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<b>PROJECT</b>	River Beult Hydrological Study Chilmington Green, Ashford	<b>CLIENT</b>	Hodson Developments			
<b>TITLE</b>	Hydrological Statement	<b>REFERENCE</b>	22074-NUT-TN-03	C02		
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This Hydrological Statement has been prepared to accompany the Overarching Nutrient Neutrality Assessment and Mitigation Strategy<sup>1</sup> for the Chilmington Green Development in Kent. This statement cross-references the Overarching Nutrient Neutrality Assessment and Mitigation Strategy for Chilmington Green, being developed by Hodson Developments, and both documents should be read in conjunction.

## 1 Introduction

- 1.1 In 2018, the European Court of Justice refined the definition of plans and projects and ruled that mitigation needs to be in place to ensure that there will be no significant adverse impacts on the conservation status of designated sites. Additional nutrient loading to designated sites already in an unfavourable conservation status is effectively therefore not permissible unless mitigation is in place. This ruling has come to be known as 'The Dutch Case'.
- 1.2 In the Stour River catchment in East Kent, developments could adversely impact the designated site known as Stodmarsh. Several of the nature reserve lakes of which the Stodmarsh is composed are in a state of eutrophication (an unfavourable conservation status) and therefore the ruling of the Dutch Case applies. All developments in the catchment must demonstrate 'nutrient neutrality' to ensure no adverse effect on the integrity of the designated site, meaning that the nutrients generated by the development must be less than or equal to the nutrients generated by the existing land use.
- 1.3 The proposed development at Chilmington Green lies on the boundary of the Stour catchment where Nutrient Neutrality can apply if it contributes to nutrient loading within the catchment. The Overarching Nutrient Neutrality Assessment and Mitigation Strategy for Chilmington Green outlines that wastewater will be treated by an onsite Wastewater Treatment Works (WwTW) and discharged into the River Beult,

<sup>1</sup> Water Environment Ltd (September 2022) Chilmington Green Masterplan, Ashford. Overarching Nutrient Neutrality Assessment and Mitigation Strategy. Ref: 22074-NUT-RP-01 C01

a tributary of the River Medway, removing any Likely Significant Effect on the Stodmarsh designated sites.

- 1.4 The proposed WwTW will discharge into the River Beult, which is not subject to Natural England advice regarding Nutrient Neutrality. However, the River Beult is a recognised Site of Special Scientific Interest (SSSI) and is approximately 25km in length from Hadmans Bridge near Smarden to the confluence with the Medway River near Yalding. The point of discharge is yet to be confirmed but falls within the greater Chilmington Green redline boundary and is approximately 12km upstream of the River Beult SSSI. Natural England and the Environmental Agency have recommended that the potential impacts of the proposed treated effluent discharge into the River Beult upstream of the River Beult SSSI be assessed. The potential impacts on the River Beult SSSI are addressed in this report and the accompanying ecological assessment "A Review of Potential Impacts of the River Beult SSSI"<sup>2</sup> compiled by Corylus Ecology (included as an appendix).

## **2 Natural England & Environmental Agency Comments**

- 2.1 The Environmental Agency (EA) and Natural England (NE) notes that the application could have potential significant effects on the River Beult Site of Special Scientific Interest (SSSI).
- 2.2 In response to the Water Environment Ltd Overarching Nutrient Neutrality Assessment and Mitigation Strategy for Chilmington Green, EA and NE requests further information on the following points which will be addressed separately in this note.

### **Hydrological Impacts**

*EA note that the site boundary contains headwaters of the River Beult which provides essential baseflow to the downstream designated SSSI. The EA also state that the development should not impede the natural flow within the SSSI watercourse without the appropriate Impoundment licences.*

*NE further note that one of the targets for the River Beult SSSI is flow and recommend that a hydrological assessment be undertaken in order to understand the risks and area of impact relating to the proposal.*

### **Water Quality**

*EA state that they have no objection to the development proposal on the basis that the onsite WwTW is run by an OFWAT approved company. With regards to water quality, CSMG targets will need to be met when calculated permit limits for discharge are considered.*

*NE notes that the River Beult SSSI has water quality targets for ammonia, suspended solids, total phosphorus and siltation, also noting that the site is in unfavourable condition.*

- 2.3 Natural England have responded to the Hydrological Assessment. The key points raised include:
  - NE are concerned with the percentage increase in flow, particularly at Q95 and Q70. Maximum acceptable deviation from daily naturalised flow is 10-15%.
  - In the case flow contribution deviation is significantly higher than target flows, an assessment of impacts on the river and ecology needs to be carried out.
  - The potential discharge cannot be viewed as mitigation/protection against abstraction.

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<sup>2</sup> Corylus (January 2023) Chilmington Green Wastewater Strategy – a summary review of potential effects on the River Beult Site of Special Scientific Interest (SSSI)

### **3 Background- Qualifying Features of River Beult SSSI**

- 3.1 The River Beult is listed as a Site of Special Scientific Interest (SSSI). Qualifying features include Botany, Invertebrates, Kingfishers and Breeding Birds. The site is currently in unfavourable condition and the principal reasons for this are channel modification, water quality and abstraction/impoundment. Further information on the River Beult SSSI conservation objectives are included in A Review of Potential Impacts of the River Beult SSSI in Appendix A.

#### Change in Flow

- 3.2 Natural England has advised that between a 10-15% deviation in flow regime is acceptable and the below calculations follow this range.

#### Water Quality Objectives

- 3.3 Water quality objectives of the River Beult SSSI are listed in Appendix A

### **4 Hydrological Impacts**

- 4.1 Following receipt of the comments from Natural England to the hydrological assessment, further work has been carried out to provide further detail on the phasing of this large development to better quantify the potential impacts of onsite treatment and discharge to the ditch network on the flow in the River Beult SSSI. This version of the hydrological assessment aims to outline the strategic approach that will be used to ensure that the discharge from the WwTW into the River Beult will not exceed 12.6% deviation in flow.
- 4.2 The first phase of the strategy is based on onsite treatment of wastewater from the remaining c700 dwellings in Phase 1 which equates to a flow of 3l/s. This phase of development will produce a flow rate within the acceptable flow variation of 10%-15% and no further mitigation is required over and above that included as part of the WwTW.
- 4.3 The second phase takes into account Phase 1 and 2 of the proposed Chilmington Green development (up to c2700 dwellings) which results in a peak 'attenuated' flow of 8.25l/s.
- 4.4 It is proposed that treated effluent from the WwTW undergoes an additional treatment stage in order to make it suitable irrigation. The treated water will be stored and used on site for irrigation, limiting the impact of the discharge on the River Beult flow regime. From the peak flow of 8.3l/s, it is proposed that 3l/s is discharged into the river and 5.25l/s is stored in onsite ponds for irrigation, resulting in 165,564 m<sup>3</sup> per year which can be reused instead of having to source water for irrigation from the mains. Flows based on 3l/s have been detailed below.
- 4.5 This section will address the potential changes in flow of the River Beult SSSI as a result of the Chilmington Green treated wastewater discharge. Using publicly available NRFA data, the flow at the beginning of the River Beult SSSI can be calculated. Therefore, an accurate prediction in flow change can be determined- this is laid out in Table 1 below. The discharge from the WwTW has been supplied by Te-Tech, the WwTW supplier, is 3l/s for 2700 dwellings (Phase 1 and 2 of Chilmington Green Development).

**Table 1: Potential change in flow at Hadmans Bridge- River Beult SSSI**

Scenario	Flow at Hadmans Bridge (l/s)	Potential new flow (l/s)	Contribution to flow (%)
Q95	20.7	23.7	12.6
Q70	65.8	68.8	4.4
Q50	147.6	150.6	2.0
Q10	1933.5	1936.5	0.2
Q5	3717.0	3720.0	0.1

- 4.6 At 'low flow' conditions (Q95), the discharge from Chilmington Green WwTW would contribute approximately 12.6% of the overall flow at the top of the River Beult SSSI.
- 4.7 Under 'normal' flow conditions (Q50), the discharge from Chilmington Green WwTW would contribute approximately 2.0% of the overall flow at the top of the River Beult SSSI.
- 4.8 At 'high flow' conditions (Q5), the discharge from Chilmington Green WwTW would contribute approximately 0.1% of the overall flow at the top of the River Beult SSSI. This minimal contribution at Q5 would not contribute to flood risk further downstream.
- 4.9 The SuDS on site will be designed to take into account the flow from the WwTW by overcompensating for the surface water runoff rates to ensure that the combined runoff rate from the site does not increase. Therefore, in extreme rainfall events the WwTW will not increase flood flows in the River Beult.
- 4.10 Water flow monitoring will be carried out to ensure that discharge targets are met.
- 4.11 In addition to this, flow will be monitored as part of the WwTW discharge permit.

## 5 Water Quality

- 5.1 The key parameters to consider for the Chilmington Green onsite WwTW discharge are TP (Total Phosphorus) and Biochemical Oxygen Demand (BOD), Total Suspended Solids (TSS) and Ammonia. Te-Tech's design proposal for Chilmington Green outline achievable limits for the proposed WwTW as follows:

**Table 2: Treated Effluent standards (Extracted from Te-Tech proposal<sup>3</sup>)**

Effluent	Unit	Expected
BOD	mg/l	<=10
TSS	mg/l	<=10
Ammonia	mg/l	<=5
TN	mg/l	<=10
TP	mg/l	<=1
TP (with chemical dosing)	mg/l	<=0.3

- 5.2 The ecological assessment compares the Te-Tech treated effluent values to the SSSI targets. The ecological assessment concludes that "*it is currently considered that there the proposed quality of the*

<sup>3</sup> Te-Tech (2022). Chilmington Green Development - te-cyc™ Technical Proposal.

*discharge, in conjunction with the option of installing tertiary treatment, does not raise any specific and/or unsurmountable concerns regarding its potential to adversely impact the R Beult SSSI."*

- 5.3 Furthermore, depending on the flow in the River Beult, dilution and dispersion of the treated effluent from the WwTW will take place in the River Beult, further decreasing concentrations before reaching the SSSI at Hadmans Bridge.
- 5.4 Water quality monitoring will take place at the post polishing wetland to ensure CSMG water quality targets are met.

## **6 Conclusions**

- 6.1 Natural England and the Environmental Agency have recommended that the potential impacts of treated effluent discharge upstream of the River Beult SSSI are assessed.
- 6.2 In order to decrease discharge into the river, treated water will be stored in onsite ponds and used for irrigation.
- 6.3 Maximum discharge into the River Beult will be 3l/s. Flow changes are evident, however, with the presented strategy the maximum deviation to daily naturalised flows is 12.6%.
- 6.4 In an effort to reduce any potential water quality impacts of the treated effluent on the River Beult SSSI, it is suggested that the discharge undergo post treatment polishing in the form of a wetland or constructed reedbed. Post treatment polishing will reduce nutrients and other solubles.

## **Appendix A**

Corylus (January 2023). 21139 Chilmington Green Wastewater Strategy. A Review of Potential Effects on the River Beult SSSI.

Te-Tech (2022). Chilmington Green Development - te-cyc™ Technical Proposal.

Environmental Agency Response (2022). Email Subject: Pre-App Planning Advice - Nutrient Neutrality Assessment and Mitigation Strategy - ENVPAC/1/KSL/00591

Natural England Response (2022). Email Subject: DAS 23800/407733 Stodmarsh Nutrient Neutrality Assessment & Mitigation Strategy