

Piddle Valley Inflow Management Plan

Report 2014/2015

Scheme Ref: C9608



DOCUMENT CONTROL SHEET

REVISION HISTORY		
Version No.	Date Issued	Revision Description
1	1/04/2015	Draft
2		For issue

	Prepared (Network Engineer)	Reviewed / Updated (Project Manager)	Reviewed (Wastewater Regulation Adviser)	Approved (Sewerage Planning Manager)
Name	Rhiannon Humm	Harry Wheeler	Andy Mears	David Martin
Date	1/04/2015	16/4/2015	30 April 2015	30 April 2015

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1. 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 a large number of properties within Piddletrenthide to suffer significant flooding due to overland fluvial flow as well as ground and surface water inundation of the foul sewer, which had periodically resulted in loss of foul service and restricted toilet use.

Wessex Water's Piddlehinton Sewage Treatment Works (STW) receives foul sewage from the Piddle Valley via a 150mm/225mm public gravity sewer system that is predominantly situated in the valley floor, adjacent to the river. The sewage flows from Alton Pancras in the north via Piddletrenthide, White Lackington and Piddlehinton to the treatment works in the south. See *Appendix 1* General Location Plan

Efforts have been made by the respective authorities in the area to address these problems. West Dorset District Council and the Environment Agency have carried out extensive land drainage works to mitigate fluvial flooding and Dorset County Council has made improvements to the highway drainage systems to preclude highway runoff.

2. Historic work (pre installation of overflows)

Historically, Wessex Water has made a concerted effort to seal the public foul sewers from ground water infiltration and surface water ingress as detailed in previous reports.

During exceptionally wet periods Wessex Water has mobilised temporary equipment to pump the groundwater out of the sewers to the adjacent River Piddle in order to prevent property flooding. Sampling showed that the effects of this operation on river water quality are minimal.

This culminated in a Wessex Water flood alleviation scheme to construct two pumped overflows in Piddletrenthide. These overflows are permitted by the Environment Agency and can only operate when the flows in the sewers exceed set limits and ground water 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' - for details see *Appendix 2*. This includes analysing ground water levels, measuring sewer flows, identifying and eliminating significant infiltration in the public sewers, and taking river samples during operation of the overflows.

3. Summary of works carried out between 2011 and 2014 (post installation of overflows)

Following the construction of the overflows, the following works were carried out in 2011 - 2013, as discussed in the 2011/2012 Piddle Valley Inflow Management Plan report [DM#1435504](#) and 2012/2013 Piddle Valley Inflow Management Plan report [DM#1492239](#):

- 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 a few 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 at a cost of £34k.
- An impermeable area survey was carried out, the private sewers that are now transferred to Wessex Water under “The Water Industry (Schemes for Adoption of Private Sewers) Regulations 2011” (S105A) were mapped and Wessex Water’s sewer records were updated. A small amount of impermeable area was found to be connected to the foul system.
- Ultrasonic depth monitors were installed at the overflows in order to alert the control room via telemetry when the overflows operate, and to record the depth of the flow in the sewer. Treated effluent flow is also being recorded at Piddlehinton STW.
- A programme was set up to record ground water levels from a series of boreholes throughout the catchment. These boreholes have been monitored manually using a dip tape since 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 5**) to sample the discharges once a fortnight during overflow 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 are held.
- 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 in regards to efforts that are being made by Wessex Water to reduce groundwater infiltration in the foul sewers.
- Tankering and over pumping to protect public health.
- A case study report was prepared and is used widely (**See Appendix 8**).

The following work was carried out in 2013/2014 as included in the 2013/2014 Piddle Valley Inflow Management Plan report [DM#1603262](#):

- An auto data logger was installed at West Lodge borehole in Piddlehinton.
- A review of the Section 105A CCTV survey was undertaken to identify any holes or infiltration in the sewers for sealing where cost beneficial.
- Further stakeholder and internal meetings were organised.
- Water quality sampling at the agreed locations and for the same parameters was continued.
- Further target CCTV survey inspections occurred.

In the 2013/2014 Inflow Management Plan report, Wessex Water proposed to undertake the following works in 2014/2015;

- Complete sealing of manholes and patch lining of small diameter lateral sewers that had been started in early 2014 to prevent ground water infiltration.
- Further stakeholder and internal meetings.
- Continue to monitor groundwater levels and analyse sewer level and pump run data to try to establish the exact interaction between them and identify trigger levels for tankering and over pumping
- Further targeted inspections if appropriate using CCTV and possibly using “Electroscan” if trials in other catchments prove cost effective.
- Review the system to establish whether the existing pumped overflows provide adequate hydraulic protection to the system.
- Further investigate the land drainage that is suspected to be connected to the foul system, which will require working closely with and the support of the EHO
- Review Wessex Waters policy and begin objecting to planning applications in catchments vulnerable to ground water inundation.

4. Works in 2014/2015

4.1 CCTV

The CCTV was targeted at surveying the lateral sewers in the centre of Piddletrenthide to determine any more locations of infiltration in the sewers. We have carried out 1.1km of targeted CCTV on S105A and 300m of main sewer in February 2015. No new infiltration was found on this CCTV survey; however some structural defects were found which will be analysed in 2015 by the Wessex Water rehabilitation team.

Electroscan was investigated as a possible alternative method of sewer surveying. This method is not considered to be an appropriate technique because it incorrectly identifies watertight joints sealed by gel as being faulty.

4.2 Sewer Rehabilitation Works

Sewer rehabilitation was carried out using epoxy lining and patch lining on 2 lengths of predominantly S105A sewers totalling 37m in July 2014.

A CCTV survey from December 2013 showed the incoming private lateral from Austral Farm that was running with clear water. It was proposed to install a manhole to monitor it, however instead we have sealed this substantial source of ingress and re-surveyed it in February 2015 to confirm it is sealed. The new CCTV survey showed a considerably smaller volume of infiltration from the private lateral; however CCTV in the main sewer suggests that infiltration may not been completely eliminated and we intend to investigate the private lateral further. The before and after survey photos are show in *Figure 1*.

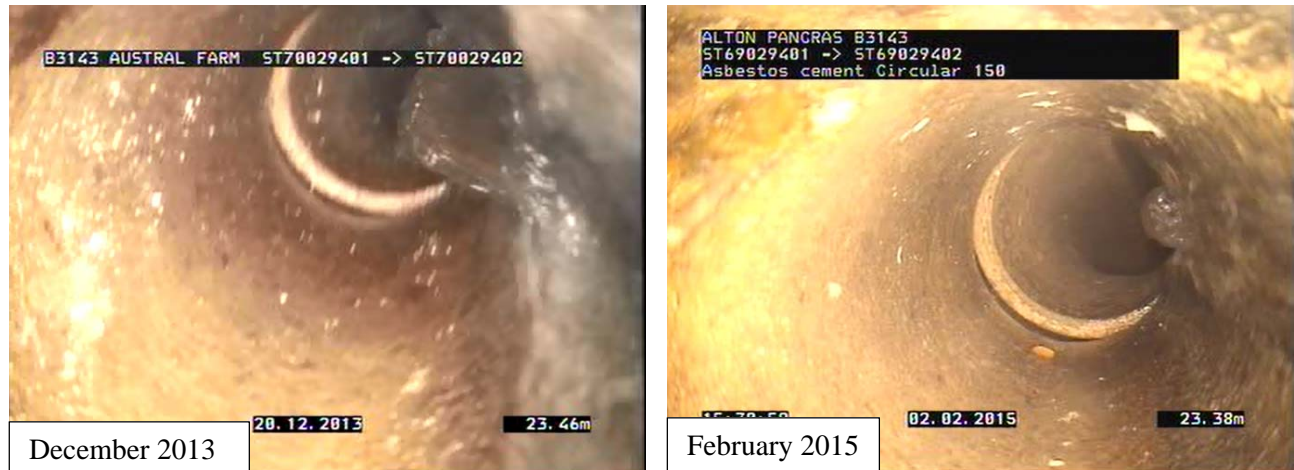


Figure 1 – CCTV photos of the infiltration found in private lateral at Austral Farm

4.3 High Level Assessment in Piddlehinton

Wessex Water was informed at a meeting on 31st January 2015 that some houses in Piddlehinton regularly suffer from restricted toilet use and require tankering. This has been under reported to Wessex Waters control room during the times when the flooding occurred and subsequently had not been not been put forward for a hydraulic review.

A high level assessment investigating the incidents and reports in Piddlehinton has been completed and placed on a watching brief awaiting the outcome of the detailed modelling exercise being carried out by Wessex Water’s consultants.

4.4 OMAP (Operational Mitigation Action Plan)

An OMAP has been put in place for Piddletrenthide 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 in order to protect public health (see *Appendix 3*). This will be used when tankering is no longer deemed to be BATNEEC.

The OMAP has been submitted and reviewed by the EA.

The over-pumping location is from the manhole on Church Lane to the River Piddle and samples are taken at agreed points from the river upstream and downstream of the discharge point to check pollution levels.

The OMAP has not been used this winter as it has not been necessary to over pump to protect public health.

4.5 InfoWorks Model

The hydraulic model of the sewerage network has been calibrated against the recorded operation of the new overflows and the monitored ground water levels for the two winter periods (2012/13 and 2013/14) by Wessex Water's consultants. (It should be noted that these periods were considered to be extreme groundwater events)

This has enabled the hydraulic model to be improved. The model has been utilised to develop three options to alleviate flooding in the Church Lane area on Piddletrenthide and to predict the effect on the existing overflows. The costs of these options will be identified before any further works are promoted in consultation with the stakeholders including the Environment Agency. This study is currently in optioneering stage.

4.6 Boreholes

There are now three borehole auto loggers providing telemetered data from the upper, middle and lower part of the catchment, with readings at 15 minute intervals rather than on a once a month basis with dip tape.

2012/2013 was the wettest winter on record and was then subsequently beaten in 2013/2014. Since then the borehole level has decreased gradually but remained relatively high compared to pre-2012 levels. The peak ground water level this year was 125.0 mAOD, whereas the peak in 2013 was 127.7 mAOD.

Ground water trigger levels have been 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) to protect public health, when the ground water infiltrates the sewers and overloads the system.

Figure 2 demonstrates the correlation between the flow at the sewage treatment works and ground water levels at Barcombe Farm borehole.

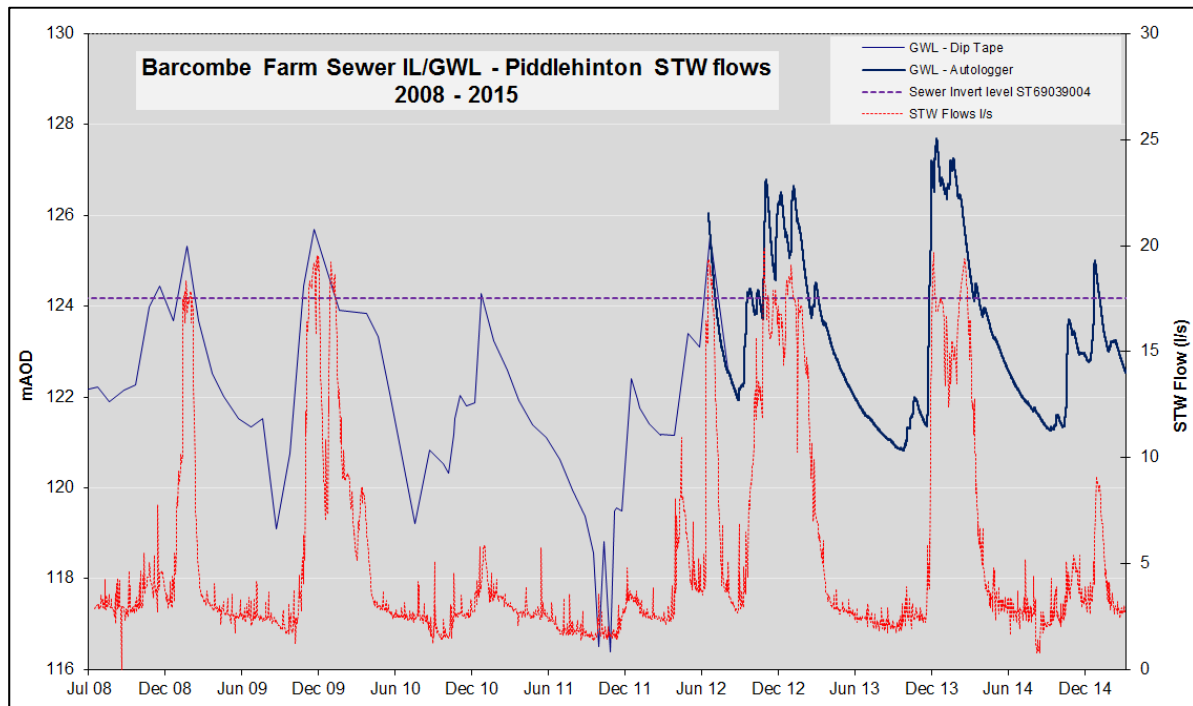


Figure 2 – STW flow and ground water level at Barcombe Farm

Flows to the inlet of Piddlehinton sewage treatment works have not reached the levels of 2012 and 2013, shown in **Table 1**.

Table 1	Year					
	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
Total Flow to STW (m ³)	194,123	100,563	74,152	313,465	203,723	119,292

In previous years, graphing the ground water levels against the daily pump run-stops for the pumped overflows demonstrates that the pumps operated for long periods during times when the ground water level was exceptionally high. However, this year has had more normal winter ground water levels and although there has been a rise in the sewer levels, they didn't reach the highs of 2013. It is not clear yet whether this is entirely due to drier weather this year or if the sewer sealing already performed has helped improve the situation, but is most likely a combination of both, see **Figure 3**. (Note: rainfall has been inverted and scaled, and is therefore only indicative)

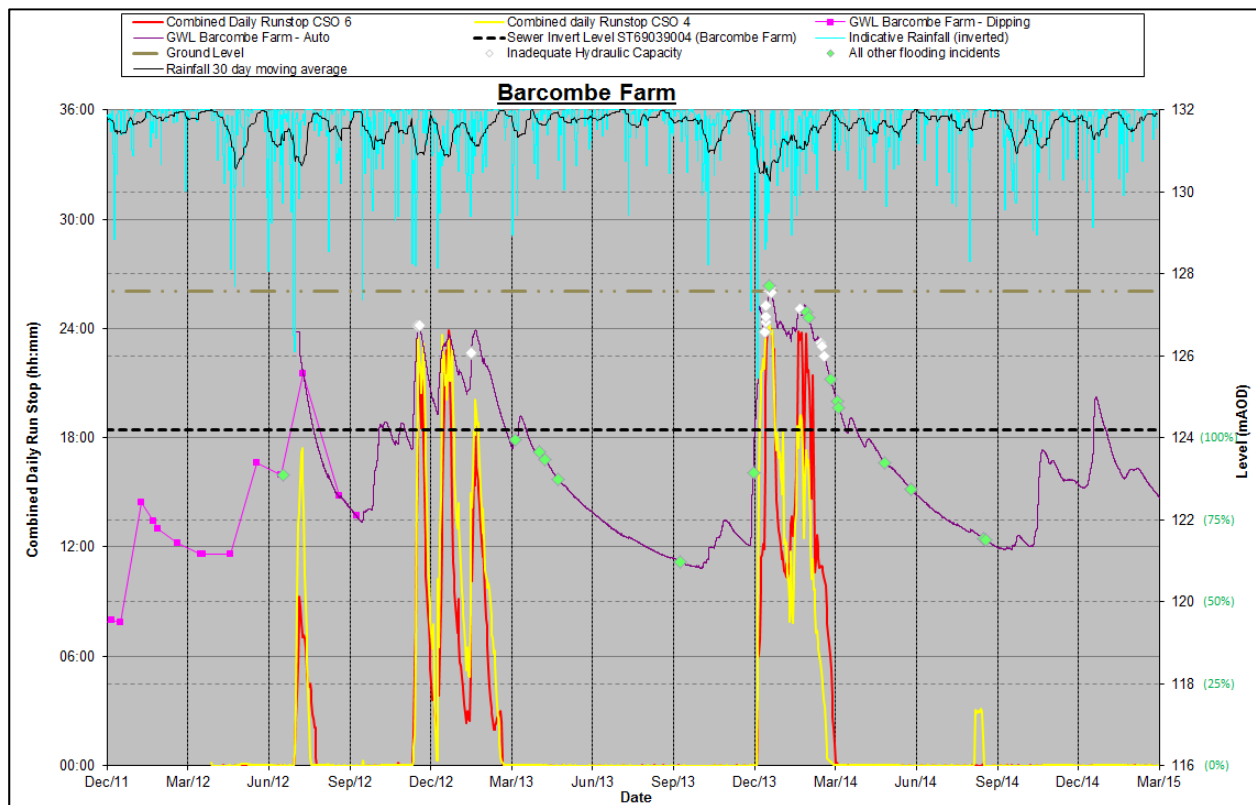


Figure 3 – Overflow pump run stop data and ground water level at Barcombe Farm

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

4.7 Meeting Actions

There was a meeting on Saturday 31st January 2015 at Willows Lawn in Piddletrenthide, attended by Oliver Letwin (M.P.), John Cox (Chairman Piddle Valley Parish Council and Neighbourhood Plan Committee), Neil Herbert (Neighbourhood Plan Committee), Sara Milne (Piddle Valley Parish Council and Neighbourhood Plan Committee), David Martin (Sewerage Planning Manager of Wessex Water). From this, there were 11 actions requested to be completed by Wessex Water as shown below. The full minutes can be found in *Appendix 4*

1. Layout drawings for the whole valley (Alton Pancras, Piddletrenthide, White Lackington and Piddlehinton) sent to Piddle Valley Parish Council (PVPC) – *Completed*
2. Wessex Water's consultant Atkins to assess the cost and feasibility of installing a pumped overflow to the North of Piddlehinton and report to PVPC – *Ongoing*
3. Wessex Water to assess the effectiveness of increasing the diameter of the sewer to 300mm from the South end of Egypt through Smiths Lane to the Piddle Inn – *Ongoing*
4. Drawings identifying the location and type of all epoxy resin and other lining and sealing works carried out to date to the sewer sent to PVPC – *Completed*
5. Drawings identifying the location of where CCTV and other surveys of the sewers have been carried out sent to PVPC – *Completed*
6. Drawings identifying the location and type of all future proposed epoxy resin and other lining and sealing works to the sewer sent to PVPC – *Ongoing*
7. Drawings identifying the location of where all future CCTV and other surveys of the sewer will be carried out sent to PVPC – *Ongoing*
8. Wessex Water will complete the sealing of all serious ingress points in the sewer during 2015-2016 – *CCTV in 2015 only found one case of infiltration, which was from a private sewer and the source is being investigated and will be sealed.*
9. Wessex Water will consider the possibility of installing a permanent (theoretically temporary) pumping station in Church Lane, Piddletrenthide if the epoxy resin lining and other sealing works is not sufficient to enable the system to operate functionally – *Ongoing*
10. Copies of the Wessex Water Inflow Management Plan for the Piddle Valley sent to Oliver Letwin, Neil Herbert and Sara Milne – *Completed*
11. Wessex Waters programme for future epoxy resin and other lining and sealing of the sewer with target dates sent to Oliver Letwin, Neil Herbert and Sara Milne – *Ongoing*

4.8 Updating Sewer Records

We have been continually updating our sewer records of both public and private sewers and drains.

The plan below shows the sewer layout pre 2011, which does not contain much detail from the time, including a public sewer incorrectly plotted as going beneath a house.

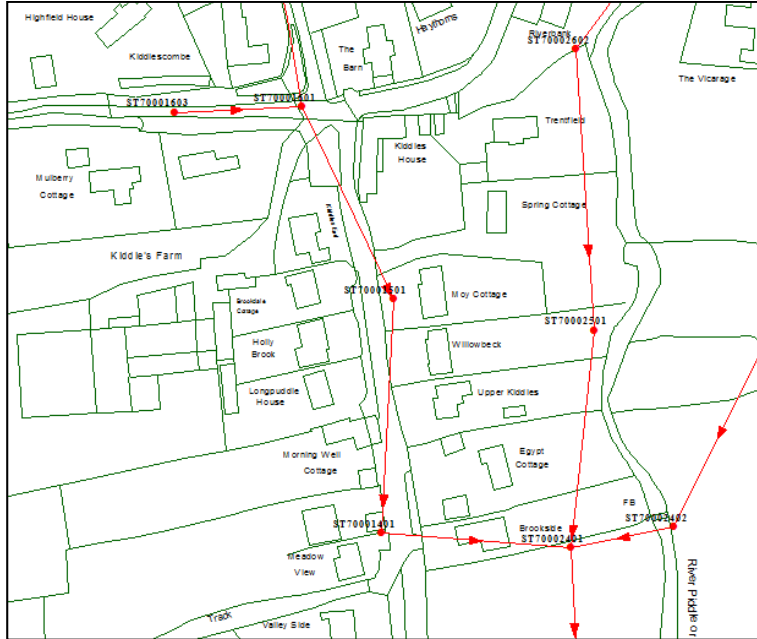


Figure 4 – Pre 2011 sewer records

The plan below is from 2014, following the plotting of the section 105A and some private sewers in 2011.

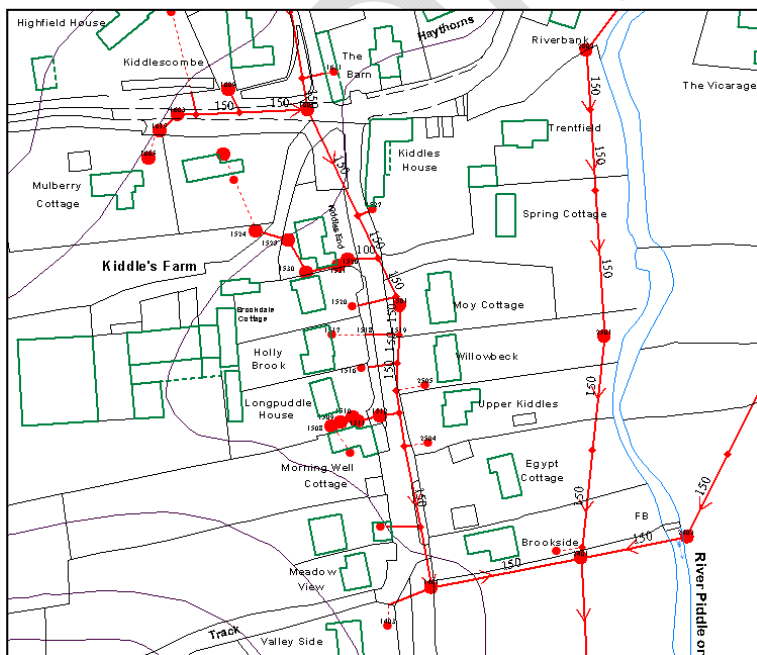


Figure 5 – 2014 sewer records

The plan below is of the 2015 sewer records, following liaison with the council regarding the private highway drain outside of Egypt Cottage.

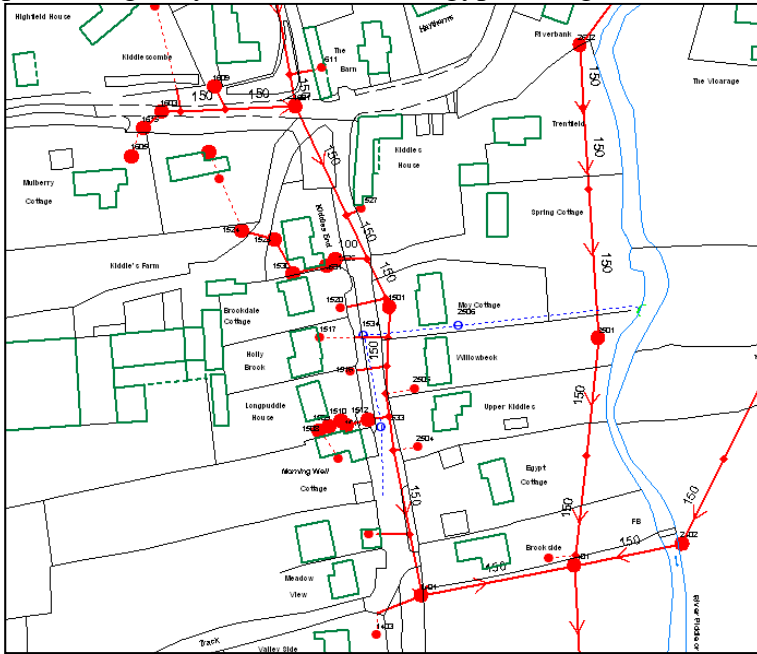


Figure 6 – 2015 sewer records

4.9 Sampling

During overflow operation, river water quality samples are taken every fortnight as stipulated in the Discharge Permit. The following determinants are monitored:

- ATU-BOD as O₂
- Suspended Solids
- Ammoniacal Nitrogen
- Total Oxidised Nitrogen

In previous years, this sampling has shown that the overflows have minimal effect on river water quality and in fact, the discharges are of similar quality to the fully treated sewage works effluent produced at Piddlehinton STW some 4km downstream.

This year, the overflows have not discharged due to groundwater inundation and the only sampling carried out comprised 3 sample sets of river water from the sampling points defined in *Appendix 5* to give background bacti data:

Table 2

River Piddle at Piddletrenthide 100m u/s of Rivendell overflow							
Date	Coli/ 100ml	E coli/ 100ml	Enterococci	BOD atu	Susp solids	Ammonia as N	Tot oxid N
01-Dec-14	520	550	140	<2.0	<5	<0.02	7.7
17-Dec-14	2100	510	180	<6.0	23	<0.02	7.6
05-Jan-15	1700	190	150	<6.0	21	0.03	7.7

Table 3

River Piddle at Piddletrenthide 150m u/s of the Piddle Inn overflow							
Date	Coli/ 100ml	E coli/ 100ml	Enterococci	BOD atu	Susp solids	Ammonia as N	Tot oxid N
01-Dec-14	770	570	70	<2.0	<5	<0.02	7.7
17-Dec-14	2600	1100	170	<6.0	19	<0.02	7.5
05-Jan-15	980	330	40	<6.0	17	0.03	7.8

Table 4

River Piddle at Piddletrenthide 100m d/s of the Piddle Inn overflow							
Date	Coli/ 100ml	E coli/ 100ml	Enterococci	BOD atu	Susp solids	Ammonia as N	Tot oxid N
01-Dec-14	570	530	40	<2.0	6	<0.02	7.6
17-Dec-14	2500	400	190	<6.0	16	<0.02	7.5
05-Jan-15	1100	390	50	<6.0	21	0.02	7.8

Further bacti analysis will be carried out when the overflows next spill.

5. Reactive operational work and customer contacts

Although this winter has been dry compared to the previous two record breaking winters, ground water levels have remained fairly high. *Figure 7* below shows the manhole (ST70003602) on Church Lane on 21/1/2015, during an Operational site visit triggered by rapidly rising ground water. This was the location used last year for tankering in Piddletrenthide to protect properties from flooding. It has not been necessary to tanker this year due to the lower ground water levels and decreased sewer flow.



Figure 7 – Tankering location, taken on the 21/1/2015 when ground water was rapidly increasing and reached the trigger for preparedness.

Over-pumping has also not taken place throughout this winter 2014/15 demonstrating that the mitigation measures used in the extreme wet winters of 2012/13 and 2013/14 are not required to protect public health in a normal winter and that previous works by Wessex Water may have been partially successful in reducing infiltration.

5.1 Customer Contacts

Table 5 below shows the type of customer contacts made to Wessex in 2014/2015

Incident Type	No.
Flooding External – Inside Boundary	1
Blockage/Backing Up	2
Pollution	2
Manhole cover	2

The reports of flooding, backing up and pollution all occurred in Piddletrenthide. The fewer customer contacts this year and no requirement to over pump or tanker would suggest that the sewers have adequate capacity in an average winter. Both the customer contacts for pollution refer to the overflow discharging into the River Piddle due to a blockage (as reported 10/09/2014 by Wessex Water to EA, NIRS reference 01276234).

Wessex Water has written to councils objecting to any further development in Piddle Valley without a groundwater strategy in place.

5.2 Stakeholder and liaison meetings

Table 6 below shows the meetings relevant to the Piddle Valley Inflow Management Plan.

Date	Name	Appointment/ Meeting/ Contact Details	Key Personnel	Who	Comments – Key Outcomes
25/04/2015	Strategic Infiltration Meeting	Internal Meeting	Wessex Water Operations Environment and Assets Engineering	WW	Piddle Valley discussed strategically alongside Inflow management plans
6/06/2015	Network Review Meeting (NRM)	Present 2013/14 report to NRM	Wessex Water Technical and Financial review	WW	Report and Presentation accepted
10/06/2015	Strategic Infiltration Meeting	Internal Meeting	Wessex Water Operations Environment and Assets Engineering	WW	Piddle Valley borehole data presented and discussed as being used for trigger levels throughout Wessex Water
18/06/2014	CIWEM Meeting	Presentation	David Martin	WW	The method of managing infiltration in the Piddle Valley was used as a case study
3/10/2014	Wessex Water Engineering	Familiarisation/Fact finding for new LDE	Steve Lawrence Rhiannon Humm Beth Selwyn	WW	Spoke to Pydel Vale resident about flooding problem
5/11/2014	Strategic Infiltration Meeting	Internal Meeting	Wessex Water Operations Environment and Assets Engineering	WW	Piddle Valley Quality data reported back as showing little impact on standard sewage indicators, but bacteria levels have not been reported as not a permit requirement

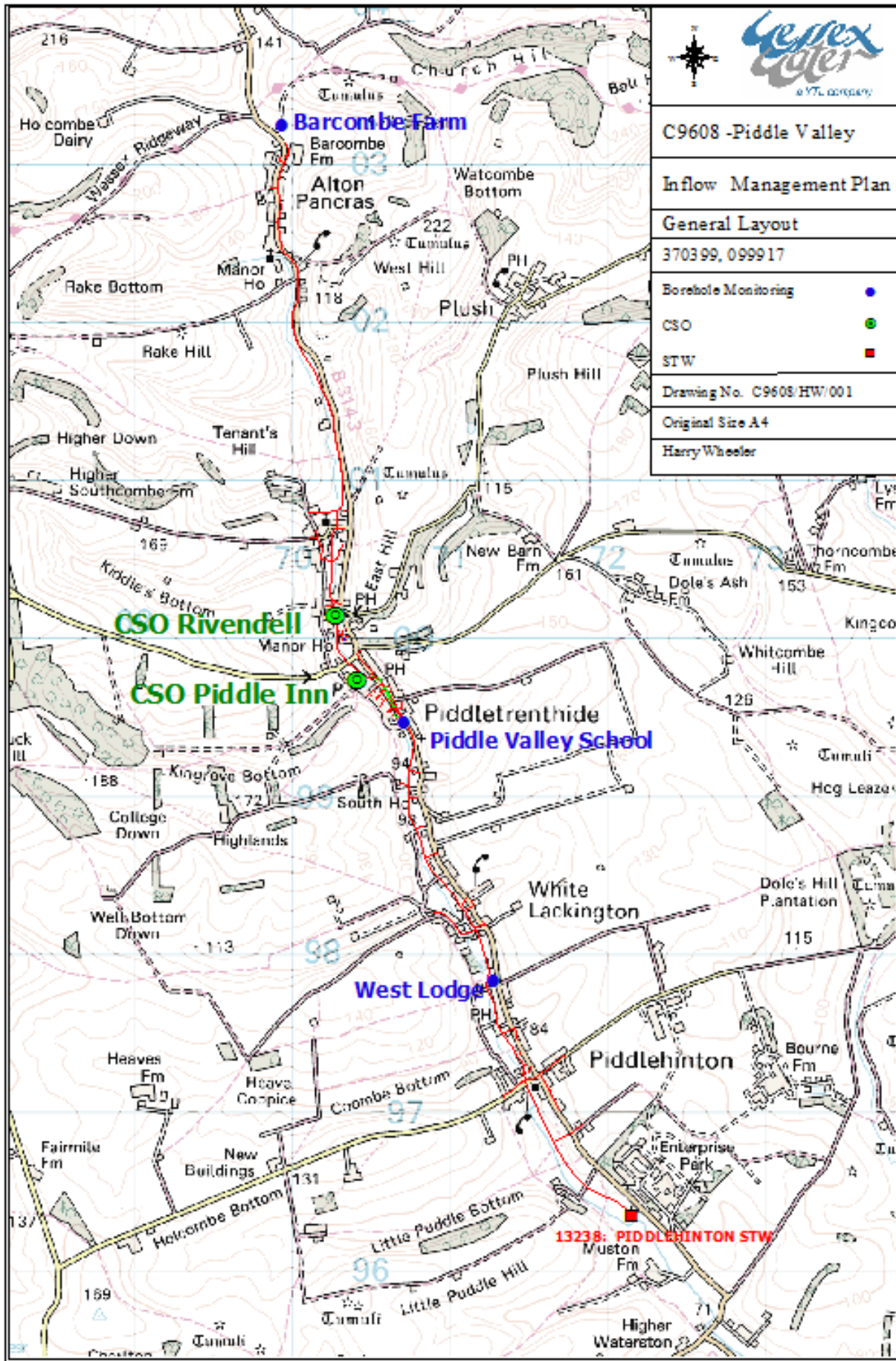
26/11/2014	Operational Liaison South	EA and Wessex Water meeting	Emma Gilson Julian Wardlaw Andy Mears Wessex Water Operations	EA WW	Background samples to be taken from Piddletrenthide with bacti analysis
31/01/2015	Piddle Valley Parish Council Willow Lawn	Parish Council Meeting	David Martin Oliver Letwin	WW MP	Held to find solution to the sewage and flooding problems within Piddle Valley
9/02/2015	Mr Joliffe Egypt Cottage Piddletrenthide	Meeting to examine sewer plans	David Martin Andy Hicklin Brian Richards	WW EA DCC	Confirmed highway drain outside Egypt Cottage is private

6. Future Works

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

- Continue delivering the Inflow Management plan (*Appendix 2*)
- Further stakeholder and internal meetings, where necessary.
- Continue to monitor groundwater levels, sewer levels and pump run data to examine the interaction between them and compare ground water level with our trigger levels for the catchment.
- Further targeted inspections, if appropriate, using CCTV.
- Continue to seal any significant finds from CCTV to prevent groundwater infiltration.
- Review the system to establish whether the existing pumped overflows provide adequate hydraulic protection to the system.
- Further investigate the land drainage that is suspected to be connected to the foul system, which will require working closely with the EHO.
- Continue with our policy to object to planning applications in catchments vulnerable to ground water inundation.

Appendix 1 - General location plan



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Piddle Valley Inflow Management / Infiltration Reduction Plan

Requirements of the Permit:

1. Formulate and follow an Inflow Monitoring Plan (IMP) from date of issue of the two Pumped overflow 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 overflows 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
 EA – Environment Agency

IMP List of actions and responsibilities

Existing Assets		Responsibility	Date Completed
1	Procedure for pro-active maintenance of sewers as set out in Sewerage Risk Management Manual. Seal any infiltration identified.	WW	CCTV 04/2011 15/8/2011 02/2013 03/2014 07/2014
2	Removal of surface water as far as is possible from all significant sources of: <ul style="list-style-type: none"> • Surface water inflows • Infiltration • Connected surface water drains/sewers • Connected land drains. Impermeable area survey is required together with a connectivity survey of all road gullies.	WW	IAS 15/11/11
3	Monitor sewer levels, to assess the success of inflow reduction both at the overflow chambers and at the STW. The flow measurement at the STW is on the outfall after treatment process, there is no overflow at the STW but it is known to flood.	WECS	Ongoing
4	A review of this monitoring together with data from rainfall, borehole data (there are several bore holes in Piddletrenthide that West Dorset DC sunk that Wessex can use. In addition to these Wessex Water can request data for several Environment Agency (EA) boreholes. Three boreholes installed with web based auto loggers as at 2014 Trigger levels identified for Operational Mitigation Action Plan (OMAP)	WW	Ongoing 2013 2014

Existing Assets		Responsibility	Date Completed
5	Subject to this review further CCTV and sewer sealing may be needed. (Sewer sealing completed in Jan/Feb2012) (Targeted CCTV surveys Feb/March 2013) (Sewer sealing completed in Feb/Mar2014) (Sewer sealing completed in July 2014) (Targeted CCTV survey in Feb 2015)	WW	Ongoing

Private Sewers / Highways		Responsibility	Date Completed
6	Assessment of the sewers which are anticipated to become public (Oct 2011). This will require all laterals to be located, surveyed, determine if they will be public or remain private. Those that are to be public will need all manholes inspected for infiltration. Some CCTV survey work may be required. Private Sewer Transfer Complete October 2011, Targeted survey CCTV and assessment of ex S105 ongoing where cost effective Previously unmapped private highway drains around Egypt added to sewer records	WW	Initial survey completed 15/11/11 Ongoing 02/2014
7	Plot known laterals (from recent CCTV) to assist above. S105A sewers plotted to WW records	WW	06/2011 19/12/2011
8	All significant areas of infiltration in transferred public sewers are to be sealed. (no significant areas found as yet, however there are some that may require further investigation, high level incomers and laterals with infiltration) Infiltration found in 2013 sealed in Feb/Mar 2014 Ongoing if more found under future targeted surveys	WW	Sealing works Feb 2012 Feb/Jul 2014 Ongoing
9	Identify areas of infiltration in the remaining private drainage and pass information on to West Dorset District Council (WDDC) for further action. (no significant areas found as yet, however there are some that may require further investigation, high level incomers and laterals with infiltration) One significant area found in 2013 WW to investigate further Wessex have dug down and repaired Needs to be reviewed with CCTV in late 2015/ early 2016	WW and WDDC	2015 Ongoing
10	Wessex to have a procedure for recording, investigating and resolving incidents. Already in place (Rapid).	WW	In place
11	If any gullies are found to be connected to the foul sewer pass information to Dorset County Council (DCC) and request that they should be removed.(None found)	WW and DCC	19/2/2012
12	Existing highway outfalls to be inspected and if necessary cleared of any build up of silt.	DCC	Investigating 2013
13	Existing River condition to be checked for any restrictions / condition.	EA	

Private Sewers / Highways		Responsibility	Date Completed
14	Discharge to land from the flood relief culvert to be sampled. (Added to point 16)	EA	Completed

Inundation		Responsibility	Date Completed
15	Develop Local Action Plan (At a high ground water level) Community flood warning plan EA and DCC to discuss 2013	WW, WDDC, DCC and EA	
16	Sample discharge once a fortnight during overflow operation and correlate with sampled surface water (river), 3No. sampling points as follows: 1. River c.100m u/s of the Rivendell overflow 2. River c.300m d/s of the Rivendell overflow = river c.150m u/s of the Piddle Inn overflow 3. River c.100m d/s of the Piddle Inn overflow 4. flood defence discharge point downstream of the village	WW	Set up 31/1/2011 As required

Reporting and PR		Responsibility	Date Completed
17	All work done needs to be recorded and made available to the EA upon request.	WW	Ongoing
18	Annual report on findings. Biochemical oxygen Demand, Total Suspended Solids, Ammonia and periods of pumping / overflow. See permit for details.	WW	Ongoing
19	Education of the residents about the balance between impact of misconnections / inundation of foul system and the remaining flooding risk / gardens becoming water logged as infiltration is eliminated. Article on works on Piddle Valley website and in Piddle Valley News Presentation to affected resident Share a summary report with parish council	WW WDDC DCC and EA	July 2012 14/6/2013 21/6/2013 31/1/2015
20	Planning department made aware of the problems in Piddle Valley. Wessex Water sent a letter to the LLFA Flood Risk Managers Wessex Water to continue objecting to development in catchments without a ground water strategy in place	WDDC WW	 July 2013 Ongoing
21	Surface water disposal issues to be addressed by SUDS approval body. This now follows the planning route. WW regularly meet Dorset Council.	WDDC and DCC	 Ongoing

Emergency Works		Responsibility	Date Completed
22	Wessex Water to develop an Operational Mitigation Action Plan for when over pumping and tankering is required - this document is considered to be the Infiltration Reduction Plan and Report	WW	2014

Emergency Works		Responsibility	Date Completed
23	Tankering in order to protect public health against sewer backing up and flooding.	WW	When Required
24	Overpump in order to protect public health as a last resort if/when it is not feasible to protect public health by tankering	WW	When Required
25	River quality sampling when overpumping on alternate days upstream and downstream of discharge point.	WW	When Required

Capital Works		Responsibility	Date Completed
26	<p>Wessex Water to investigate whether the existing overflow arrangement is adequate and review further options, these include options to:</p> <ul style="list-style-type: none"> • Increase pump rates at existing overflows • Move a pumped overflow to a better position • Install a third a pumped overflow within the catchment 	WW	<p>Ongoing</p> <p>2016</p>

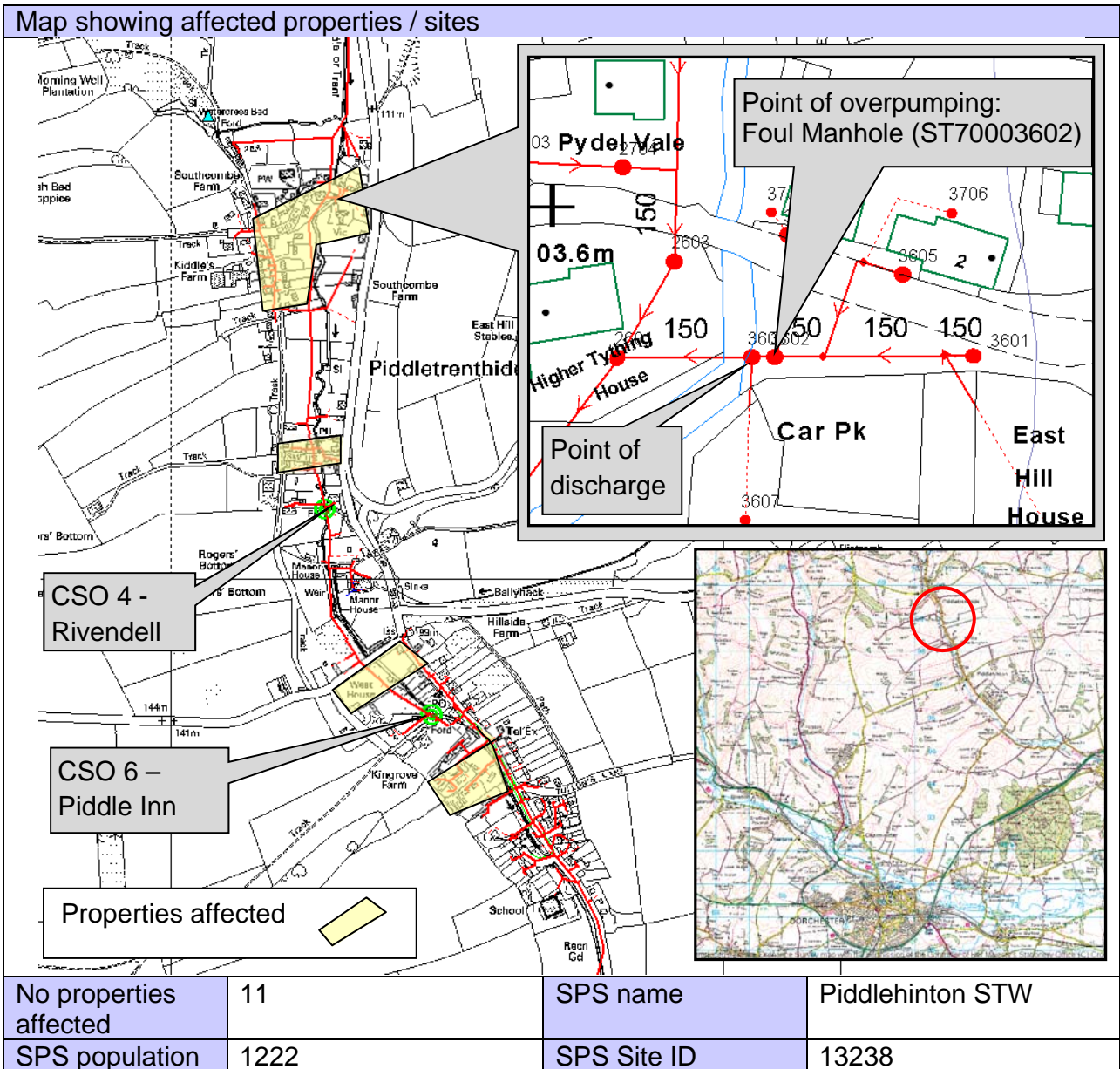
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Appendix 3 – Operational Mitigation Action Plan

Operational Mitigation Action Plan (OMAP)
Piddletrenthide

Catchment details

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



Historical consequences of inundation

Internal flooding	3	Restricted toilet use / Blockage Backing up	55
External flooding	29	Pollutions	13

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 land owner required	No	Does land owner need to be contacted	No
Borehole Trigger	Barcombe Farm	Level	123.0
Borehole NGR	ST 69922 03216		
EA groundwater warning	Wessex Water to be included in the EA warning email.	Consent details	Piddletrenthide; STW: 040067 PS4: EPR/AP3827XC PS6: EPR/AP3822XS

Trigger for tankering

Flooding / Surcharge	Manholes surcharge within 1m from flooding		
Tanker from	Foul manhole (ST70001401) adjacent Brookside, DT2 7QZ	Tanker to	Dorchester STW (13096)
NGR:	ST 70204 00476	NGR:	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	Foul manhole (ST70003602) adjacent to 3 Church Lane, DT2 7QY	Pump to	River Piddle, 10 metres downstream of road bridge
NGR:	ST 70302 00687	NGR:	ST 70302 00691
Discharge rate	<20l/s	Sensitivity of watercourse	3
Treatment arrangements	Copasac	Other requirements	Traffic management PR Plan
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	River Piddle, 10 metres downstream of road bridge
		NGR:	ST 70302 00691
Upstream sampling location	10 metres upstream of discharge point, adjacent to road bridge	Downstream Sampling location	40 metres downstream of discharge point adjacent to wall of car park
Sample ID Number	63800146	Sample ID Number	63800148
NGR:	ST 70302 00700	NGR:	ST 70275 00662
Standard sampling parameters	BOD, SS, Ammonical 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
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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

Appendix 4 – Meeting Minutes

Notes re meeting on Saturday 31st January 2015 @ 0830hrs Willow Lawn, Piddletrethide. c/o Neil Herbert

Present:- Oliver Letwin M.P., John Cox Chairman Piddle Valley Parish Council, Neighbourhood Plan Committee, Neil Herbert Neighbourhood Plan Committee, Sara Milne Piddle Valley Parish Council and Neighbourhood Plan Committee, David Martin Sewerage Planning Manager of Wessex Water.

The meeting was held in order to find solutions to the sewage and flooding problems within the catchment area of the Piddle Valley Parish council. (The hamlet of Plush has no public sewer.)

The main sewer was built in 1973, and is approx. 2mtrs deep. The laterals connecting with the main sewer are between 0.5 and 1.5 mtrs deep.

There are no road gullies connected to the main sewer.

For nine months of the year the sewer is operating well and within its overall capacity. The difficulties arise during the very wet winter months when there has been continuous heavy rain.

The sewage problems are due in the main to leakage of ground water into the sewer. This occurs only when the level of the water table rises to above that of the sewer.

Ground water seeps into the sewer through cracks and open joints in the sewer pipe walls and through cracks around manhole sections and covers. This permeability of the sewer accounts for about 80 - 90% of the errant inflow.

The remaining 10 -20% is due to 'sewer abuse' - that is the lifting of manhole covers by residents to prevent ground water endangering properties. It was mentioned that sewer abuse has been observed in the Piddle Valley, but the true impact of this is not known, it could be higher than 20%.

In some areas - e.g. Sixpenny Handley - Wessex Water (WW) - have screwed down and sealed manhole covers to prevent this abuse. It appears to have been successful so far.

The main sewer is inspected as required. In 2008 some sealing of the sewer was carried out using a 'gel system'. This has deteriorated faster than anticipated and has become ineffective. The system has been replaced by a permanent system. Wessex Water is now re- lining the sewer with an epoxy resin on a continuing basis where leaks occur.

The main sewer in Piddlehinton was surveyed in 2011 and was found to be in good condition with little or no infiltration.

For three months during the winter of 2013/14 tankers had to pump out sewage from several locations in the main valley sewer several times a day.

At a meeting of the Piddle Valley Parish Council (PVPC) with Wessex Water in 2008, three options were considered:

A. To install 3 CSOs (Rivendell, Piddle Inn and White Lackington). These are pump chambers which take sewage from the sewer, screen (coarse filter) it and pump it into the river. These

are now only allowed by the Environment Agency in exceptional circumstances (due to E.U. legislation) and on a temporary basis - but presumably will remain unless there is a problem with the quality of water within the river.

B. To construct a new sewer from Alton Pancras in the North, down through Piddletrenthide, White Lackington and Piddlehinton to the sewage treatment plant just below Enterprise Park in the South. (The treatment plant was constructed much earlier than the sewer - in 1940 approximately - to cope with sewage from the army camp during the war). This would cost £4m -£5m excluding the treatment plant is upgrade costs.

C. Sealing private laterals.

The plan then adopted in 2008 was a combination of options A and C. Four locations were identified as potential suitable points for CSO's. However only two of these CSO pumping stations were installed - at Rivendell (CSO 4) and the Piddle Inn (CSO 6) - not the one proposed in White Lackington.

Due to the extremely wet winter, an additional temporary pump was installed for a few months in 2013/14 in Church Lane, Piddletrenthide. There was apparently no screen (filter) used with this CSO. This is being investigated as it should not have happened.

There was a problem in the summer of 2014 with the CSO at Rivendell due to a blockage in the sewer. The pump switched itself on and pumped raw concentrated sewage into the river. The problem was swiftly cured and the river cleaned. Normally the pumps would only be pumping extremely dilute sewage into the river when the water table is very high and the sewer filled with ground water leaking into the system. Telemetry has been installed in both CSO pumping stations, which will alarm Wessex Water in the unlikely event of a further blockage occurrence.

From 2011 to the present day, surveys, including CCTV surveys, sealing and lining works have been carried out to the Piddle Valley sewers, all as detailed in response no 11 of David Martins e-mail of 30 January 2015 to Neil Herbert. Note these works are ongoing.

ACTION

1. Oliver Letwin will organise a meeting in Dorchester with West Dorset District Council, Dorset County Council, the Environment Agency, Wessex Water (David Martin), Piddle Valley Parish Council and himself in order to make plans for alleviating the flooding problems within the Piddle Valley as a whole.
2. David Martin (Wessex Water) will send sewer layout drawings for the whole valley (Alton Pancras, Piddletrenthide, White Lackington and Piddlehinton) to the Piddle Valley Parish Council chairman (John Cox, Baker's Cottage, Piddletrenthide, Dorchester DT2 7QL). Noted there may be a charge for this.
3. David Martin will ask their consultants (Atkins) to assess the cost and feasibility of installing a CSO pumping station to the North of Piddlehinton. This might solve the problem of sewage overflow. The result of this assessment, to be sent to PVPC as above.

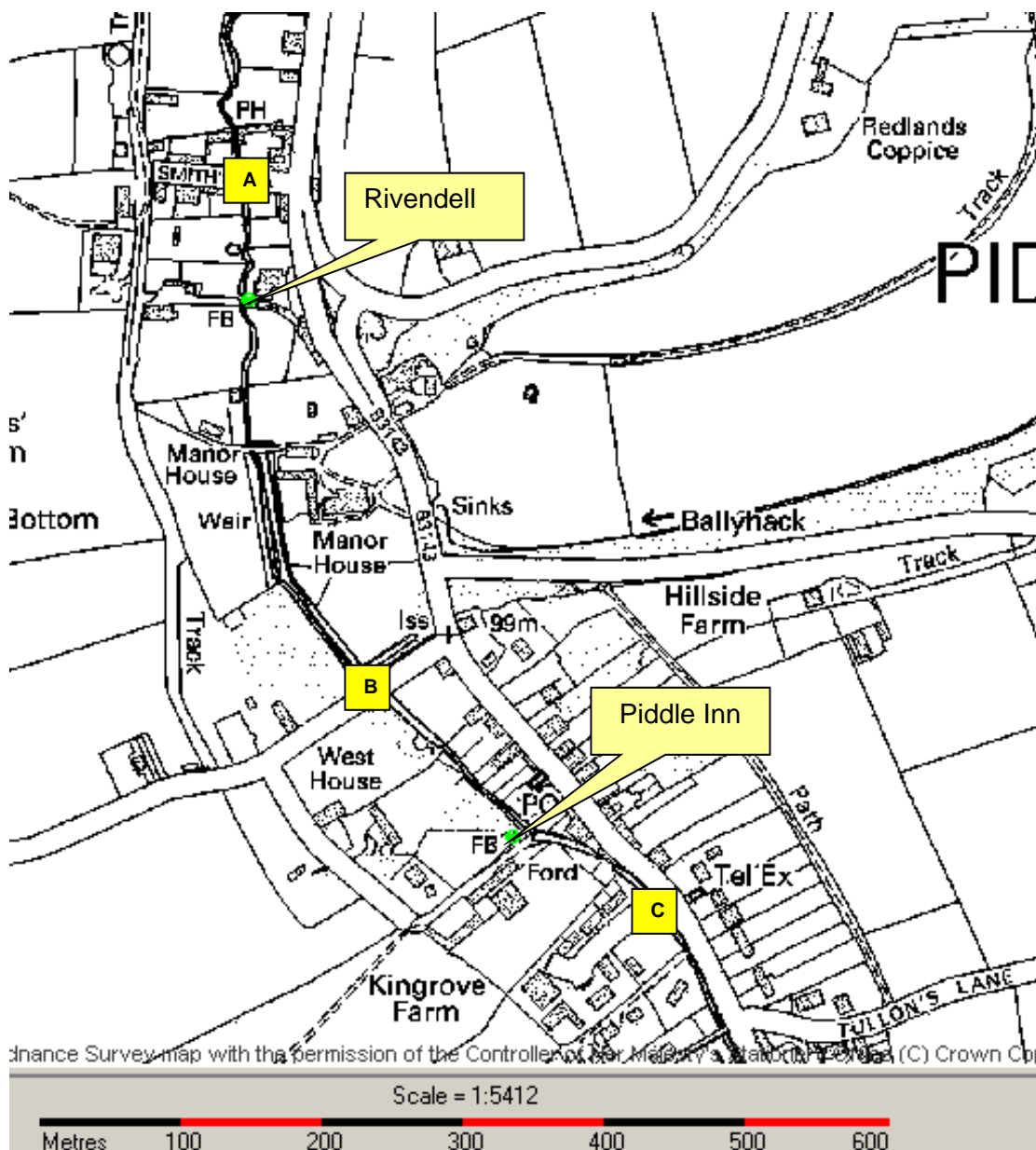
4. Wessex Water to assess the effectiveness of increasing the diameter of the sewer to 300mm from the South end of Egypt through Smiths Lane to the Piddle Inn.
5. David Martin will send layout drawings identifying the location and type of all epoxy resin and other lining and sealing works carried out to date to the sewer (covering whole length of sewer throughout the valley). Send to PVPC as above.
6. David Martin will send layout drawings identifying the location of where CCTV and other surveys of the sewer have been carried out in the valley, to the PVPC (as above).
7. David Martin will send layout drawings identifying the location and type of all future proposed epoxy resin and other lining and sealing works to the sewer (covering whole length of sewer throughout the valley). Send to PVPC as above.
8. David Martin will send layout drawings identifying the location of where all future CCTV and other surveys of the sewer are to be carried out in the valley, to the PVPC (as above).
9. Wessex Water will complete the sealing of all serious ingress points in the sewer during 2015 -2016.
10. Wessex Water will consider the possibility of installing a permanent (theoretically temporary) CSO pumping station in Church Lane, Piddletrenthide if the epoxy resin lining and other sealing works is not sufficient to enable the system to operate functionally.
11. David Martin will email copies of the Wessex Water Inflow Management Plan for the Piddle Valley to:
Oliver Letwin M.P., John Cox (j.cox@madasafish.com), Neil Herbert (herbert.nj.86@gmail.com) and Sara Milne (saramilne51@googlemail.com)
12. David Martin will send to the above, the Wessex Water programme for future epoxy resin and other lining and sealing of the sewer with target dates.
13. Piddle Valley Parish Council to contact Matt Boon of the Environment Agency re the enforcement of river clearing by riparian owners within the valley.

The meeting closed at 9.45am.

S.L,S.Milne

Note: - Action no 11 - A copy of the Wessex Water Inflow Management Plan for the Piddle Valley has been received, and is available via the Piddle Valley website.

Appendix 5 – Sampling Locations



A = ST 70271 00229 = river c.100m u/s of the Rivendell overflow

B = SY 70359 99861 = river c.300m d/s of the Rivendell overflow = river c.150m u/s of the Piddle Inn overflow

C = SY 70559 99713 = river c.100m d/s of the Piddle Inn overflow

Site Sample Numbers

River Piddle at Piddletrenthide 100m u/s of Rivendell overflow - **30602001**

River Piddle at Piddletrenthide 150m u/s of the Piddle Inn overflow - **30602002**

River Piddle at Piddletrenthide 100m d/s of the Piddle Inn overflow - **30602003**

Piddletrenthide flood alleviation outfall d/s of school - **30602004**

Piddletrenthide Rivendell overflow discharge - Site ID 17637 **30602005**

Piddletrenthide Piddle Inn overflow discharge - Site ID 17638 **30602006**

Location A



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

Location B



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

Location C



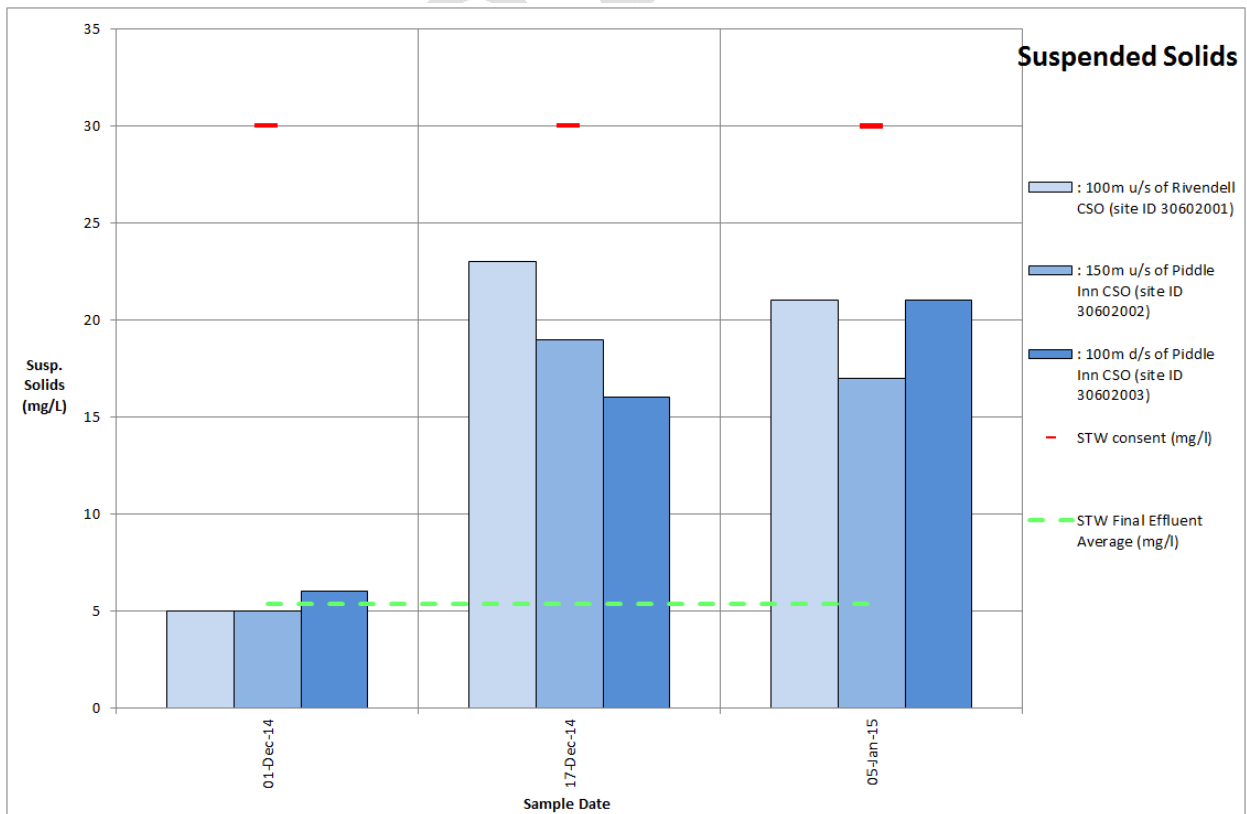
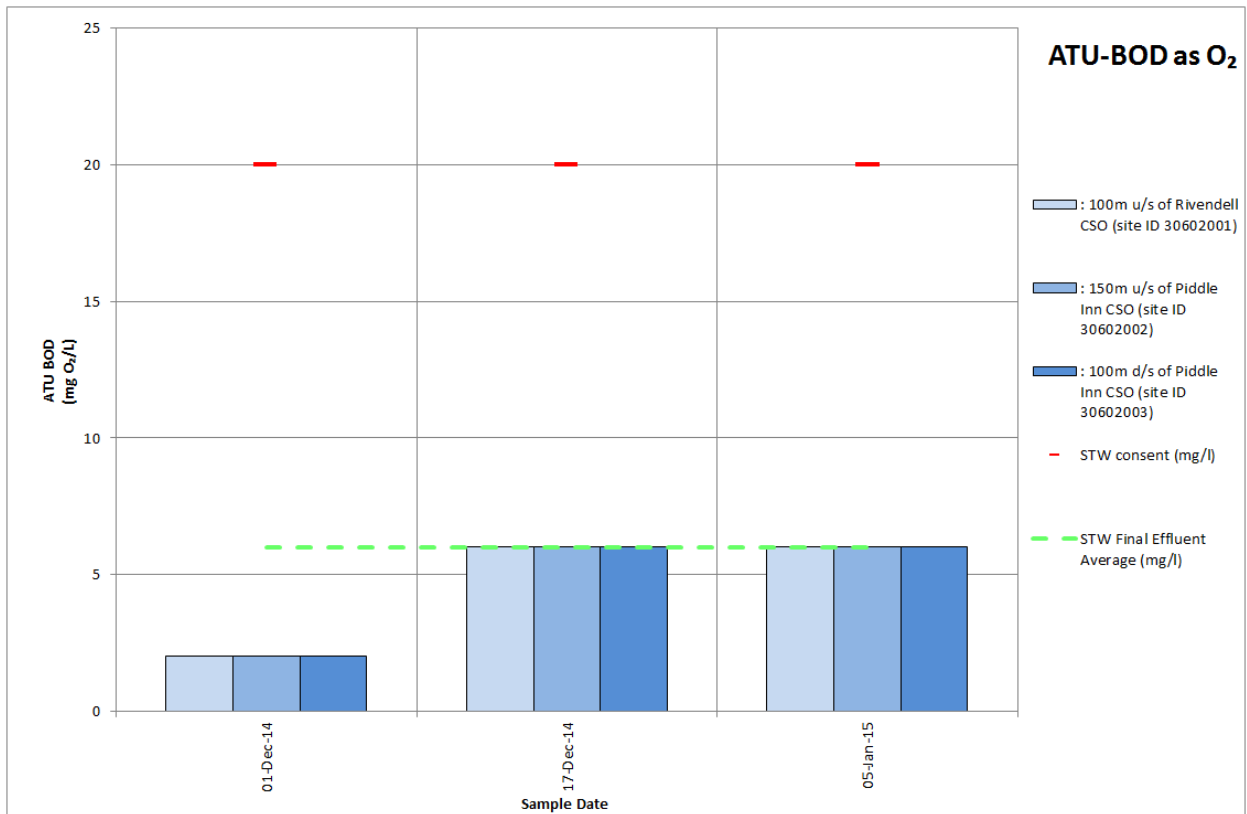
Take sample from bridge, u/s side and mid-channel

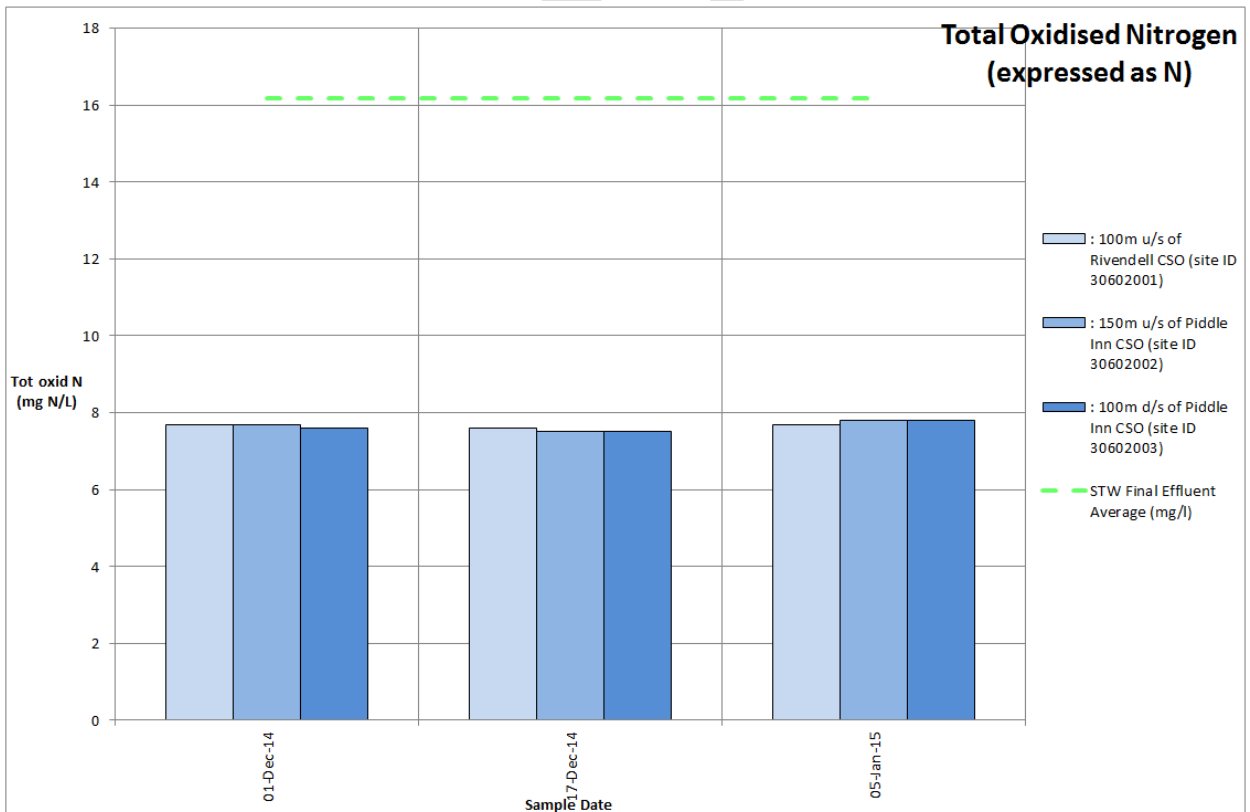
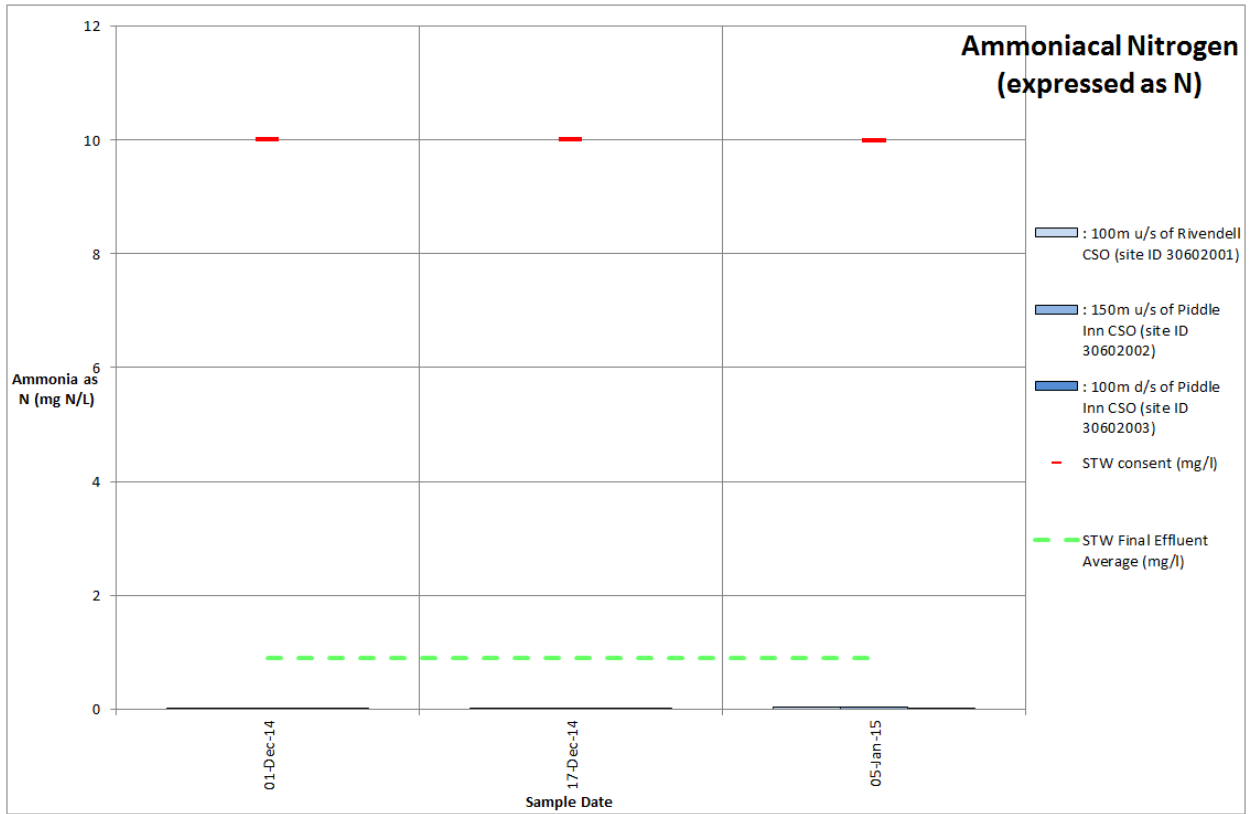
Appendix 6 – Sampling Data

Date	BOD atu - less than (mg O2/L)	Susp solids (mg/L)	Ammonia as N (mg N/L)	Tot oxid N (mg N/L)
01-Dec-14	2.00	5	0.02	7.7
	2.00	5	0.02	7.7
	2.00	6	0.02	7.6
% Deterioration	0	20	0	-1
17-Dec-14	6.00	23	0.02	7.6
	6.00	19	0.02	7.5
	6.00	16	0.02	7.5
% Deterioration	0	-30	0	-1
05-Jan-15	6.00	21	0.03	7.7
	6.00	17	0.03	7.8
	6.00	21	0.02	7.8
% Deterioration	0	0	-33	1

DRAFT

Appendix 7 - Sampling





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?

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.



Pumping station weir and screening arrangement under construction



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.