

Water Environment Limited
 6 Coppergate Mews
 Brighton Road
 Surbiton
 London
 KT6 5NE

Tel: 020 8545 9720

www.WaterEnvironment.co.uk

PROJECT	Chilmington Green Ashford, Kent		CLIENT	Hodson Developments			
TITLE	River Beult Monitoring December 2023		REFERENCE	22074-SVY-TN-03		C01	
AUTHOR		CHECKER		APPROVER			
Megan Ward BSc Environmental Science		Gareth Snyman MSc Geo, BSc EWM		Guy Laister MSc Eng, BSc Eng, (Civil) CEng, CEnv, C.WEM			
REV	COMMENTS			DATE	AUTH	CHKR	APPR
C01	Final issue			17/04/2024	MW	GS	GL

1 Introduction

- 1.1 Water Environment was commissioned by Hodson Developments Ltd to undertake surface water baseline monitoring at five locations along the River Beult and tributaries to the southwest of Ashford in Kent.
- 1.2 Monitoring included the collection of water samples for laboratory chemical analysis, the recording of in field physico-chemical parameters and the flow profiles of the watercourse. General observations of visual pollution, lack of flow and other environmental factors were also recorded.
- 1.3 The monitoring schedule is set out over twelve months and occurs approximately fortnightly at five different locations, identified during a preliminary walkover survey. Site descriptions have been included below:
 - 1- Chilmington Green Road Discharge Point (Grid Ref. TQ 98335 39335)
 - 2- Chilmington Green Road 2 (Grid Ref. TQ 98064 39400)
 - 3- Boyce Wood (Grid Ref. TQ 97043 39153)
 - 4- Bethersden Road (Grid Ref. TQ 96573 38580)
 - 5- Kiln Wood (Grid Ref. TQ 95736 38649)
- 1.4 A detailed site location plan can be found in Appendix A.
- 1.5 Monitoring results are presented in a monthly report, with a final report issued on the completion of the monitoring study.
- 1.6 This report will summarise two rounds of sampling as two site visits were undertaken in December.

2 Monitoring and Sampling Methodology

- 2.1 Water Environment attended site on the 05th and the 14th of December 2023.
- 2.2 General weather conditions during the visit on the 05th were slightly wet and overcast with light drizzle and rain throughout the day. A heavy rainfall event occurred the previous day and night, resulting in very flooded conditions. Water was not present at site 1, and therefore no measurements or samples were taken. All other sites had flowing water present, at very high levels from the previous day of rainfall. Therefore, no measurements were recorded at site 4 and 5. Similarly, no water samples were taken at site 4 due to the hazardous conditions.
- 2.3 General weather conditions during the visit on the 14th were dry and overcast but had been preceded by heavy overnight rains. Water was not present at site 1, and therefore no measurements or samples were taken. All other sites have flowing water present and the following measurements and samples were taken for sites 2, 3, 4 and 5.
- 2.4 Pictures of the sites and conditions can be found in Appendix B.

Flow Monitoring

- 2.5 A Valeport Model 801 Electromagnetic Flowmeter was inserted into the river at multiple locations across the width of the river to give a range of flow across the river profile. Flow and depth were determined at each transect point to calculate an overall stream profile and discharge rate. The number of transects and measurements taken at each site vary depending on river width, but a minimum of 5 were taken for each site.
- 2.6 Schematics and river profiles at each monitoring point, with flow recordings at each position are attached in Appendix C.

Water quality Monitoring

- 2.7 In-situ monitoring was conducted using a Hanna Multiparameter probe. The multiparameter probe was inserted directly into the river at the sample site location where parameters measured include conductivity, pH, temperature, dissolved oxygen and salinity.
- 2.8 To prevent cross contamination, the multiparameter probe was rinsed thoroughly at each location using water from downstream at the next sampling point and stored in a calibration fluid.

Water quality Sampling

- 2.9 A set of 3 water samples were collected for each site: 2, 3, 4 and 5. Samples were unable to be collected for site 4 during the site visit on the 5th of December due to hazardous flooding conditions. The samples were kept in a suitable storage box whilst on and off site and sent to an accredited laboratory for further analysis.

3 River Profile and Flow rates

- 3.1 Whilst recording flow, the depth of the river channel was recorded. Site 1 was recorded as dry for both site visits. Sites 4 and 5 were too high to record any measurements for the site visit on the 05th. A general observation is that the river channel gradually got wider and deeper from site 1 to 5 which was expected.
- 3.2 The discharge rate was higher during the site visit on the 05th compared with the 14th, this was because the water levels in the river channels at each site were considerably higher as the site visit was preceded by very heavy rainfall.
- 3.3 The discharge rate increased through the sites for both site visits on the 05th and the 14th.
- 3.4 The table below summarises the discharge recorded at each site, however, further data can be found in Appendix C.

Using the flow profiles from onsite monitoring, the discharge (m³/s) has been calculated and displayed in Table 1. Table 1: Discharge Analysis for both site visits in December

Site	(05/12/2023)	(14/12/2023)
1	NA	NA
2	0.06 m ³ /s	0.01 m ³ /s
3	0.16 m ³ /s	0.05 m ³ /s
4	NA	0.15 m ³ /s
5	NA	0.34 m ³ /s

4 **Water Quality- In-Situ monitoring**

- 4.1 The following section summarises the in-situ water quality parameters that were recorded on site. For robust results, the below examples consist of 2 spot samples taken after the multiparameter probe had been correctly calibrated and 'settled'. Samples were taken for sites 2, 3, 4 and 5. Samples were not taken at site 4 during the site visit on the 5th of December.

Temperature

- 4.2 The temperature at each site 2, 3, 4 and 5 was consistent for both site visits. There was a slight decrease as the day progressed for both site visits.

Dissolved Oxygen (DO) (mg/l and % saturation)

- 4.3 The dissolved oxygen concentrations ranged between 5.97 ppm and 7.82 ppm, and 49.45% and 65.9% for both site visits. The lowest concentrations were found at Site 2 and the highest at Site 5, for the site visit on the 5th, and the highest concentrations at site 2 and the lowest concentrations at site 5, for the site visit on the 14th.

Conductivity

- 4.4 Specific conductivity was recorded between 297.5 $\mu\text{S}/\text{cm}$ and 594 $\mu\text{S}/\text{cm}$. The lowest and highest consistent readings were at Site 5 and 2 respectively. The decrease in conductivity from site 2 to site 5 may be a direct correlation with the decrease in temperature and salinity from site 2 to 5, for both site visits.

pH

- 4.5 The pH had a noticeably small range from 7.22 to 7.73. The lower ranges were recorded at site 5 and the higher at site 2.

Salinity

- 4.6 Salinity was very consistent along the river, as expected. Measurements ranged from 0.14 psu to 0.29 psu.

Visual and Odour observations

- 4.7 There were no odours recorded at any of the sampling locations. The channel beds at sites 2, 3, 4 and 5 were extremely silty. Therefore, visually the water can appear to be a silted colour when walking in the channel to record flow measurements. It was ensured that any water quality samples (in-situ or laboratory) were collected upstream of the flow monitoring transect.
- 4.8 Please see table below for a summarised view of the in-situ water quality measurements.

Table 2: In-Situ Monitoring results

Site (05/12/23)	Time	Temperature (°C)	pH	ORP (mV)	EC (µS/cm)	Sal (psu)	DO (%)	DO (ppm)
2	12:26:21	7.52	7.45	-24.21	511	0.25	50.97	5.97
3	13:05:23	7.23	7.50	5.5	443	0.21	57.75	6.82
4	NA	NA	NA	NA	NA	NA	NA	NA
5	14:09:06	6.71	7.22	-8.10	297.50	0.14	64.35	7.72
Site (14/12/23)	Time	Temperature (°C)	pH	ORP (mV)	EC (µS/cm)	Sal (psu)	DO (%)	DO (ppm)
2	12:14:20	7.84	7.66	-72.85	594	0.29	65.9	7.79
3	12:56:46	7.42	7.73	-41.80	577	0.28	65.5	7.82
4	13:44:18	7.06	7.45	-27.80	436	0.21	55.55	6.69
5	14:29:21	6.91	7.39	-22.95	355.5	0.17	49.45	5.98

5 Water Quality- Laboratory Chemical Analysis

- 5.1 The surface water chemical analysis results are summarised below. Please note that no water quality samples were taken at site 1 (point of discharge) as this was recorded as dry, and site 4 during the site visit on the 05/12/23, as the water levels were too high to obtain samples.

Table 3: Analytical Test Results

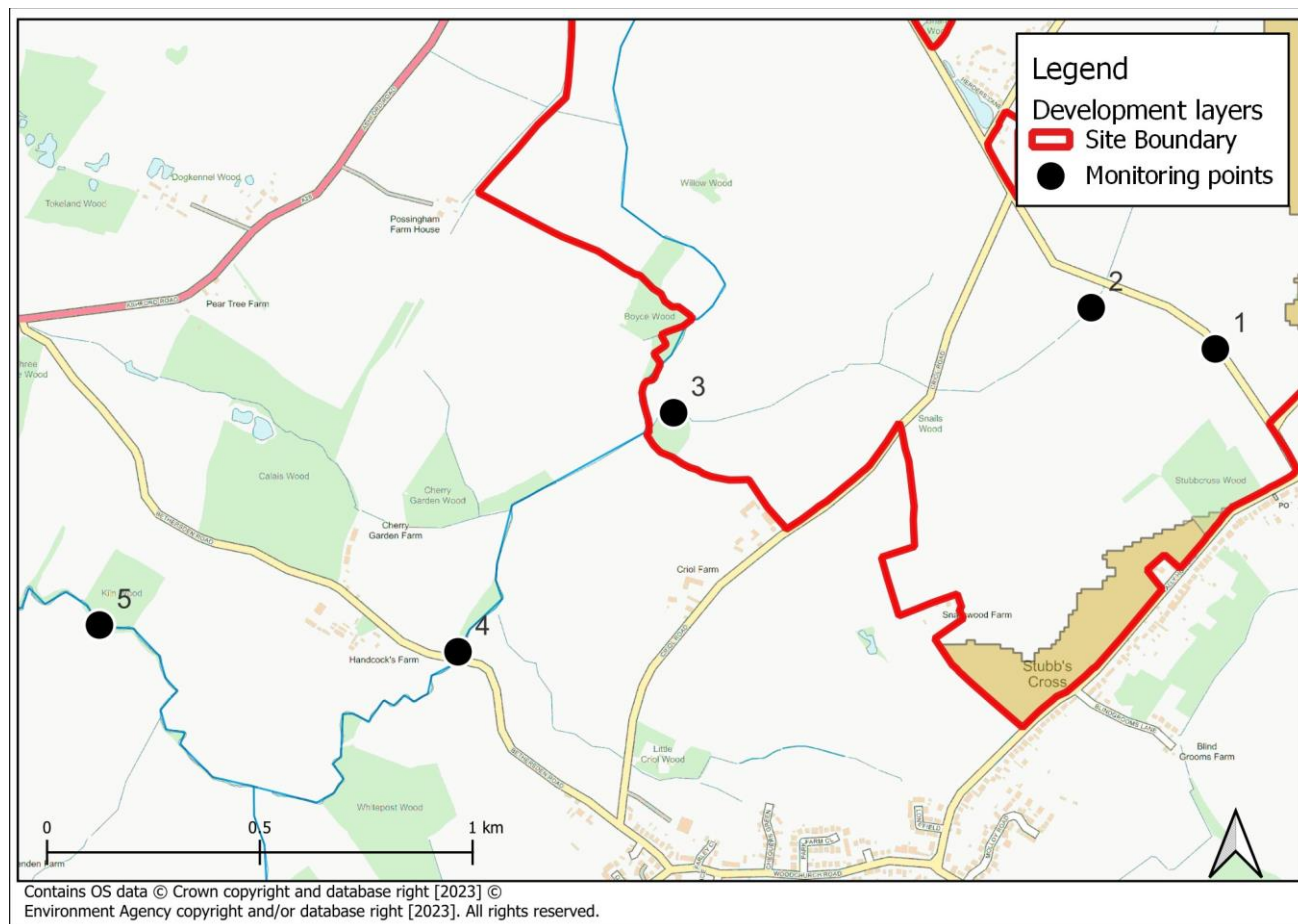
Parameter (05/12/2023)	Site 1	Site 2	Site 3	Site 4	Site 5
Biological Oxygen Demand BOD (mg/l)	NA	<2	<1	NA	<1
Alkalinity as CaCO₃ (mg/l)	NA	145	123	NA	59
Total Suspended Solids (mg/l)	NA	63	92	NA	65
Ammoniacal Nitrogen as N (mg/l)	NA	0.25	0.13	NA	0.10
Nitrite (mg/l)	NA	0.7	0.2	NA	0.2
Nitrite as N (mg/l)	NA	0.21	0.07	NA	0.06
Nitrate (mg/l)	NA	42.0	24.2	NA	9.1
Nitrate as N (mg/l)	NA	9.481	5.461	NA	2.047
Nitrogen, Oxidised Nitrogen (mg/l)	NA	9.7	5.5	NA	2.1
Total Nitrogen (mg/l)	NA	11.9	7.1	NA	3.3
Orthophosphate PO₄ (mg/l)	NA	0.27	0.22	NA	0.30
Total Phosphorus (µg/l)	NA	130	124	NA	149
Parameter (14/12/2023)	Site 1	Site 2	Site 3	Site 4	Site 5
Biological Oxygen Demand BOD (mg/l)	NA	<1	<1	<1	1
Alkalinity as CaCO₃ (mg/l)	NA	193	184	103	78
Total Suspended Solids (mg/l)	NA	26	31	37	27
Ammoniacal Nitrogen as N (mg/l)	NA	0.09	0.05	0.06	1.50
Nitrite (mg/l)	NA	<0.1	<0.1	<0.1	<0.1
Nitrite as N (mg/l)	NA	<0.03	<0.03	<0.03	<0.03
Nitrate (mg/l)	NA	47.1	30.0	14.8	9.1
Nitrate as N (mg/l)	NA	10.640	6.762	3.331	2.052
Nitrogen, Oxidised Nitrogen (mg/l)	NA	10.7	6.8	3.4	2.1
Total Nitrogen (mg/l)	NA	13.3	8.6	4.8	3.4
Orthophosphate PO₄ (mg/l)	NA	0.29	0.18	0.15	0.21
Total Phosphorus (µg/l)	NA	105	79	75	108

- 5.2 Total Nitrogen decreased considerably from site 2 to site 5 for both site visits, and the values were consistent for both site visits, ranging from 3.3 mg/l to 11 mg/l (05/12/23), and 3.4 mg/l to 13.3 mg/l (14/12/23).
- 5.3 The results for Total Phosphorus showed no notable pattern between sites, the values ranged at each site, with the two highest values found at site 2 and 5, for both site visits. Total Phosphorus was considerably higher for the site visit on the 05/12/23 compared with the site visit on the 14/12/23, this was due to the high-water levels after a period of heavy rainfall on the 05th.
- 5.4 The Total Suspended Solids were much higher for the site visit on the 05th compared with the 14th. Values ranged from 63 mg/l to 92 mg/l (05/12/23), and 26 mg/l to 37 mg/l (14/12/23). This was due to the high-water levels after a period of heavy rainfall on the 05th.

6 Summary of Monitoring

- 6.1 This report is one of a series of monitoring reports on the River Beult. This will assist in forming baselines that will be compared to future monitoring at the respective sites.
- 6.2 Due to heavy rainfall occurring before the site visit on the 05/12/23, flow measurements were not able to be taken at sites 4 and 5, and all other measurements were not taken at site 4. This was due to extreme high levels of water.
- 6.3 Total Nitrogen was consistent for both sites visits and Total Phosphorus was much higher for the site visit on the 05th compared with the 14th, this was due to high water levels as a result of heavy rainfall.

Appendix A: Figures



Appendix B: Photographs



Site 2: Stream next to field hedge row (05/12/23)



Site 3: Stream prior to joining adjacent River Beult tributary. (05/12/23)



Site 4: Upper River Beult near Bethersden Road (05/12/23)



Site 5: Near Kiln Wood Public Right of Way (05/12/23)

Appendix C: River Cross section profiles

