Piddle Valley Inflow Management Plan

Report 2023/2024

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23/04/2024	Annual update (draft)
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	Prepared Network Engineer	**Reviewed Principal Engineer**	**Approved Head of Waste Water Compliance**
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Agreed on (Date)	22/04/2024	23/04/2024	01/05/2024

Contents

Introduction

The Piddle Valley is situated in West Dorset and the topography is such that the hills slope down sharply into a flat river valley. The slopes and crests are mostly comprised of shallow well-drained calcareous silty soils over chalk, whilst the valley bottoms are made up of deep calcareous and non-calcareous fine silty soils.

Due to its geology and topography, the Piddle Valley is prone to high water tables during prolonged wet periods. Historically, this has caused many properties within the village of Piddletrenthide to suffer significant flooding due to overland fluvial flow as well as surface and ground inundation of the foul sewer. These flows have consequently resulted in flooding, prolonged overflows, and restricted toilet use.

Efforts have been made by the respective authorities to address these problems. West Dorset District Council and the Environment Agency (EA) have carried out extensive land drainage works to mitigate fluvial flooding and Dorset County Council has made improvements to highway drainage systems to preclude highway runoff. Wessex Water has undertaken significant inspection, cleaning and sealing to ensure the sewer system is watertight as well as constructing two permanent overflows which are permitted to operate during times of groundwater inundation.

Piddlehinton water recycling centre (WRC) receives foul sewage from the Piddle Valley via a 150mm and 225mm public gravity sewer system that is predominantly situated in the valley, adjacent to the river. Foul sewage flows from Alton Pancras in the north via Piddletrenthide, White Lackington and Piddlehinton to the WRC in south (see *Figure 1).*

This annual report provides details of Wessex Water's infiltration reduction activities in the Piddle Valley.

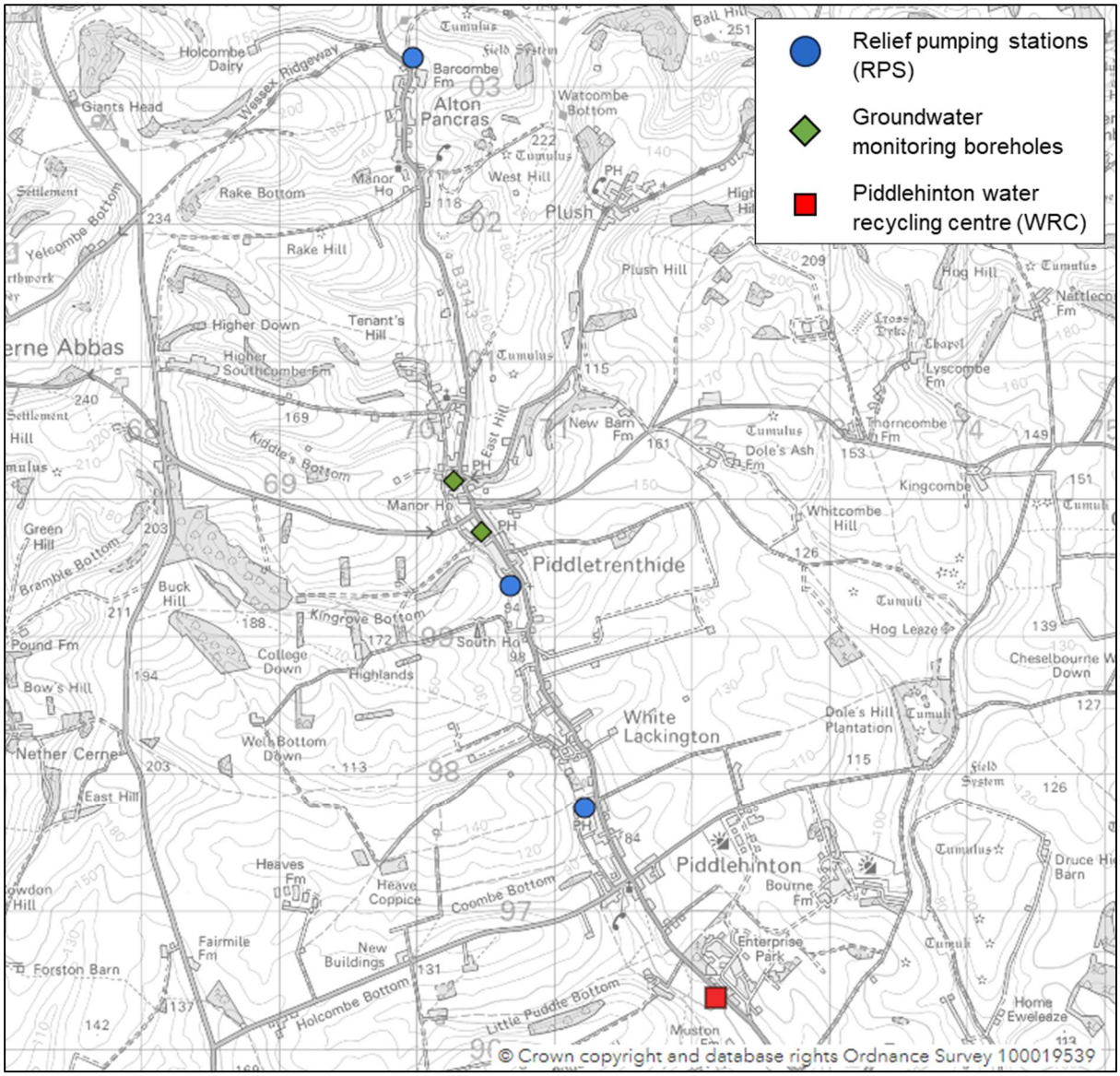


Figure 1: *General location plan*

Section 1 History of the Piddle Valley

1.1 Background

There has been a seasonal groundwater inundation problem in the Piddle Valley for decades. During the last three decades Wessex Water has made a concerted effort to seal the public foul sewers from ground water infiltration and surface water ingress:

- **1986-1994 -** Numerous sewer joints and manholes in the Piddle Valley were sealed under various projects.
- **1994/1995** - A project to seal manhole covers in low lying areas specifically aimed at reducing surface water ingress was undertaken.
- **1997/1998** - Sewer sealing works were carried out using a silicate base flood grouting system.
- **2005-2007 –** Further sealing works were completed under a loss of service scheme. This included the air testing and pressure testing of the public sewers.

In 2011, two Ground Water Relief Pumping Stations (RPS) (see ***Figure 1***) were built in Piddletrenthide to prevent property flooding during exceptionally wet periods and high groundwater levels. The permanent overflows were constructed to avoid the need to mobilise temporary equipment to pump the groundwater out of the sewers to the adjacent River Piddle. Sampling shows the effects of this operation on river water quality are minimal. This is discussed further in Section 2.

The pumped overflows are permitted by the Environment Agency and can only operate when the flows in the sewer exceed set limits and groundwater levels are above the invert of the surrounding foul sewers (Permit No's EPR/AP3827XC and EPR/AP3822XS).

The Environment Agency permits also require Wessex Water to prepare and implement an 'Inflow Management Plan' - see ***Appendix 1***. This includes analysing groundwater levels, measuring sewer flows, identifying and eliminating significant infiltration in the public sewers and taking river samples during operation of the pumped relief stations.

1.2 Summary of Historical Works

Following the construction of the pumped relief stations, the works summarised in Table 1 were carried out between 2011 and 2023, as detailed in the previous annual Piddle Valley Inflow Management Plan reports (Table 2).

Table 1: Summary of completed works in previous years

Completed Works 2011-2022/23
• A CCTV survey was carried out on 12.8km of public foul sewer and section 105A sewers in the catchment. Numerous blockages, a small amount of infiltration and some breaks/holes were discovered. The sewers were cleaned, and the CCTV survey was repeated, which identified a few more breaks/holes and a further sewer containing infiltration (160m of Section 105A sewers were CCTV surveyed). • Sewer rehabilitation works were carried out involving the sealing of 2 manholes, relining 515m of sewer and subsequently air testing a total length of 75m. • An impermeable area survey was carried out to find if any roof or road gullies were connected to the foul sewerage system. Only a small amount of impermeable area was found to be connected to the foul system. • The private sewers that are now transferred to Wessex Water under "The Water Industry (Schemes for Adoption of Private Sewers) Regulations 2011" (S105A) were proactively surveyed and mapped and Wessex Water's sewer records updated. • Ultrasonic depth monitors were installed at the pumped relief locations to alert the control room via telemetry when they operate, and to record the depth of the flow in the sewer. Treated effluent flow is also being recorded at Piddlehinton WRC. • A programme was set up to record ground water levels from a series of boreholes throughout the catchment. These boreholes were monitored manually using a dip tape from June 2008. Auto level loggers were installed in all the boreholes in Piddle Valley (Barcombe Farm – July 2012, Piddle Valley School – February 2013, West Lodge – November 2013) which now take readings every 15 minutes. • Sampling points were established and agreed between Wessex Water and the Environment Agency (as shown in ***Appendix 4****)* to sample the discharges once a fortnight during operation as per the permit conditions. Wessex Water also agreed to attempt to take samples from the flood defence discharge point. • Wessex Water consulted widely with the stakeholders, holding meetings with Dorset County Council, West Dorset District Council, and the Environment Agency. Regular steering group liaison meetings have been held ***(see appendix 8)*** • Wessex Water liaised internally through regular meetings between Planning, Asset Management, Compliance, Sustainability, Water Resources, Supply, Engineering and Construction teams. • An article was published in the local parish magazine and on the Piddle Valley website regarding efforts that are being made by Wessex Water to reduce groundwater infiltration in the foul sewers. • Tankering and over pumping has been carried out to protect public health during times of high sewer levels. • A case study report was prepared and is used widely ***(See Appendix 9).*** • Further frequent targeted CCTV has been undertaken and sewer rehabilitation work undertaken where necessary.

- External consultants reviewed the hydraulic computer model and developed a series of proposals that could relieve the valley from the sewerage inundation.
- A groundwater modelling appraisal was undertaken in 2016/17 by external consultants to review the feasibility of lowering the groundwater at various points throughout the catchment. The hydrological model is based on the groundwater model built by the Environment Agency.
- In January 2017 strategic, sustainable and alternative solutions were reviewed and estimated, the strategic solutions that did not involve further ground water relief pumping stations cost between £5.3m and £9.3m (excluding costs for upsizing WRC to facilitate extra flows), whereas the provision of two more permanent groundwater pumped relief stations would cost £0.5m to £0.8m.
- Further targeted inspections, where appropriate, using CCTV equipment to identify further sources of groundwater infiltration. Reviewed the CCTV survey completed in 2022 to identify any infiltration in Piddletrenthide.
- Continued to monitor the Barcombe Farm borehole levels as a trigger for preparedness against flooding issues within the Piddle Valley Catchment.
- Continued liaison with stakeholders through the Lead Local Flood Authority and Parish Council, as appropriate
- Worked with the WaterUK group to promote education of groundwater inundation issues and develop a storyboard on the subject.
- Continued to deliver the Inflow Management Plan (Appendix 1).
- Continued to monitor the groundwater relief stations on our event duration monitor (EDM) program. The spill frequency and duration figures are reported to the Environment Agency annually.
- The draft DWMP was made publicly available in 2022.
- Acted as Water Company representative on the Environment Agency led Groundwater research steering group to promote the challenges of groundwater flooding.

Table 2: Summary of previous reports

Year	Wessex Water Report Ref	Access to previous reports
2011/2012	C9837-284970845-26	These reports are available upon request. Please email: DWMP@wessexwater.co.uk
2012/2013	C9837-284970845-28	
2013/2014	C9837-284970845-27	
2014/2015	C9837-284970845-29	
2015/2016	C9837-284970845-22	
2016/2017	C9837-284970845-21	
2017/2018	C9837-284970845-81	
2018/2019	C9837-284970845-84	
2019/2020	C9837-284970845-88 v 0.16	
2020/2021	C9837-284970845-88 v 1.0	
2021/2022	C9837-284970845-88 v 1.9	
2022/2023	C9837-284970845-88 v 2.0	
2023/2024	C9837-284970845-88 v 3.0	

Section 2 Works undertaken in 2023/2024

In summary, the following work was carried out in 2023/2024 as proposed in the 2022/2023 Piddle Valley Inflow Management Plan report:

- Continued to deliver the Inflow Management Plan.
- Continued to monitor the Barcombe Farm borehole levels as a trigger for preparedness against flooding issues within the Piddle Valley Catchment.
- Sealing of five sewer lengths in Piddletrenthide based upon previous surveys.
- Further targeted inspections, where appropriate, using CCTV equipment to identify further sources of groundwater infiltration.
- Continued liaison with stakeholders through the Environment Agency, Lead Local Flood Authority and Parish Council.
- Published a public version of this report on our website.
- Developed the existing Coast Watch App to include rivers to be launched in April 2024 which will include the Piddle Valley groundwater relief pumping stations. Known as Coast and Rivers Watch.

2.1 CCTV

A CCTV survey was completed in April 2023 in the lengths on the main sewer from Whites Close to Piddlehinton WRC and including the sewers on Rectory Road. Some partial blockages were located during this survey however, no infiltration was found.

A further survey has been scheduled to be completed in April 2024 when groundwater levels have subsided.

2.2 Sewer rehabilitation works

Infiltration sealing was completed between September 2023 – February 2024 on five sewer lengths in Piddletrenthide.

2.3 Operational Mitigation Action Plans (OMAP)

Although most central properties in Piddletrenthide are protected by the two permanent pumped relief stations, other areas in the Piddle Valley are still vulnerable to the effects of groundwater inundation.

OMAPs are in place for Egypt, north Piddletrenthide and Rectory Road, Piddlehinton as part of the Local Emergency Plans (LEPs) for Wessex Water to over-pump into the river where there is a risk of internal flooding or loss of service due to groundwater inundation to protect public health (See ***Appendix 2***). These are used when tankering is no longer deemed to be effective during times of groundwater inundation during wet winters. The OMAPs have been submitted to and reviewed by the EA.

The OMAPs for Piddletrenthide and Piddlehinton were enacted during the winter period of 2023/24 due to high groundwater levels.

Piddletrenthide OMAP was in place between 12/12/2023 to 31/01/2024 and 22/02/2024 to 19/03/2024.

Piddlehinton OMAP was in place between 09/12/2023 to 19/01/2024 and started again on 22/02/2024. The OMAP was still in place at the end of this reporting period (31/03/2024).

2.4 Communication and visibility of our plans

WaterUK (the national representation of all water and sewerage companies) has led various sewerage initiatives over recent years. Wessex Water has been closely involved in these including the DWMP framework:

- The DWMP framework was published in September 2018 (here). This provides a framework for water companies to consistently undertake long term planning and give visibility to stakeholders of these plans.
- Wessex Water staff have previously attended monthly meetings with WaterUK and other companies to establish how these DWMPs will be delivered and presented in a consistent manner.

A number of years ago, Wessex Water created an animation that visualises the complex problems in catchments where groundwater inundation is a problem, such as the Piddle Valley. The video remains available on YouTube (here).

Our website has been expanded to give more visibility to more information, including:

- An Infiltration webpage (here) with links to the video and summary reports for catchments vulnerable to groundwater inundation
- A DWMP webpage (here) that includes a geospatial portal showing drainage strategies and case studies.

Wessex Water is developing the existing Coastal Watch App to include rivers and near real time data will be made available for the Piddle Valley groundwater relief pumping stations in late April 2024 (known as Coast and Rivers Watch).

Figure 2: Groundwater education video

Wessex Water has continued with its policy of objecting to development in catchments without a groundwater strategy in place.

The new five-day groundwater flood forecasts developed by the local Wessex Environment Agency have been used alongside our existing borehole monitoring program in the Piddle Valley as part of our LEPs to inform tankering and overpumping activities. We continue working closely with the Environment Agency to refine future flood alert thresholds to activate OMAPs based on local boreholes.

Drone footage was captured during elevated groundwater levels during winter 2020/21, the images showed the extent to which the Piddle Valley is affected by groundwater flooding.

2.5 Monitoring groundwater levels

The borehole data from Barcombe farm is analysed weekly (or more frequently during high groundwater events) to facilitate internal groundwater level warnings.

The Wessex region experienced incredibly wet weather across 2023-24, with higher-than-average rainfall in nine months during the period. February 2024 was both the warmest on record and the wettest in 30 years, with the 12-month sequence to the end of February being the wettest since our records began in 1911.

Groundwater levels rose rapidly during the autumn, and whilst drier weather in January 2024 provided a brief reprieve, levels remained high for the majority of the winter.

The Piddle Valley sewers are considered at risk of groundwater inundation once the levels at Barcombe Farm borehole exceed 123m AOD, this “trigger level of preparedness” is to warn Wessex Water Operations that there is an imminent risk and the catchment’s OMAP may need to be instigated.

The trigger levels are estimated from analysis of ground water level trends, previous flooding incident contact information and operational experience. They are now used as an alert for

preparedness for high ground water levels which could necessitate the use of mitigation measures under the OMAP (such as over pumping or tankering the system) to protect public health when the groundwater infiltrates the sewers and overloads the system.

Groundwater levels exceeded the OMAP trigger levels in 2023/2024 and Operational teams were warned to be prepared for groundwater inundation. The groundwater levels have remained high since October 2023 peaking at 126.79 mAOD on 10/12/2023 and 05/01/2024 at Barcombe Farm.

The groundwater level has remained above the trigger level for preparedness at the close of the reporting year at 126.09 mAOD on 31/03/2024.

Figure 3 demonstrates the correlation between the inflow at Piddlehinton water recycling centre, groundwater levels at Barcombe Farm Borehole since the installation of the data logger in July 2012 and average rainfall taken from three nearby rain gauges (Friar Waddon, Evershot and Kingstag Ridge).

In order to analyse flooding in relation to groundwater, customer contacts have been added to the graph showing when reported flooding occurs and whether it is due to inadequate hydraulic capacity (IHC) or other causes such as blockages.

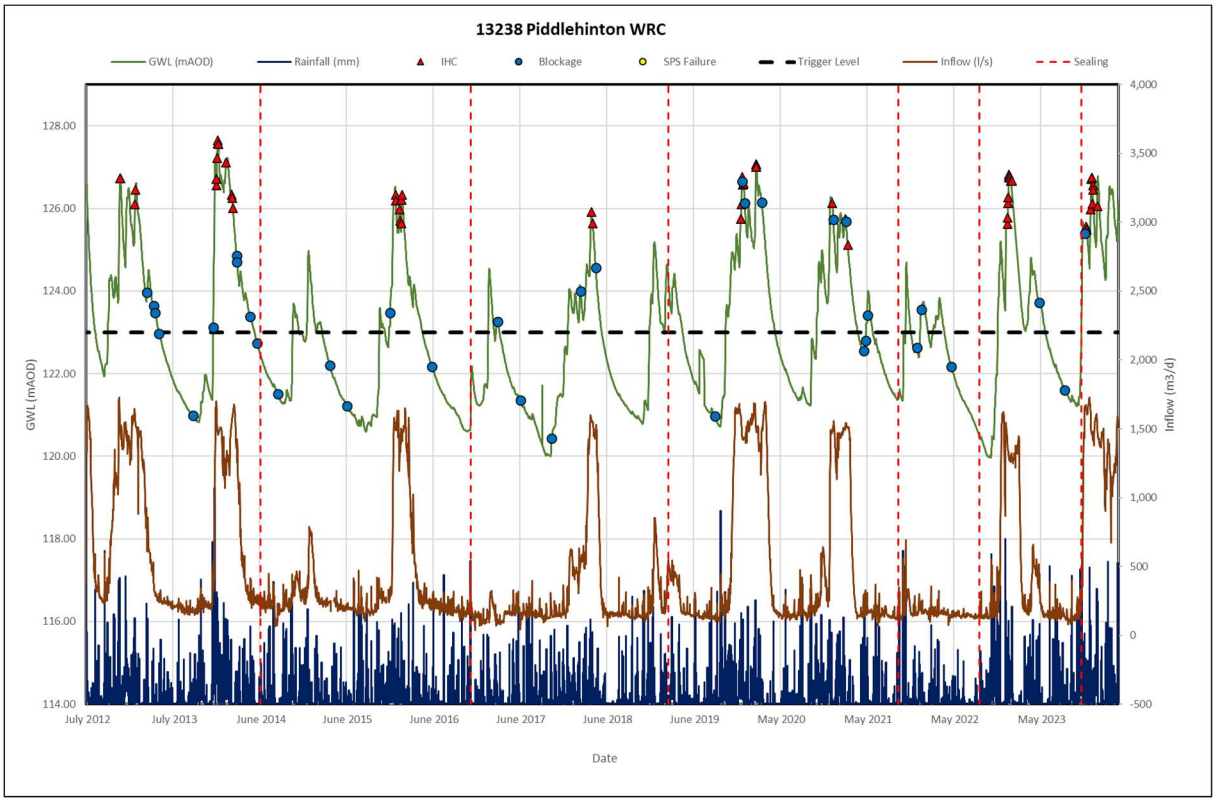


Figure 3: Piddlehinton WRC inflow, rainfall, and groundwater levels at Barcombe Farm

Graphing the ground water levels against the daily pump run-stops for the pumped relief stations demonstrates that the pumps operated for long periods during times when the ground water level was exceptionally high. This can be seen in Appendix 4.

Appendix 4 shows the borehole levels for Barcombe Farm, West Lodge and Piddletrenthide School graphed against the sump and pump run times for the two relief pump stations. *Note: rainfall has been inverted, scaled and averaged over a month to indicate catchment wetness. IHC is flooding incidents reported due to inadequate hydraulic capacity.*

The groundwater relief stations were added to our event duration monitor (EDM) program. The spill frequency and duration figures are reported to the Environment Agency annually. The EDM figures 2023 are in table 3 below.

Table 3: Pumped relief stations EDM

ID	Site Name	Permit No	Durn Hrs	12/24 Spill Count	% of reporting period EDM operational
17637	RIVENDELL (CSO4) CSO	EPR/AP3827XC	2057	89	100.0%
17638	R/O TRENT HOUSE (CSO6) CSO	EPR/AP3822XS	2126	93	100.0%

Data for period 2023

Annual flows to the water recycling centre (WRC) are summarised in the ***Table 4*** below.

Table 4: Annual flows to Piddlehinton WRC

Year	Total Flow to WRC (m3)
2009/10	194,123
2010/11	100,563
2011/12	74,152
2012/13	313,465
2013/14	203,723
2014/15	119,292
2015/16	174,155
2016/17	72,635
2017/18	101,438
2018/19	136,495
2019/20	256,088
2020/21	203,390
2021/22	68,218
2022/23	160,099
2023/24	252,484

Reporting year – April 1st – March 31st

Table 5: Yearly incidents due to Inadequate Hydraulic Capacity, Piddlehinton WRC Catchment

	IHC Incidents													
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Reported incidents	4	3	11	0	10	0	2	9	6	3	0	14	12	44

2.7 Sampling water quality

During wet weather/ high groundwater level periods, the relief pumping stations are required to operate to lower the sewer levels for the catchment. During pumped relief operation, river water quality samples are taken every fortnight as stipulated in the discharge permit.

This sampling has shown that the relief stations flow has had minimal effect on river water quality and the discharges are of similar quality to the fully treated sewage works effluent produced at Piddlehinton WRC, some 4km downstream of the relief pumping stations.

The relief pumping stations (Rivendell CSO4 and Piddle Inn CSO6) operated between November 2023 to March 2024, ***Figures 4-7*** show the results from the sampling carried out during this time. The graphs show that water quality results downstream are broadly in line with water quality results upstream, with no deterioration in water quality. Details of the sampling locations can be seen in Appendix 5.

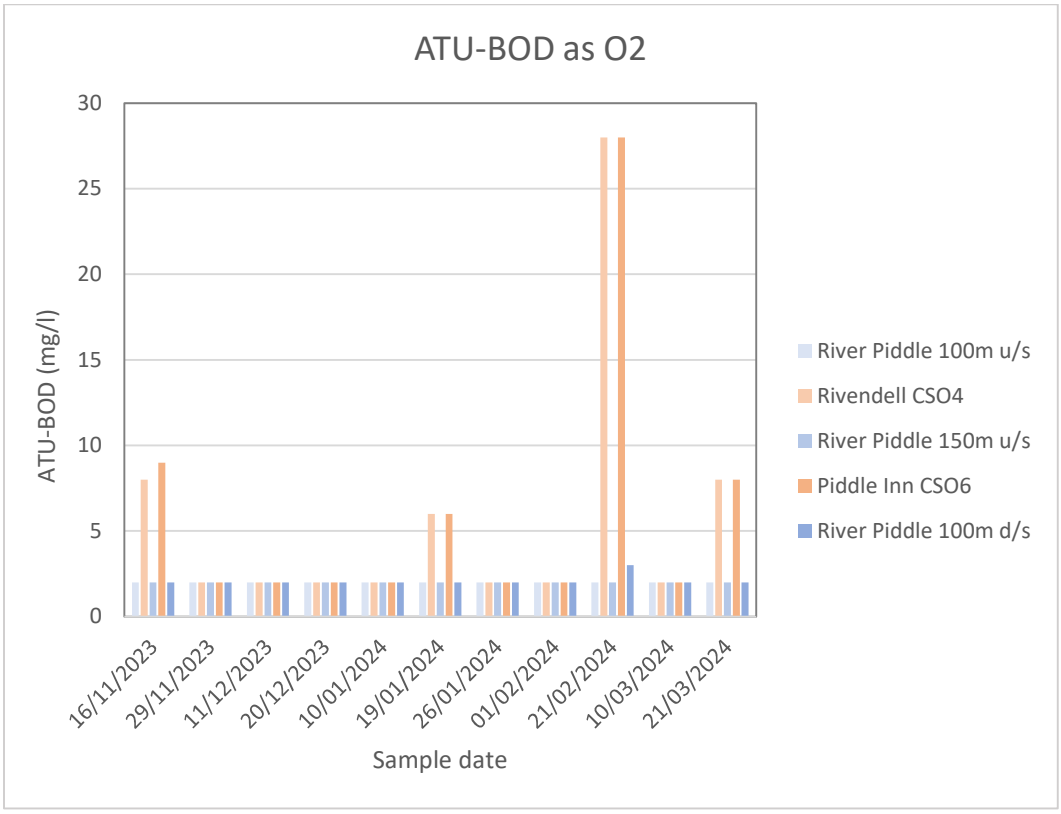


Figure 4: Biochemical Oxygen Demand ATU sampling results

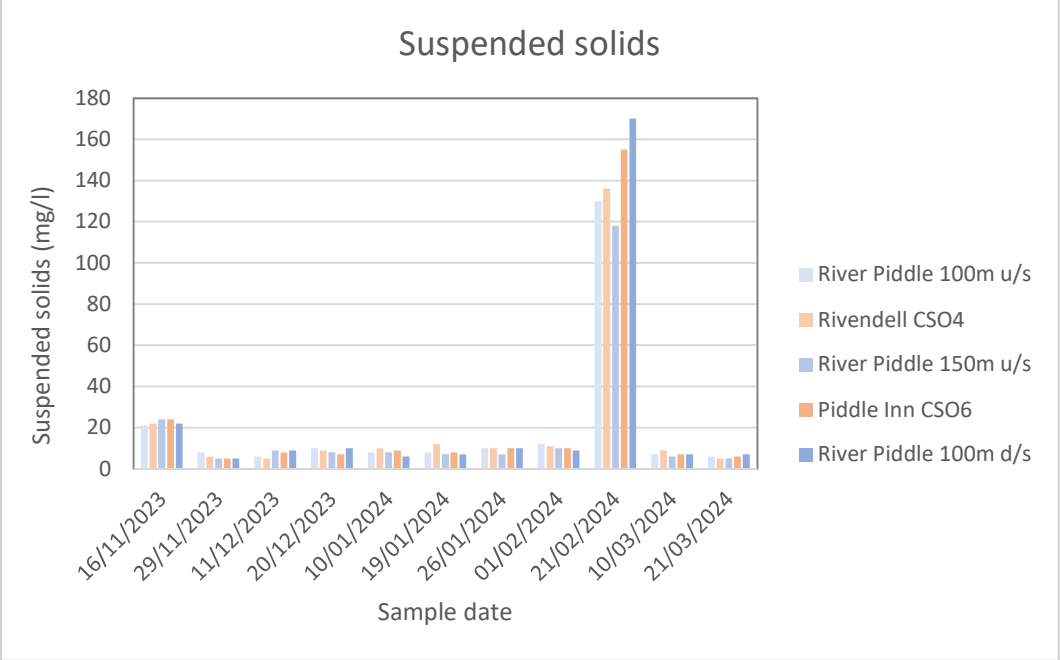


Figure 5: Suspended solids sampling results

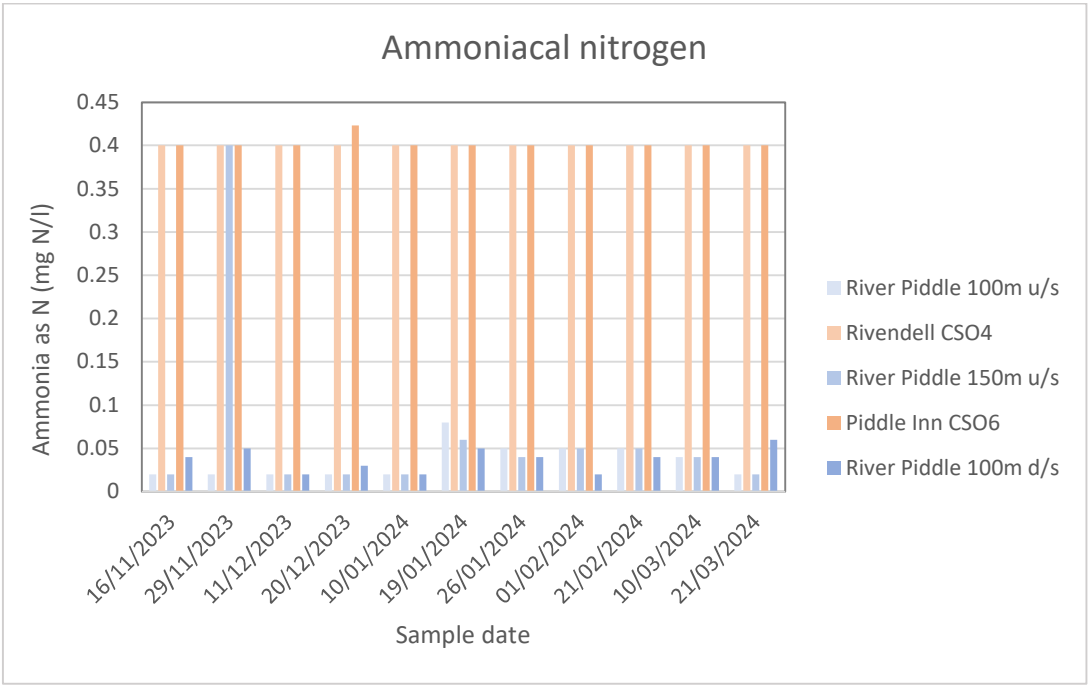


Figure 6: Ammoniacal nitrogen sampling results

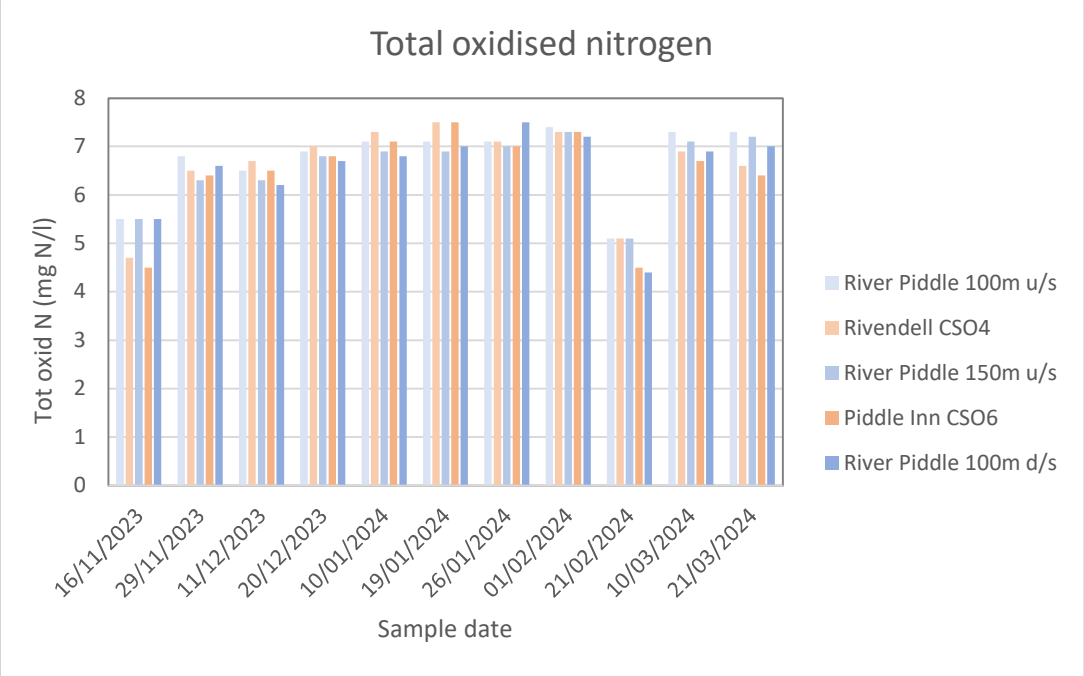


Figure 7: Total oxidised nitrogen sampling results

The flows being discharged to the river are comparable to what is expected from the fully treated final effluent discharge to the river further downstream at Piddlehinton WRC as shown in ***Table 6.***

Name	Consent	Unit	Limit	Winter	Start	End
Ammoniacal Nitrogen	5	mg/l	95%	10	01-Nov	30-Apr
Biochemical Oxygen Demand ATU	15	mg/l	95%	20	01-Nov	30-Apr
Suspended Solids	15	mg/l	95%	30	01-Nov	30-Apr

For all sampling data collected as part of the inflow management plan and while the OMAPs within the area are in place see ***Appendix 6***.

Section 3 Reactive operational work and customer contacts

3.1 Reactive operational work

Both OMAPs in Piddletrenthide and Piddlehinton were active for periods during the winter in order to prevent flooding and protect public health.

Both groundwater relief pumping stations (CSO4 and CSO6) operated throughout the winter from the end of October through to March due to very high groundwater levels.

3.2 Customer contacts

Table 7 below shows the type of customer contacts made to Wessex Water in the winter period of 2022/2023 for the entire Piddlehinton WRC catchment. There were 3 external flooding incidents reported during this time.

Table 6: Flooding incident summary for winter 2023/2024

Incident Type	No.
Flooding Internal	0
Flooding External – Inside Boundary	1
Flooding External – Outside Boundary	2
Blockage / Backing Up	9
Clean Up Enquiry	0

3.3 Stakeholder and liaison meetings

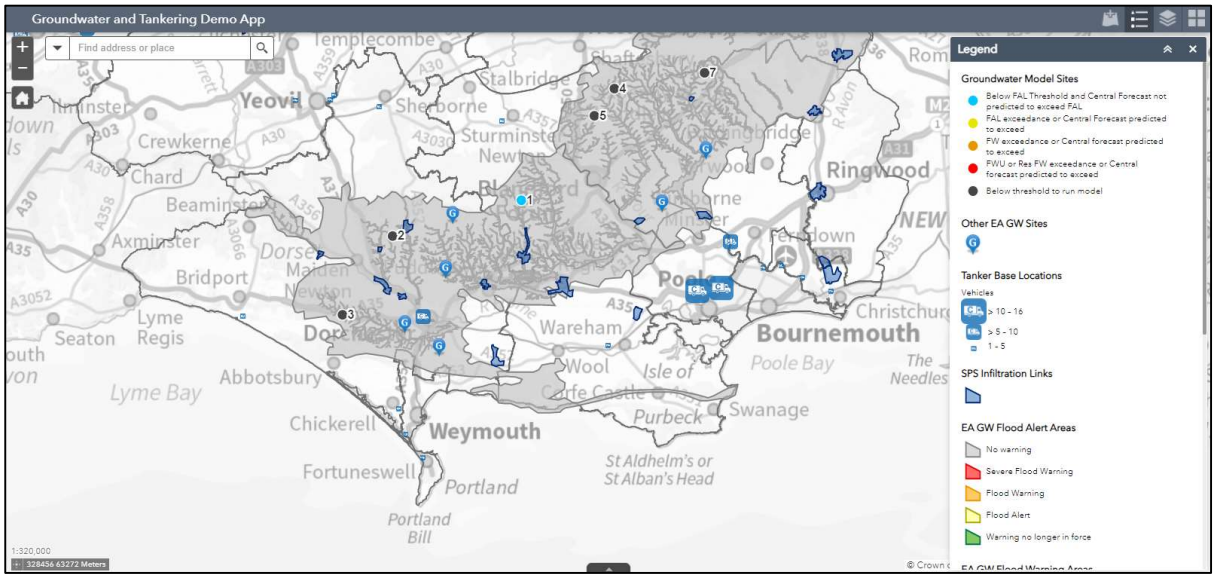
Regular meetings are held with Dorset Council to discuss flood risks and the Environment Agency. This resulted in Wessex Water contributing towards the Piddle Natural Flood Management project. This is an appraisal to attenuate flow in the upper catchments to reduce fluvial flood risk.

The Inflow Management Plan is available on the DWMP Portal and Wessex Water's Website. We have promoted the availability of this and the other Infiltration Reduction plan summaries to stakeholders at flood risk management meetings with Lead Local Flood Authorities (LLFA's) and catchment partnerships meetings as part of our DWMP work.

Regular liaison with the Environment Agency regarding their groundwater flooding model, to inform Wessex Water's own internal response and reporting system.

Further work has been carried out to improve groundwater forecasting in the region in association with the EA. ***Figure 8*** shows the groundwater and tankering app which is being developed to assist operations with reactive work during times of high groundwater. Live data from the EA groundwater models is used to forecast groundwater flooding.

Figure 8: *Groundwater and Tankering App*



Dorset Council has consulted Wessex Water on a planning application for a small development of 9 residential units, offices, a café and 2 workshops, in accordance with our consultation strategy in areas at risk of groundwater inundation. Wessex Water's planning liaison department will respond to see what mechanism can be instigated to provide potential betterment by inspecting the private laterals as part of the adoption process.

Section 4 Future works

Wessex Water plans to undertake the following work in the next year;

- Continue to deliver the Inflow Management Plan (see ***Appendix 1***).
- Review and update the existing high-level appraisals for flooding.
- Review recent CCTV surveys and site investigations by Wessex Water and undertake any appropriate remedial works as soon as practical.
- Continue to monitor the Barcombe Farm borehole levels as a trigger for preparedness against flooding issues within the Piddle Valley catchment.
- Further targeted inspections, if appropriate, using CCTV equipment to identify further sources of groundwater infiltration.
- Continued liaison with stakeholders through the Lead Local Flood Authority and Parish Council.
- Liaise with Dorset Council regards betterment on recent section 104 application
- Publish a version of this report on our website.
- Consider use of the EnTRADE Auction Platform to promote Natural Flood Management within the Piddle Valley as part of the Poole Harbour nitrogen offsetting project.
- Further infiltration sealing where appropriate based on the results of the CCTV survey scheduled for April 2024.

Appendix 1

Piddle Valley Inflow Management / Infiltration Reduction Plan

Requirements of the Permit:

1. Formulate and follow an Inflow Management Plan (IMP) from date of issue of the two Pumped relief station permits issued 08/04/2011, constructed in September 2011
2. Review the effectiveness of the IMP annually and report to EA by 1st May
3. This applies to the first five years of operation of the pumped relief stations and will require a full review in 2016.

This inflow management plan also acts as an infiltration reduction plan.

Abbreviations:

WW - Wessex Water
WDDC - West Dorset District Council
DCC - Dorset County Council
DC - Dorset Council *
EA - Environment Agency

(* created on 1 April 2019 to administer most of the area formerly administered by Dorset County Council, which was previously subdivided into the districts including West Dorset District Council)

Piddle Valley - Infiltration Reduction Plan

n/a	Achieved Completed	Achieved Monitor	Don e	Ongoing	Short Term	Medium Term	Long Term
					<2 years	2-10 years	10 Years>

Action	Responsibility	Additional Input	Timescales	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Planned 2024 >	Comments
Review existing asset and operational data and produce an Infiltration Reduction Plan	Wessex Water		Annually	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Ongoing	
Review existing asset and operational data and produce Operational Mitigation Action Plan (OMAP)	Wessex Water		Annually	n/a	n/a	Short Term	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Ongoing	
Review existing asset and operational data and produce Inflow Management Plan annual report	Wessex Water		Annually	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Ongoing	
Review existing catchment borehole data (possibly including data from the Environment Agency).	Wessex Water		Annually	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Ongoing	Three WW boreholes monitored in the Piddle Valley
Monitor sewer levels, to assess the success of inflow reduction both at the pumped relief chambers and at the WRC	Wessex Water		Annually	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Ongoing	

Action	Responsibility	Additional Input	Timescales	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Planned 2024 >	Comments
Add OMAP layer to DWMP Hub for Risk Management Authorities	Wessex Water		When Applicable	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Short term	Done	Done	Achieved Completed	
Follow procedure for responding to, investigating, resolving and recording operational contact incidents - (Rapid in place).	Wessex Water		Annually	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Ongoing	
Review historic and current telemetry and rainfall records and update.	Wessex Water		Annually	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Ongoing	
Communication with other authorities during times of elevated groundwater levels	Wessex Water	EA, LLFA, DC	When Applicable	Done	Done	Done	n/a	n/a	n/a	n/a	n/a	Done	Done	n/a	Done	Done	Ongoing	
Continue customer engagement, via the Wessex Water website and public meetings when applicable	Wessex Water	EA, DC	Annually	n/a	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	n/a	Ongoing	Article in Piddle Valley News and on website (2012). Presentation to affected customer (2013). Summary reports shared to Parish Council 2013-2016). Drone footage to be made available for continued community engagement (2021).

Action	Responsibility	Additional Input	Timescales	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Planned 2024 >	Comments
Continue wider customer engagement By putting IRPs and groundwater impact video on the Wessex Water website LINK Further develop Rivers and Coastal watch App to include inland overflows to rivers	Wessex Water		Annually	n/a	n/a	n/a	n/a	Short Term	Done	Done	Done	Done	Done	Done	Done	Done	Ongoing	Information developed on website 2015/16 Video added 2017 /18
Develop Local Action Plan (At a high ground water level). Community flood warning plan EA and DCC to discuss 2013.	Wessex Water	EA, LLFA, DC, EHO	When Applicable	n/a	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Ongoing	
Liaise with the Environment Agency with regards to their ground water warning modelling and service	Wessex Water	EA, LLFA	When Applicable	n/a	n/a	n/a	n/a	Long Term	n/a	n/a	Short Term	n/a	Done	Done	n/a	n/a	Achieved Monitor	Viewpoint Groundwater and Tankering App produced in 2020/21
Risk modelling of Wessex Water Assets to plan which catchments require proactive surveys as set out in Sewerage Risk Management Manual	Wessex Water		Annually	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Ongoing	
Undertake pro-active inspection of public sewers as set out in Sewerage Risk Management Manual. Identify infiltration using CCTV	Wessex Water		Annually	Done	Done	n/a	Done	Done	Done	Done	n/a	n/a	Done	Done	Done	Done	Ongoing	

Action	Responsibility	Additional Input	Timescales	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Planned 2024 >	Comments
CCTV and targeted infiltration studies according to analysis from previous surveys of s105a sewers where cost effective	Wessex Water		When Applicable	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Long Term	To be completed after public sewers have been surveyed and assessed
Where areas of infiltration in private drainage systems are found, pass information on to the Council for further action. WW to consider funding private improvements.	Wessex Water	LLFA, DC	When Applicable	n/a	n/a	n/a	n/a	n/a	done	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Long Term	Infiltration found in March 2016 was reviewed and sealed where cost effective in 2016/2017.
Continued sewer and manhole sealing of the public system where proven to be cost effective based on proactive inspections.	Wessex Water		When Applicable	Done	Done	Done	Done	Done	n/a	n/a	n/a	Done	n/a	n/a	n/a	Done	Ongoing	Sealing completed in Piddletrenthide in 2023
Analyse flows in the sewers, using historic and current telemetry, rainfall, flow surveys and modelling where appropriate.	Wessex Water		Annually	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Ongoing	
Routine review of telemetry; compare with borehole data, local watercourse data, rainfall data and customer incidents to assess residual levels of infiltration	Wessex Water		Annually	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Ongoing	
Continued monitoring of telemetry	Wessex Water		Routinely	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Done	Ongoing	Telemetry is monitored throughout the year and more frequently during times of high groundwater

Action	Responsibility	Additional Input	Timescales	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Planned 2024 >	Comments
Pumped relief stations have been included in the EDM programme; spill data is reported to the EA annually	Wessex Water		Annually	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Done	Done	Done	Done	Ongoing	
Appraisal of flooding incidents.	Wessex Water		When Applicable	n/a	n/a	n/a	n/a	n/a	Done	n/a	n/a	n/a	n/a	Short term	n/a	n/a	Ongoing	Review of High Level Assessment
Existing highway outfalls to be inspected and if necessary, cleared of any build-up of silt.	LLFA		When Applicable	n/a	Done	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Ongoing	LLFA to confirm future actions
Identify road gullies and other impermeable area connected into the foul sewers and remove them where cost effective	LLFA		When Applicable	Done	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Achieved Completed	IAS completed 2011. No road gully connections found, minor area of roof connections to foul
Tankering in order to protect public health against sewer backing up and flooding.	Wessex Water		When Applicable	n/a	Done	Done	n/a	n/a	n/a	n/a	n/a	Done	Done	n/a	Done	n/a	Ongoing	
Over-pump in order to protect public health as a last resort if/when it is not feasible to protect public health by tankering	Wessex Water		When Applicable	n/a	Done	Done	n/a	Done	Done	Done	n/a	Done	Done	n/a	Done	Done	Ongoing	
River quality sampling when over-pumping while OMAPs are in place on alternate days upstream and downstream of discharge point.	Wessex Water		When Applicable	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Done	n/a	n/a	Done	Done	Ongoing	

Action	Responsibility	Additional Input	Timescales	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Planned 2024 >	Comments
River quality sampling when relief pumping stations are operating as per IMP permit once a fortnight at the point of discharge and upstream and downstream.	Wessex Water		When Applicable	n/a	Done	Done	Done	Done	n/a	Done	Done	Done	Done	n/a	Done	Done	Ongoing	
Investigate the use of Artificial Intelligence (AI) to code CCTV, increase survey efficiency and help identify defects and hotspots	Wessex Water		When Applicable	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Done	Achieved completed	
Consider use of Meteor Cameras to monitor area of high frequency maintenance and when OMAP is active	Wessex Water		When Applicable	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Use of machine learning and rainfall forecasting to predict flows in sewers	Wessex Water		When Applicable	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Done	Achieved completed	
Private Sewer Transfer Complete October 2011. Plot known laterals from CCTV	Wessex Water		When Applicable	Done	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Achieved Completed	
Remedial works of private assets	Private		When Applicable	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Long Term	
Inspection of private gullies, drains and manholes	Private	WW	When Applicable	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Long Term	
Monitor and regulate surface water disposal to prevent surface water to foul misconnections.	Wessex Water		When Applicable	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Long Term	

Action	Responsibility	Additional Input	Timescales	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Planned 2024 >	Comments
Consider sustainable solutions such as above ground attenuation	Wessex Water		When Applicable	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Long Term	

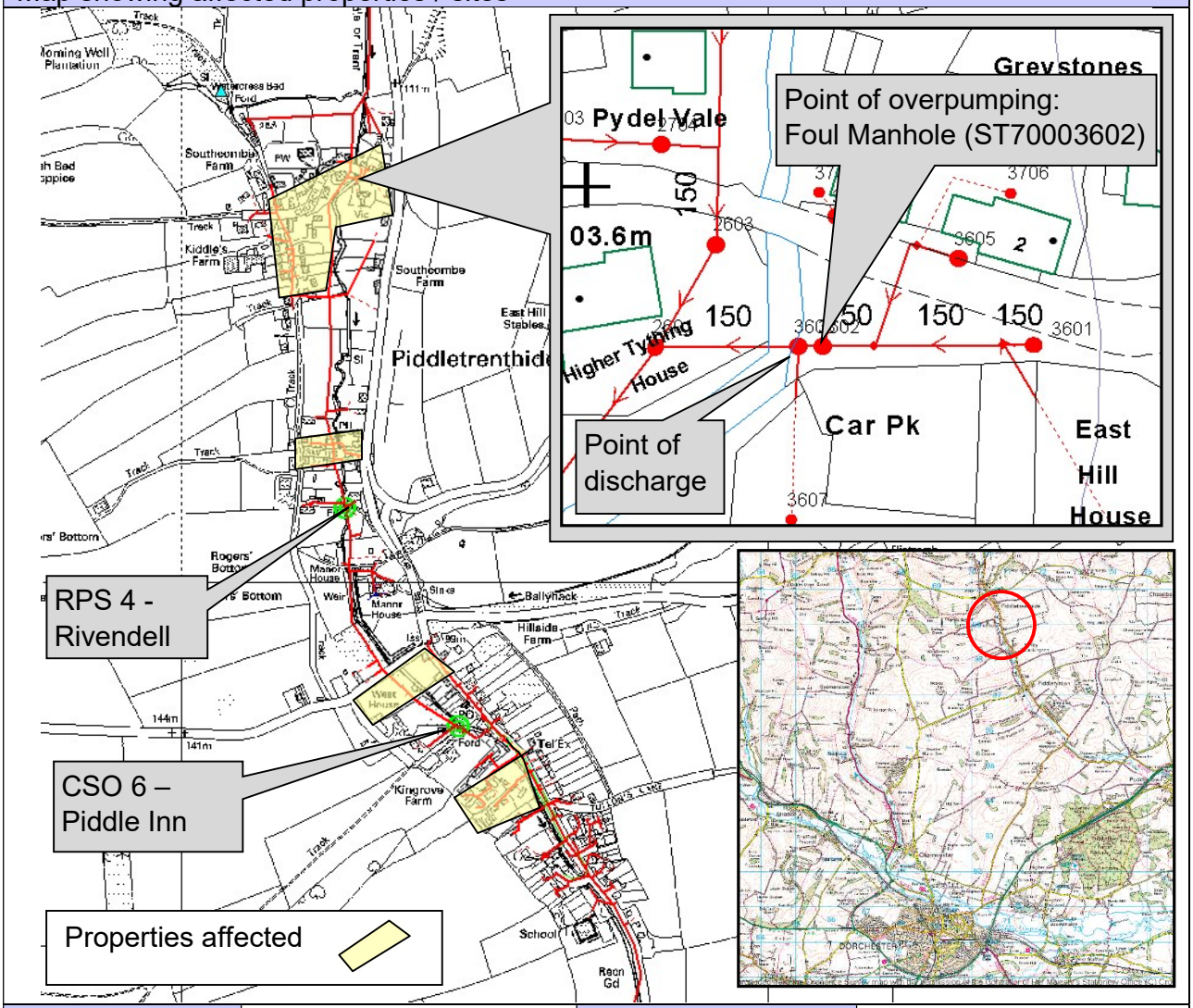
Appendix 2

Operational Mitigation Action Plan (OMAP) Piddletrenthide

Catchment details

Location	Piddletrenthide	Council	West Dorset District
WRC catchment	Piddlehinton WRC	WRC Site ID	13238
		WRC population	1222

Map showing affected properties / sites



No properties affected	11	WRC name	Piddlehinton WRC
SPS population	1222	WRC Site ID	13238

Historical consequences of inundation

Internal flooding	3	Restricted toilet use / Blockage Backing up	76
External flooding	35	Pollutions	14

Key operational contacts

WW name	Wessex Water	Telephone	24 hour service 0345 6004600
EA name	Environment Agency incident hotline	Telephone	Telephone (24 hour service) 0800 80 70 60
Notification	Only during normal working hours	Can pumps be mobilised before notification	Yes

Preparedness

Permission from landowner required	No	Does land owner need to be contacted	No
Borehole Trigger Borehole NGR	Barcombe Farm ST 69922 03216	Level	123.0
EA groundwater warning	Wessex Water to be included in the EA warning email.	Consent details	Piddletrenthide; WRC: 040067 RPS4: EPR/AP3827XC RPS6: EPR/AP3822XS

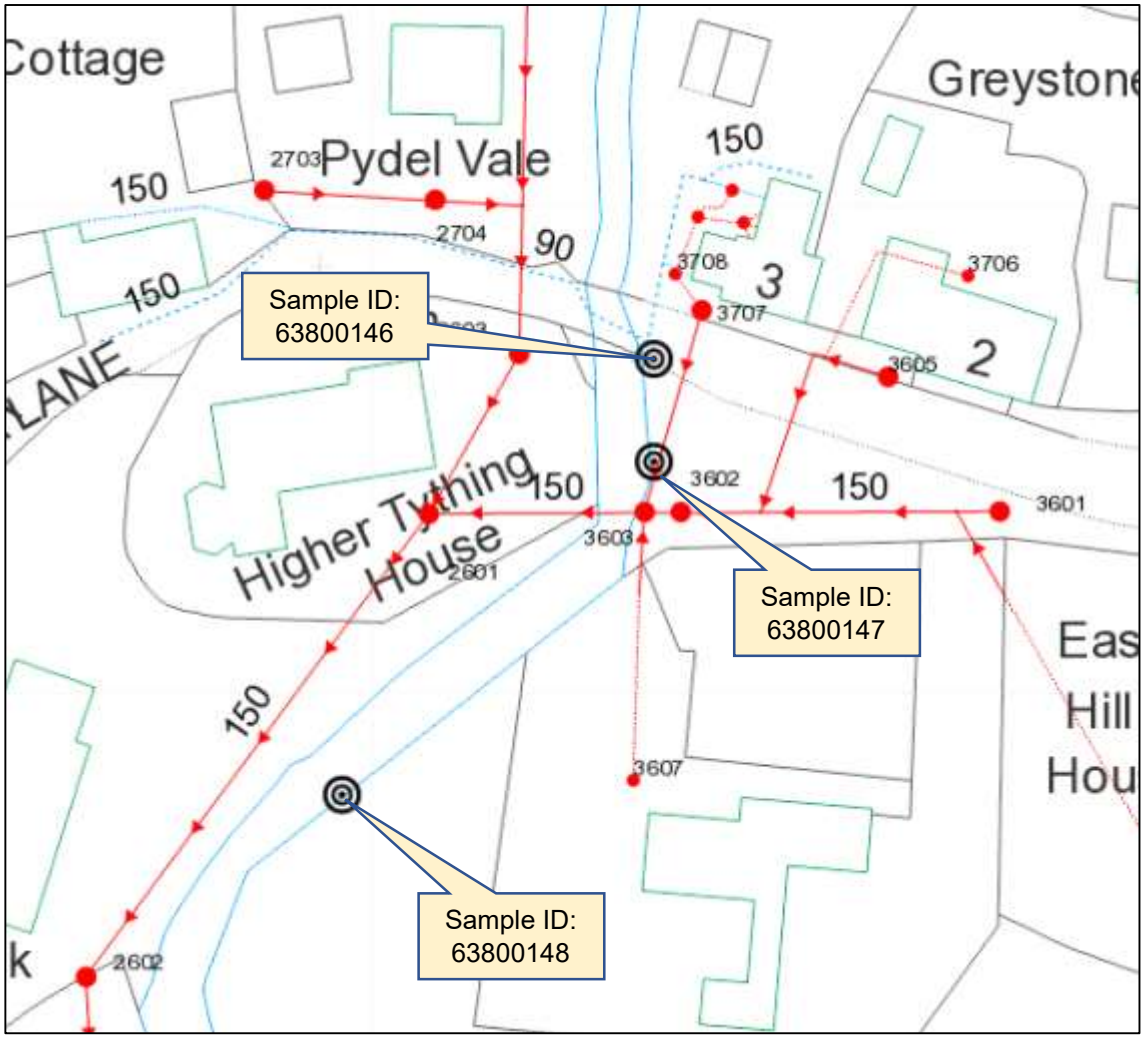
Trigger for tankering

Flooding / Surcharge	Manholes surcharge within 1m from flooding		
Tanker from NGR:	Foul manhole (ST70001401) adjacent Brookside, DT2 7QZ ST 70204 00476	Tanker to NGR:	Dorchester WRC (13096) SY 70964 90221
Tankering frequency	Daily	Night tankering	Yes

Triggers for pumping to river

Flooding / Surcharge	Any risk of internal flooding or loss of service due to groundwater inundation		
Pump from NGR:	Foul manhole (ST70003602) adjacent to 3 Church Lane, DT2 7QY ST 70302 00687	Pump to NGR:	River Piddle, 10 metres downstream of road bridge ST 70302 00691
Discharge rate	<20l/s	Sensitivity of watercourse	3
Treatment arrangements	Copasac	Other requirements	Traffic management PR Plan

Sampling information



Sampling regime	Full Lab suite	Sampling frequency	3 times per week e.g. (Monday, Wednesday, Friday) then weekly

Sample ID Number	63800147	Point of Discharge NGR:	River Piddle, 10 metres downstream of road bridge ST 70302 00691
Upstream sampling location Sample ID Number NGR:	10 metres upstream of discharge point, adjacent to road bridge 63800146 ST 70302 00700	Downstream Sampling location Sample ID Number NGR:	40 metres downstream of discharge point adjacent to wall of car park 63800148 ST 70275 00662
Standard sampling parameters	BOD, SS, Ammoniacal Nitrogen, pH and Total oxidised nitrogen	Deviations from normal sampling criteria	None

Trigger for ending of OMAP

Flooding / Surcharge	Surcharge in sewer reduces below flooding level and heavy rainfall is not forecast

Document Control

Issue nr	Date	Author	Comments
1	25/07/14	R Pearcey	First Draft
1a	05/08/14	H Wheeler	Amendments
2	07/09/14	R Trotman	Second Draft
3	06/01/15	R Trotman	EA comments / Final version

Key Contacts

WW	Guy Pascall (Operational Sewerage Manager - South) Mark Cooper (Area Sewerage Manager)	WW mobile	07786 660899 07776 226970
WW	Matt Kettle & Roz Chamberlaine	Email	inflow.infiltration@wessexwater.co.uk
EA	Environment Agency Incident Hotline	Telephone	(24-hour service) 0800 80 70 60
Landowner		Telephone	
Tenant			

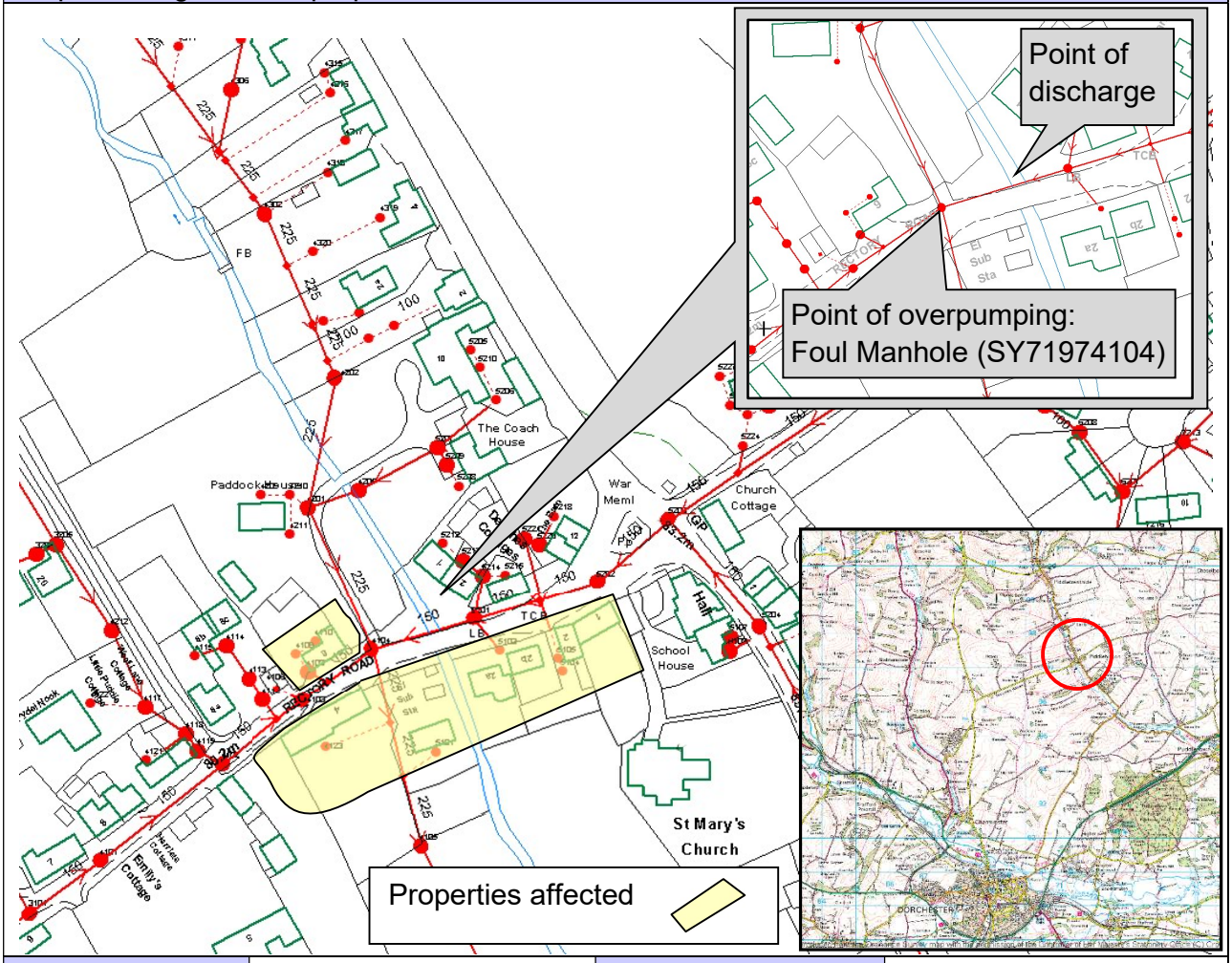
Appendix 3

Operational Mitigation Action Plan (OMAP064) Piddlehinton

Catchment details

Location	Piddlehinton	Council	West Dorset District
WRC catchment	Piddlehinton WRC	WRC Site ID	13238
		WRC population	1222

Map showing affected properties / sites



No properties affected	7	SWT name	Piddlehinton WRC
SPS population	1222	WRC Site ID	13238

Historical consequences of inundation

Internal flooding	4	Restricted toilet use / Blockage Backing up	86
External flooding	39	Pollutions	16

Key operational contacts

WW name	Wessex Water	Telephone	24 hour service 0345 6004600
EA name	Environment Agency incident hotline	Telephone	Telephone (24 hour service) 0800 80 70 60
Notification	Only during normal working hours	Can pumps be mobilised before notification	Yes

Preparedness

Permission from landowner required	Yes	Does landowner need to be contacted	Yes
Borehole Trigger Borehole NGR	Barcombe Farm ST 69922 03216	Level	123.0
EA groundwater warning	Wessex Water to be included in the EA warning email.	Consent details	Piddletrenthide; WRC: 040067 RPS4: EPR/AP3827XC RPS6: EPR/AP3822XS

Trigger for tankering

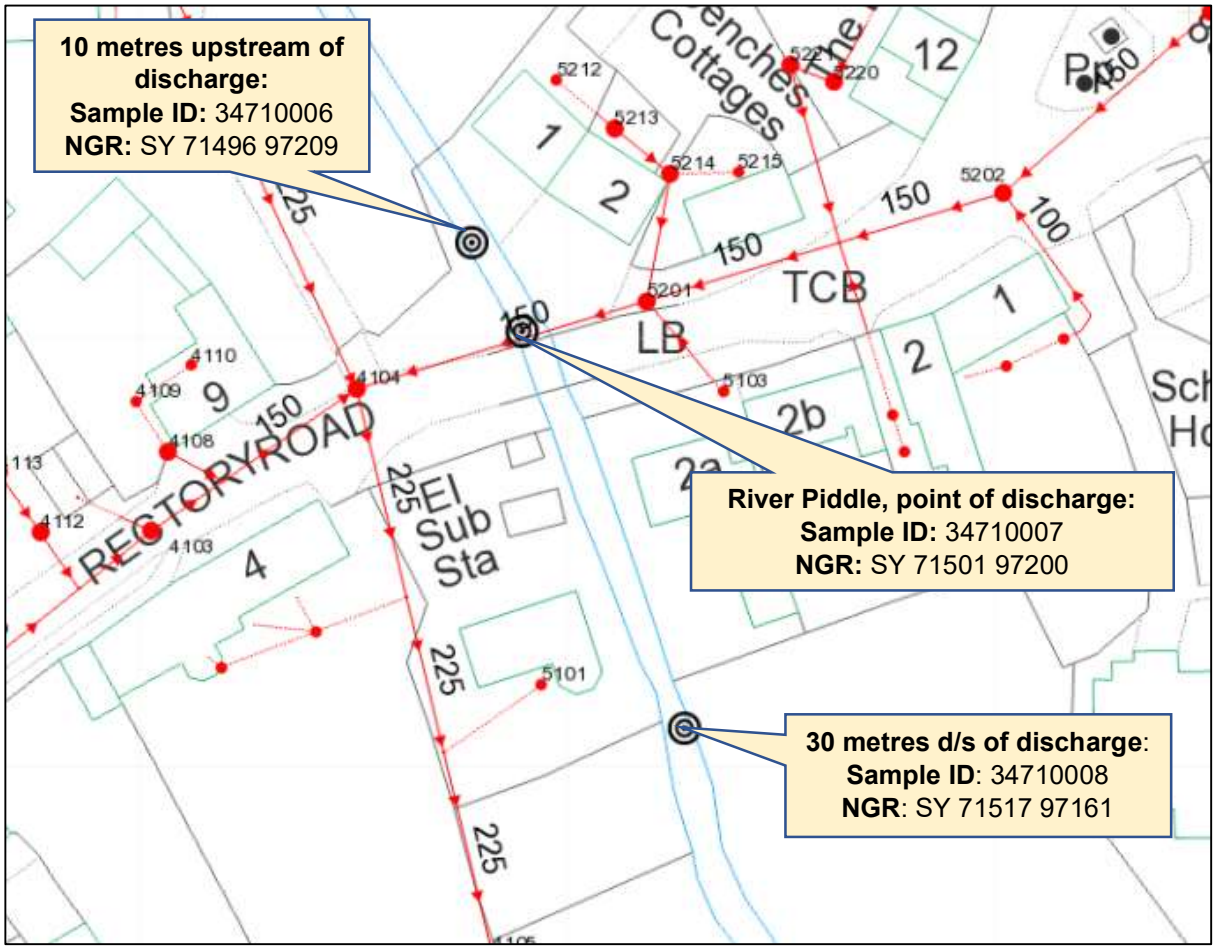
Flooding / Surcharge	Manholes surcharge within 1m from flooding		
Tanker from NGR:	Foul manhole (SY71974104) driveway entrance adjacent 9 Rectory Road, Piddlehinton, DT2 7TE SY 71485 97195	Tanker to NGR:	Dorchester WRC (13096) SY 70964 90221
Tankering frequency	Daily	Night tankering	No

Triggers for pumping to river

Flooding / Surcharge	Any risk of internal flooding or loss of service due to groundwater inundation

Pump from NGR:	Foul manhole (SY71974104) driveway entrance adjacent to 9 Rectory Road, Piddlehinton, DT2 7TE SY 71485 97195	Pump to NGR:	River Piddle, adjacent to road bridge SY 71501 97200
Discharge rate	<20l/s	Sensitivity of watercourse	3
Treatment arrangements	Copasac	Other requirements	Traffic management PR Plan

Sampling information



Sampling regime	Full Lab suite	Sampling frequency	3 times per week e.g. (Monday, Wednesday, Friday) then weekly
Sample ID Number	River Piddle, point of discharge: 34710007	Point of Discharge	River Piddle, adjacent to road bridge

		NGR:	SY 71501 97200
Upstream sampling location Sample ID Number NGR:	10 metres upstream of discharge point, adjacent to garden wall 34710006 SY 71496 97209	Downstream Sampling location Sample ID Number NGR:	30 metres downstream of discharge point beyond garden of 3 Rectory Road, DT2 7TE (access required). 34710008 SY 71517 97161
Standard sampling parameters	BOD, SS, Ammoniacal Nitrogen, pH and Total oxidised nitrogen	Deviations from normal sampling criteria	None

Trigger for ending of OMAP

Flooding / Surcharge	Surcharge in sewer reduces below flooding level and heavy rainfall is not forecast

Document Control

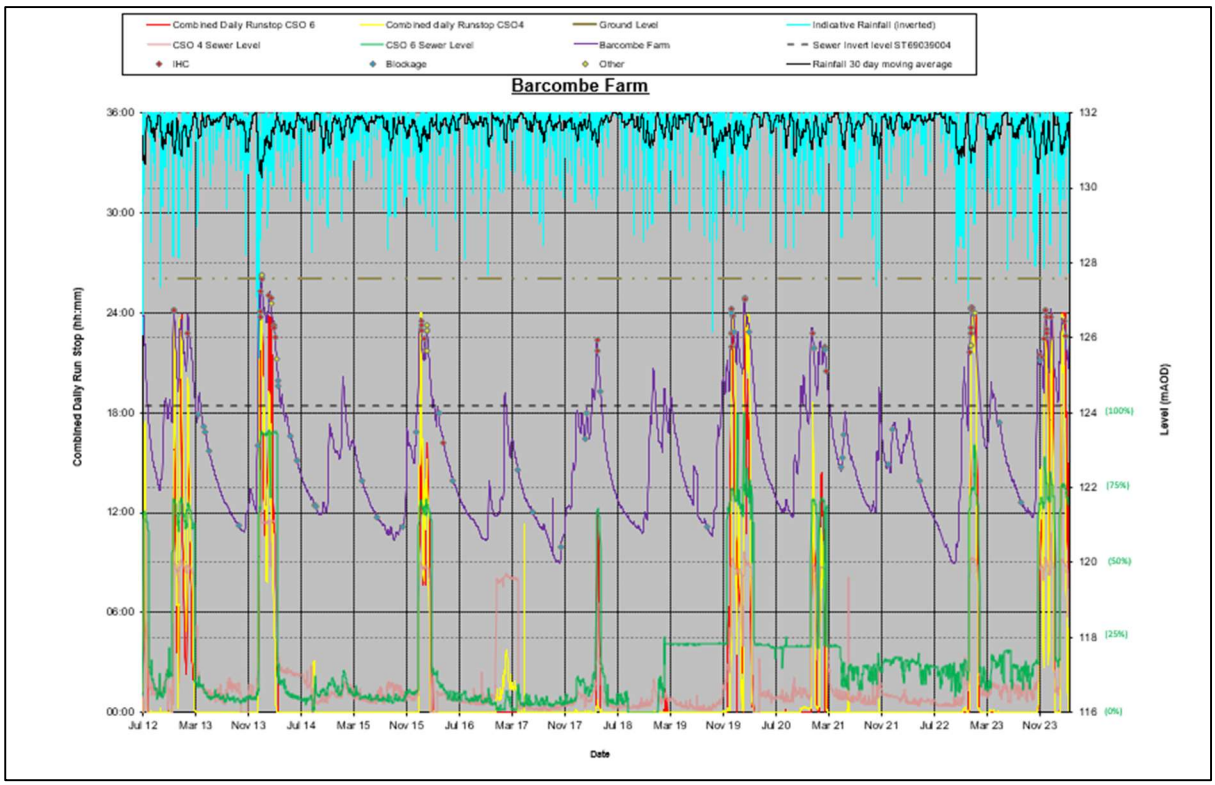
Issue nr	Date	Author	Comments
1	03/05/2017	R Chamberlaine	First Draft
2	10/01/2023	S Rawes	Sampling point IDs added

Key Contacts

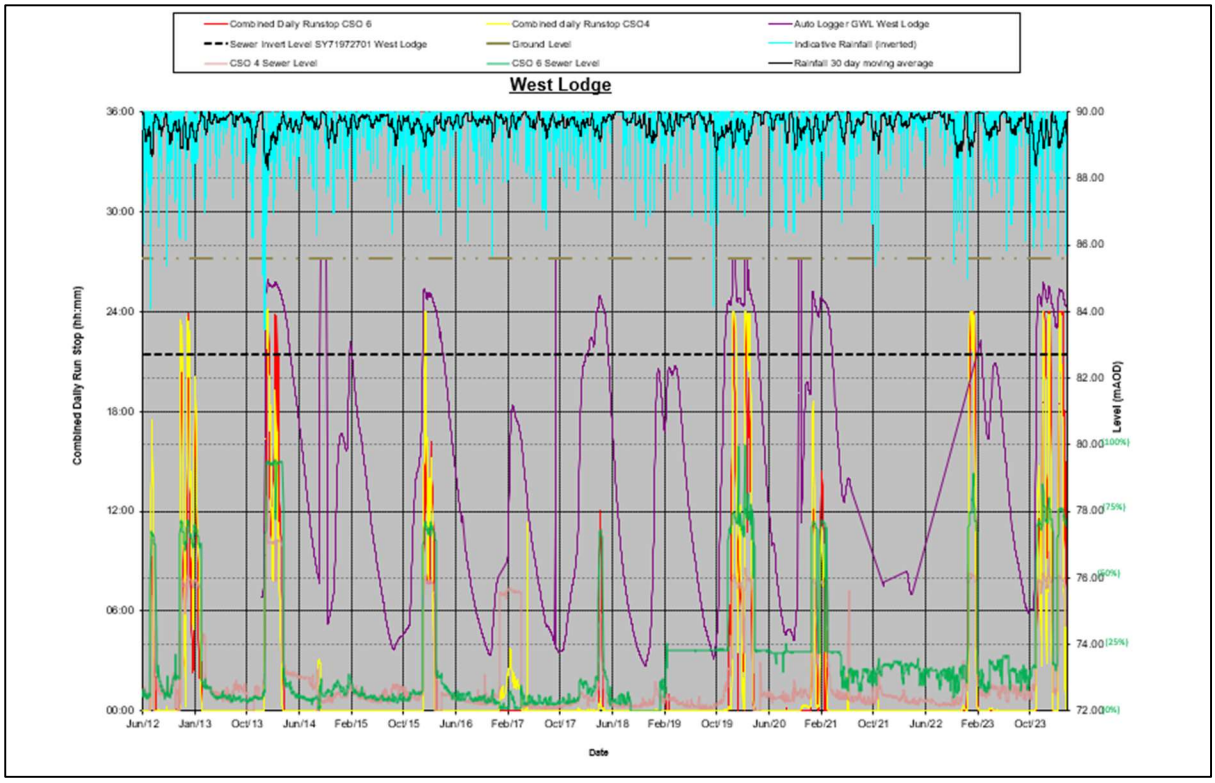
WW	Guy Pascall (Operational Sewerage Manager - South) Mark Cooper (Area Sewerage Manager)	WW mobile	07786 660899 07776 226970
WW	Matt Kettle & Roz Chamberlaine	Email	inflow.infiltration@wessexwater.co.uk
EA	Environment Agency Incident Hotline	Telephone	(24-hour service) 0800 80 70 60
Landowner		Telephone	
Tenant			

Appendix 4

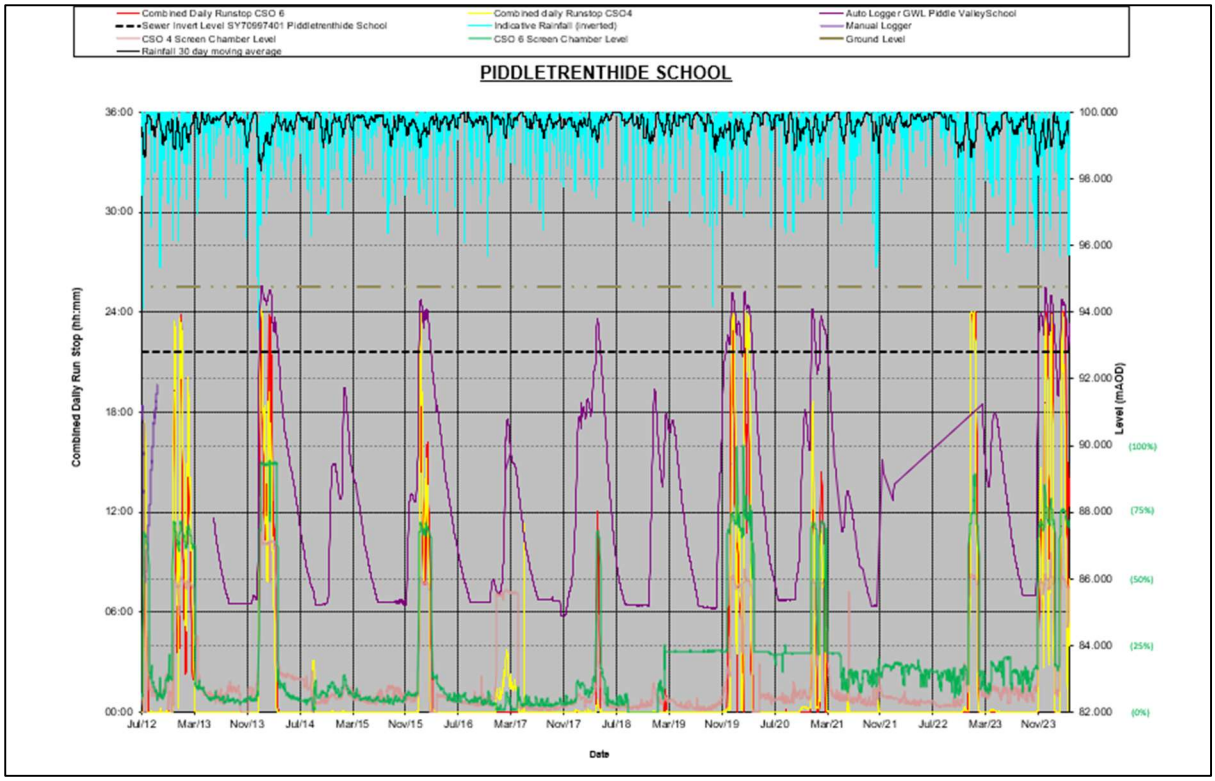
Boreholes vs RPS Pump Run Times



Barcombe Farm borehole vs Sump and Pump Run time.



West Lodge borehole vs Sump and Pump Run time.



Piddletrenthide School borehole vs Sump and Pump Run time.

Appendix 5

Sampling Locations

30602001 Sampling Point A: ST 70271 00229 - river c.100m u/s of the Rivendell RPS

Take sample from the bridge, u/s side and mid-channel.

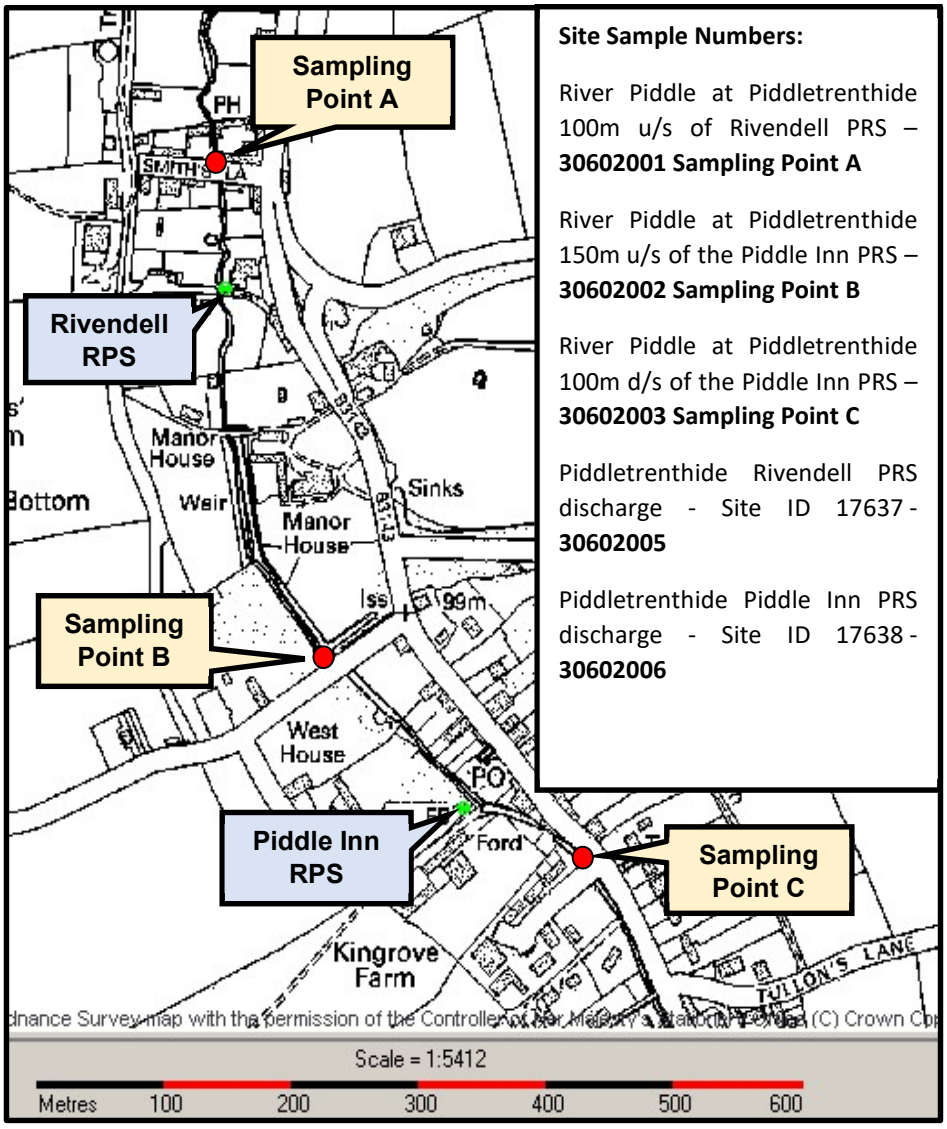
30602002 Sampling Point B: SY 70359 99861 - river c.300m d/s of the Rivendell RPS

- river c.150m u/s of the Piddle Inn RPS

Take sample from bridge, u/s side and slightly towards the left-hand side of the bridge span.

30602003 Sampling Point C: SY 70559 99713 - river c.100m d/s of the Piddle Inn RPS

Take sample from bridge, u/s side and mid-channel



Appendix 6

Sampling Results

RPS sampling

Date	Sample point number	BOD atu (mg O_2/l)	Suspended solids (mg/l)	Ammonia as N (mg N/l)	Total oxidised N (mg N/l)
26/07/2012	30602005	<4.0	7	<0.600	5.53
23/04/2012	30602001	<11.0	72	0.029	4.6
23/04/2012	30602002	<11.0	67	0.028	4.65
23/04/2012	30602003	<14.0	81	0.04	4.35
26/04/2012	30602001	<8.0	20	0.022	6.16
26/04/2012	30602002	<8.0	22	0.018	5.96
26/04/2012	30602003	<8.0	18	0.015	5.88
26/07/2012	30602006	10	19	2.74	6.1
26/07/2012	30602001	<2.0	7	<0.010	7.35
26/07/2012	30602002	<2.0	7	<0.010	7.23
26/07/2012	30602003	<2.0	7	0.043	7.15
09/08/2012	30602005	<6.0	<5	<0.600	2.81
09/08/2012	30602006	10	14	3.59	<0.50
09/08/2012	30602001	<2.0	<5	0.015	6.79
09/08/2012	30602002	<2.0	<5	0.013	7.04
09/08/2012	30602003	<2.0	7	0.012	7.32
23/08/2012	30602005	<6.0	<5	<0.600	2.14
23/08/2012	30602006	19	8	4.38	<0.50
23/08/2012	30602001	<2.0	<5	0.035	6.79
23/08/2012	30602002				
23/08/2012	30602003	<2.0	8	0.062	6.74
14/09/2012	30602005	<8.0	<5	<0.600	0.66
14/09/2012	30602006	<14.0	13	6.55	<0.50
14/09/2012	30602001	<6.0	<5	0.026	7.27
14/09/2012	30602002	<6.0	<5	0.031	7.32
14/09/2012	30602003	<6.0	5	0.031	7.3
27/09/2012	30602005	<8.0	16	1.05	2.77
27/09/2012	30602006	<9.0	17	6.63	1.52
27/09/2012	30602001	<2.0	<5	0.013	7.12
27/09/2012	30602002	<2.0	5	0.011	7.1
27/09/2012	30602003	<2.0	7	0.027	7.06
19/10/2012	30602005	<6.0	<5	<0.600	4.19
19/10/2012	30602006	<6.0	6	8.37	0.58
19/10/2012	30602001	<6.0	11	1.95	6.92
19/10/2012	30602002	<6.0	14	0.617	6.81
19/10/2012	30602003	<6.0	13	0.229	6.75
30/10/2012	30602005	<6.0	<5	<0.600	4.82
30/10/2012	30602006	<6.0	7	1.41	5.12
30/10/2012	30602001	<2.0	29	0.034	7.63

Date	Sample point number	BOD atu (mg O_2/l)	Suspended solids (mg/l)	Ammonia as N (mg N/l)	Total oxidised N (mg N/l)
30/10/2012	30602001	2	35	0.02	7.76
30/10/2012	30602003	<2.0	21	0.033	7.73
20/11/2012	30602005	<6.0	<5	2.38	5.23
20/11/2012	30602006	<6.0	8	2.74	5.98
20/11/2012	30602001	<9.0	76	0.054	5.81
20/11/2012	30602002	<9.0	65	0.088	5.79
20/11/2012	30602003	<9.0	77	0.034	5.77
05/12/2012	30602005	<6.0	7	<0.600	6.66
05/12/2012	30602006	<6.0	<5	<0.600	6.61
05/12/2012	30602001	<6.0	20	0.022	7.98
05/12/2012	30602002	<6.0	17	0.032	7.77
05/12/2012	30602003	<6.0	16	0.022	7.79
15/01/2013	30602005	10	17	2.64	5.57
15/01/2013	30602006	7	11	1.24	6
15/01/2013	30602001	<6.0	22	0.023	8.33
15/01/2013	30602002	<6.0	21	0.047	8.16
15/01/2013	30602003	<6.0	23	0.055	7.87
15/02/2013	30602005	26	49	9.08	6.92
15/02/2013	30602006	9	23	2.03	7.15
15/02/2013	30602001	<2.0	14	0.02	8.43
15/02/2013	30602002	<2.0	14	0.048	8.31
15/02/2013	30602003	<2.0	14	0.058	8.13
28/02/2013	30602005	<9.0	21	2.71	5.88
28/02/2013	30602006	<9.0	17	1.84	5.32
28/02/2013	30602001	<2.0	8	0.117	8.25
28/02/2013	30602002	<2.0	7	0.051	8.14
28/02/2013	30602003	<2.0	11	0.052	8.1
19/03/2013	30602005	<6.0	<5	<0.400	5.7
19/03/2013	30602006	<6.0	<5	1.58	0.7
19/03/2013	30602001	<2.0	<5	<0.020	8.3
19/03/2013	30602002	<2.0	<5	<0.020	8.6
19/03/2013	30602003	<2.0	<5	<0.020	8.1
03/04/2013	30602005	<6.0	<5	<0.400	4.7
03/04/2013	30602006	<8.0	12	4.55	<0.20
03/04/2013	30602001	<6.0	8	<0.020	8.2
03/04/2013	30602002	<6.0	9	0.44	7.9
03/04/2013	30602003	<6.0	9	<0.020	8
25/04/2013	30602005	<2.0	<5	0.464	5.6
25/04/2013	30602006	3	13	6.6	<0.20
25/04/2013	30602001	<6.0	10	<0.020	8
25/04/2013	30602002	<6.0	11	<0.020	8
25/04/2013	30602003	<6.0	8	<0.020	7.9
07/06/2013	30602005	<6.0	10	<0.400	7
07/06/2013	30602006	<6.0	11	6.09	<0.20
07/06/2013	30602001	<2.0	<5	0.02	7.9

Date	Sample point number	BOD atu (mg O_2/l)	Suspended solids (mg/l)	Ammonia as N (mg N/l)	Total oxidised N (mg N/l)
07/06/2013	30602002	<2.0	7	0.04	7.9
07/06/2013	30602003	<2.0	5	0.05	7.9
31/12/2013	30602005	13	16	1.44	7
31/12/2013	30602006	7	12	0.945	6.9
31/12/2013	30602001	<2.0	9	<0.020	7.6
31/12/2013	30602002	<2.0	7	0.02	7.4
31/12/2013	30602003	<2.0	5	0.02	7.4
16/01/2014	30602005	<8.0	8	0.865	6.5
16/01/2014	30602006	<8.0	<5	<0.400	6.4
16/01/2014	30602001	<6.0	15	0.03	7.2
16/01/2014	30602002	<6.0	15	0.02	6.9
16/01/2014	30602003	<6.0	13	<0.020	6.9
07/02/2014	30602005	2	7	<0.400	7.1
07/02/2014	30602005				
07/02/2014	30602006	<2.0	<5	<0.400	6.9
07/02/2014	30602006				
07/02/2014	30602001	<2.0	14	<0.020	7.5
07/02/2014	30602001				
07/02/2014	30602001				
07/02/2014	30602002	<2.0	10	<0.400	7.7
07/02/2014	30602003	<2.0	12	<0.400	7.7
07/02/2014	30602003				
05/03/2014	30602005	<6.0	8	1.04	6.5
05/03/2014	30602006	<6.0	<5	0.569	6.9
05/03/2014	30602001	<2.0	6	0.02	7.6
05/03/2014	30602002	<2.0	5	0.02	7.4
05/03/2014	30602003	<2.0	<5	<0.020	7.5
01/12/2014	30602001	<2.0	<5	<0.020	7.7
01/12/2014	30602002	<2.0	<5	<0.020	7.7
01/12/2014	30602003	<2.0	6	<0.020	7.6
17/12/2014	30602001	<6.0	23	<0.020	7.6
17/12/2014	30602002	<6.0	19	<0.020	7.5
17/12/2014	30602003	<6.0	16	<0.020	7.5
05/01/2015	30602001	<6.0	21	0.03	7.7
05/01/2015	30602002	<6.0	17	0.03	7.8
05/01/2015	30602003	<6.0	21	0.02	7.8
07/01/2016	30602005	12	12	0.746	8.2
07/01/2016	30602006	9	16	0.642	7.8
07/01/2016	30602001	2	35	0.02	6.9
07/01/2016	30602002	<4.0	34	0.03	6.4
07/01/2016	30602003	<4.0	39	0.04	6.4
26/01/2016	30602005	21	16	1.58	6
26/01/2016	30602006	13	18	1.69	7.5
26/01/2016	30602001	<6.0	19	0.02	7.7
26/01/2016	30602002	<6.0	13	0.03	7.5

Date	Sample point number	BOD atu (mg O_2/l)	Suspended solids (mg/l)	Ammonia as N (mg N/l)	Total oxidised N (mg N/l)
26/01/2016	30602003	<6.0	11	0.03	7.5
01/03/2016	30602005	<9.0	17	1.16	6
01/03/2016	30602006	13	17	1.52	4.9
01/03/2016	30602001	<4.0	9	<0.020	8.1
01/03/2016	30602002	<4.0	9	0.03	7.9
01/03/2016	30602003	<4.0	14	0.06	7.8
30/03/2016	30602005	<14.0	18	2.34	8.2
30/03/2016	30602006	<9.0	<5	3.24	8.3
30/03/2016	30602001	<2.0	7	<0.020	7.7
30/03/2016	30602002	<2.0	7	<0.020	7.6
30/03/2016	30602003	<4.0	6	<0.020	7.7
09/02/2017	30602005				
09/02/2017	30602005	14	33	2.36	7.2
09/02/2017	30602006				
09/02/2017	30602006	<6.0	15	<0.400	7.7
09/02/2017	30602001	<2.0	14	<0.020	7.3
09/02/2017	30602001				
09/02/2017	30602002				
09/02/2017	30602002	<2.0	16	0.12	7.3
09/02/2017	30602003				
09/02/2017	30602003	<4.0	20	0.1	7.2
27/02/2017	30602005	171	274	54.7	<0.20
27/02/2017	30602001	<6.0	16	<0.020	7.3
27/02/2017	30602001	<6.0	16	<0.020	7.2
24/03/2017	30602005	222	252	33.3	
24/03/2017	30602001	<2.0	7	<0.020	
24/03/2017	30602002	2	13	0.27	
24/03/2017	30602003	2	11	0.2	
16/04/2018	30602005	15	23	1.82	
16/04/2018	30602006	15	31	2.23	
16/04/2018	30602001	2	8	<0.020	
16/04/2018	30602002	<2.0	7	<0.020	
16/04/2018	30602003	<2.0	8	<0.020	
02/05/2018	30602005	47	67	2.65	4.7
02/05/2018	30602006	63	94	5.15	4.1
02/05/2018	30602001	2	23	<0.020	6.3
02/05/2018	30602002	3	27	<0.020	6
02/05/2018	30602003	2	26	<0.020	6
19/12/2019	30602005	7	11	1.77	6.1
19/12/2019	30602006	8	14	1.49	6.3
19/12/2019	30602001	<4.0	8	<0.020	6.5
19/12/2019	30602002	<2.0	13	0.02	6.2
19/12/2019	30602003	3	9	0.28	6.2
30/12/2019	30602005	9	15	1.9	6.3
30/12/2019	30602006	11	13	0.958	6.2

Date	Sample point number	BOD atu (mg O_2/l)	Suspended solids (mg/l)	Ammonia as N (mg N/l)	Total oxidised N (mg N/l)
30/12/2019	30602001	<2.0	8	<0.020	7
30/12/2019	30602002	<2.0	9	0.04	6.8
30/12/2019	30602003	4	12	0.31	6.5
20/01/2020	30602005	14	29	2.17	5.5
20/01/2020	30602006	6	10	1.51	5.9
20/01/2020	30602001	<2.0	9	<0.020	7.3
20/01/2020	30602002	<2.0	8	0.03	7.3
20/01/2020	30602003	<2.0	8	0.04	7.2
31/01/2020	30602005	9	18	3.82	5.3
31/01/2020	30602006	10	19	3.07	5.6
31/01/2020	30602001	<2.0	8	<0.020	7.5
31/01/2020	30602002	<2.0	7	0.03	7.4
31/01/2020	30602003	<2.0	8	0.03	7.3
24/02/2020	30602005	6	8	0.537	6.5
24/02/2020	30602006	4	<5	<0.400	6.6
24/02/2020	30602001	<2.0	<5	0.04	7
24/02/2020	30602002	<2.0	5	0.03	6.9
24/02/2020	30602003	2	7	0.09	6.6
24/03/2020	30602005	31	31	3.83	4.6
24/03/2020	30602006	20	27	2.85	4.9
24/03/2020	30602001	<2.0	6	<0.020	7.6
24/03/2020	30602002	<2.0	6	<0.020	7.4
24/03/2020	30602003	<2.0	6	0.02	7.4
21/12/2021	30602001	2	13	0.04	5.2
21/12/2021	30602002	<2.0	9	<0.020	7.2
21/12/2021	30602003	<2.0	10	<0.020	7.1
04/01/2023	30602001	<2.0	14	<0.020	7
04/01/2023	30602002	<2.0	14	<0.020	6.8
04/01/2023	30602003	<2.0	13	<0.020	6.7
17/01/2023	30602001	<2.0	14	<0.020	7.1
17/01/2023	30602002	<2.0	10	<0.020	6.9
17/01/2023	30602003	<2.0	7	<0.020	6.6
02/02/2023	30602001	<2.0	8	<0.020	7.2
02/02/2023	30602002	<2.0	8	<0.020	6.9
02/02/2023	30602003	2	8	0.03	6.9
16/02/2023	30602005	<2.0	8	<0.400	6.9
16/02/2023	30602006	<2.0	7	<0.400	6.9
16/02/2023	30602001	<2.0	8	<0.020	7
16/02/2023	30602002	<2.0	8	<0.020	7.1
16/02/2023	30602003	<2.0	8	<0.020	7
16/11/2023	30602005	<8.0	22	<0.400	4.7
16/11/2023	30602006	<9.0	24	<0.400	4.5
16/11/2023	30602001	<2.0	21	0.02	5.5
16/11/2023	30602002	<2.0	24	<0.020	5.5
16/11/2023	30602003	<2.0	22	0.04	5.5

Date	Sample point number	BOD atu (mg O_2/l)	Suspended solids (mg/l)	Ammonia as N (mg N/l)	Total oxidised N (mg N/l)
29/11/2023	30602005	<2.0	6	<0.400	6.5
29/11/2023	30602006	<2.0	5	<0.400	6.4
29/11/2023	30602001	<2.0	8	<0.020	6.8
29/11/2023	30602002	<2.0	<5	<0.400	6.3
29/11/2023	30602003	<2.0	<5	0.05	6.6
11/12/2023	30602005	<2.0	<5	<0.400	6.7
11/12/2023	30602006	<2.0	8	<0.400	6.5
11/12/2023	30602001	<2.0	6	<0.020	6.5
11/12/2023	30602002	<2.0	9	<0.020	6.3
11/12/2023	30602003	<2.0	9	0.02	6.2
20/12/2023	30602005	2	9	<0.400	7
20/12/2023	30602006	<2.0	7	0.423	6.8
20/12/2023	30602001	<2.0	10	0.02	6.9
20/12/2023	30602002	<2.0	8	0.02	6.8
20/12/2023	30602003	<2.0	10	0.03	6.7
10/01/2024	30602005	<2.0	10	<0.400	7.3
10/01/2024	30602006	<2.0	9	<0.400	7.1
10/01/2024	30602001	<2.0	8	<0.020	7.1
10/01/2024	30602002	<2.0	8	<0.020	6.9
10/01/2024	30602003	<2.0	6	<0.020	6.8
19/01/2024	30602005	6	12	<0.400	7.5
19/01/2024	30602006	<6.0	8	<0.400	7.5
19/01/2024	30602001	<2.0	8	0.08	7.1
19/01/2024	30602002	<2.0	7	0.06	6.9
19/01/2024	30602003	<2.0	7	0.05	7
26/01/2024	30602005	2	10	<0.400	7.1
26/01/2024	30602006	2	10	<0.400	7
26/01/2024	30602001	<2.0	10	0.05	7.1
26/01/2024	30602002	<2.0	7	0.04	7
26/01/2024	30602003	<2.0	10	0.04	7.5
01/02/2024	30602005	<2.0	11	<0.400	7.3
01/02/2024	30602006	<2.0	10	<0.400	7.3
01/02/2024	30602001	<2.0	12	0.05	7.4
01/02/2024	30602002	<2.0	10	0.05	7.3
01/02/2024	30602003	<2.0	9	<0.020	7.2
21/02/2024	30602005	<28.0	136	<0.400	5.1
21/02/2024	30602006	<28.0	155	<0.400	4.5
21/02/2024	30602001	2	130	0.05	5.1
21/02/2024	30602002	2	118	0.05	5.1
21/02/2024	30602003	3	170	0.04	4.4
10/03/2024	30602005	<2.0	9	<0.400	6.9
10/03/2024	30602006	<2.0	7	<0.400	6.7
10/03/2024	30602001	<2.0	7	0.04	7.3
10/03/2024	30602002	<2.0	6	0.04	7.1
10/03/2024	30602003	<2.0	7	0.04	6.9

Date	Sample point number	BOD atu (mg O_2/l)	Suspended solids (mg/l)	Ammonia as N (mg N/l)	Total oxidised N (mg N/l)
21/03/2024	30602005	<8.0	<5	<0.400	6.6
21/03/2024	30602006	<8.0	6	<0.400	6.4
21/03/2024	30602001	<2.0	6	<0.020	7.3
21/03/2024	30602002	<2.0	<5	<0.020	7.2
21/03/2024	30602003	2	7	0.06	7

Piddletrenthide OMAP sampling

Date	Sample point number	BOD atu (mg O_2/l)	Suspended solids (mg/l)	Ammonia as N (mg N/l)	Total oxidised N (mg N/l)
21/02/2020	63800146	<2.0	8	<0.400	7.2
21/02/2020	63800147	2	9	<0.400	7.2
21/02/2020	63800148	<2.0	13	<0.400	7.2
23/02/2020	63800146	<2.0	10	<0.400	6.8
23/02/2020	63800147	<2.0	10	<0.400	6.8
23/02/2020	63800148	<2.0	9	<0.400	6.9
25/02/2020	63800146	<2.0	7	<0.400	7.2
25/02/2020	63800147	<2.0	8	<0.400	7.3
25/02/2020	63800148	<2.0	9	<0.400	7.2
27/02/2020	63800146	<2.0	11	<0.400	7
27/02/2020	63800147	<2.0	11	<0.400	7
27/02/2020	63800148	<2.0	13	<0.400	6.9
02/03/2020	63800146	<2.0	9	<0.400	7.7
02/03/2020	63800147	<2.0	8	<0.400	7.3
02/03/2020	63800148	<2.0	8	<0.400	7.7
03/03/2020	63800146	<2.0	8	<0.400	7.4
03/03/2020	63800147	<2.0	8	<0.400	7.5
03/03/2020	63800148	<2.0	7	<0.400	7.5
04/03/2020	63800146	<2.0	8	<0.400	7.4
04/03/2020	63800147	2	9	<0.400	7.2
04/03/2020	63800148	<2.0	9	<0.400	7.3
06/03/2020	63800146	<2.0	12	<0.400	7.3
06/03/2020	63800147	<6.0	11	<0.400	7.4
06/03/2020	63800148	<2.0	10	<0.400	7.5
22/12/2022	63800146	<2.0	<5	<0.400	10.7
22/12/2022	63800146	<2.0	50	<0.400	6.4
22/12/2022	63800147	2	<5	<0.400	10.7
22/12/2022	63800147	2	54	<0.400	6.4
22/12/2022	63800148	<2.0	<5	<0.400	11.5
22/12/2022	63800148	2	58	<0.400	6.3
23/12/2022	63800146	<2.0	<5	<0.400	10.8
23/12/2022	63800146	2	48	<0.400	7
23/12/2022	63800147	<2.0	<5	<0.400	11.5

Date	Sample point number	BOD atu (mg O_2/l)	Suspended solids (mg/l)	Ammonia as N (mg N/l)	Total oxidised N (mg N/l)
23/12/2022	63800147	<2.0	53	<0.400	6.9
23/12/2022	63800148	<2.0	<5	<0.400	11.2
23/12/2022	63800148	2	57	<0.400	6.8
29/12/2022	63800146	<2.0	22	<0.400	7.3
29/12/2022	63800147	<4.0	24	<0.400	7.4
29/12/2022	63800148	<2.0	22	<0.400	7.2
30/12/2022	63800146	<19.0	94	<0.400	5.7
30/12/2022	63800147	<11.0	96	<0.400	5.8
30/12/2022	63800148	<11.0	81	<0.400	5.7
04/01/2023	63800146	<6.0	13	<0.400	7.5
04/01/2023	63800147	<8.0	14	<0.400	7.4
04/01/2023	63800148	<6.0	14	<0.400	7.5
05/01/2023	63800146	<2.0	12	<0.400	7.5
05/01/2023	63800147	<6.0	11	<0.400	7.4
05/01/2023	63800148	<2.0	14	<0.400	7.5
06/01/2023	63800146	<2.0	9	<0.400	7.7
06/01/2023	63800147	<2.0	9	<0.400	7.6
06/01/2023	63800148	<2.0	12	<0.400	7.7
11/01/2023	63800146	<11.0	10	<0.400	7.1
11/01/2023	63800147	<8.0	10	<0.400	7.2
11/01/2023	63800148	<8.0	10	<0.400	7.1
17/01/2023	63800146	<2.0	9	<0.400	7.4
17/01/2023	63800147	<6.0	8	<0.400	7.6
17/01/2023	63800148	<2.0	10	<0.400	7.6
24/01/2023	63800146	<6.0	10	<0.400	7.9
24/01/2023	63800147	<6.0	9	<0.400	7.6
24/01/2023	63800148	<6.0	8	<0.400	7.6
02/02/2023	63800146	<2.0	7	<0.400	7.4
02/02/2023	63800147	<6.0	6	<0.400	7.8
02/02/2023	63800148	<2.0	8	<0.400	7.6
03/02/2023	63800146	<2.0	9	<0.400	7.6
03/02/2023	63800147	2	9	<0.400	7.6
03/02/2023	63800148	2	10	<0.400	7.6
16/02/2023	63800146	<2.0	11	<0.400	6.8
16/02/2023	63800147	<2.0	9	<0.400	6.6
16/02/2023	63800147	<2.0	10	<0.400	6.9
13/12/2023	63800146		9	<0.400	
13/12/2023	63800147		8	<0.400	
13/12/2023	63800148		9	<0.400	
15/12/2023	63800146		<5	<0.400	
15/12/2023	63800147		<5	<0.400	
20/12/2023	63800146	<2.0	7	<0.400	7.1
20/12/2023	63800147	<2.0	6	<0.400	7
20/12/2023	63800148	<2.0	5	<0.400	7
27/12/2023	63800146		9	<0.400	

Date	Sample point number	BOD atu (mg O_2/l)	Suspended solids (mg/l)	Ammonia as N (mg N/l)	Total oxidised N (mg N/l)
27/12/2023	63800147		10	<0.400	
27/12/2023	63800148		9	<0.400	
03/01/2024	63800146	<2.0	106	<0.400	6.4
03/01/2024	63800147	<2.0	17	<0.400	7
03/01/2024	63800148	<2.0	<5	<0.400	7.1
10/01/2024	63800146	<2.0	6	<0.400	7
10/01/2024	63800147	<2.0	10	<0.400	7.4
10/01/2024	63800148	<2.0	7	<0.400	7.3
19/01/2024	63800146	<2.0	9	<0.400	7.5
19/01/2024	63800147	2	10	<0.400	7.7
19/01/2024	63800148	<2.0	8	<0.400	7.4
26/01/2024	63800146	<2.0	8	<0.400	6.9
26/01/2024	63800147	2	11	<0.400	7.2
26/01/2024	63800148	2	12	<0.400	7.3
01/02/2024	63800146	<2.0	10	<0.400	7.1
01/02/2024	63800147	<2.0	9	<0.400	7.2
01/02/2024	63800148	<2.0	10	<0.400	7.5
23/02/2024	63800146	<2.0	13	<0.400	7.6
23/02/2024	63800147	<2.0	13	<0.400	7.4
23/02/2024	63800148	<2.0	14	<0.400	7.3
27/02/2024	63800146	<2.0	8	<0.400	6
27/02/2024	63800147	<4.0	8	<0.400	6.8
27/02/2024	63800148	<2.0	8	<0.400	6.4
28/02/2024	63800146	<2.0	22	<0.400	7
28/02/2024	63800147	<4.0	22	<0.400	6.7
28/02/2024	63800148	<2.0	20	<0.400	7
10/03/2024	63800146	<2.0	8	<0.400	6.9
10/03/2024	63800147	<2.0	10	<0.400	6.8
10/03/2024	63800148	<2.0	8	<0.400	6.9
13/03/2024	63800146	<2.0	<5	<0.400	7.7
13/03/2024	63800147	<2.0	7	<0.400	7.5
13/03/2024	63800148	<2.0	6	<0.400	7.5
21/03/2024	63800146	<2.0	<5	<0.400	6.3
21/03/2024	63800147	<2.0	<5	<0.400	6.5
21/03/2024	63800148	<2.0	<5	<0.400	6.5

Piddlehinton OMAP sampling

Date	Sample point number	BOD atu (mg O_2/l)	Suspended solids (mg/l)	Ammonia as N (mg N/l)	Total oxidised N (mg N/l)
17/01/2023	34710006	<2.0	<5	<0.400	7.2
17/01/2023	34710007	<6.0	<5	<0.400	7.2
17/01/2023	34710008	<2.0	<5	0.578	7.6

Date	Sample point number	BOD atu (mg O_2/l)	Suspended solids (mg/l)	Ammonia as N (mg N/l)	Total oxidised N (mg N/l)
18/01/2023	34710006	<2.0	<5	<0.400	7.5
18/01/2023	34710007	2	<5	<0.400	7.6
18/01/2023	34710008	<2.0	<5	<0.400	7.6
20/01/2023	34710006	<2.0	<5	<0.400	7.2
20/01/2023	34710007	<8.0	<5	<0.400	7.3
20/01/2023	34710008	<6.0	<5	<0.400	7
24/01/2023	34710006	<8.0	7	<0.400	7.6
24/01/2023	34710007	<6.0	6	<0.400	7.7
24/01/2023	34710008	<8.0	6	<0.400	7.6
01/02/2023	34710006	<6.0	7	<0.400	7.4
01/02/2023	34710007	<6.0	8	<0.400	7.1
01/02/2023	34710008	<6.0	17	<0.400	7.1
09/02/2023	34710006	<2.0	6	<0.400	7.5
09/02/2023	34710007	<2.0	6	<0.400	7.5
09/02/2023	34710008	2	7	<0.400	7.5
16/02/2023	34710006	<2.0	9	<0.400	6.9
16/02/2023	34710007	2	9	<0.400	6.8
16/02/2023	34710008	<2.0	10	<0.400	7
12/12/2023	34710006	<2.0	<5	<0.400	6.7
12/12/2023	34710007	2	5	<0.400	6.6
12/12/2023	34710008	<2.0	7	<0.400	7
15/12/2023	34710006	<6.0	<5	<0.400	7
15/12/2023	34710007	<6.0	<5	<0.400	6.8
15/12/2023	34710008	<6.0	<5	<0.400	6.8
20/12/2023	34710006	<2.0	6	<0.400	7
20/12/2023	34710007	<2.0	5	<0.400	7.1
20/12/2023	34710008	<2.0	7	<0.400	7
27/12/2023	34710006		7	<0.400	
27/12/2023	34710007		21	0.981	
27/12/2023	34710008		9	<0.400	
02/01/2024	34710006	<11.0	25	<0.400	5.2
02/01/2024	34710007	<11.0	29	<0.400	5.2
02/01/2024	34710008	<9.0	29	<0.400	5.2
09/01/2024	34710006	<2.0	<5	<0.400	7.5
09/01/2024	34710007	2	<5	<0.400	7.2
09/01/2024	34710008	<2.0	<5	<0.400	7.2
19/01/2024	34710006	<2.0	7	<0.400	7.9
19/01/2024	34710007	2	8	<0.400	7.9
19/01/2024	34710008	<2.0	6	<0.400	7.6
24/01/2024	34710006	<2.0	7	<0.400	7.6
24/01/2024	34710007	8	16	<0.400	7.4
24/01/2024	34710008	2	8	<0.400	7.5
01/02/2024	34710006	<2.0	7	<0.400	7.3
01/02/2024	34710007	<2.0	7	<0.400	7.3
01/02/2024	34710008	<2.0	9	<0.400	7.3

Date	Sample point number	BOD atu (mg O_2/l)	Suspended solids (mg/l)	Ammonia as N (mg N/l)	Total oxidised N (mg N/l)
23/02/2024	34710006	<2.0	12	<0.400	6.9
23/02/2024	34710007	<2.0	9	<0.400	7.2
23/02/2024	34710008	<2.0	11	<0.400	7
27/02/2024	34710006	<2.0	6	<0.400	6.1
27/02/2024	34710007	<4.0	6	<0.400	6
27/02/2024	34710008	<2.0	<5	<0.400	6.1
28/02/2024	34710006	<2.0	7	<0.400	7
28/02/2024	34710007	<4.0	6	<0.400	6.7
28/02/2024	34710008	<2.0	5	<0.400	6.6
08/03/2024	34710006	<2.0	5	<0.400	6.8
08/03/2024	34710007	<6.0	9	<0.400	6.6
08/03/2024	34710008	<2.0	6	<0.400	7.4
13/03/2024	34710006	<2.0	<5	<0.400	7.2
13/03/2024	34710007	<2.0	6	<0.400	7.8
13/03/2024	34710008	<2.0	<5	<0.400	7.5
18/03/2024	34710006	<2.0	7	<0.400	6.9
18/03/2024	34710007	<2.0	8	<0.400	6.8
18/03/2024	34710008	2	7	<0.400	6.8
26/03/2024	34710006	<6.0	8	<0.400	7.2
26/03/2024	34710007	<6.0	7	<0.400	7.2
26/03/2024	34710008	<6.0	9	<0.400	7.2

Appendix 7

Infiltration Investigations and Sealing

The tables below for sealing surveys in Piddlehinton and Piddle valley are found below:

All infiltration related works since April 2011

Financial year	Description	CCTV Ref	Length Inspected (m)	Sealing Scheme(s)	Amount Sealed
2011-12	Infiltration investigations and sealing of 13m patch lining	WD0397	16473	C9607	13m
2012-13	Infiltration investigations	CCTV114673	2019	-	-
2013-14	Infiltration investigations	CCTV116014, CCTV116020	258	-	-
2014-15	Infiltration investigations and 24m patch lining	CCTV117590	1262	C9607	24m
2015-16	Infiltration investigations	CCTV118911	1191	-	-
2016-17	Infiltration investigations and sealing of 212m full length	CCTV120526, CCTV120574	1051	CJ269	212m
2017-18	Infiltration investigations	CCTV121790	2442	-	-
2018-19	Infiltration investigations and sealing of 113m of full length and patch lining	CCTV121946, CCTV122621, CCTV123083, CCTV122381	1720	CJ269, CL426	113m
2019-20	Infiltration investigations	CCTV123168, CCTV124045	3952	-	-
2020-21	Infiltration investigations and MH sealing	SAST001162	78	CN0092	14no. MHs
2021-22	Infiltration investigations	-	-	-	-
2022-23	Infiltration investigations	SAST006217	-	-	-
2023-24	Infiltration investigations	SAST006217	1939	CR0069	249

Summary of sewer sealing in the catchment

Date	Description	Catchment(s)	Scheme	Lengths sealed	Meterage (m)
Jul 2007	Full length sewer lining	Piddlehinton WRC	CR111	2no. full length	164
Jan 2012	Patch lining	Piddlehinton WRC	C9607	8no. patch	13
Jul 2014 - Jan 2015	Patch lining	Piddlehinton WRC	C9607	8no. patch	24
Nov - Dec 2016	Full length sewer lining	Piddlehinton WRC	CJ269	8no. full length	212
Feb 2019	Full length sewer lining	Piddlehinton WRC	CJ269	1no. full length	8
Feb 2019	Full length and patch lining	Piddlehinton WRC	CL426	2no. full length, 10no. patch	105
Sept 2023 - Feb 2024	Full length sewer lining	Piddlehinton WRC	CR0069	5no. full length	249

Manhole sealing to date

Date	Description	Catchment(s)	Scheme	MHs sealed
2015	Manhole sealing as part of infiltration investigations scheme	Piddlehinton WRC	C9607	1
Aug - Nov 2020	Manhole sealing as part of infiltration investigations scheme	Piddlehinton WRC	CN0092	14
October 2021	Manhole sealing following infiltration investigations	Piddlehinton WRC	CR111	2
September 2022	Manhole sealing following infiltration investigations	Piddlehinton WRC	CQ0259	4

All CCTV surveys to date

Date	Description	Catchment(s)	Survey	Scheme	Length inspected (m)
Nov 2006 - Jan 2007	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	WD0275	C9166	2637
Mar 2011	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	WD0397	-	2851
Apr - Sep 2011	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	WD0397	-	16473
Feb - Mar 2013	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	CCTV114673	-	2019
Dec 2013	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	CCTV116014	-	41
Dec 2013	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	CCTV116020	-	217
Feb 2015	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	CCTV117590	-	1262
Mar 2016	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	CCTV118911	-	1191
Nov 2016	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	CCTV120526	CJ269	143
Mar 2017	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	CCTV120574	C9837	908
Feb 2018	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	CCTV121790	-	2442
Apr 2018	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	CCTV121946	-	745
Sep - Oct 2018	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	CCTV122621	C9837	418
Feb 2019	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	CCTV123083	CL426	558

Date	Description	Catchment(s)	Survey	Scheme	Length inspected (m)
Mar 2019	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	CCTV122381	CL346.	0
Apr 2019	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	CCTV123168	C9837	1727
Jan - Feb 2020	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	CCTV124045	-	2225
Jan 2021	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	SAST001162	C9837	78
April 2023	Infiltrations investigations under Infiltration scheme	Piddlehinton WRC	SAST006217	C00190	1939

Appendix 8

Groundwater Liaison

Date	Work Completed	Attendees
22/03/2019	Presentation from EA on Environment Agency Groundwater Flood warning service and start exploring partnership opportunities	WW, EA
20/02/2020	Meeting to discuss the groundwater forecasts and how we might be able to work together developing them further / future partnership working opportunities	WW, EA
15/10/2020	Discuss setting up a jointly funded partnership with Wessex Water (and any others) to enable the further development of the Groundwater Flood Warning / Forecasting service	WW, EA
25/11/2020	Discuss extending the thresholds of the existing groundwater forecasts and try developing some new forecasts on additional sites beyond the chalk	WW, EA
07/10/2021	Kick off Wessex Water Input into the groundwater collaboration project to add thresholds into EA Groundwater flood warning service	WW, EA
14/02/2022	Wessex Water thresholds and discussion on how this can be integrated into the EA Flood Warnings	WW, EA

Appendix 9

Piddletrenthide Case Study

Piddletrenthide Flood Alleviation

A case study in innovative permitting to resolve groundwater induced flooding of domestic properties

How joint working between a sewerage company, the environmental regulator and the local authority has enabled a pragmatic and sustainable solution to a long standing problem.

Groundwater Flooding

Piddletrenthide lies in a chalk valley in Dorset straddling the river Piddle. Most winters the water table rises to ground level causing localised flooding. When this occurs the sewerage system is effectively used as a land drainage network as residents have no option to protect their properties but to direct surface water down manholes. For many years the Environment Agency (EA) allowed Wessex Water, under emergency powers, to pump out the sewerage system to the local stream at two locations in the village in order to provide a positive drainage system to the residents. This was not an officially permitted arrangement and overland temporary pumping made it very unsightly.

A pragmatic and sustainable solution

A new groundwater land drainage scheme for the villages along the Piddle would have been very expensive and only been beneficial for a few weeks every year. Similarly, upsizing the sewer network's capacity and the downstream sewage works would have also been a very expensive and unsustainable option. Neither option was cost beneficial. The challenge was, how could the three parties – the EA, Wessex Water and Dorset CC, come up with a pragmatic and sustainable solution to remove the risk of property flooding for wet winter periods of high groundwater?

Pumping station weir and screening arrangement under construction

The solution involved an ***innovative permitting arrangement***. The EA agreed to permit two pumped, screened overflows only for periods when groundwater was about to cause flooding. A condition of the consent was that Wessex Water signed up to an **Inflow Management Plan** (IMP): a commitment to monitor groundwater levels, keep the integrity of the public sewer network under review (through CCTV inspection), carry out remedial work where necessary and work with the local authority to ensure private drains were also in good condition. The IMP also requires water quality sampling if and when pumping occurs in order to demonstrate that there is no adverse impact on the watercourse resulting from pumping station operation. An annual IMP report is also required to record activity carried out in the preceding year.

One of the completed and unobtrusive pumping stations next to the R. Piddle

Conclusion

Permanently reducing groundwater induced flood risk for Piddletrenthide was only possible because of an innovative and unique permitting arrangement between the EA and Wessex Water.