

## REPORT

# **Withernsea Wastewater Treatment Works Long Sea Outfall (LSO) Replacement**

### Non-Technical Summary

Client: Yorkshire Water Services

Reference: I&BPB5063R101F01

Status: Final/01

Date: 15 February 2019



HASKONINGDHV UK LTD.

Marlborough House  
Marlborough Crescent  
Newcastle upon Tyne  
NE1 4EE  
Industry & Buildings  
VAT registration number: 792428892

+44 191 2111300 **T**  
+44 1733 262243 **F**  
info.newcastle@uk.rhdhv.com **E**  
royalhaskoningdhv.com **W**

Document title: Withernsea Wastewater Treatment Works Long Sea Outfall (LSO) Replacement

Document short title: Withernsea LSO Replacement NTS

Reference: I&BPB5063R101F01

Status: 01/Final

Date: 15 February 2019

Project name: PB5063

Project number: PB5063

Author(s): Sarah Marjoram, Claire Gilchrist

Drafted by: Sarah Marjoram

---

Checked by: Gregor McNiven

---

Date / initials: 13/02/19 / GM

---

Approved by: Wasim Hashim

---

Date / initials: 14/02/19 / WH

---

Classification

Project related



## Disclaimer

*No part of these specifications/printed matter may be reproduced and/or published by print, photocopy, microfilm or by any other means, without the prior written permission of HaskoningDHV UK Ltd.; nor may they be used, without such permission, for any purposes other than that for which they were produced. HaskoningDHV UK Ltd. accepts no responsibility or liability for these specifications/printed matter to any party other than the persons by whom it was commissioned and as concluded under that Appointment. The integrated QHSE management system of HaskoningDHV UK Ltd. has been certified in accordance with ISO 9001:2015, ISO 14001:2015 and OHSAS 18001:2007.*

## Table of Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
1.1	Background	1
<b>2</b>	<b>Description of the proposed scheme</b>	<b>3</b>
2.1	Need for the proposed scheme	3
2.2	Alternative options considered	3
2.3	Proposed scheme construction phase	4
2.4	Description of the Operational Phase	6
2.5	Programme	6
<b>3</b>	<b>Requirement for and scope of EIA</b>	<b>6</b>
<b>4</b>	<b>Assessment Methodology</b>	<b>6</b>
<b>5</b>	<b>Summary of Predicted Environmental Impacts</b>	<b>7</b>
5.1	Marine Hydrodynamic and Sedimentary Regime	7
5.2	Marine Sediment and Water Quality	8
5.3	Marine and Coastal Ecology	8
5.4	Fish and Fisheries	8
5.5	Marine and Coastal Ornithology	9
5.6	Marine Historic Environment	9
<b>6</b>	<b>Cumulative Impact Assessment</b>	<b>10</b>
<b>7</b>	<b>Water Framework Directive Compliance Assessment</b>	<b>10</b>
<b>8</b>	<b>Habitats Regulations Assessment</b>	<b>10</b>
<b>9</b>	<b>Marine Conservation Zone Assessment</b>	<b>11</b>
<b>10</b>	<b>Summary and Conclusions</b>	<b>11</b>

## Table of Figures

Figure 1.1	Proposed scheme layout	2
------------	------------------------	---

## 1 Introduction

### 1.1 Background

Yorkshire Water Services (YWS) is proposing the construction of a new long sea outfall (LSO) on the Holderness Coast in the East Riding of Yorkshire to discharge treated wastewater (in compliance with the EA discharge consent) from Withernsea and its surrounding catchment. Amplified rates of erosion along this coast, due to storm events, have placed the existing Withernsea Wastewater Treatment Works (WwTW) and the LSO under threat of instability that would lead to collapse and subsequent pollution. This has accelerated the need for a new WwTW and a new LSO.

The new LSO will extend approximately 3.4km from the new WwTW, to the east of Hollym village. The terrestrial section is approximately 2.3km in length. The intertidal and subtidal sections are approximately 1.1km in length, from the toe of the cliff. The discharge point of the new LSO will be up to 50m to the south of the permitted discharge point of the existing LSO.

The wider onshore project, which does not form part of this application, comprises the demolition of the existing Withernsea WwTW, construction of a replacement WwTW, a new rising main and a connection from the new rising main to the existing Hollym Sewage Pumping Station (SPS).

In January 2018 the Local Planning Authority (LPA), East Riding of Yorkshire Council (ERYC), confirmed that the works above Mean High Water Spring tides (MHWS) (including the WwTW, Rising Main and terrestrial LSO sections) did not require Environmental Impact Assessment (EIA) under the requirements of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017.

Those works below the level of MHWS comprising the construction of the intertidal, and subtidal length of the LSO, represent the 'proposed scheme' and are shown in **Figure 1.1**. The proposed scheme was screened in January 2018 under the requirements of the Marine Works (Environmental Impact Assessment) Regulations 2017 (as amended) ('the MWRs') by the Marine Management Organisation (MMO). The MMO confirmed in February 2018 that construction of the LSO below MHWS required an EIA under the MWRs, and as such an Environmental Statement (ES) should be produced in support of a marine licence application to the MMO.

The EIA has assessed the potential environmental impacts of the construction, operation and decommissioning phases and an ES has been produced. This document represents the 'Non-Technical Summary' (NTS) of the ES.





**Legend**

- Connection Pit
- Indicative location of temporary access ramp for pipeline protection works
- Proposed Scheme Boundary
- LSO Section above MHWS
- New LSO
- Existing LSO
- HDD/Microtunnelling Site Compound
- Existing Wastewater Treatment
- MHWS
- MLW

© HaskoningDHV UK Ltd.  
 Contains OS data © Crown Copyright and database right 2018  
 Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Client:	Project:
Yorkshire Water Services	Withernsea LSO EIA

Title:  
**Proposed Scheme Layout**

Figure: 2.1

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
0	11/02/2019	TC	ES	A3	1:5,000

Co-ordinate system: British National Grid



**ROYAL HASKONINGDHV**  
 Marlborough House  
 Marlborough Crescent  
 Newcastle-upon-Tyne, NE1 4EE  
 +44 (0)191 211 1300  
 www.royalhaskoningdhv.com

## 2 Description of the proposed scheme

### 2.1 Need for the proposed scheme

The marine (intertidal and subtidal) length of the existing LSO was constructed in 1991 with a 60-year design life (i.e. to remain in place until 2051). Although the original design of the outfall took into consideration the predicted seabed changes and cliff erosion at the time, recent significant storm events at the site location in 2015 and 2016 have amplified the rates of erosion. The WwTW current position is less than 60m from the cliff edge. The cliff is predicted to erode to such an extent that it will reach the existing WwTW boundary within the next 10 years, and the existing outfall is already partially exposed in the intertidal section and is predicted to be fully exposed on the seabed (beyond low water) in 2028.

EYRC will serve a demolition notice on the existing WwTW site once the cliff edge reaches 20m from the site boundary. Therefore, in order to continue to serve the community there is an urgent need for a replacement before the existing WwTW becomes inoperable.

An asset inspection carried out in 2017 identified that the existing LSO protection had become exposed on the foreshore, resulting in external damage of the concrete. Although the pipe is not currently visible, it is anticipated that exposure is imminent. Therefore, the 'do nothing' approach would not be acceptable and it is necessary to find a new location for the Withernsea WwTW and associated infrastructure.

### 2.2 Alternative options considered

The new LSO route is dictated by the relocation of the new WwTW, therefore the assessment of alternative location options for the new WwTW is key to understanding the new proposed route of the LSO. The following sections describe the options assessed for the proposed scheme, through consideration of the options for the new Withernsea WwTW.

#### 2.2.1 Relocation of the WwTW

A number of factors were considered in the selection of potential locations for the new WwTW:

- Distance from predicted 100-year erosion line.
- Downstream to Withernsea Bathing Water.
- More than 400m from residential areas.
- Access to public roads.
- Distance from flood zones, ecological and archaeological interests.

Of the seven sites identified, two sites were taken forward for further consideration. Following public consultation with residents the site of the proposed new WwTW was chosen as the site was the furthest away from residential developments, to avoid odour impacts, and to avoid construction traffic travelling through Hollym village.

### 2.2.2 Re-use of the Existing LSO

The potential re-use of the existing steel pipe for the offshore section of the LSO was considered within a feasibility study, however, due to ongoing coastal erosion and uncertainty of the internal and external condition of the steel pipe it was concluded that the existing outfall would not satisfy its remaining asset life and therefore this option was discounted.

### 2.2.3 Replacement of LSO

Based on the preferred location of the WwTW and the requirement for a new LSO the proposed route follows the shortest distance on land and the intertidal and subtidal sections follow as close as possible to the existing discharge point offshore. As with the existing LSO, the preferred new LSO route is located within the Greater Wash Special Protection Area (SPA) and Holderness Inshore Marine Conservation Zone (MCZ).

The following construction techniques have been considered for the proposed replacement LSO at Withernsea and assessed for each section of the potential LSO route: open cut/trenching, tunnelling, and Horizontal Directional Drilling (HDD). Following the completion of the marine and terrestrial ground investigation, the preferred construction techniques for the LSO options, considering the rate of coastal erosion apparent to the site, was confirmed. Given ground conditions, the most feasible construction method is as follows;

1. **Conventional trenching and backfilling** for the installation of the terrestrial length of the LSO, up to the 100-year predicted erosion line (approximately 2.3km in length).
2. **HDD/micro-tunnelling** from the 100-year predicted erosion line, to a point approximately 100m from the cliff offshore. This will provide protection to the LSO from future erosion risk, whilst avoiding impacts to the soft cliffs.
3. **Conventional trenching and backfilling** for the subtidal section due to the risk of geological hazards below the seabed. An open cut trench with a float and flood pipe installation and subsequently backfilled is proposed. This discharge point will be as close as practicably possible to the existing discharge point.

## 2.3 Proposed scheme construction phase

### 2.3.1 Intertidal LSO section

The construction of the intertidal length of the LSO will involve the following elements:

- Horizontal Directional Drilling (HDD) or micro-tunnelling of the LSO from the terrestrial section and approximately 100m of the foreshore
- The installation of a temporary cofferdam by vibro-piling to allow the recovery of the tunnelling machine or HDD exit point and to connect the intertidal LSO section with the subtidal LSO section.



- The excavation of approximately 5,000m<sup>3</sup> to form a 100m trench between the cofferdam and the low-water limit of the marine dredging equipment in which the subtidal marine section of the LSO will be installed. The material will be side-cast until the pipeline is installed, and then backfilled over the pipeline.
- A temporary access ramp from the cliff will be constructed and will remain in situ for the duration of the construction period.
- Construction hours for the intertidal section will be six days per week, between the hours of 08:00 and 19:00 for approximately two months.

### 2.3.2 Subtidal LSO section

The construction of the subtidal length of the LSO will involve the following elements:

- A back-hoe or cutter suction dredger will be used to dredge a 1km trench for the subtidal section of LSO, removing approximately 50,000m<sup>3</sup> of material. This material will be side-cast and once the LSO pipe is installed, used to backfill the trench. The LSO will be installed approximately 3m below the seabed
- A diffuser will be installed at the end of the LSO.
- Imported material comprised of a rock blanket will be used to provide scour protection to the diffuser structure, covering a 10m radius from the diffuser. Due to the burial depth of the LSO (more than 3m) based on future seabed erosion predictions over the design life and to maintain a minimum cover of 2m, scour protection for the length of the LSO is not considered to be required.
- Construction hours for the subtidal section will be seven days per week, 24 hours per day for approximately two months

### 2.3.3 Decommissioning of the Existing LSO

Once the replacement LSO is commissioned the existing LSO will be decommissioned. This will involve the following activities undertaken, over a period of up to two weeks:

- Above seabed structures, including the diffuser riser, diffuser protection and marker buoy will be removed to below seabed level and disposed of at a suitably licenced waste disposal facility.
- Area of the foreshore surrounding the existing LSO will be excavated to enable removal of the existing LSO from the cliff face up to, and including, the exposed concrete chamber on the lower foreshore. The foreshore will be reinstated to existing levels following removal, with suitable infilling material to be utilised if necessary.



- The remaining intertidal and subtidal section of LSO will be capped at both ends with suitable grout/concrete and left *in situ*.

## 2.4 Description of the Operational Phase

The replacement LSO will discharge treated waste water from the new WwTW to a discharge point no more than 50m from the existing LSO discharge point. The discharge of wastewater from the new LSO will be a consented discharge as agreed with YWS and the Environment Agency. Minor maintenance activities for the existing LSO are covered by a 10-year Marine Licence. A request to the MMO to vary this licence to remove the existing LSO and include the replacement LSO will be submitted by YWS.

### 2.4.1 Description of the Decommissioning Phase

The replacement LSO has been designed to remain operational for a period of up to 60 years, however at a point in the future is likely that it will require decommissioning.

The decommissioning of the replacement LSO is expected to follow a similar methodology as the decommissioning of the existing LSO, however the exact method will be agreed upon with the regulatory authorities at the time as it will depend of the condition of the LSO. These works will be subject to a separate consent which would be acquired by the applicant at that time.

## 2.5 Programme

Construction of the proposed scheme is planned to begin in April 2020. Construction works below MHWS will be undertaken within the summer months (1<sup>st</sup> April to 30<sup>th</sup> September) due to the requirement to avoid poor weather conditions and are expected to take approximately five months. It is intended that the decommissioning works for the existing LSO would also be carried out during the summer periods, however, it is possible that timings of the new LSO commissioning may mean that decommissioning activities may need to be undertaken in early winter months, for a period of approximately two weeks.

## 3 Requirement for and scope of EIA

Through the screening process, the MMO has determined that the proposed scheme falls under the requirements of MWRs. The scope of the EIA was defined through the submission of an Environmental Scoping Report (ESR) to the MMO and receipt of a Scoping Opinion. The EIA has been undertaken in accordance with the comments received within the Scoping Opinion.

## 4 Assessment Methodology

The characteristics of the existing (baseline) environment were defined, and the potential environmental impacts of the proposed scheme identified and assessed through the following methods and activities:

- Desk based reviews, interpretation and assessment of existing data

- Site surveys, including a geophysical survey, ornithology survey, a marine ecological survey and sediment quality survey
- Consultation

The ES reports the findings of the EIA process. The following environmental parameters were considered in detail within this process:

- Marine Hydrodynamic and Sedimentary Regime
- Marine Sediment and Water Quality
- Marine and Coastal Ecology
- Marine and Coastal Ornithology
- Fish and Fisheries
- Marine Mammals
- Marine Historic Environment

## 5 Summary of Predicted Environmental Impacts

### 5.1 Marine Hydrodynamic and Sedimentary Regime

Due to the rapid rates of coastal erosion, the Holderness Coastline is relatively well researched and monitoring has been undertaken by ERYC since 1951. The assessment has been undertaken using this data, along with targeted surveys for this project and expert judgement.

There will be no effects on the hydrodynamic and sedimentary regime from installation of the intertidal section of the LSO because it will utilise a trenchless solution. There will be unavoidable increases in suspended sediment concentrations arising locally from installation of the subtidal section however, these effects will be temporary and the increases are likely to be well within the range of values exhibited naturally, especially when sediment is mobilised under storms.

The temporary presence of a cofferdam, required to facilitate connection of the HDD/micro-tunnelling section to the subtidal trench, could cause a temporary interruption to any sediment transport that may be occurring at the interface between the inter-tidal and sub-tidal zones. However, it is predicted that such effects are short term, temporary and not significant in the context of the natural variability in the baseline environment. Baseline conditions will be fully reinstated upon removal of the cofferdam.

The decommissioning of the existing LSO will involve trenching on the foreshore which would be backfilled with side cast materials. Due to the short-term and relatively small-scale nature of this activity, no significant impacts are predicted in terms of increased suspended sediment concentrations or sediment deposition. The capping and abandonment of the subtidal section of the existing LSO is considered to have less potential for environmental impact than excavation and removal of 1000m of the pipeline.

Whilst there will be some acknowledged temporary and localised effects from installation of the LSO, these are not significant impacts on the baseline coastal processes during construction of the proposed works. There are no significant impacts predicted on the baseline coastal processes during operation of the proposed works.

## **5.2 Marine Sediment and Water Quality**

The findings of the sediment quality survey determined that no contaminants were recorded above CEFAS Action Level 2. The Holderness coastline is known to be particularly mobile, with the coastal waters consequently being highly turbid with high levels of suspended sediment. Given the net southerly sediment transport direction along this coastline, no impact on marine water quality is expected at Withernsea, Tunstall or Hornsea bathing waters. Furthermore, any increase in total suspended solids would likely be within the natural variability of the Holderness system.

The dredged seabed material will not be brought to the surface of the water column, but side-cast at depth, minimising the potential for resuspension of sediments.

For the HDD works (if utilised), the use of a drilling fluid is required. Only a small amount of this is used, however, there is the potential that this may be released at the punch out location on the foreshore, on one occasion only. This is a mud-based fluid, bentonite, which is inert and as such is not toxic within the marine environment.

There are no significant impacts predicted on marine sediment and water quality during construction or operation of the proposed scheme, with all impacts considered to be negligible.

## **5.3 Marine and Coastal Ecology**

Site-specific intertidal and subtidal benthic ecology surveys were undertaken in November and July 2017, respectively. The proposed scheme footprint lies within the Holderness Inshore MCZ. However, the intertidal survey identified the habitat as barren intertidal sand and shingle with no fauna identified. The subtidal survey identified mixed and coarse sediments characterised by opportunistic and fast-growing encrusting organisms.

The topic of marine mammals has been scoped into this EIA, following comments received from the MMO within the EIA Scoping Response, principally concerning grey seals. The Humber Estuary supports a breeding colony of grey seals at Donna Nook, to the south of the estuary.

Negligible to minor adverse impacts on benthic communities are expected as a result of water quality, direct temporary disturbance or suspended sediment concentrations during the construction phase. Minor adverse impacts are predicted on marine mammals as a result of underwater noise.

Activities during the operational phase of the replacement LSO are considered to be negligible.

## **5.4 Fish and Fisheries**

The Holderness Coast supports spawning and nursery grounds for plaice and sandeel as well as nursery grounds for cod, herring and whiting, and spawning grounds for sole, as well as supporting European eel, whiting, plaice, hake, ling, monkfish, salmon and sea trout. The

coastline also supports commercially significant populations of shellfish including brown crab, lobster and velvet swimming crab which in turn support commercial fishing at Withernsea.

Due to the naturally high levels of suspended sediment along the Holderness coast, impacts on fish, shellfish, or their eggs, as a result of suspended sediment or dissolved oxygen concentrations are predicted to be minor adverse at worst, as a result of the construction of the LSO. Impacts as a result of noise are considered to be, at worst, minor adverse for herring and negligible for all other species.

Impacts to commercial fishing as a result of the proposed scheme are considered to be negligible. A Fisheries Liaison Officer will be appointed in order to communicate the details of the construction of the replacement LSO and the decommissioning of the existing LSO to the local fishing fleet.

## **5.5 Marine and Coastal Ornithology**

The proposed scheme is within the Greater Wash SPA which is designated to support marine and coastal waterbird interests. The proposed scheme is also close to the Humber Estuary SPA/Ramsar site. A wintering bird survey was carried out over the 2017/2018 period and identified small numbers of red-throated diver using the inshore area during high tide conditions. No other designated species were identified using the marine or foreshore area.

The construction works required for the replacement LSO are programmed to take place outside of the wintering period and as such are not considered to have an adverse impact on designated species through disturbance or through reductions in water quality. Decommissioning of the existing LSO may be undertaken during the overwintering period, however a negligibly impacts is expected, due to the minimal nature of the works.

Operational activities will take place infrequently and will not be discernible above background levels of activity in the area and as such will not have an adverse effect on birds.

## **5.6 Marine Historic Environment**

This section is informed by a desk-based assessment as well as project-specific geotechnical and geophysical surveys. No designated heritage assets were identified within the redline boundary of the proposed intertidal works area, however there are 15 records of non-designated heritage assets. Only one of these records are within the proposed working boundary for the LSO and records indicate that this asset has been removed or lost to sea.

No designated or non-designated heritage assets were identified within the subtidal zone of the proposed LSO, and geophysical surveys did not identify any anomalies of archaeological interest and the potential for remains with geoarchaeological potential within the vicinity of the LSO is low.

A formal protocol for archaeological discoveries is recommended to allow for any unexpected discoveries of archaeological material to be addressed in an appropriate, timely and efficient manner.

No adverse impacts are expected to occur through the construction and operation of the replacement LSO within the intertidal and subtidal zones.



## 6 Cumulative Impact Assessment

The MWRs require that an assessment is made of the potential for cumulative effects to arise (a 'cumulative impact assessment' (CIA)). This should consider the impacts of the proposed scheme with other past, present and reasonably foreseeable (proposed) projects.

A review of EYRC's planning application website, the National Infrastructure Planning website and the MMO's Marine Information System was used to identify relevant nearby projects. One project was screened into the CIA, EYRC's proposed 'Withernsea South Coastal Defences' project.

The Withernsea South Coastal Defences project is located over 1km to the north of the proposed scheme. Construction dates for the coastal defences are not yet confirmed, however they are understood to be planned to commence in Autumn 2019 for a maximum period of six months (including mobilisation and demobilisation). No cumulative effects are therefore predicted during the construction phase.

Additionally, project-wide cumulative impacts which could arise from the combined effect (additive or interactive) of the proposed scheme with other elements of the replacement Withernsea WwTW and associated infrastructure were considered. Each of these aspects of the project are located above MHWS. As such, only certain environmental receptors have the potential to be subject to cumulative impacts, due to the lack of a pathway between the marine receptor and to the construction activities (Marine and Coastal Ornithology and Marine Historic Environment).

The assessment concluded that the potential cumulative impacts with each of the schemes outlined above were of no impact, or of negligible significance.

## 7 Water Framework Directive Compliance Assessment

A Water Framework Directive (WFD) compliance assessment has been undertaken for the proposed scheme. The scoping stage of the assessment did not identify any proposed activities that could have an adverse effect on WFD compliance parameters for the Yorkshire South coastal water body and the Hull and East Riding Chalk groundwater body, and would not compromise the ability of the water bodies to meet their objectives. As a result, further assessment was not necessary

## 8 Habitats Regulations Assessment

An assessment of the potential for the proposed scheme to affect sites designated for nature conservation has been undertaken. The proposed scheme, when assessed alone and in combination with nearby projects and plans, would not result in a 'likely significant effect' (LSE) on the Humber Estuary SPA/Ramsar/SAC designation.

However, the assessment concluded that the proposed scheme would have the potential to result in a LSE on the Greater Wash SPA, during the decommissioning of the existing LSO, which could occur during the overwintering period. However, the effects and impacts of the proposed scheme

are considered to be of sufficiently low magnitude that an adverse effect on the integrity of the site would not occur (either alone or in-combination with other projects).

## 9 Marine Conservation Zone Assessment

The proposed scheme is located within the Holderness Inshore Marine Conservation Zone (MCZ) and as such was screened in to Stage 1 of the MCZ assessment process. The Stage 1 assessment concluded that the proposed works would not result in a significant risk to the conservation objectives of the features designated within the MCZ.

## 10 Summary and Conclusions

The EIA process relating to the proposed LSO replacement scheme has found that through the implementation and adherence to the identified mitigation measures, there will be:

- No significant (i.e. moderate or major) adverse residual impacts resulting from the proposed scheme; and
- No significant adverse cumulative impacts resulting from the proposed scheme in cumulation with other plans and projects.