

Doc B2.7.2 Environmental risk assessment H1 annex (d) Surface water discharges (basic)

The installation will continually produce trade effluent with a simple composition typical of food processing, comprising mostly water with some biodegradable solids, fats and grease, starches, preserving salts and cleaning chemicals. Preliminary on-site treatment includes catch-pots in drains and a packaged dissolved-air flotation (DAF) plant to remove significant quantities of the solids, fats and greases and lower BOD and COD attributed to them. All the effluent is discharged into sewer at emission point S1 for treatment at the Queensferry sewage treatment works (grid reference SJ 32265 683266) operated by Welsh Water Ltd.

Effluent does not contain any priority substances or other pollutants with environmental quality standards (EQS) listed in Appendix A of the H1 methodology. The effluent from the installation is periodically sampled on site prior to being discharged into the sewer and analysed by Welsh Water for COD, suspended solids and FOG with mean results for:

COD	3,999 mg/l
Suspended solids	1,280 mg/l
FOG	100 mg/l
Mean flow rate	321 m ³ /day or 0.004m ³ /s.

Calculating correction factor for STW

All of effluent parameters are substantially attenuated during sewage treatment and must be corrected in order to calculate process contribution in the final receiving surface water.

$$RC_{corr} = RC_{act} \times STRF$$

Where:

- RC_{corr} = corrected mean release concentration allowing for any attenuation of pollutant during sewage treatment (mg/l)
- RC_{act} = actual mean release rate of pollutants discharged to sewer (mg/l)
- STRF = sewage treatment reduction factor representing the remaining proportion of the pollutant in the effluent following treatment

Appendix B does not include STRF for either suspended solids or fats and greases arising from food processing which are readily biodegradable and totally attenuated during treatment. Appendix B includes a STRF for total organic carbon (TOC) of 0.0000 proportion left in effluent after volatilisation. TOC is a similar measure to the COD arising from the dissolved substances as well as suspended solids and fats and grease. It has been applied in this assessment to demonstrate the effective attenuation of COD during sewage treatment:
COD $RC_{corr} = 3,999 \text{ mg/l} \times 0.000 = 0 \text{ mg/l}$ after attenuation

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Process contributions for discharges to coastal waters

Queensferry STW discharges 5km from the mouth of the R. Dee flowing into the river estuary. It is a coastal water discharge, being below the tidal limit and will be predominantly saline.

Process contribution for COD could have been estimated from:

$$PC_{\text{water}} = \frac{(EFR^{2/3} \times RC)}{DRc} \times 1000$$

Where

- PC = process contribution (µg/l)
- EFR = maximum normal effluent flow rate (m³/s)
- RC = mean released concentration of pollutant in the effluent (mg/l)
- DRc = dispersion rate (coastal waters) (m³/s^{2/3})

And

- Mean flow rate is 321m³/day or 0.004m³/s.
- Mean release concentration of COD in the effluent is 0.000 mg/l after correction
- No data is available for dispersion rate and opted to use the nominal dilution conditions and rate in annex (d) for coastal waters of medium dilution conditions with a nominal rate of 8.0.

$$PC_{\text{water}} = \frac{(0.004^{2/3} \times 0.000)}{8.0} \times 1000$$

$$PC_{\text{water}} = 0.000$$

Treated effluent is ultimately discharged from the STW into a tidal stretch of the River Dee 5km from the Dee estuary. The river at the point of ultimate discharge is not a designated fishery under the DEFRA EC Freshwater Fish Directive for cyprinid or salmonid waters. The Dee estuary is designated a special area of conservation (SAC), special protection area (SPA), Ramsar site and the Shellfish Waters Directive also applies (Figure 1).

There is unlikely to be process contributions of any substance with relevant environmental standards in Appendix A and all emissions of trade effluent from the installation to surface (coastal) water via STW are considered insignificant.