CRESTWOOD ENVIRONMENTAL LTD

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# Sewer Discharge Risk Assessment

**Report Reference: CE-WH-1801-RP15-SEW-RA-FINAL-V1**

**Report Date: 01 March 2024**

**Produced by Crestwood Environmental Ltd.**

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# 1 INTRODUCTION

1.1.1 Crestwood Environmental Ltd (Crestwood) have prepared this Risk Assessment on behalf of Novidon Ltd (Novidon) (**the Applicant and Operator**), in support of an environmental permit application for the operation of a modified starch manufacturing facility and medium combustion plant. The plant is operated at Wrexham Industrial Estate, Coed Aben Road, Wrexham, Clwyd, LL13 9UH (**the Site**).

1.1.2 As part of this application, the Regulator (Natural Resources Wales, NRW) has requested the submission of a quantitative risk assessment of the discharge of process effluent from the Site to the public foul sewer and to the relevant receiving surface water feature.

1.1.3 The following report details the quantitative risk assessment for the discharge to the relevant surface water feature from the Site, using the methodology identified by the guiance: Surface water pollution risk assessment for your environmental permit - GOV.UK (www.gov.uk).

1.1.4 Please note that this report is a screening assessment of the sewer discharge only. Should the assessment identify a potentially significant environmental impact, this would necessitate the completion of more detailed assessment, typically requiring the completion of detailed discharge modelling.

# 2 BACKGROUND

2.1.1 Any hazardous chemicals and elements which are planned to be released into surface water must be assessed in terms of environmental risk, this is carried out through a variety of screening tests. If the screening tests identify environmental risk, a more detailed assessment, typically requiring the completion of detailed discharge modelling may be required.

2.1.2 Screening tests are typically carried out in 3 stages:

1. Identify the pollutants released;
2. Gather data on these pollutants;
3. Carry out screening tests

2.1.3 Risk assessments should be carried out to identify the environmental risk associated with a worst-case scenario. Therefore, the pollutants specified by the site's trade effluent consent and associated maximum allowed concentrations for these pollutants have been used in screening tests. All screening tests involve comparison with the relevant Environmental Quality Standards (EQS). The following table displays the pollutants, initial pollutant discharge concentrations and relevant EQS for the Site.

| Pollutant | Concentration (mg/l) | EQS (mg/l) |
|---|---|---|
| Settled Chemical Oxygen Demand (COD) | 3000 | Not Available |
| Total Suspended Solids | 800 | Not Available |
| Phosphate | 15 | Not Available |
| Fats, Oils and Greases | 100 | Not Available |
| Ammonia | 25 | Not Available |
| Sulphate | 500 | 400 |
| Sulphide | 2 | Not Available |

2.1.4 Depending on the type of treatment used, sewerage treatment works will remove a proportion of pollutants before they are discharged into a receiving surface water feature. The amount of pollutant removal is known as the sewerage reduction factor and must be accounted for when calculating final discharge concentrations. It has been identified that discharge from the Site is sent to the Five Fords Wastewater Treatment Works (WWTW) located to the southeast of Wrexham. This WWTW employs activated sludge treatment and so, the following table displays the relevant sewerage reduction factors

and final discharge concentrations. Please note that the sewerage reduction factors are generic and do not reflect the actual performance of the Five Fords WWTW, which may be superior to the abatement suggested by the factors utilised in this assessment.

| Pollutant | Sewerage Reduction Factor | Discharge Concentration (mg/l) |
|---|---|---|
| Settled Chemical Oxygen Demand (COD) | Not Available | 3000 |
| Total Suspended Solids | Not Available | 800 |
| Phosphate | 0.8 | 12 |
| Fats, Oils and Greases | Not Available | 100 |
| Ammonia | 0.08 | 2 |
| Sulphate | Not Available | 500 |
| Sulphide | Not Available | 2 |

2.1.5 To determine the relevant screening tests which are to be carried out for a risk assessment, it must be known whether the receiving surface water feature is freshwater, an estuary, or a coastal body.

2.1.6 It has been identified that once treated by the Five Fords WWTW, effluent is discharged into to the River Clywedog, a freshwater river flowing close to the north of the works. Therefore, the relevant screening tests for this risk assessment are as follows:

1. Comparison with the relevant EQS;
2. Comparison with the relevant EQS, introducing dilution;
3. Comparison with the relevant EQS, introducing background concentration data;
4. Comparison of the predicted environmental concentration with the relevant EQS.

2.1.7 Each screening test builds on the result of the previous test.

# 3 Screening Test Results

3.1.1 As mentioned previously, screening tests compare discharge concentrations to EQS, when a pollutant is screened out by a test (i.e., there is acceptable environmental risk) it is typically not included in further tests. However, due to the lack of EQS, all tests for which data is available have been carried out in this risk assessment. Should any pollutants not screen out from any test, detailed discharge modelling will be required.

3.1.2 Further tests will be undertaken should the relevant data becomes available.

## 3.2 Screening Test 1

3.2.1 Screening test 1 involves a comparison between discharge concentrations and the relevant EQS. If the discharge concentration is below 10% of the EQS, the pollutant is screened out and there is acceptable environmental risk. The results of this screening test are displayed below.

| Pollutant | Discharge Concentration (mg/l) | EQS (mg/l) | % of EQS |
|---|---|---|---|
| Settled Chemical Oxygen Demand (COD) | 3000 | Not Available | Not Available |
| Total Suspended Solids | 800 | Not Available | Not Available |
| Phosphate | 12 | Not Available | Not Available |
| Fats, Oils and Greases | 100 | Not Available | Not Available |
| Ammonia | 2 | Not Available | Not Available |
| Sulphate | 500 | 400 | 125% |
| Sulphide | 2 | Not Available | Not Available |

3.2.2 As can be seen from the table above, EQS data is unavailable for the majority of pollutants discharged from the Site. An EQS is available for sulphate, however, this pollutant does not screen out.

## 3.3 Screening Test 2

3.3.1 This test introduces the dilution available in the receiving water (River Clywedog). Effluent flow rate data, obtained from the site's trade effluent consent and river flow rate data, obtained from the National River Flow Archive were[1] used to conduct this screening test.

- Effluent flow rate = 4.2 l/s
- River flow rate = 321 l/s

3.3.2 The process contributions (PC) of all pollutants were calculated for each pollutant. If a pollutant's PC is below 4% of the relevant EQS, it is screened out and it is deemed that there is acceptable environmental risk.

3.3.3 The following steps were used to calculate each pollutant's PC:

1) Multiply the effluent flow rate by the discharge concentration of each pollutant.
2) Add the effluent flow rate to the river flow rate.
3) Divide the result of step 1 by the result of step 2.

3.3.4 The results of this screening test are displayed below.

| Pollutant | Discharge Concentration (mg/l) | Mass Flow Rate (mg/s) | PC (mg/l) | EQS (mg/l) | % of EQS |
|---|---|---|---|---|---|
| Settled Chemical Oxygen Demand (COD) | 3000 | 12600 | 38.7 | Not Available | Not Available |
| Total Suspended Solids | 800 | 3360 | 10.3 | Not Available | Not Available |
| Phosphate | 12 | 50.4 | 0.15 | Not Available | Not Available |
| Fats, Oils and Greases | 100 | 420 | 1.29 | Not Available | Not Available |
| Ammonia | 2 | 8.4 | 0.03 | Not Available | Not Available |
| Sulphate | 500 | 2100 | 6.46 | 400 | 1.61% |
| Sulphide | 2 | 8.4 | 0.03 | Not Available | Not Available |

3.3.5 As can be seen from the table above, sulphate screens out from this test and the discharge of this

[1] https://nrfa.ceh.ac.uk/data/station/meanflow/67025

substance from the Site can therefore be deemed as an acceptable environmental risk.

## 3.4 Screening Test 3

3.4.1 This test introduces the background concentration of pollutants in the receiving waters. The predicted environmental concentration (PEC) of the water downstream from the discharge must be calculated through adding the background concentration of a pollutant to its PC.

3.4.2 If the difference between a pollutant's background concentration and its PEC is less than 10% of the EQS, it is screened out and is an acceptable environmental risk.

3.4.3 The following table displays the results of this screening test.

| Pollutant | Discharge Concentration (mg/l) | PC (mg/l) | Background Concentration (mg/l) | PEC (mg/l) | EQS (mg/l) | % of EQS |
|---|---|---|---|---|---|---|
| Settled Chemical Oxygen Demand (COD) | 3000 | 38.7 | Not Available | 38.7 | Not Available | Not Available |
| Total Suspended Solids | 800 | 10.3 | Not Available | 10.3 | Not Available | Not Available |
| Phosphate | 12 | 0.15 | Not Available | 0.15 | Not Available | Not Available |
| Fats, Oils and Greases | 100 | 1.29 | Not Available | 1.29 | Not Available | Not Available |
| Ammonia | 2 | 0.03 | Not Available | 0.03 | Not Available | Not Available |
| Sulphate | 500 | 6.46 | 200 | 206.6 | 400 | 1.61% |
| Sulphide | 2 | 0.03 | Not Available | 0.03 | Not Available | Not Available |

3.4.4 As can be seen from the table above, sulphate screens out from this test and can therefore be deemed as an acceptable environmental risk.

3.4.5 Background concentration data must be obtained through either the EA or NRW, this process can often take numerous weeks and so, background concentration data is not available at the time of writing this report. The background concentration of sulphate has been estimated to be 50% of the relevant EQS which is in-line with the methodology identified by the EA and the Department for Environment, Food and Rural Affairs for Environmental Permit applications2..

3.4.6 Although background concentration data is unknown, information contained in the Water Framework Directive indicates that the River Clywedog has moderate ecological status, meaning that pollutants are present. It can therefore be assumed that substantial background concentrations of all relevant pollutants will be observed.

## 3.5 Screening Test 4

3.5.1 This test involves determining whether a pollutant's PEC is greater than the relevant EQS.

3.5.2 The following table displays the results of this screening test.

[2]https://www.gov.uk/guidance/surface-water-pollution-risk-assessment-for-your-environmental-permit

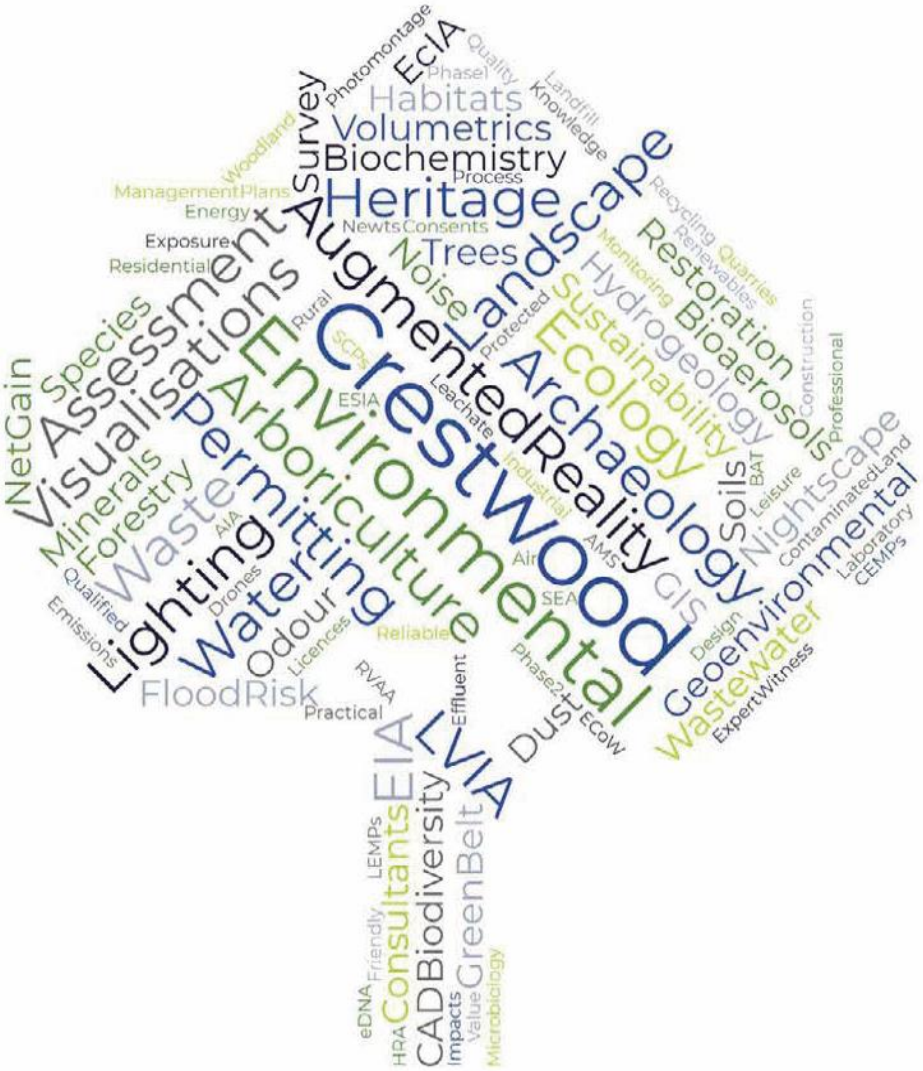
| Pollutant | Discharge Concentration (mg/l) | PEC (mg/l) | EQS (mg/l) | Greater Than EQS |
|---|---|---|---|---|
| Settled Chemical Oxygen Demand (COD) | 3000 | 38.7 | Not Available | Not Available |
| Total Suspended Solids | 800 | 10.3 | Not Available | Not Available |
| Phosphate | 12 | 0.15 | Not Available | Not Available |
| Fats, Oils and Greases | 100 | 1.29 | Not Available | Not Available |
| Ammonia | 2 | 0.03 | Not Available | Not Available |
| Sulphate | 500 | 206.6 | 400 | No |
| Sulphide | 2 | 0.03 | Not Available | Not Available |

3.5.3 As can be seen from the table above, sulphate screens out from this test and can therefore be deemed as an acceptable environmental risk.

# 4 Conclusions

4.1.1 Due to the lack of EQS and background concentration data, this risk assessment cannot determine if the majority of pollutants from the Site, screen out. The only pollutant which is known to screen out is sulphate.

4.1.2 It is thought that through correspondence with NRW, relevant environmental standards for the pollutants detailed in this risk assessment can be identified. This will allow screening tests to be successfully carried out and identify whether detailed discharge modelling is required. It is also thought that NRW will be able to provide the background concentration of all relevant pollutants in the River Clywedog, allowing for screening test 3 to be carried out more accurately.

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