Early Site Works – Autumn 2026
ii) Main Works – Spring 2027
iii) New Road Open to Traffic – Autumn 2029
iv) Existing Bridge Removed – Spring 2030

2.6.3 Maintenance and aftercare of the environmental aspects of the Scheme including management and establishment maintenance of the soft estate would remain the responsibility of the contractor for five years after the completion of construction.

2.7 Pre-Construction Activities

Archaeological Investigations

2.7.1 Advanced archaeological surveys and watching briefs in accordance with the agreed Written Scheme of Investigation (WSI) would be undertaken in the preliminary stages of the project. Refer to ES Chapter 10 Cultural Heritage.

Temporary Land Take, Site Compounds and Storage

2.7.2 To carry out the construction works, it is essential that land is acquired for the duration of the works for use as site compounds (including offices, stores, accommodation areas and car parking), construction working areas (including for temporary works and haul routes), topsoil and other construction storage areas.. Land for the temporary storage of unsuitable (including contaminated) material awaiting removal for recycling or disposal would also be required.

2.7.3 One or more batching plants for the preparation of concrete may be needed to minimise the road haulage of concrete and ensure that concrete is available at work locations precisely when required. This/these would be sited in the site compounds.

2.7.4 Two such areas have been identified and included in the draft Orders for the SchemeSite Compound Area 1 would accommodate the site offices and provide access to the assembly area for the replacement bridge components. The site is located off Chester Road East, close to the Riverside gypsy and traveller site.

a) Allows vehicle access to and from the A494 with minimal additional use of the local road network or from Chester Road East.

b) Connects directly to the bridge construction area in the former FCC depot and so avoids the need to use further public roads to distribute plant and materials.

c) Avoids taking ‘green field’ land or other public amenity space.

d) Would be available throughout the construction period as it is outside the permanent works boundary.

e) Would allow the cleared and restored site to be returned for new use at the end of the project.

2.7.5 Site Compound Area 2 would accommodate plant, materials and staff for the river bridge works and provide lay-down space as well as access to the works for large cranes and similar equipment. The site is located on the northern bank of the River Dee, on the eastern side of the existing A494 embankment. The land is currently in agricultural use for arable crops. The access would therefore be kept away from Ferrybank Farm. The cycle route along the base of the A494 embankment would be temporarily diverted to a new route between Fox's Drive and the River Dee path. Use of this site:

a) Allows vehicle access directly off the westbound A494 via a short length of temporary road.

b) Gives direct access needed for construction of the replacement bridge.

c) Is large enough for the assembly and placing of large bridge components.

d) Is not adjacent to residential or other public amenity space apart from the riverside path (which is unavoidable)

e) Would be available throughout the construction period, as it is outside the permanent works boundary.

f) Would allow the cleared site to be restored and returned to its current use at the end of the project subject to agreement with landowner.

Demolition

2.7.6 Demolition works would be undertaken by the contractor in accordance with method statements approved by the regulator and the local planning authority. Pre-demolition surveys would be undertaken as required. Demolition audits would be undertaken to identify any materials that could be recovered for re-use or recycling. Any structures that are known to support bat roosts would be demolished in accordance with a European Protected Species Licence issued by NRW.

2.8 Key Construction Activities

2.8.1 The key construction activities and sequencing of each would be identified by the appointed contractor. However, during the preparation of the EIA, several aspects of the construction methodology have been considered to inform the EIA process. This has focussed on the in river working due to the environmental sensitivities of the River Dee and marine biodiversity and may still subject to further dialogue and

discussions with NRW. It is currently anticipated that a jack up barge would be needed to install the piles and river piers and to remove the existing bridge deck and cross heads. The existing river piers would remain in-situ.

2.8.2 The construction activities are described in the following stages and have been developed as part of the anticipated construction methodology. These may change if the appointed contractor chooses an alternative approach, however, specialist contractors have been consulted in arriving at these stages and are therefore considered to be feasible and describe the most likely construction sequencing. The overall construction period is anticipated to take between 2-3 years with a target date of spring 2027 for the start of the main works.

Site Clearance

2.8.3 The initial activities following site establishment would be fencing site clearance, the installation of pre-earthworks drainage and topsoil strip under archaeological supervision where identified as required.

Mobilisation

2.8.4 Mobilisation would commence once the contractor has been appointed and the detailed design and necessary approvals are in place to undertake the works, including the approval of any statutory licenses, consents and permits. The extent of mobilisation works would be determined by the contractor; however, it is expected to include the following:

i) Possession of the land and demolition of the remaining structures to the south of the A494 between the railway bridge and Queensferry Interchange to provide a material storage area during the next stage

ii) Construction of the revised local highway arrangement to access the traveller site and main compound area, this would include all necessary utility diversions, drainage, kerbing and pavement.

iii) Construct the new pumping station and associated outfall for the Queensferry Drain, divert the river through the new infrastructure (this would be phased with the utility diversions)

iv) Implement temporary walking and cycling route diversions, it will be necessary to provide temporary routes whilst the permanent routes are implemented from the traveller site to the Queensferry Interchange.

v) Establish main office and stores compound within the existing hard standing area to the west of the travellers site

vi) Install a new temporary access from the A494 to the east of the river Dee to gain access to the satellite stores, office and welfare facility

vii) Commence works on the eastern crane platform and temporary jetty to facilitate mobilisation of the Jack-up barge and service the in-river operations

viii) Install a mooring facility and crane platform to the eastern bank. This will be used during high tides only to remove the need to dredge the intertidal bed. The barge will be loaded by crane at high tide and used to transport materials to the barge. Approximate use will typically be three times per week

ix) Mobilise the jack-up barge and transport this to site. The barge will be loaded with all equipment to undertake the piling operations including a service crane and piling rig. The jack-up barge would be quarantined at River Mersey Dry-Dock prior to being towed into position adjacent to the temporary jetty on a rising high tide.

x) Environmental mitigation works.

xi) Diversion of rising main sewers, either fully or temporarily at points of conflict with the proposed bridge abutments.

xii) Diversion of 33kV overhead electricity cables located to the east of the river.

xiii)

River Pier Works (RPW)

RPW Stage 1 – Mobilisation and Initial Setup

2.8.5 Mobilise ‘jack-up’ barge to the position of the new pier. Mobilise cranes and smaller plant. Install temporary anchor piles on riverbanks, riverbanks to form fixed points for tethering floating barge(s) if needed.

RPW Stage 2 – Installation of Steel Casing Tubes

2.8.6 Using tracked machine positioned on jack-up barge, insert steel casing tubes into riverbed to depth sufficient to achieve stability and a seal to minimise water ingress and contain disturbed silts. The casings are expected to be installed into the glacial till to an estimated total depth below riverbed level of approximately 13m (to be confirmed).

2.8.7 Tubes to be lifted from floating support barge alongside, by crane, and lowered vertically to position, then oscillated or driven in with vibration. Introduce drilling fluid, Polymer or Bentonite to stabilise the ground.

RPW Stage 3 – Rotary Boring and Reinforcement

2.8.8 Using a piling rig positioned on the jack-up barge rotary bore within the steel tubes to remove riverbed silt and underlying glacial till deposits to full pile depth required (approx. 34m below riverbed level (assuming river bed level is at 0m AOD).

2.8.9 Capture arisings from auger rotary bore, eg by temporary structure mounted on each tube, and remove to land, minimising any loss of material into the river. Using crane, lift and insert reinforcement into the bored holes.

RPW Stage 4 – Concrete Placement

2.8.10 Place concrete using a tremie pipe (watertight pipe) to form the piles, pumping off the displaced drilling fluid for recycling. Concrete to be prepared on shore and delivered to the jack-up by pumping. It is anticipated that the piles will be installed in groups of four and that the jack up barge will be moved slightly for each group to maintain an even spread of load from cranes on the deck of the barge.

RPW Stage 5 – Pile Cap and Pier Construction

2.8.11 Install temporary formwork or a precast concrete caisson at the top of piles above river bed level, fix reinforcement and pump concrete to construct a continuous pile cap and piers.

2.8.12 Repeat activities for second river pier.

Earthworks

2.8.13 The Scheme would require new embankments and bridge abutments to be built to achieve the required vertical road alignment for the approaches to the new bridge. The abutments would be set well back from the top of the riverbank to allow for the provision of active travel routes along both banks and retention of riverbanks. Other movements of natural earth and made ground would be needed to construct the

new drainage system, including ditches and swale, and for the construction of new structures. There would also be a requirement for earth movement for initial site clearance e.g. stripping and storing topsoil and for final landscaping throughout the works area.

2.8.14 Topsoil would be stripped using tracked excavators and possibly a dozer in the one agricultural field. It is anticipated that dump trucks would transport material to temporary topsoil stockpile locations where it would be stored no greater than 4m high. Bulk earthmoving operations would typically be carried out using large excavators, articulated dump trucks, dozers and heavy compaction plant. On completion of the earthworks and landscape fill areas, topsoil would be placed and planting carried out in accordance with the specified landscape design. Further works of ecological mitigation would be carried out and a period of establishment and aftercare would be implemented.

2.8.15 Outline plans for environmental protection during earthworks are set out in the Outline Construction Environmental Management Plan which forms Appendix 18.A to the Environmental Statement.

Replacement Bridge Construction

2.8.16 The construction of the replacement bridge would be a complex operation and subject to a detailed works execution plan prepared by the contractor. However, some outline activities are identified below that provide an indication of what construction activities may be required:

a) The Queensferry Drain, River Pumping Station and Outfall will be relocated to a new position to the south and other services within the banks will have been protected or diverted.

b) Excavate down to formation level – install temporary sheet piles to river bank to maintain flood bank level of integrity.

c) Install piles within formation and crop the pile heads to receive abutment.

d) Cast abutment concrete and construct bearings.

e) Backfill the abutment ready for placement of bridge beams.

f) Remove temporary river bank support piles and regrade the river bank.

g) Construct earthwork embankment approaches to new abutments.

h) Construct temporary crane support platform either on or immediately to the rear of the new bridge abutments.

i) Place side-span bridge beams in pairs spanning from abutments to beyond the piers, using crane(s) positioned on each bank.

j) Lift central span beams by crane from barge or from banks, using crane(s) positioned on bank and splice to complete each girder.

k) Fix permanent formwork to beams, place reinforcement and pump concrete to form deck incorporating pre-cast edge beams.

l) Waterproof the new deck with spray-applied bitumen system, apply bitumen-macadam / asphalt carriageway surfacing and lining and install barriers. Install services and street lighting columns.

Road pavement construction

2.8.17 Road pavement construction requires sizeable items of specialist plant, such as paving machines and heavy rollers, and the delivery to site of significant volumes of construction materials such as asphalt. In addition, it is likely that some pavement works will need to be completed at night due to traffic management requirements when tying the new road surface into existing highways.

2.8.18 The installation of road restraint systems, road signs and lighting in the highway verges may be carried out during normal daytime working hours, as some of the last activities in each Section. They are unlikely to have any significant impacts on the local environment.

2.8.19 Road marking may require some night-time working to tie into the existing road network, but this will be localised, of short duration and is unlikely to have any significant impact on the local environment.

2.9 Traffic Management

2.9.1 Traffic management and restrictions would be needed to provide safe access and working areas for the construction workforce and their vehicles, plant and equipment and to permit safe passage of vehicles and non-motorised users, such as pedestrians and cyclists, through and adjacent to the works.

2.9.2 These traffic restrictions must be carefully planned and managed and would include a variety of measures, from separating works areas from public access areas to full closures of certain roads for short durations plus speed restrictions. Ideally the construction programme would be developed, wherever practicable, to avoid the need to have temporary traffic management in place over bank holiday periods. However, major elements of traffic management, such as narrow lanes and significant lengths of solid barrier or cones, would need to remain in place to maintain the safety of the travelling public. In addition, repeated removal and reinstatement of traffic management would result in inefficient and prolonged working, additional surfacing and lining works and confusion for the road user.

2.9.3 Full overnight closures of the A494 may be required for short periods to allow the lifting of bridge beams and other works directly over or alongside the carriageway. These would be planned and publicised well in advance.

2.10 Outline-Construction Environmental Management Plan

2.10.1 An Outline Construction Environmental Management Plan (Outline CEMP) is included in Appendix 18.A in Volume 3. The Outline CEMP sets out how the various construction activities would be managed to comply with the relevant environmental legislation and best practice to minimise effects on residents and environmental receptors. Following publication of the draft Orders and the Public Local Inquiry, the Outline CEMP would be developed into a full CEMP by the contractor, which would be in place before construction begins.

2.10.2 The CEMP is a live document that is developed and updated through the detailed design and construction stages. Development and implementation would be managed throughout by the contractor. The CEMP would ensure that construction activities are planned and managed in accordance with all the environmental requirements identified in the ES.

2.10.3 Compliance with the CEMP would be a mandatory contractual requirement both for the main contractor and for all subcontractors, to ensure that best practice is implemented during construction and to safeguard the environment.

Marine Licence

2.10.4 The River Dee is a tidal estuary and so the construction of the replacement bridge will require that a Marine Licence be obtained from Natural Resources Wales before work below Mean High Water Springs can take place.

Working Hours

2.10.5 The working day would vary between the seasons. However, it would typically be Monday – Friday 0700 to 1900 in the summer months and 0700 to 1700 in the winter. In certain circumstances, specific works may have to be undertaken outside the normal working hours. Night working would also be required in some cases. This would include work to be carried out during limited periods for work requiring lane or carriageway closures, to minimise disruption to road users. These instances would be kept to a minimum and require agreement with the Welsh Government and NMWTRA beforehand.

2.10.6 In river working would be restricted to between 0800 – 1700hrs and no work in 3hr period leading up to high tide at Chester weir as agreed with NRW

2.10.7 Any working outside the normal hours would be agreed with the local authority's Public Protection Officer (or equivalent) and residents would be informed in advance.

Community Liaison

2.10.8 Before commencing construction activities, a Public Liaison Officer (PLO) would be appointed by the contractor for the Scheme. The PLO would be the main direct contact for Community Councils, local planning authorities, residents, businesses and stakeholder groups and would be responsible for managing and implementing the Communication Strategy.

2.10.9 A complaints procedure would be established for the Scheme. The procedure would be managed using a database of incidents, complaints and enquiries. All complaints would be recorded, with the intention of resolving the complaint within

seven days of being reported. The action taken to resolve the complaints would also be recorded.

2.10.10 An Environmental Liaison Group has been established for the Scheme, comprising key stakeholders such as the local authority and Natural Resources Wales. The Group would continue to meet at suitable points during the construction period.