




BRADWELL SITE

NEW OUTLET DESIGN SPECIFICATION (MIXED EFFLUENT A2 OT2)

BRAD/EN/REP/188

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## 1. Purpose

This document provides the specification for the new outlet design for discharges into the Blackwater Estuary. This has been informed by modelling undertaken by HR Wallingford, a specialist water management company. It is in response to the Environment Agency request to provide an operating technique to meet condition 2.3 "A2 OT2 – Outlet arrangement i.e. specification of the new outlet which determines there is the correct dilution and dispersion as modelled" for the Mixed Effluent permit PR2TS/E10760C<sup>1</sup>. The new outlet design and optimal discharge period ensures that discharges from the site achieve sufficient dilution and dispersion in the receiving water environment to meet relevant environmental quality standards (EQS) for various substances in the effluent.

The requirement of this new outlet for discharges is as a result of the continuing silting up of the existing discharge route which now presents a risk of preventing site's discharges. Furthermore, when the site enters Care and Maintenance, a quiescent period during which no significant activity will be carried out, there will be less human intervention required to continue to make discharges. Accordingly, the new outlet has been designed to require less human intervention whilst achieving sufficient dilution and dispersion.

## 2. Design Parameters

As previously stated the new outlet design has been informed by modelling undertaken by HR Wallingford. A summary of the work is presented in EN/REP/113<sup>2</sup>.

To achieve the dispersion and dilution stated in EN/REP/138<sup>3</sup> the new outlet which is a 180mm diameter polyethylene pipe, with 65mm discharge nozzle at the end is recommended to be configured as below:

- an outfall port of diameter 0.065m;
- discharging horizontally;
- raised 5.5 m above the sea bed, but always submerged; and
- angled offshore, perpendicular to the tidal current direction.

The new outlet pipelines have been installed in the East Syphon Culvert and configured to the recommended design specification as shown on R7M-0501366-DWG-014<sup>4</sup>. Any modification to the design and configuration will be controlled via the company's management control procedure and would require agreement by a Suitably Qualified and Experienced Person (SQEP) from the Environment Team.

## 3. Optimising Dispersion

To optimise dispersion and ensure predicted dilution factors are achieved, discharge must be made within an optimum window of 1 to 2.5 hours after High Water for 45 minutes as required by permit condition 2.1.1. This is achieved by a management control process which ensures that all discharges

adhere to a Quality Plan where the discharge window is specified. Discharge tide times will be determined using the Bradwell Waterside tide times.

## REFERENCES

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- 1 Environment Agency 2016. Mixed Effluent Permit Number PR2TS/E10760C
- 2 BRAD/EN/REP/113 March 2014. Effluent Discharge Arrangements: Initial Dilution EBR4908-RT009-R04-00.
- 3 BRAD/EN/REP/138, January 2015. Annual Average concentration – dedicated discharge EBR4908-RT012-R05-00
- 4 R7M-0501366-DWG-014, July 2014. East Outlet Diffuser Arrangement