Shoreham Adur Tidal Walls - Reach W7

Environmental Report

December 2021

Mott MacDonald
10 Temple Back
Bristol BS1 6FL
United Kingdom

T +44 (0)117 906 9500
mottmac.com

Shoreham Adur Tidal Walls - Reach W7

Environmental Report

December 2021

Mott MacDonald Limited. Registered in England and Wales no. 1243967.
Registered office: Mott MacDonald House, 8-10 Sydenham Road, Croydon CR0 2EE, United Kingdom

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
P01	16/03/21	SC	AB	JB	Issue to Client
P02	11/11/21	SC	AB	JB	Second Issue
P03	09/12/21	SC	AB	JB	Third Issue
P04	14/12/21	SC	AB	JB	Minor revision

Document reference: | |

Information class: Standard

This document is issued for the party which commissioned it and for specific purposes connected with the above-captioned project only. It should not be relied upon by any other party or used for any other purpose.

We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it.

Contents

1 Introduction 1
1.1 Background to the Scheme 1
1.2 2015 Planning Permission 1
1.3 Purpose of this Report 1
1.4 Location of the Scheme 1
1.5 Approach to this Environmental Report 2
1.6 The Planning Process 3

2 Design and Construction Strategy 4
2.1 Background to Reach W7 4
2.2 Proposed Works to W7 4
2.3 W7 Construction Strategy 4
2.4 Environmental Action Plan 5
2.5 Assumptions and Limitations 6

3 Environmental Assessment 8
3.1 Air Quality 8
Construction Phase 8
3.2 Historic Environment 8
Construction Phase 8
3.3 Nature Conservation 9
Construction Phase 9
3.4 Landscape and Visual Effects 14
Construction Phase 15
3.5 Noise and Vibration 15
Construction Noise 15
Construction Vibration 16
3.6 Soils and Ground Conditions 16
Construction Phase 16
3.7 Water Environment 17
Construction Phase 17
3.8 Material Assets 17
Construction Phase 17
3.9 Climate 18
3.10 Heat and Radiation 18
3.11 Major Accidents and Disasters 18
3.12 Combined and Cumulative Effects 18
Combined Effects during the Construction Phase 18
Cumulative Effects during the Construction Phase 20

4 Conclusions and recommendations 24
4.2 Recommendations 25

A. Shoreham Adur Tidal Walls Full Reach Plan 26

B. Shoreham Adur Tidal Walls Reach W7 28
B.1 Shoreham Adur Tidal Walls Reach W7: Reach Overview 29
B.2 Shoreham Adur Tidal Walls Reach W7: General Arrangement Plan 31

C. Environmental Action Plan 33

Tables

Table 1.1: References to the Assessment Methodologies 2
Table 2.1: Schedule of works for W7 together with the 2015 and 2018 W7 works. 5
Table 3.1: In-Combination Construction Effects 19
Table 3.2: EIA developments within 1.5km of the Scheme 21
Table 3.3: Assessment of Likely Significant Cumulative Effects 23
Table 4.1: Summary of Mitigation Measures and Significance of Effect for each Environmental Discipline 24

1 Introduction

1.1 Background to the Scheme

1.1.1 The Environment Agency have constructed a range of improvement works on the flood defences along the western and eastern banks of the River Adur, to manage the risk of tidal flooding to the town of Shoreham-by-Sea, in West Sussex. These works, known as the Shoreham Adur Tidal Walls, will reduce flood risk to homes and businesses in and around Shoreham-by-Sea.

1.1.2 Following the completion of the Shoreham Adur Tidal Walls works, additional works are now required at Reach W7 to rectify an issue with seepage through a c200meter length of the chalk filled flood defence embankment.

1.2 2015 Planning Permission

1.2.1 In October 2015 Mott MacDonald, on behalf of The Environment Agency, submitted a Planning Application to Adur Borough Council as the Local Planning Authority (LPA) for the Scheme. The application was accompanied by an Environmental Statement (ES) which was prepared in compliance with the requirements of the Town and Country Planning (Environmental Impact Assessment) Regulations 2011, as amended by the Town and Country Planning (Environmental Impact Assessment) (Amendment) Regulations 2015, hereafter referred to as the EIA Regulations[1]. Planning Consent was granted on the 1 June 2016 (reference AWDM/1614/15). The works commenced on site in September 2016 with Team Van Oord (TVO) as the main Contractor. All construction works associated with the 2015 Planning Application are now complete.

1.2.2 A series of ES addendums were submitted and accepted during main construction. One of which was in 2018 and constituted changes within Reach W7 for the removal of a ditch from the main construction drawings and amendments to the landward embankment toe.

1.3 Purpose of this Report

1.3.1 Due to additional construction works required within the Reach W7 chalk embankment, an Environmental Report has been prepared. The purpose of this Report is to identify any changes from the 2015 ES and subsequent 2018 addendum and provide clarification of any new or materially different environmental effects associated with those changes.

1.4 Location of the Scheme

1.4.1 The Shoreham Adur Tidal Walls Scheme extended approximately 5.4km on the west bank from the mouth of the river to Shoreham Tollbridge, and approximately 1.8km on the east bank from Coronation Green to the A27 and was divided into reaches with seven reaches on the west and three reaches on the east bank.

1.4.2 Reach W7 is located on the west bank adjacent to Shoreham Airport. A plan showing the extent of the reach is provided in Appendix A (Shoreham Adur Tidal Walls Full Reach Plan).

[1] The 2015 ES and supporting documents can be accessed online through the Adur and Worthing Council website by searching the planning permission reference AWDM/1614/15: https://planning.adur-worthing.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=NXCKDTCB05900

1.5 Approach to this Environmental Report

1.5.1 All the findings of the EIA undertaken for the consented Scheme were reported in the 2015 ES in accordance with the Town and Country Planning (EIA) Regulations 2011. The process of EIA in the context of town and country planning in England is now governed by the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (hereafter referred to as the '2017 Regulations'). As such, this Environmental Report has been developed to align with the 2017 Regulations.

1.5.2 The structure of this Environmental Report focuses on those environmental disciplines where there is a potential change to the original 2015 ES assessment, including Air Quality, Historic Environment, Nature Conservation, Landscape and Visual Effects, Noise and Vibration, Soil and Ground Conditions, Water Environment, Material Assets, and Combined and Cumulative Effects. Where amendments to the findings of the 2015 ES are not required, the original content within the 2015 ES remains unchanged. The Environmental Report draws on baseline information contained within the 2015 ES. It is however, not a duplication of the 2015 ES and should therefore be read in conjunction with the 2015 ES[2] if further baseline information is required. The environmental assessments within this Environmental Report are listed in Table 1.1. The consideration of effects for each environmental discipline has broadly followed the assessment methodologies set out in the original 2015 ES. In accordance with the 2017 Regulations, due regard must also be given to the likely significant effects on Climate, Heat and Radiation, and Major Accidents and Disasters and as a result these additional environmental considerations have been brought into the assessment scope.

Table 1.1: References to the Assessment Methodologies

Environmental Discipline	Method of Assessment Reference
Air Quality	2015 ES Chapter 6, Section 6.2
Historic Environment	2015 ES Chapter 7, Section 7.2
Nature Conservation	2015 ES Chapter 8, Section 8.2
Landscape and Visual Effects	2015 ES Chapter 9, Section 9.2
Noise and Vibration	2015 ES Chapter 10, Section 10.2
Soil and Ground Conditions	2015 ES Chapter 11, Section 11.2
Water Environment	2015 ES Chapter 12, Section 12.2
Material Assets	2015 ES Chapter 13, Section 13.2
Combined and Cumulative Effects	2015 ES Chapter 15, Section 15.2
Climate	DMRB Volume 11, Section 3, LA 114
Heat and Radiation	MPI-57-052017, Rev 1.2 2018
Major Accidents and Disasters	MPI-57-052017, Rev 1.2 2018

1.5.3 As with the 2015 EIA, the assessment will identify the potential for significant effects based on the scope of works for each environmental discipline. A Moderate Adverse or Beneficial effect and above will be considered significant.

[2] Adur and Worthing Councils (2021). Shoreham Adur Tidal Wall Planning Application [Accessed 08/11/2021}

1.5.4 The focus of this Environmental Report is the proposed construction works required within Reach W7. No changes are proposed to the operation of the scheme at W7 and as such, the operational effects concluded within the 2015 ES remain unchanged and valid. **Operational effects have therefore not been revisited within this Environmental Report.**

1.6 The Planning Process

1.6.1 The scheme is defined as Permitted Development (PD) under Part 13 (D)(b) of the Town and Country Planning (General Permitted Development) (England) Order 2015 by virtue of the fact that it involves:

'Developments by the Environment Agency –

(b) development in, on or under any watercourse or land drainage works and required in connection with the improvement, maintenance or repair of that watercourse or those works.'

1.6.2 Although the scheme falls under PD rights, due consideration will need to be given to relevant policy guidance as the planning context and circumstance must be taken into account in order for the scheme to avoid resulting in significant environmental effects and the need for statutory EIA.

2 Design and Construction Strategy

2.1 Background to Reach W7

2.1.1 The 2018 constructed chalk embankment approved under the original planning permission (AWDM/1614/15) is defined by the area between the airport car park at the southern end of the reach and extends north to approximately the northern end of Cecil Pashley Way, adjacent to the river, where it ties in with the original alignment of the flood defence (where it has been modified by development in association with New Monks Farm during 2020).

2.1.2 The embankment approved under the original planning permission forms a functional part of the flood defence, though the steel sheet piles being introduced under this design change are not required as a stability feature. The steel sheet piles are being installed to mitigate seepage through the newly constructed chalk embankment. The Public Right of Way footpath runs along the crest of the embankment which is 2m wide with timber edge boards, increasing to 3m in width at passing places.

2.2 Proposed Works to W7

2.2.1 It is proposed to install steel sheet piles along the crest of the embankment for approximately 195m from chainages 145-230 and 275-385. The steel sheet piles are approximately 0.6m by 0.45m in planform with a depth of 3.75m which is contained within the footprint and section profile of the newly constructed chalk embankment. This construction requires the removal of the footpath and placement of a temporary pile platform on the landward face of the embankment. The vegetation landward and footpath shall be reinstated upon completion of the works to the same standard or better.

2.2.2 The installation of the steel sheet piles will result in the following:

- temporary removal of the footpath within the crest of the embankment;
- removal of the vegetation on the landward side of the embankment. Topsoil shall be removed and stockpiled where possible or replaced as required and the works area re-seeded in accordance with the 2015 ES specification, in line with Section C1.1 of the EAP (Appendix C);
- temporary removal and reinstatement of a number of verge marker posts / signage / access gates owing to the construction methodology; and
- monitoring of the gravel filter drain running along the verge at the landward toe of the embankment, which shall be repaired or replaced in the event of any damage during construction.
- Inspection of the gravel filter drain will necessitate the inclusion of three new inspection points in the form of Type 7 chambers in accordance with the standard detail for the specification of highways works.

2.3 W7 Construction Strategy

2.3.1 Table 2.1 below shows the proposed Schedule of Works for W7 set against the original 2015 works and the 2018 amendments. Appendix B.1 provides an overview of the design changes related to the 2018 ES Addendum works. Appendix B.2 provides a draft general arrangement (GA) plan outlining the layout and sections of current proposed piling works at Reach W7.

Table 2.1: Schedule of works for W7 together with the 2015 and 2018 W7 works.

General Strategy of Works Assessed in the 2015 ES	General Strategy of Works Assessed in the 2018 ES Addendum	General Strategy of Works Assessed in 2021 Environmental Report
Ditch running along the toe of the new realigned embankment.	Removal of the ditch south of the EA sluice and replacement with a buried geotextile wrapped gravel filter drain. A chimney of shingle is visible at ground level.	Gravel Filter drain to be protected during construction of the temporary works required to install the steel sheet piles, or reinstated where required.
Toe of embankment stabilised where the ditch is situated with Type 1a Fill material.	Removal of the Class 1A fill material beneath the landward toe of the new embankment. Toe has been set back to existing ground level.	Temporary pile platform to be constructed along the landward slope and toe of the newly constructed embankment. Slope and toe levels are to be reinstated upon completion.
Passing bays to be concrete slabs to span the culverts.	Vehicle passing bay being reinstated rather than new build	Verge marker posts and signage around the vehicle passing bays are to be stored and reinstated where they are impacted on by the temporary works.
Embankment construction sequence includes construction of a new Public Rights of Way (PRoW) along the crest of the structure	No Change	PRoW to be temporarily diverted and footpath to be removed and reinstated upon completion of the works.

2.3.2 A Principal Contractor has been selected to carry out the Schedule of Works. Whilst certain elements of construction are yet to receive final approval, and commencement date has not been finalised, the construction works as assessed within Section 61 Prior Consent and Section 28 consents are not anticipated to change . As such, a number of assumptions have been made:

- All construction works will be completed from the landward side or via the crest of the embankment. No works will take place from the riverward face.
- Piling works will be prepared via pre auger with installation via a Movax vibration head most likely accompanied by an excavator.
- The construction works are expected to commence from late February 2022, and will occur during daytime hours between 07:00 – 20:00 Monday to Friday. Piling works and any works with potential to result in noise levels above 70db will be undertaken after the end of March 2022 between the hours of 08:00 – 18:00. The use of impact hammer piling (as opposed to Movax vibro-piling) will be limited to use at last resort and by exception, for a maximum of 2 hours per day. No works will be undertaken on Saturdays, Sundays or bank holidays except in exceptional circumstances and with prior arrangement with Adur District Council. It is not expected that there will be a need to complete any works at night.
- The full programme including enabling works (or pre-piling) and landscaping and reinstatement is to be determined (procurement is not finalised). Completion is anticipated to be in autumn (currently 30th September) 2022. The disruption of Covid is a high risk to schedule, and risks ae continuously assessed alongside procurement and programme.

2.4 Environmental Action Plan

2.4.1 An EAP was produced for the 2015 ES, which summarised the actions required to implement the environmental mitigation and outcomes contained within the ES. The EAP sets out specific objectives and targets defining the way in which the ES findings were to be addressed during the implementation phase of the project (pre-construction, construction and post-construction phases). It also detailed roles and responsibilities of those involved in the proposal and referred to all temporary and permanent works.

2.4.2 The actions and responsibilities set out within the EAP have been reviewed and remain valid for the purposes of this Environmental Report and must be adhered to by the Contractor, refer to Appendix C. Once the Principal Contractor has been selected the full Schedule of Works will be confirmed and the EAP shall be updated where necessary by the Client. The Principal Contractor will produce all required method statements outlined in Section A1.5.

2.5 Assumptions and Limitations

2.5.1 Potential impacts and their effects cannot be predicted with absolute certainty. Predictions are limited by the quality and certainty of information available and the accuracy of predictive techniques employed.

2.5.2 The assessment has been based on baseline information contained within the 2015 ES with the exception of Nature Conservation, which also considered results of a site walkover in 2017 and 2018 in relation to the 2018 ES Addendum. An additional ecological site walkover was undertaken on 5th November 2021 to provide an update on the current site conditions to inform this assessment.

2.5.3 No new Historic Environment receptors have been identified as a result of the proposed remediation works due to the disturbance of previously made ground where the proposed works are to be carried out. It is therefore considered that the proposed works would not result in any new or materially different effects during construction for any known heritage assets or the historic landscapes assessed within the 2015 ES (Volume 2, Tables 7.2) or within the archaeological Written Scheme of Investigation (WSI) (WSI, Revision D, September 2016).

2.5.4 It is assumed that upon completion of construction, the works will be buried, and the visual aesthetics of the area will return to their pre-construction conditions or to a better standard with no impact on any of the visual receptor locations.

2.5.5 The assessments set out within this report have been based on the assumption that the physical construction works are to take place during daylight hours between 08:00 and 18:00 in line with the original 2015 ES construction methodology[3]. It is therefore assumed that the need for artificial lighting is not required. If the scope of works is to include the need for artificial lighting, then the assessment conclusions set out within this report must be revisited.

2.5.6 Appendix B.2 provides the General Arrangement (GA) layout for the proposed works at Reach W7. It should be noted that if the GA plan is subject to change the assessments set out within this Environmental Report may no longer be applicable. Any changes which are not consistent with Appendix B.2, the Contractor and Employer must ensure that those changes do not affect the assessment conclusions presented in this report.

2.5.7 Although a Principal Contractor has been selected to carry out the Schedule of Works, certain elements of construction are yet to be decided. The construction strategy outlined in section 2.3 is therefore based on limited information and obtained from conversations with the above-mentioned contractor. Should these details change, a review of assessment conclusions is recommended.

2.5.8 A Giken piling method was proposed at two reaches, Reach W5 and Reach W7, in Chapter 3 of the 2015 ES[4]. Push piling (Giken) is known as ‘silent and vibration free’ piling although it does require a piling rig (such as Movax) to start off the push piling process (up to 3 sheet piles). However, as detailed in section 2.3, piling works have been confirmed by the client to be via pre auger with installation via a Movax vibration head, most likely on an excavator. As such, the piling method proposed in the 2015 ES is at odds with the piling method proposed as part of the

[3] Adur and Worthing Councils (2021). Shoreham Adur Tidal Walls Construction Methodology Report. Available at Microsoft Word - Document1 (adur-worthing.gov.uk) [Accessed 04/11/2021).

[4] Chapter 3 of the 2015 ES: https://docs.adur-worthing.gov.uk/NorthgatePublicDocs/02045174.pdf

current scope of works being proposed. As such, a Section 61 Prior Consent application will be submitted to the Local Planning Authority prior to the commencement of works to ensure that the proposed piling methodology does not give rise to significant effects.

3 Environmental Assessment

3.1 Air Quality

3.1.1 The 2015 ES considered the potential impacts on sensitive receptors as a result of construction road traffic emissions and construction dust. The original conclusions made within the 2015 ES confirmed that as a result of measures set out in the EAP and Traffic Management Plan (TMP) (which was to be produced by the Contractor), heavy-duty vehicle movements would not exceed 100 AADT at Reach W7. Potentially significant dust emissions were also considered during the construction phase, however these effects were described as temporary. As such, it was anticipated that pre-construction conditions would return once the construction phase had been complete.

3.1.2 Construction activities were predicted to have 'Medium to High' effects in terms of generating dust for a temporary period. To mitigate against construction dust effects, best practice mitigation measures in accordance with IAQM Guidance to control fugitive dust were incorporated into the EAP (Appendix C).

Construction Phase

3.1.3 The main potential impacts on sensitive receptors as a result of construction activities at Reach W7 remain consistent with those anticipated in the 2015 ES. On-site dust emissions arising from construction activities and vehicle movements have the potential to cause temporary effects upon air quality. Given the scope and scale of construction activities required at Reach W7, construction traffic movements are anticipated to be substantially less than movements anticipated in the original 2015 ES and will therefore not meet the assessment threshold. There is the potential for creation of dust, predominantly from piling activities required as part of the work, which could impact nearby sensitive receptors. However, the implementation of best practice construction methods as outlined in the EAP (Appendix C (B2)) will reduce the creation of dust on-site during the construction phase.

3.1.4 Given the temporary nature of the proposed construction works (between spring and autumn 2022) and provided best practice measures outlined within the EAP (Appendix C (B2)) are adhered to and implemented by the Contractor, no significant effects are anticipated.

3.2 Historic Environment

3.2.1 The 2015 ES describes Shoreham Airport as one of Britain's oldest licensed airport and was also used as a military airfield in both World Wars, which is where it gains its heritage significance. Other airport buildings are also of significance and are Grade II listed. The Dome Trainer buildings is a Scheduled Ancient Monument. Along the west bank of the River Adur are a group of pillboxes which were built into the bank of the previously existing flood defences.

3.2.2 A programme of archaeological trial trenching was undertaken to investigate the features seen on an RAF aerial photograph in 2017. The results from the trial trench evaluation proved that Nissen huts were strung out along the western side of the defensive ditch. Scrub clearance to the north has also identified additional unidentified pillboxes. A rifle range and ammunition bay were also identified.

Construction Phase

3.2.3 It is anticipated that the proposed scope of works at Reach W7 (as described in Section 2) would not result in any new or materially different effects during construction for any known heritage assets or the historic landscapes assessed within the 2015 ES (Volume 2, Tables 7.2)

or within the archaeological Written Scheme of Investigation (WSI) (WSI, Revision D, September 2016). This includes existing Pillboxes (MM204-MM208), which will be preserved in-situ during the proposed construction works.

3.2.4 Temporary construction effects are likely to occur from the movement of plant and personnel, appearance of worksites and construction noise. As such, this will likely affect the setting of existing Pillboxes for a temporary period during the construction phase. However, it is not anticipated that construction activities would have an overall adverse impact on the setting of designated and non-designated heritage assets in the vicinity. This is due to the scope and scale of construction works, and the short-term nature of the works (enabling works of approx. 6 weeks followed by piling or main works with estimated duration of 11 weeks) followed by possible extension to 30th Sept 2022 to accommodate, reinstatement and further to risk associated with current and emerging Covid-related conditions and disruptions) as required for the scheme.

3.3 Nature Conservation

3.3.1 A site walkover was undertaken in December 2017 and February 2018 as part of the 2018 ES Addendum to re-assess baseline conditions. It was concluded that conditions remained the same with no substantial changes to the habitats within this Reach. However, grassland had been cleared as part of the reptile mitigation strategy and a willow tree and scrub adjacent to the receptor area had also been removed. Reptile trapping and translocation had also been undertaken within Reach W7. Since completion of the 2018 works, the vegetation on the landward side of the embankment has been regularly strimmed, in accordance with the EAP (Appendix C (A4.1)), to reduce the possibility of any reptiles recolonising the area.

3.3.2 An updating ecological walkover was undertaken on the 5th November 2021 to assess the current habitats on site. At the time of this survey the riverside of the embankment was observed to comprise rough grassland which offered good quality reptile habitat. The landward side of the embankment along the section of proposed works comprised short grassland that appeared to be regularly cut and was unsuitable for reptiles. North of the area affected by these forthcoming works, the landward embankment was not strimmed and comprised rough grassland which offered good quality reptile habitat. This reptile habitat links with the reptile receptor site to the north, which was used as part of the reptile mitigation strategy for the works which were completed in 2018. There is therefore potential for reptiles to disperse from the receptor site onto suitable habitat, if present, along the new embankment.

3.3.3 The Nature Conservation impact assessment in the 2015 ES Volume 2 identified a Minor Adverse effect on reptiles, over wintering birds, saltmarsh habitat and the Adur Estuary Site of Special Scientific Interest (SSSI) and Royal Society for the Protection of Birds (RSPB) Reserve during construction with mitigation as outlined in the EAP in place (Appendix C). The 2015 ES confirmed that the use of vibro-piling for the installation of sheet piling would be undertaken at low tide when fish species were unlikely to be present in significant numbers. As such, a negligible effect on fish species was anticipated during construction.

Construction Phase

Habitats

3.3.4 The Nature Conservation impact assessment in the 2015 ES Volume 2 identified a Minor Adverse effect on saltmarsh habitat within the Adur Estuary SSSI and RSPB Reserve during construction.

3.3.5 As outlined within the EAP (Appendix C (A4)), vegetation in the proposed works area, on the landward side of the embankment, has been maintained at a level to discourage the repopulation of reptiles. It is understood that no other vegetation clearance will be required in

order to accommodate the construction phase. Best practice measures set out within the EAP (Appendix C (B4)) will be adhered to and implemented by the Contractor.

3.3.6 Where the existing grassland on the landward embankment is removed or damaged to facilitate these works, it will be reinstated on a like for like basis or better and there will be no loss of habitat.

3.3.7 The only works within the saltmarsh habitat will be the possible erection of heras fencing to prevent public access around either end of the works. The footings for the heras fencing will be within the saltmarsh. There is a risk that footings could be placed over notable flora, but due to the small scale of works and small number of footings that will be needed, any impacts will be minimal and reversible. Ecological supervision will ensure that no notable flora is impacted. Where vegetation dies back under the footings, this will create small areas of bare ground which will be naturally colonised by saltmarsh vegetation on completion of the works. This is necessary to prevent the exacerbation of desire-lines forming during the closure of the embankment.

3.3.8 Due to the scope and scale of the proposed construction activities and relatively short duration (commencement in spring 2022with completion prior to winter 2022), effects upon notable habitats are anticipated to be minor and therefore not significant.

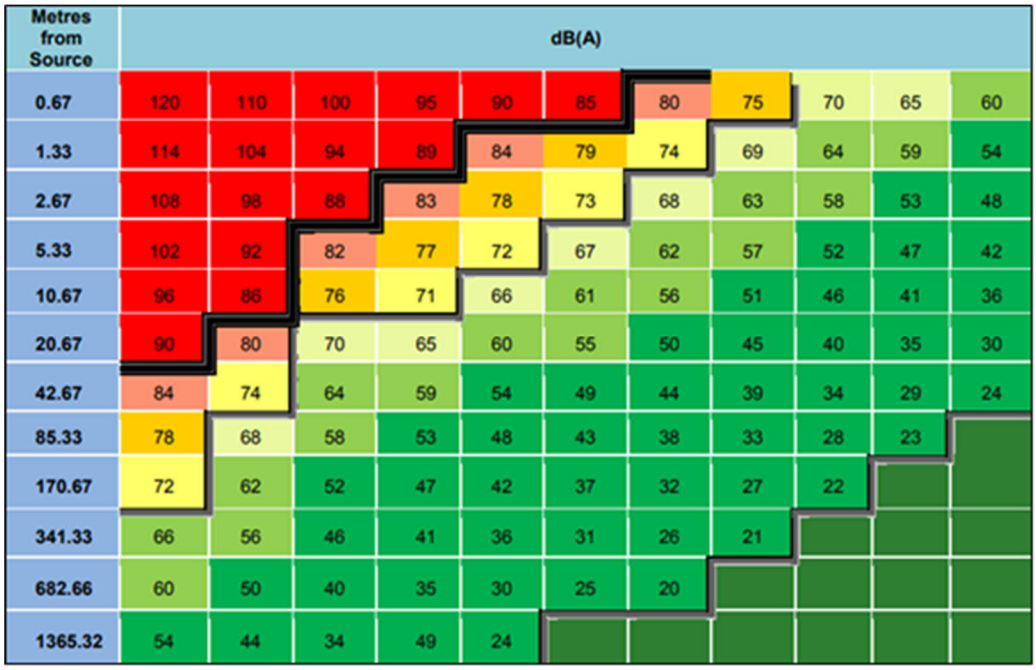
Designated Sites

3.3.9 The Adur Estuary SSSI is designated for its intertidal habitats such as saltmarsh and mudflat and is located adjacent to Reach W7. As such, CRoW Assent will be required prior to the commencement of construction works. There will be no works within the SSSI, with the possible exception of temporary heras fencing which may be installed at either end of the works to prevent public access around the edge of the saltmarsh. There will be no loss of habitats within the SSSI and therefore impacts are associated with disturbance of species associated with the SSSI and risk of contamination during construction works.

3.3.10 The Adur Estuary SSSI is designated for its diverse assemblage of overwintering birds, including dunlin *Calidris alpina*, redshank *Tringa totanus* and ringed plover *Charadrius hiaticula*. The number of ringed plover regularly exceeds 1% of the total British population, making the estuary of national importance for this species. As outlined in the original ES the construction activities in Reach W7 have the potential to adversely affect a high tide roost for overwintering birds through noise and visual disturbance, which could contribute to the localised displacement of these species.

3.3.11 Research has shown that noise levels approaching 70 decibels (dB) at the receptor location result in the most profound responses from bird species (i.e. site abandonment), whereas general background construction noise below c.55dB is unlikely to result in disturbance. It appears that irregular yet frequent loud noise exceeding 70dB is the most likely to result in effects, and that impacts can be observed for distances up to 300m in some species. There is published data on the likely decay rate of source noise over certain distances to receptor, as shown in Figure 1 (Waterbird Disturbance Mitigation Toolkit, 2018). These data show that receptor noise levels at or below c.70dB (at the bird) are not likely to be significant.

Figure 1 Estimated noise decay rates and likely effect on waterbirds. (Waterbird Disturbance Mitigation Toolkit, 2020). Red: High impact. Orange: Moderate impact. Green: Acceptable impact



3.3.12 The habitats used by the important assemblage of wintering birds associated with the SSSI are located adjacent to the works and therefore there will be little decay of noise from the source to the receptor. As such, noisy works, including piling, would likely give rise to significant effects if unmitigated.

3.3.13 To mitigate for the risk of disturbing the wintering bird assemblage from construction, activities anticipated to exceed 70dB, including piling, will be scheduled to be undertaken after 28th March 2022 between the hours of 08:00 and 18:00.Impact pile driving will be limited to a maximum of 2 hrs per day, and moreover will only be used as a last resort and by exception, to drive piles home that are blocked at depth.

3.3.14 The SSSI is also designated for its population of common lizard *Zootoca vivipara*. Impacts on reptiles are discussed below under protected species. However, in summary, no adverse effects for reptiles within the SSSI are likely.

3.3.15 With the implementation and adherence of best practice mitigation measures set out within the EAP (notably B4 of Appendix C) by the Contractor, significant effects are not anticipated upon the Adur Estuary as a result of the Scheme.

Protected Species

Reptiles

3.3.16 Reptiles, notably common lizard, are one of the reasons for notification of the Adur Estuary SSSI. However, the area within the current construction boundary of Reach W7 was trapped out of reptiles in 2018 and a cutting management plan has kept the grass on the landward embankment to a short sward of around 20mm. Thus, the habitat within the construction footprint is not currently suitable for reptiles. The seaward side of the embankment currently comprises rough grassland which provides good quality reptile habitat. This habitat links with the reptile receptor site to the north, which was used as part of the reptile mitigation strategy for the works which were completed in 2018. There is therefore potential for reptiles to disperse

from the receptor site onto suitable habitat along the new embankment. As the works are confined to the existing hard standing pathway at the top of the embankment and the managed short grassland on the landward side of the embankment, it is not considered likely that there would be adverse effects on reptiles. Nonetheless, precautionary measures set out within the EAP (B4.6) should be implemented to prevent impacts to reptile habitat immediately adjacent to the works.

3.3.17 On completion of works, the grassland on the landward embankment should be left unmanaged so that a rough species rich grassland develops to increase the area of suitable reptile habitat adjacent to the SSSI and allow the translocated population to recolonise this area.

Wintering Birds

3.3.18 As outlined above under the Adur Estuary SSSI assessment, habitats immediately adjacent to the works area provide suitable habitat for wintering birds and are likely to continue to support the notable assemblages of wintering birds associated with the SSSI. There is therefore the potential for impacts on wintering birds as a result of the proposed construction activities at Reach W7 (including Dunlin, Redshank, Ringed Plover, Lapwing *Vanellus vanellus* and Oystercatcher *Haematopus ostralegus*). Piling in particular is likely to result in noise levels that could cause disturbance. Therefore, where construction activities are likely to result in nose levels above 70dB within the adjacent habitats used by wintering birds, these works will be programmed after the 28th March. Construction works that are less noise generating (equal to or under 70dB at edge of SSSI) are programmed to commence in late February 2022, avoiding the majority of the wintering bird season.

3.3.19 Works are located along a well-used public right of way where there is regular visual disturbance from pedestrians, cyclists and dog walkers. During the construction period, the disturbance from public access will be temporarily removed, replaced by visual disturbance from construction activities. This construction disturbance will be restricted to normal working hours, but the public right of way will remain closed. Levels of visual disturbance will therefore be comparable with existing background levels and will be reduced outside of working hours. In addition, the airports runway (perpendicular to the works area and adjacent) will be closed, likely until completion of piling – again – reducing the cumulative impact of noise generating activity in this zone.

3.3.20 Mitigation measures outlined in the EAP are designed to ensure that the proposals do not have a significant adverse effect on wintering birds (B4.7).

Breeding Birds

3.3.21 The proposed works will not result in the loss of any scrub habitat which may be used by nesting birds or any rough grassland which could be used by ground nesting birds. Direct impacts on breeding birds are therefore not anticipated. There is however a very low risk of noise and visual disturbance resulting in disturbance of Schedule 1 birds which may be breeding within adjacent habitats.

3.3.22 As outlined in the 2015 ES, there are records of Schedule 1 Cetti's warbler Cettia cetti breeding within the vicinity of reach W7. The only area of potential nesting habitat for this species within the vicinity of the works is the small area of scrub at the southern end of the scheme. This habitat is of limited potential for this Schedule 1 species, due to its small extent and existing disturbance. However, due to the historical records of breeding Cetti's warbler along this reach, their presence cannot be ruled out. The closest works to this area of scrub are the site compound. The use of this compound is likely to be similar to background noise levels, given the proximity of the car park, railway and other sources of existing disturbance. Novel activities are more likely to result in disturbance, such as the proposed piling. The nearest piling works are around 120m from the edge of this scrub. Noise modelling has identified that preparation for

piling works could result in a maximum noise level at the scrub of 61db, and that during piling noise levels could result in a maximum noise level at the scrub of 64db. These noise levels are below the 70db level where significant disturbance could occur[5] . It is therefore unlikely that the works would cause significant disturbance to breeding Cetti's warbler due to the anticipated noise levels of below 70db at the area of poor quality habitat and the existing background disturbance from the adjacent airfield, car park and railway line. To further minimise any risk of disturbance, the site compound will be placed at the southern end of the works area and will be arranged in such a way that reduces potential noise impacts. Furthermore, the ECoW will undertake routine monitoring of the scrub during the works, to identify if Cetti's warbler are present and whether any additional mitigation is required.

3.3.23 The proposals to install heras fencing at either end of the works presents a risk of bird strike and killing or injury of birds which may attempt to fly through the mesh fencing (applies to wintering and breeding birds). To minimise this risk, regular signage or other appropriate features should be installed on the heras fencing to make it more visible to birds.

3.3.24 The measures above will ensure that the works do not have a significant adverse effect on breeding birds.

Fish

3.3.25 As outlined in the original ES, sheet piling works in Reach W7 has the potential to cause harm or injury to fish, alter behaviour such as breeding or migration or contribute to the displacement of these species. Sixteen dominant species of fish were recorded in the Adur estuary including sea trout *Salmo trutta*, herring *Clupea harengus*, Eel *Anguilla anguilla* and brill *Scophthalmus rhombus*, and the assemblage of fish was assessed to be of medium conservation importance. The Shoreham Tidal Walls – Marine Acoustic Technical Appendix which supported the ES investigated the potential impacts of the works, in particular piling, on fish. This Technical Appendix made reference to a study by Subacoustech (2004), where they found that there was no discernible effect from vibro-piling on fish present during monitoring of a project in Littlehampton, which is located along the same stretch of coastline as the Shoreham scheme and supports similar assemblage of fish. This assessment of 'no discernible effect' was based on piling within the water column. As there will be no piling within the water column for these additional works within W7, this will further reduce the potential for impacts to fish during the W7 works. The potential for impacts to fish is again reduced by the fact that the works are only affecting a single reach (W7), over an anticipatedconstruction period between mid February and end Sept 2022, as opposed to the main scheme where there were multiple reaches and extended works. Construction activities will be confined to the embankment crest and landward side of the embankment in accordance with Section B4.10 of the EAP (Appendix C).Therefore, the use of vibro piling for the W7 works is highly unlikely to have any measurable effect on the fish population within the Adur Estuary and there will be no significant effects.

3.3.26 . This assessment is based on the use of vibro piling. In the event that construction methodology deviates from the methods proposed in the Construction Methodology Report, the Contractor and Employer must ensure that those deviations do not render the assessment of effects and measures set out within the EAP (Appendix C (B4) to become inadequate.

Marine Mammals

3.3.27 The only recorded marine mammal species within the ZoI is known to be the common seal *Phoca vitulina* which infrequently at different times of the year can be seen hauled out on mudflats near the seaward (Adur river sea entrance) facing reaches (Reach 1 and 2) There are

[5] It is acknowledged that these levels are based on disturbance of water birds rather than of breeding Cetti's warbler but are considered appropriate in the absence of other guidance.

no records along the Adur Estuary adjacent to Reach W7 and no impacts on marine mammals are likely due to the distance of the works from the known areas used by common seal.

Biodiversity Enhancements

3.3.28 In accordance with the National Planning Policy Framework (NPPF) 2021, development should contribute and enhance the natural environment by '*minimising impacts and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures'.* To accord with national planning policy, the proposals should incorporate enhancements. These should include the following measures:

3.3.29 Existing managed grassland along the landward embankment should be left uncut during the summer to allow plants to flower, to provide improved habitat for invertebrates and reptiles. The grassland should be cut in late autumn when reptiles will no longer be active and after flowering plants will have set seed. Grass cuttings should be removed to maintain a low nutrient grassland which will encourage diversity of flowering plants and help establish a species rich grassland.

3.3.30 Additional wildflower banks should be created on areas of grassland to the west or the landward side of the embankment. These should be created using chalk with little or no topsoil seeded with a wildflower mix (such as EM6F – Wild Flowers for Chalk & Limestone Soils). This will create a wildflower rich habitat for invertebrates. This would also contribute to The National Pollinator Strategy for bees and other pollinators in England (2014). Potential locations include an area of existing ruderal vegetation at the southern end of the scheme (Grid Reference TQ2080505204).

3.4 Landscape and Visual Effects

Landscape Character Baseline

3.4.1 Within the 2015 ES, the landscape character assessment identified that reach W7 sits within Landscape Character Area (LCA) 5, Shoreham Airport.

3.4.2 Within the Shoreham Airport LCA 5 land is defined by the large open expanse of the airfield embankment, the western reach of the River Adur and includes the historic setting of the airport buildings. The eastern edge of the LCA is delineated by the western bank of the River Adur. A well-used footpath runs along the crest of the embankment adjacent to the water along its length. These historic structures hold a strong narrative to the area's past.

3.4.3 The baseline assessment considered LCA 5 on balance, to be of medium sensitivity to change.

Visual Baseline

3.4.4 Within the 2015 ES, the visual assessment identified a small number of visual receptors affording views to Reach W7. There are two local PROWs which run along the western and eastern embankment adjacent to the River Adur which currently afford open views along the river, to the edge of Old Shoreham Town in the east and across Shoreham Airport looking west. To the north views to the rising South Downs are afforded set in the context of the intervening A27. Properties on the Western most edge of Old Shoreham Town afford interrupted views through and over existing vegetation and the newly formed tidal wall in the foreground of the view to the river beyond and the new raised embankment on the western river bank in reach W7. Upper storey views may also capture Shoreham Airport beyond.

Construction Phase

Landscape Character Effects

3.4.5 During construction, works will be focused upon the eastern periphery of the character area as it bounds the River Adur. There would be direct effects upon LCA 5, limited to the eastern most boundary of the character area, albeit given the open nature of the LCA the presence of machinery and construction activity on the eastern boundary may have a temporary influence upon the adjacent landscape and indirect effects upon neighbouring LCA 4 Adur Fringe and LCA1 Shoreham Town. However, given the works are localised within this reach and are set within the context of the wider LCA 5, as well as being short in duration (anticipated between mid February and end Sept 2022), no significant adverse effects are anticipated.

3.4.6 Nonetheless, best practice measures as outlined within the EAP (notably B5.1 and B5.2 of Appendix C) will be adhered to by the Contractor in order to best manage and minimise adverse effects upon landscape character during construction.

Visual Effects

3.4.7 During construction, the PROW along the embankment crest in W7 would be temporarily closed and as such would not be considered in a visual assessment. However, views from the PROW on the eastern bank and also on Shoreham Tollbridge would afford open views across the water to the works in the south and west beyond. Whilst this would be at odds with the nature of the existing view, works would be only temporary in nature. Consequently, it is not considered the PROWs would experience significant adverse effects as a result of the proposals. Views to the works may also be afforded from upper storey windows adjacent to the eastern reaches, albeit in the middle distance beyond the eastern embankment and river itself. Slightly more open views may be afforded at a lower level from properties further north on Old Shoreham Road set in the context of the A283 in the immediate foreground of the view, as well as the brick and flint boundary wall between the road and river footpath beyond. Given the magnitude of change on local visual receptors, particularly when considering the temporary nature of the construction, it is not considered that there would be significant adverse effects during construction.

3.4.8 As with the case for minimising effects upon landscape character, best practice measures outlined within the EAP must also be adhered to in order to limit potential visual effects.

3.4.9 Upon completion of construction, the works will be buried and the visual aesthetics of the area will return to their pre-construction conditions with no impact on any of the visual receptor locations.

3.5 Noise and Vibration

3.5.1 The 2015 ES concluded that there will be no significant noise and vibration effects at Reach W7 due to an absence of human sensitive receptors adjacent to the reach.

Construction Noise

3.5.2 Temporary construction noise effects are likely to occur from the sheet piling, movement of plant and personnel. The construction method to be deployed for the proposed works at Reach W7 involves pre-augering in advance of driving piles with the use of a movax piling hammer. It is not anticipated that these will result in any significant adverse effects due to the assumed absence of any new human sensitive receptors. Should any new receptors be identified, a detailed review will be required in line with the 2015 ES.

3.5.3 In accordance with the EAP (Appendix C (A6.1.2)), a construction noise management plan should be produced and agreed in advance of the construction works. In addition, Section 61 Prior Consent is submitted for acceptance by the Local Planning Authority prior to the

commencement of the works to ensure that impacts are assessed, consented, and that significant effects do not arise. Good practice measures proposed within the Section 61 Prior Consent Application are set out within the EAP (Appendix C (A6.1.3)

3.5.4 A Section 28 Assent 'Notice of Works' application has been prepared with due regard given to ecological receptors that could be disturbed by noise-generating activities on site. The Section 61 Prior Consent application noise profile has informed the Section 28 Assent application and confirms that anticipated noise levels at the edge of the SSSI during the enabling phase (commencement from the 15th February to 27th March 2022) and at the identified suitable Cetti's warbler habitat at the southern edge of the works area during the piling phase (28th March 2022 onwards) are not likely to give rise to disturbance as noise levels are expected to remain below 70db throughout the construction period.

Construction Vibration

3.5.5 Temporary construction vibration effects are likely to occur from the sheet piling activities proposed at Reach W7 however, it is not anticipated that these will have a significant adverse impact due to the assumed absence of any new human sensitive receptors. The construction method to be deployed for the proposed works at Reach W7 involves pre-augering in advance of driving piles with the use of a movax piling hammer. Should any new receptors be identified, a detailed review will be required in line with the 2015 ES.

3.5.6 A Section 61 Prior Consent will be submitted and accepted by the Local Planning Authority prior to the commencement of the works to ensure that impacts are assessed and significant adverse effects do not arise. Specifically, Appendix B of the Section 61 Prior Consent application confirms that vibration effects as a result of the proposed works are unlikely to be adversely significant.

3.6 Soils and Ground Conditions

3.6.1 The 2015 ES reported that the construction of the Scheme had the potential to impact on local geology and soils. The baseline conditions confirm that Reach W7 is located within a Principal Aquifer. Soil testing at Reach W7 also confirmed that all contaminants were at concentrations below assessment criteria for Open Space / Park Land use.

3.6.2 Although the 2015 ES confirmed that the driving of sheet pile walls into the chalk was an impact on geology and soils at Reach W7, it wasn't considered a construction issue within Table 11.5. As such, it was considered that due to the pre-existing ground conditions at Reach W7, sheet piling through soils into the Principal Aquifer (chalk) would not promote the migration of any potentially contaminated groundwater. These works are within the new flood defence embankment and do not extend down into the Principal Aquifer.

Construction Phase

3.6.3 Following a review of the proposed scope of works at Reach W7 against the conclusions made within the 2015 ES, no additional impacts are anticipated on soil and ground conditions during construction. As such, potential pollution pathways would be limited to contamination of soils through accidental spills and leakages of hazardous substances or the mobilisation of sediments and contaminants into surface water receptors such as the River Adur. Best practice measures, as outlined within the EAP (Appendix C (B7.1 – B7.6)), will be implemented and adhered to by the Contractor during the construction period in order to mitigate adverse impacts.

3.7 Water Environment

3.7.1 Following an analysis of the baseline condition of surface water, groundwater and flood risk at Reach W7, it was concluded within Section 12.5 of the 2015 ES Volume 2 that adverse effects on the water environment were only expected in the construction phase and would be Minor or Neutral and therefore not significant. Therefore, after mitigation, there was not anticipated to be any adverse effects during construction.

3.7.2 A Flood Risk Assessment (FRA) and Water Framework Directive (WFD) Compliance Assessment were also carried out (refer to Appendices 12.3 and 12.4 in Volume 3 of the 2015 ES respectively). The FRA concluded that with the new defences in place, the residential and commercial properties in Shoreham that are currently at risk of flooding will be protected into the future from a 1-in-300-year flood event. As sea levels rise, the number of properties that are protected will increase, up to the 50-year design life of the Scheme. The WFD Compliance Assessment concluded that the Scheme will not affect the status of the waterbodies within the study area, namely the Ladywell Stream, Adur transitional, Sussex coastal and Brighton Chalk Block waterbodies.

Construction Phase

3.7.3 Following a review of the 2015 ES conclusions against the proposed scope of works at Reach W7, no additional impacts on the water environment are anticipated during the construction phase. As set out within the 2015 ES, piling can result in risks to the water environment and potable supplies from pollution/turbidity, risk of mobilising contaminants or drilling through aquifers and creating preferential pathways. In reference to the Reach W7 as-built plans, contamination was not identified on site and is therefore not considered to be an existing constraint for the proposed works. As such, significant adverse effects on the water environment are not anticipated.

3.7.4 Best practice measures set out above, as outlined within the EAP (Appendix C (A8)), shall be produced by the Contractor for acceptance by the Employer prior to the commencement of works. During the works, strict adherence to measures set out within the EAP (Appendix C (B8.2 – B8.4)), and implementation by the Contractor will ensure significant effects do not arise.

3.8 Material Assets

3.8.1 This section assesses the impacts for material assets and the likely associated Reach W7.

Construction Phase

3.8.2 In the original assessment within the ES (2015) Reach W7 was anticipated to generate its main waste streams through the removal of the embankment and concentrate slabs on the footpath and through clearance of vegetation on both the riverward structure, landward slope and materials during the initial construction phases of the Shoreham Adur Tidal Walls scheme. However, the design changes within Reach W7 in remediation (assessed here in addendum) are not so substantial as to alter the overall significance of effect from Neutral during site preparation/remediation and Minor Adverse during construction.

3.8.3 A Site Waste Management Plan (SWMP) (Appendix C (A7)) will be developed by the Principal Contractor for the Scheme and should be read in conjunction with the EAP (Appendix C (B7)).

3.8.4 With the implementation of the SWMP for Reach W7, the overall impact of the changes to Reach W7 design and construction strategy will remain as Neutral during site preparation/remediation and Minor Adverse during construction, as identified in the 2015 ES. These effects will not be significant.

3.9 Climate

3.9.1 As outlined in Section 1.5, Climate has been considered in line with the updated 2017 Regulations.

3.9.2 The scheme will increase greenhouse gas emissions through the emissions of the plant used for the works and the embodied carbon in the materials used. The scheme design should consider principles of sustainable design to ensure carbon emissions are reduced where possible. Carbon reduction principles are set out within the EAP (Appendix C (B11)) and should be considered by the Principal Contractor and all sub-contractors for the duration of construction of the scheme. It is considered that due to the small-scale nature of the works, the scheme will not impact upon the UK meeting the government's carbon budgets. However, the inclusion of measures to reduce carbon emissions will ensure that the contribution of the Scheme to climate change is further reduced. As such, no significant effects are anticipated as a result of the construction of the scheme.

3.10 Heat and Radiation

3.10.1 As outlined in 1.5, Heat and Radiation has been considered in line with the updated 2017 Regulations.

3.10.2 Due to the scope and scale of the works and the type of development, no significant effects are anticipated during construction. As such, no residual effects are anticipated.

3.11 Major Accidents and Disasters

3.11.1 As outlined in 1.5, Major Accidents and Disasters has been considered in line with the updated 2017 Regulations

3.11.2 The scheme has the potential to be affected by natural hazards, due to the nature of the scheme which would compromise the existing embankment. To mitigate any risk from natural disasters, the Contractor will apply for a Flood Risk Activity Permit (FRAP) for the duration of the construction phase in accordance with the EAP (Appendix C (A8.2 and B8.3). Measures within the FRAP are to mitigate any loss of integrity. Details of management procedures in relation to potential accidents would also be set out within the FRAP. Please refer to the scheme's FRAP and attached appendices for further information.

3.12 Combined and Cumulative Effects

3.12.1 In this section, we consider the ES topics for each of the three resources – Communities, Built Environment and Natural Environment, as outlined in the 2015 ES, Volume 2, Section 15.3 and Volume 3, Appendix 15.4.

Combined Effects during the Construction Phase

3.12.2 The overall significance of the combined effects for the scheme during the construction phase has been assessed as being negligible, taking into consideration best practice measures and site-specific mitigation proposed in the EAP. Table 3.1 provides further details of how environmental effects have been combined as a result of their individual significance on receptors during construction to give an on-balance effect. Overall, it is considered that in all cases, the magnitude of the impact as a result of the Scheme is within the ability of the resource to absorb such change, resulting in no significant effects.

Table 3.1: In-Combination Construction Effects

Assessment Scope	Environmental Topic	In-combination construction effects	Mitigation measures to be implemented
Communities	Air Quality (impacts on humans); Landscape and Visual effects (Visual Impacts); Noise and Vibration (impacts on humans); and Socio-Economy (includes flood risk impacts)	Given the works would be localised, combined visual and noise and vibration effects are anticipated on receptors including local residents, businesses and users of community facilities. Additionally, in-combination construction effects on residential and commercial receptors as a result of air quality have also been considered, although are not anticipated to be significant for residential and commercial users. Construction is likely to result in disruption and annoyance for the local community, however in consideration of residual effects set out above, in-combination construction effects on the local community are not considered to be significant. Due to the temporary nature of the proposed construction works (an anticipated start in mid-Feb 2022 with completion in autumn 2022) and provided best practice measures outlined within the EAP are adhered to and implemented by the Contractor, significant effects are not anticipated.	EAP (Appendix C (A1; A2; A6; A10; B2; B5; B6 and B10))
Built Environment	Historic Environment; Landscape and Visual effects (Impacts of townscape); Noise and Vibration (vibration impacts on buildings); and Socio-Economy (impacts on land take and demolition of property)	It is anticipated that the proposed scope of works at Reach W7 (as described in Section 2 above) will not result in any new or materially different effects during construction for any known heritage assets or the historic landscapes assessed within the 2015 ES. Residential and commercial properties are of high sensitivity and visual and noise and vibration impacts are anticipated as a result of the proposed works. With the selection of appropriate methods to minimise vibration impacts on buildings, which will be agreed with the LPA prior to commencement of construction activities and the production of a construction noise management plan, vibration and noise impacts would be minimised. Additional measures such as the strict enforcement of the EAP and adherence to best practice will minimise combined visual and noise and vibration effects. There will be a dedicated public liaison officer available to coordinate communication between the project team and the local community in accordance with the EAP (Appendix C (B10.1)) Overall, given the temporary nature of the proposed construction works (anticipated between Feb and end Sept 2022) and provided best practice measures outlined within the EAP are adhered to and implemented by the Contractor, residual in-combination construction effects on the built environment are not considered to be significant.	EAP (Appendix C (A1; A6; B5; B6; and B10))

Assessment Scope	Environmental Topic	In-combination construction effects	Mitigation measures to be implemented
Natural Environment	Air Quality (impacts on flora and fauna); Nature Conservation; Landscape and Visual Effects (impacts on landscape character); Soil and Ground Conditions; Water Environment; and Material Assets.	It is considered that the proposed scope of works at Reach W7 will not result in any new or materially different in-combination effects on the natural environment during construction than were identified within the 2015 ES. Given the proposed scope of works and the temporary nature of the construction phase (commencing in spring and completing in autumn 2022), with additional risk of added time due to current disruptions, and provided best practice measures set out within the EAP are adhered to and implemented by the Contractor, residual in-combination construction effects are not considered to be significant.	EAP (Appendix C (A1; A4; A7; A8; A9; B1; B4; B7; B8; and B9))

Cumulative Effects during the Construction Phase

3.12.3 There are five developments that meet the criteria outlined in the 2015 ES (Chapter 15, sections 15.3.4 to 15.3.5), and that are located within 1.5km of the Scheme, as detailed in Table 3.2: EIA developments within 1.5km of the Scheme

3.12.4 Following this, an assessment has been undertaken to determine whether there will be any likely significant environmental effects that will arise from the scheme in combination with other relevant developments. The assessment is presented in Table 3.3**Error! Reference source not found.**..

3.12.5 The assessment concludes that there will not be any likely significant environmental effects as a result of the scheme in-combination with the developments outlined in Table 3.2: EIA developments within 1.5km of the Scheme 2 below. As such, no mitigation, further to that which is outlined within the EAP (Appendix C) is required.

Table 3.2: EIA developments within 1.5km of the Scheme

Name	Planning Reference	Address	Distance from the scheme (Reach W7)	Description	Status	Construction/ Operation dates
New Monks Farm, Policy 5	AWDM/0961/17	Land East Of Shadwells Road At Mash Barn Estate Mash Barn Lane Lancing West Sussex	Adjacent to the scheme	Full planning permission for the demolition of existing buildings and erection of 249 dwellings with temporary access via Grinstead Lane, a Country Park, relocation and extension of the Withy Patch Gypsy and Traveller site, permanent access via a new roundabout on the A27, landscaping, two additional football pitches and other associated infrastructure (including pumping facility at the River Adur); (2) Outline planning permission (with only landscaping reserved) for a non-food retail store (Use Class A1); and (3) Outline planning permission (with all matters reserved other than access) for the erection of a further 351 dwellings, community hub, primary school, and landscaping. The application is accompanied by an Environmental Impact Assessment.	Permission granted (4 February 2020)	The construction period is anticipated to be approximately eight years, with works initiating in Q1 2021. Approximately 75 units will be constructed per year.
Shoreham Airport, Policy 7	AWDM/1093/17	Shoreham Airport Cecil Pashley Way Shoreham (Brighton City) Airport Lancing West Sussex BN43 5FF	Adjacent to the scheme	Full planning permission for the erection of new commercial buildings to provide up to 25000m2 of floorspace for Light Industrial (Use Class B1c), General Industrial (Use Class B2) and Storage and Distribution (Use Class B8) with access, landscaping and associated infrastructure (including a new pumping facility on the River Adur). This application is accompanied by an Environmental Statement.	Permission granted (27 December 2020)	The construction period is anticipated to be approximately six years with a forecasted opening year of 2027.
Land And New Roundabout Northern Boundary Of A27	AWDM/1906/20	Land And New Roundabout Northern Boundary Of A27 To East And West Of Coombes Road Old Shoreham Road Lancing West Sussex	Approximately 0.5km west of the scheme	Highway works comprising; (1) construction of a highway (a Fourth Arm) from the approved New Monks Farm A27 roundabout to Coombes Road (west) along with associated hard and soft landscaping, and; (2) closure of the existing Coombes Road (east) junction with the A27 and its replacement with landscaping. The application is accompanied by an Environmental Statement.	Permission granted (29 October 2021)	The construction period is anticipated to be approximately 12 – 18 months to complete the development in its entirety with the forecasted earliest completion date of April 2023.

Name	Planning Reference	Address	Distance from the scheme (Reach W7)	Description	Status	Construction/ Operation dates
Land Adjacent to Ham Business Centre	(AWDM/0762/13)	Land Adjacent Ham Business Centre Brighton Road Shoreham-By-Sea West Sussex	Approximately 1.5km east of the scheme	Full permission for (Class A1) food store, (Class A1-A5) retail uses - including restaurants, cafes and drinking establishments, (Class D2) Leisure, (Class C3) residential uses, a (Sui Generis) petrol filling station, car wash and associated access, car parking and landscaping; and Outline permission with all matters reserved except access for (Class C3) residential and (Sui Generis) car showroom uses and associated access, car parking and landscaping. This application is accompanied by an environmental statement	Pending decision	Information not available
Adur Slipway	(AWDM/0261/15)	Land Adjacent Playground Car Park Adur Recreation Ground Brighton Road Shoreham-By-Sea West Sussex	Adjacent to the scheme	Construction of public slipway plus increased car/trailer parking (amended plan received showing addition of flood gates)	Pending decision	Information not available

Table 3.3: Assessment of Likely Significant Cumulative Effects

Development	Construction
New Monks Farm, Policy 5 (AWDM/0961/17)	The construction phase of the New Monks Farm development will overlap with the construction of the Scheme. The New Monks Farm ES confirmed that cumulative effects may occur during this period, specifically in relation to visual impacts on residential receptors and increased disturbance to ecological receptors associated with the proposed installation of a new pumping station as part of the development to be situated on the western bank of the Adur Estuary. However, the New Monks Farm ES made reference to the package of mitigation measures taken forward to construction for the Scheme and confirmed that these measures will be replicated on the New Monks Farm development to ensure there were no significant additional construction impacts upon ecological receptors. In addition, the potential overlapping construction periods between spring and autumn 2022. Due to the small-scale construction works required for the scheme, and strict adherence to and implementation of the EAP (Appendix C (A1; A4; B1; B4; and B5)) by the Contractor working on the scheme, and the package of mitigation measures associated with New Monks farm, effects are not anticipated to be significant.
Shoreham Airport, Policy 7 (AWDM/1093/17)	The construction phase of the Shoreham Airport development has the potential to overlap with the construction of the Scheme. Cumulative effects may occur during this period, specifically in relation to noise and vibration. The Shoreham Airport ES confirms that piling has the highest potential to induce vibration impacts which may be noticeable at sensitive receptors. The Shoreham Airport ES concluded that further assessment will be undertaken to confirm potential adverse impacts from construction vibration. Dependant on the piling methodology taken forward for the proposed development, and the cumulative impact associated with the piling activities associated with the scheme, there is the potential for significant effects on residential receptors to the east of the River Adur. As such, in accordance with A6.2 of the EAP (Appendix C), the selection of appropriate piling methods to minimise vibration impacts on buildings will be agreed with the LPA prior to commencement of construction activities. This will ensure that significant cumulative effects do not arise as a result of the scheme and other developments. Overall, it has been considered that the overlapping construction periods will be for between spring and autumn 2022. Due to the small-scale construction works required for the scheme, and provided the EAP (Appendix C (A1; A6; B1 and B6)) is adhered to and implemented by the Contractor, including liaison with the relevant LPA to determine an appropriate piling methodology, vibration effects are not anticipated to be significant.
Land and New Roundabout Northern Boundary Of A27 (AWDM/1906/20)	The construction phase of the development will likely overlap with the construction of the scheme. Cumulative effects may occur during this period, specifically in relation to visual impacts. However, as the overlapping construction periods will be between spring and autumn 2022 due to the small-scale construction works required for the scheme, and permitting the respective EAP and TMP are adhered to and implemented by the Contractor working on the development and the scheme, such effects are not anticipated to be significant.
Land Adjacent to Ham Business Centre (AWDM/0762/13)	In the event that the construction phase of the development will overlap with the construction of the scheme, there is the potential for cumulative effects, specifically in relation to ecological receptors. However, as the overlapping construction periods will be between spring and autumn 2022 due to the small-scale construction works required for the scheme, and permitting the respective EAP is adhered to by the Contractor working on the development and the scheme, such effects are not anticipated to be significant.
Adur Slipway (AWDM/0261/15)	In the event that the construction phase of the development will overlap with the construction of the scheme, there is the potential for cumulative effects, specifically in relation to ecological receptors. However, as the overlapping construction periods will be between spring and autumn 2022due to the small-scale construction works required for the scheme, and permitting the respective EAP is adhered to by the Contractor working on the development and the scheme, such effects are not anticipated to be significant.

4 Conclusions and recommendations

4.1.1 This Environmental Report has been undertaken to identify any new or materially different environmental effects as a result of the amended Reach W7 design and construction methodology.

4.1.2 The Environmental Report has not recognised any alterations of any significance in the environmental disciplines from the anticipated effects identified in the 2015 ES regarding the operation phase of Reach W7. As such, operational effects were not assessed in this Environmental Report and were scoped out.

4.1.3 Table 4.1 below outlines the predicted environmental effects for each environmental discipline assessed within this report with mitigation measures in place. Overall, the Environmental Report has not identified any new significant environmental effects in regard to the construction phase of Reach W7 of the Scheme. However, given that a number of assumptions have been made regarding design elements and specification of construction activities, further recommendations for additional assessment to support these conclusions and further develop mitigation measures as required have been outlined below.

Table 4.1: Summary of Mitigation Measures and Significance of Effect for each Environmental Discipline

Environmental discipline	Mitigation measures	Conclusions
Air Quality	Best practice measures to limit and control dust emissions, as set out within the EAP (Appendix C (B2))	No likely significant effects
Historic Environment	No specific mitigation measures	No likely significant effects
Nature Conservation	Best practice measures to reduce effects on ecological receptors, as set out within the EAP (Appendix C (A1; A4; B1 and B4)) As set out in Section 2.5, the construction methodology has not been confirmed, including the selection of machinery, though the piling method has been identified as pre-auger and vibro-pilling. In the event that construction methodology deviates from the methods proposed in the Construction Methodology Report, the Contractor and Employer must ensure that those deviations do not render the measures set out within the EAP (Appendix C (B4.7 and B4.9) to become inadequate.	No likely significant effects
Landscape and Visual Effects	Best practice measures in line with EAP (Appendix C (B5))	No likely significant effects
Noise and Vibration	Best practice measures in line with EAP (Appendix C (A1; A6; A10; and B6))	No likely significant effects
Soil and Ground Conditions	Best practice measures in line with EAP (Appendix C (B7))	No likely significant effects
Water Environment	Best practice measures in line with EAP (Appendix C (A1; A8; B1; and B8))	No likely significant effects
Material Assets	Best practice measures in line with EAP (Appendix C (A1; A7; A9; B7; and B9))	No likely significant effects
Climate	Best practice measures in line with EAP (Appendix C (B11))	No likely significant effects
Heat and Radiation	No specific mitigation measures	No likely significant effects

Environmental discipline	Mitigation measures	Conclusions
Major Accidents and Disasters	No specific mitigation measures	No likely significant effects
Combined and Cumulative Effects	No specific mitigation measures	No likely significant effects

4.2 Recommendations

4.2.1 It is considered that the piling works are likely to result in noise levels that could result in disturbance. Therefore where construction activities are likely to result in noise levels above 70dB within the adjacent habitats used by wintering birds, these works are programmed after the end of March. The Contractor must ensure that noisy construction activities do not commence prior to this date to ensure significant effects do not arise. Section A4.5 of the EAP (Appendix C) sets out the necessary measures to be taken forward during construction to ensure disturbance to breeding birds is minimised.

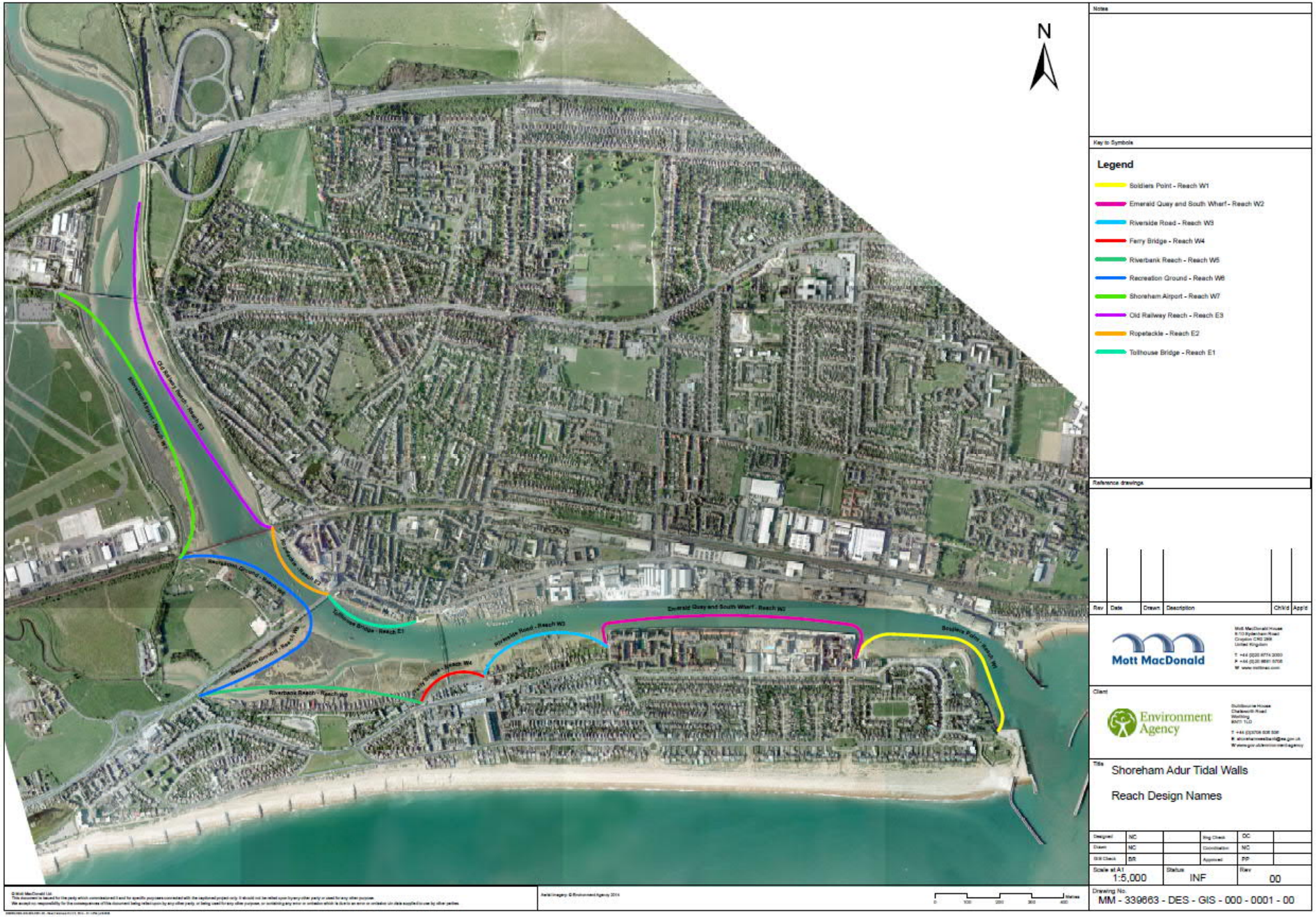
4.2.2 There is a low risk of noise and visual disturbance resulting in disturbance of Schedule 1 birds which may be breeding within adjacent habitats. The site compound will be arranged in such a way to reduce potential noise impacts. Furthermore, the ECoW will undertake routine monitoring of the scrub during the works, to identify if Cetti's warbler are present, as set out in section B4.5 of the EAP.

4.2.3 CRoW Assent will be required as works are located directly adjacent to Adur Estuary SSSI.

4.2.4 It is recommended that a construction noise management plan is produced in accordance with the EAP (Appendix C (A6.1.2)). Should any new noise receptors be identified prior to or during the commencement of works, a detailed review will be required in line with the 2015 ES. In addition, Section 61 Prior Consent will be submitted and accepted by the Local Planning Authority prior to the commencement of the works to ensure that impacts are assessed and significant effects do not arise, in accordance with the EAP (Appendix C (B6)).

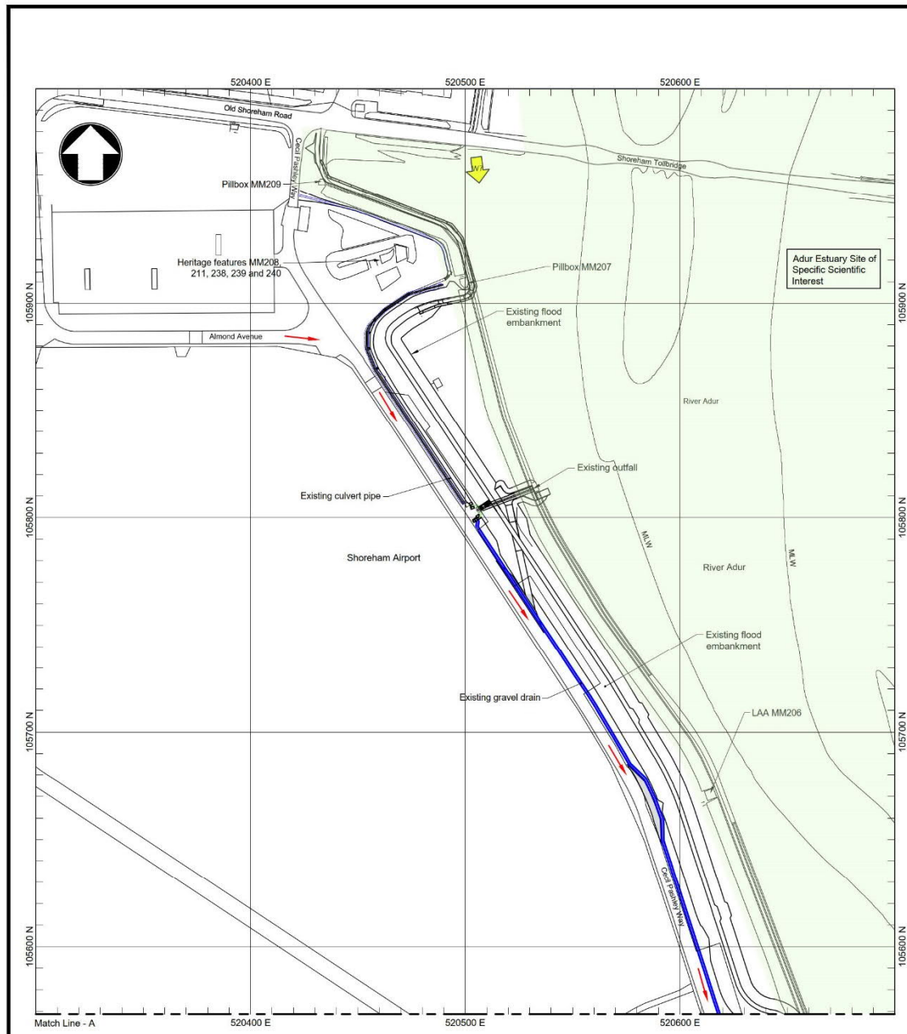
4.2.5 Prior to the commencement of construction activities, it is recommended that the contractor confirms the scope of works, including whether artificial lighting is required on site for the duration of the works. If it is confirmed that artificial lighting is required, a review of the assessment conclusions set out within this report must be undertaken to ensure that significant environmental effects do not arise.

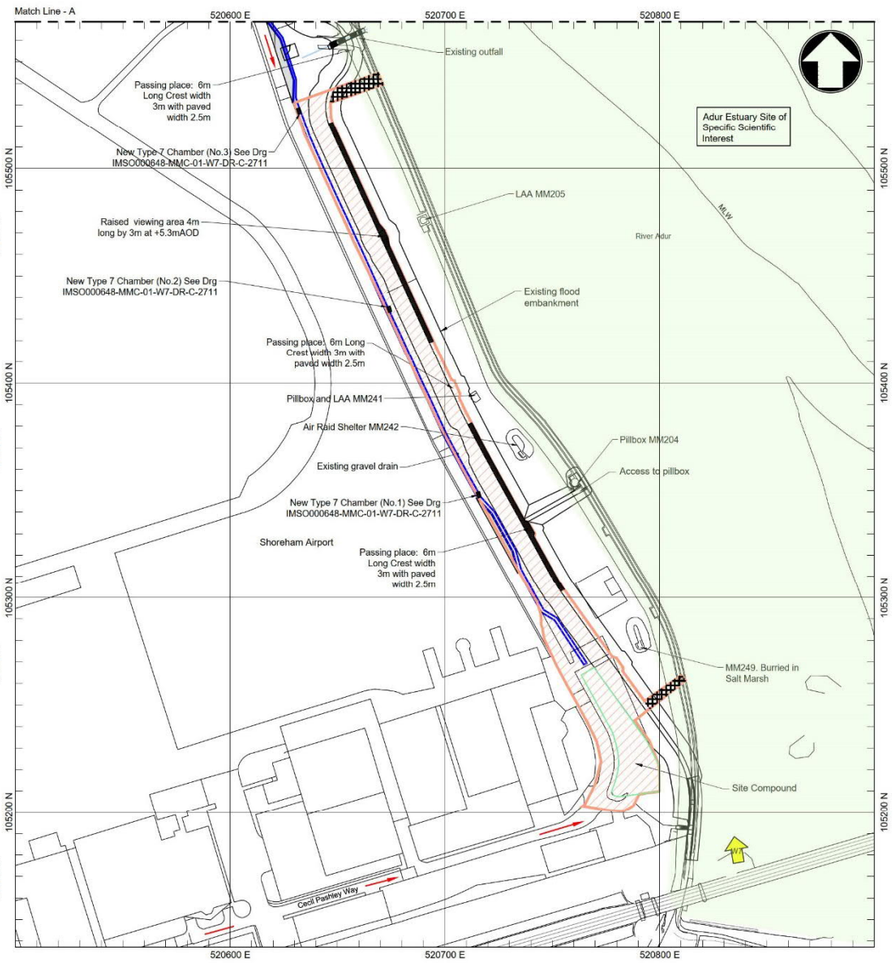
A. Shoreham Adur Tidal Walls Full Reach Plan


N
Notes
Key to Symbols
Legend
Soldiers Point - Reach W1
Emerald Quay and South Wharf - Reach W2
Riverside Road - Reach W3
Ferry Bridge - Reach W4
Riverbank Reach - Reach W5
Recreation Ground - Reach W6
Shoreham Airport - Reach W7
Old Railway Reach - Reach E3
Ropetackle - Reach E2
Tollhouse Bridge - Reach E1
Reference drawings
Rev
Date
Drawn
Description
Chk'd
Appr'd
Mott MacDonald
Client
Environment Agency
Title
Shoreham Adur Tidal Walls
Reach Design Names
Designed
NC
Dsg Check
DC
Drawn
NC
Coordination
NC
GIS Check
BR
Approved
PP
Scale at A1
1:5,000
Status
INF
Rev
00
Drawing No.
MM - 339663 - DES - GIS - 000 - 0001 - 00

B. Shoreham Adur Tidal Walls Reach W7

B.1 Shoreham Adur Tidal Walls Reach W7: Reach Overview





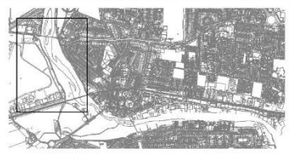
Notes

1. All dimensions are in metres unless noted otherwise.
2. All levels are in metres relative to Ordnance Datum Newlyn (OD).
3. All positions are in metres relative to National Grid.
4. The Boundary of Works lines should be along the riverward edge of the embankment footpath. An allowance has been made at either end of site to extend the boundary fence down the riverward side of the embankment to deter pedestrians from the salt marsh.
5. No plant or equipment beyond that required to install the boundary fence manually shall extend beyond the riverward edge of the footpath running along the crest of the embankment.
6. Contractor to adhere to the requirements of the Airport Legal Agreement when setting up and temporary works including site access and working platforms.
7. Alignment of Adur Estuary SSSI approximated from Defra Magic Maps.

Key to symbols

- Flood Defence (Wall or Embankment)
- MLW — Mean Low Water
- W7 — Reach extent
- Boundary of works
- Satellite site compound
- Site access
- Temporary Works
- Permanent Works
- Adur Estuary Site of Specific Interest
- Area designated for site fencing only, fencing to be manually installed.

Key plan



Reference drawings

IMSO000648-MMC-01-XX-DR-C-2711 - Sheet Pile Wall General Arrangement, Typical Section and Typical Details

1:1250 — 0 — 62.5m — 125m

Rev	Date	Drawn	Description	Ch'k'd	App'd
P02	10.11.2021	PS	For Review and Comment	GRW	AB
P01	16.07.21	PS	For Review and Comment	GRW	AB

Mott MacDonald House
8-10 Sydenham Road
Croydon, CR0 2EE
United Kingdom

T +44 (0)20 8774 2000
F +44 (0)20 8681 5706
W www.mottmac.com

Client: Environment Agency

Title
Shoreham Adur Tidal Walls
Reach W7 : Shoreham Airport

Site Plan

Designed	J H Chan	JHC	Eng check	P Rutty	PR
Drawn	P Steers	PS	Coordination	G R Wallace	GRW
Dwg check	C Arnold	CA	Approved	A Burton	AB

Scale at A1	Status	Rev	Security
1:1250	S3	P02	STD

Drawing Number
IMSO000648-MMC-01-XX-DR-C-2720

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION
This information is based on an experienced and competent contractor carrying out the work and the risks specific to these works additional to those normally associated with this type of work

Where appropriate the residual risks are indicated on the drawing with the symbol and reference to the note number

C1

CONSTRUCTION
C1 - Potential collapse of existing embankment due to excavation or additional loads on the embankment.
C2 - River bank prone to settlement and collapse if overloaded.
C3 - UXO - Military activity within the Shoreham area during the Second World War.
C4 - Temporary lowering of existing embankment leading to loss of flood protection.
C5 - Risk of damage to gravel filter drain.
C7 - PRoW - members of the public may not not be aware of works.
C8 - Intertidal environment.
C9 - Site adjacent to SSSI.
C10 - Potential for fly tipped asbestos along the grass verge of the embankment.
C11 - Low flying aircarft, restricted working in accordance with airport legal agreement.
C12 - Installation of site boundary fencing riverward of the footpath will require tidal working, ground is uneven and only manual erection is permitted riverward of the footpath.

MAINTENANCE
M1 - Potential collapse of embankment due to excavations or presence of additional loads.

DEMOLITION
See construction risks above

©
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

© Crown copyright and database rights 2014 Ordnance Survey 100024198 © Environment Agency copyright and/or database rights 2014. All rights reserved.

C:\pw work\pw_dav_cde\wal63098\dms00818\IMSO000648-MMC-01-W7-DR-C-2720.dwg Nov 10, 2021 - 3:47PM WAL63098

B.2 Shoreham Adur Tidal Walls Reach W7: General Arrangement Plan

Setting out points [1]

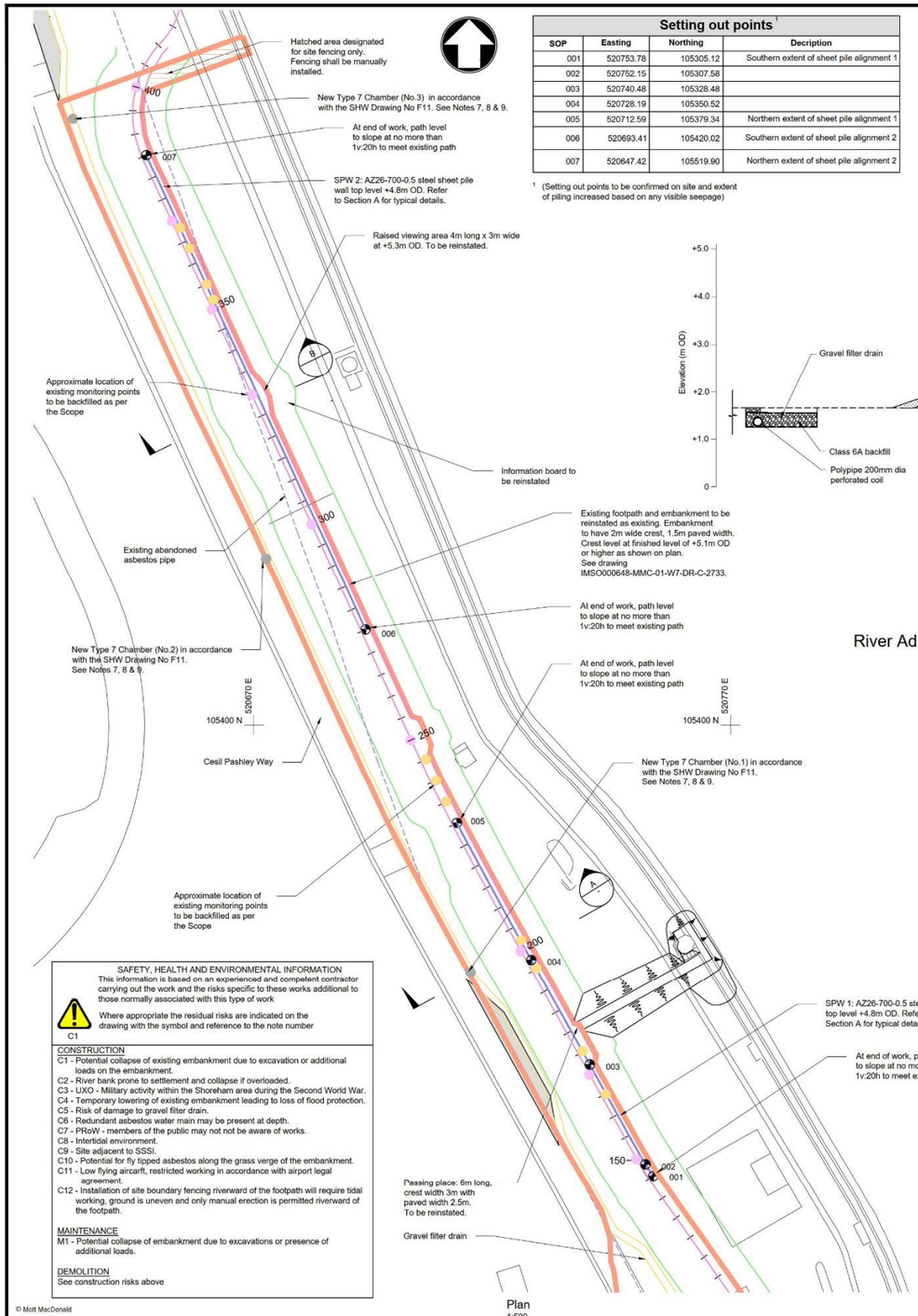
SOP	Easting	Northing	Decription
001	520753.78	105305.12	Southern extent of sheet pile alignment 1
002	520752.15	105307.58	
003	520740.48	105328.48	
004	520728.19	105350.52	
005	520712.59	105379.34	Northern extent of sheet pile alignment 1
006	520693.41	105420.02	Southern extent of sheet pile alignment 2
007	520647.42	105519.90	Northern extent of sheet pile alignment 2

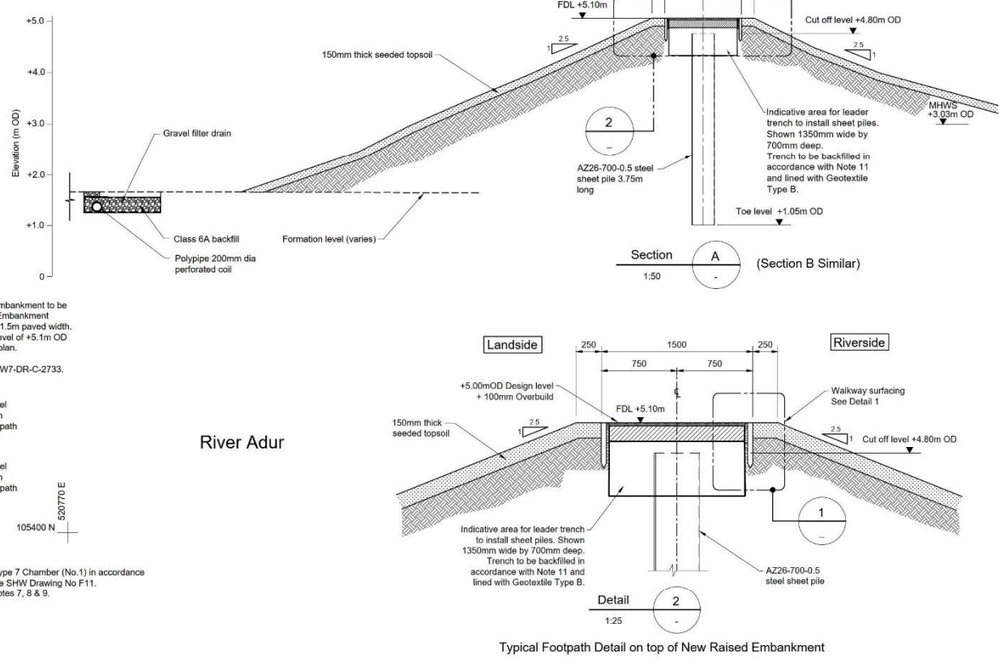
[1] (Setting out points to be confirmed on site and extent of piling increased based on any visible seepage)

Setting out points

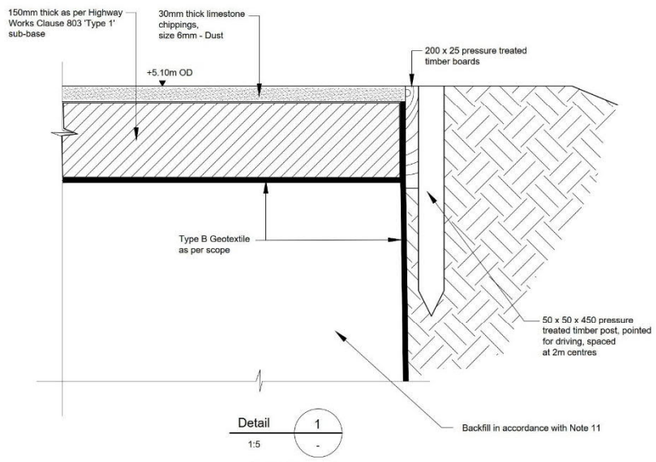
SOP	Easting	Northing	Decription
Type 7 Chamber, No.1 (008)	**520715.45**	**105347.95**	
Type 7 Chamber, No.2 (009)	**520672.53**	**105434.93**	
Type 7 Chamber, No.3 (010)	**520632.00**	**105527.50**	

[2] (Chambers to be spaced at 100m centers, with Chamber No.1 set 100m from the southern end of the gravel filter drain. Setting out points are to be used to locate the Chamber along the length of filter drain, the exact orientation and positioning are to be determined on site by the Contractor to suit the 200mm dia perforated coil polypipe)





Typical Footpath Detail on top of New Raised Embankment



Type H Footpath

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

This information is based on an experienced and competent contractor carrying out the work and the risks specific to these works additional to those normally associated with this type of work

Where appropriate the residual risks are indicated on the drawing with the symbol and reference to the note number

C1

CONSTRUCTION
C1 - Potential collapse of existing embankment due to excavation or additional loads on the embankment.
C2 - River bank prone to settlement and collapse if overloaded.
C3 - UXO - Military activity within the Shoreham area during the Second World War.
C4 - Temporary lowering of existing embankment leading to loss of flood protection.
C5 - Risk of damage to gravel filter drain.
C6 - Redundant asbestos water main may be present at depth.
C7 - PRoW - members of the public may not not be aware of works.
C8 - Intertidal environment.
C9 - Site adjacent to SSSI.
C10 - Potential for fly tipped asbestos along the grass verge of the embankment.
C11 - Low flying aircarft, restricted working in accordance with airport legal agreement.
C12 - Installation of site boundary fencing riverward of the footpath will require tidal working, ground is uneven and only manual erection is permitted riverward of the footpath.

MAINTENANCE
M1 - Potential collapse of embankment due to excavations or presence of additional loads.

DEMOLITION
See construction risks above

Notes

1. All dimensions are in metres unless noted otherwise.
2. All levels are in metres relative to Ordnance Datum Newlyn (OD).
3. All positions are in metres relative to National Grid.
4. Embankment to be reinstated to +5.10m OD or higher level as shown on plan.
5. Embankment slopes to be reinstated to existing gradients with 150mm depth of top soil seeded as per the Scope.
6. Footpath Type H as per Scope. Footpath to include a 1:40 cross fall to the landside to be free draining. Any transitions shall ensure they do not contain, pond or hold water.
7. Existing 200mm Dia perforated coil polypipe to be cut back to facilitate construction of Type 7 Chamber in accordance with the Specification for Highway Works. The branches of the existing 200mm dia polypipe shall be built into the chamber walls. The geotextile surround to the gravel filter drain shall be reinstated up against the chamber to contain the filter material (Class 6A).
8. All Type 7 Chambers have two branches with invert levels to match those of the existing 200mm Dia perforated coil polypipe. Finish level of gully top shall match the adjacent surface level of the gravel filter drain.
9. All Type 7 Chambers shall be fitted with standard covers of grade D400 rather than gratings in accordance with the Specification for Highway Works.

Earthworks

10. All materials to be placed and compacted in accordance with Clause 612 of the Specification for Highways Work unless marked otherwise on this drawing.
11. Backfill shall be formed of single sized aggregate 10mm diameter and shall be placed in accordance with Clause 503 of the Specification for Highway Works. Backfill shall be carefully compacted in layers not exceeding 150mm thickness ensuring full compaction next to the trench walls as per Clause 503.

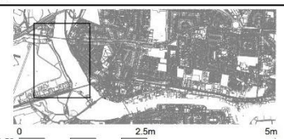
Piling

12. Piling to be carried out in accordance with the Scope.
13. Steel grade Grade S355.
14. The Contractor shall undertake a condition survey of the embankment, including records of seepage, prior to the Works and a further survey upon completion of Works following the next MHW to confirm their have been no adverse impacts on the existing embankment as a result of the Works. Where post-construction seepage is identified, the Contractor shall inform the Client.
15. Any changes to the setting out points shall ensure that the steel sheet piles extend a minimum of 7.0m beyond the end of any visible seepage.
16. Existing monitoring points to be backfilled in accordance with the Scope following completion of sheet pile works.

Key to symbols

- Boundary of works
- Top of embankment
- Bottom of embankment
- Gravel filter drain
- PDZ8 steel sheet pile
- Existing abandoned concrete asbestos pipe
- SOP Setting out point
- MHWS Mean high water springs
- MLWS Mean low water springs
- SHW Specification for Highway Works
- Existing monitoring points
- Borehole monitoring points
- Type 7 Chamber

Key plan



1:50 0 2.5m 5m
1:5 0 0.25m 0.5m
1:25 0 1m 2.5m
1:500 0 25m 50m

Rev	Date	Drawn	Description	Ch'k'd	App'd
P03	10.11.2021	PS	For Review and Comment	GRW	AB
P02	16.07.2021	PS	For Review and Comment	GRW	AB
P01	17.03.2021	PS	Draft for discussion	GRW	AB

Mott MacDonald House
8-10 Sydenham Road
Croydon, CR0 2EE
United Kingdom
T +44 (0)20 8774 2000
F +44 (0)20 8681 5706
w www.mottmac.com

Client: Environment Agency

Title: Shoreham Adur Tidal Walls
Reach W7: Shoreham Airport

Sheet Pile Wall - General Arrangement, Typical Section and Typical Detailis

Designed	J H Chan	JHC	Eng check	P Rutty	PR
Drawn	P Steers	PS	Coordination	G R Wallace	GRW
Dwg check	C Arnold	CA	Approved	A Burton	AB

Scale at A1	Status	Rev	Security
As shown	S3	P03	STD

Drawing Number: IMSO000648-MMC-01-W7-DR-C-2711

© Mott MacDonald

This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

© Crown copyright and database rights 2014 Ordnance Survey 100024198 © Environment Agency copyright and/or database rights 2014. All rights reserved.

C:\pw work\pw_dev_cdelaat8309\dms00816\IMSO000648-MMC-01-W7-DR-C-2711.dwg Nov 10, 2021 - 2:26PM WALE3098

C. Environmental Action Plan