Drainage and Wastewater Management Plan (DWMP)

Overview of the East Hampshire River Basin Catchment

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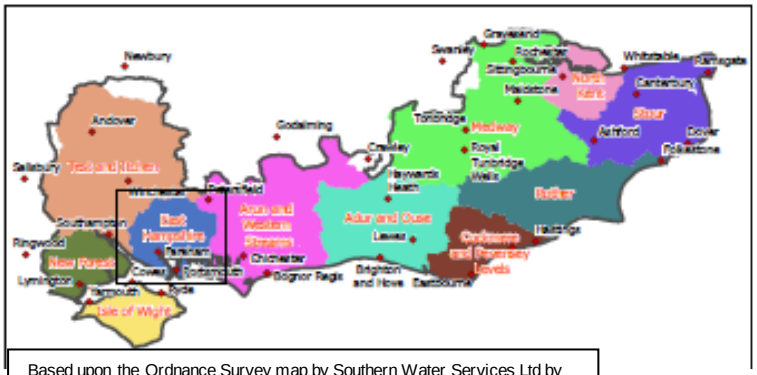
Version 2

from Southern Water

Overview of the East Hampshire Catchment

The Environment Agency has previously defined the River Basin District catchments in their River Basin Management Plans prepared in response to the European Union's Water Framework Directive. These river basin catchments are based on the natural configuration of bodies of water (rivers, estuaries, lakes etc.) within a geographical area, and relate to the natural watershed of the main rivers. We are using the same catchment boundaries for our Level 2 DWMPs. A map of the East Hampshire river basin catchment is shown in figure 1.

Figure 1: The East Hampshire river basin catchment



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The East Hampshire catchment covers a geographical area of approximately 571 km^2. Most of the catchment falls within south-east Hampshire but a small proportion is in West Sussex. It includes the rivers Hamble, Meon, Wallington, Hermitage and Lavant, as well as Portsmouth and Langstone Harbours, and the Solent coastal area between the Hamble estuary and Gosport. The catchment is home to around 460,000 people.

Much of the upper reaches of the catchment is in part of the South Downs National Park. The largely rural upper catchment consists of rolling chalk downland with small villages and hamlets. Three-quarters of the land is used for agriculture and is characterised by mixed farming and some forestry creating a mosaic landscape.

In contrast, the flat, heavily urbanised coastal plain to the south contains the larger towns and cities of Portsmouth, Havant, Waterlooville, Fareham and Gosport and is one of the most densely populated areas in the UK. The Hamble Estuary and Gosport, Langstone and Portsmouth incorporate recreational yachting harbours and the whole area has a strong maritime heritage with Portsmouth Historic Dockyard being a major tourist attraction.

Although most of the rivers in the catchment flow over clays and gravels overlying a chalk aquifer, the Hamble and, to a lesser extent, the Wallington are supported by chalk springs in their headwaters whilst the River Meon flows over the chalk for the majority of its length.

All of the watercourses discharge into the Solent, Portsmouth Harbour or Langstone Harbour, which are of national and international nature conservation importance. The marshes at the lower end of the Meon form the Titchfield Haven National Nature Reserve and its estuary is designated a Site of Special Scientific Interest (SSSI) for its importance to wading birds. The Solent and Southampton Water have both Special Protection Area (SPA) and Ramsar site designations and the Solent is additionally a Special Area of Conservation (SAC).

The underlying chalk aquifer provides drinking water in the area and the summer base flows for many of its watercourses. The underlying catchment geology has a significant impact on the hydrology of the area. Rainfall on the northern chalk tends to soak into the ground, recharging groundwater rather than rapidly entering the river system as run-off. This acts as an important source of water for many of the streams and wetlands.

Drainage and Wastewater Systems

Drainage and wastewater systems are designed to convey water. There are several different drainage systems, including:

- land drains in fields to drain the land to enable it to be used for agriculture
- highway drainage systems to ensure that roads and car parks remain safe and useable during rainfall
- rivers and streams to transport water from the land to the sea
- surface water drainage systems that take water from roofs and paved areas to local rivers, and
- sewerage systems that take wastewater away from people's homes and businesses so it can be recycled and released safely back into the environment.

All these systems provide essential services to protect the economy and environment, and ensure public health, safety and hygiene. The links between water use and the management of

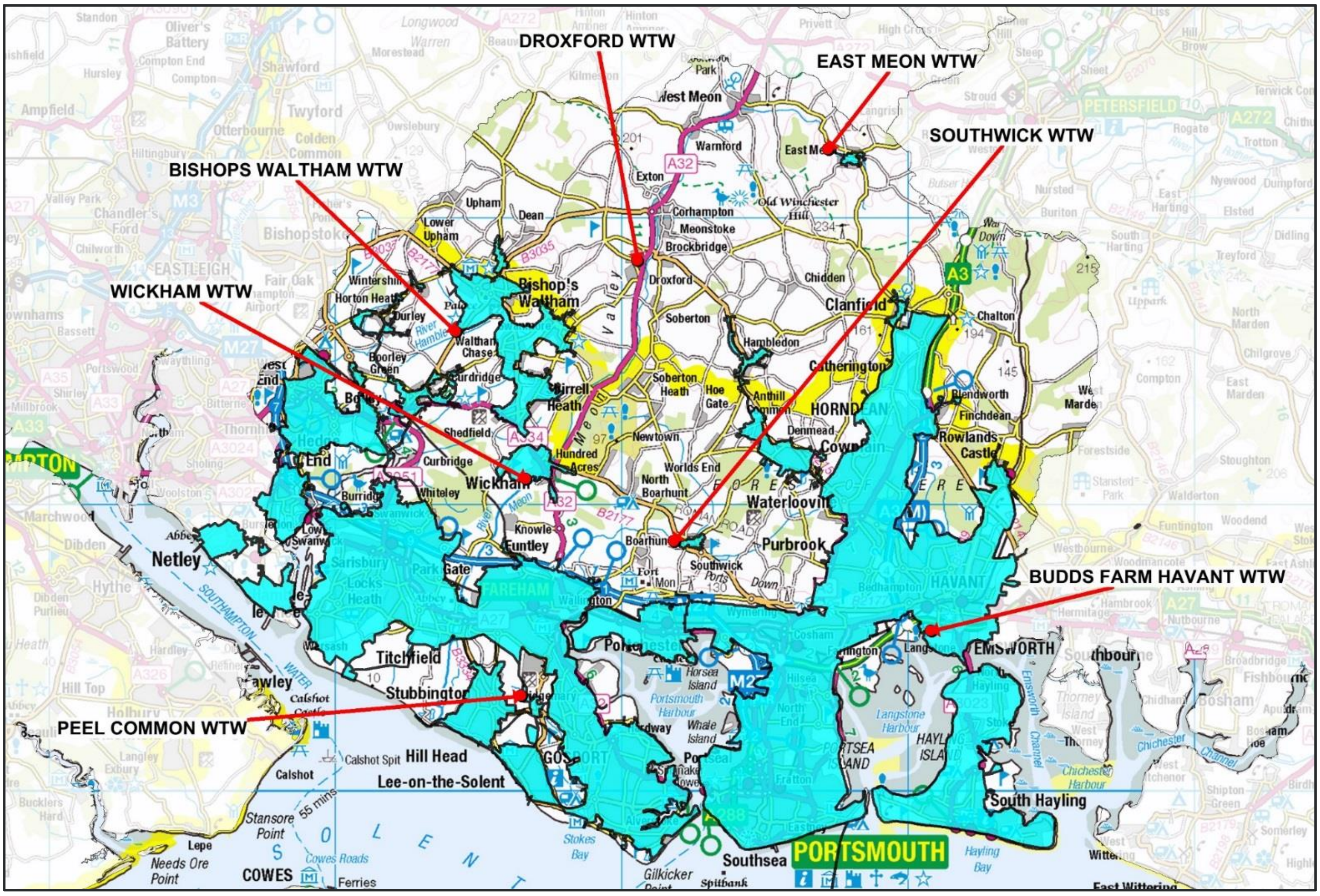
wastewater is important to protect the wider environment. This excellent independent short film, called "The Drip", shows how the water cycle links everything together.

In the East Hampshire catchment, we own and operate 7 separate sewerage systems. Each of these collect wastewater from a geographical area known as a sewer catchment. These areas are shaded blue in Figure 2. Each sewer catchment is drained by a complex sewerage system comprising a network of pipes, wastewater pumping stations (WPSs), and wastewater treatment works (WTWs). These combine to remove wastewater from homes and businesses and transport it to treatment facilities so that it can be recycled and safely discharged back into the environment.

Our sewerage systems generally cover the urban centres and communities. Of the 555 km^2 of land serviced by our sewer catchments in this river basin catchment, only 177 km^2, or 32%, of the land is covered by our drainage systems. However, of the 263,500 residential properties and 11,500 businesses within the East Hampshire catchment, 98% of the homes and 95% of the businesses are connected to our sewerage system.

Remote rural properties are often not connected to sewerage systems and therefore rely upon a septic tank within their property to collect wastewater before it is periodically emptied by tankers and the wastewater is taken to a WTW to be recycled.

Figure 2 Map of the East Hampshire Catchment showing locations of the WTWs



More than 5,826 km of wastewater pipes serve the East Hampshire catchment. The catchment's network includes 280 pumping stations (WPSs) pumping sewage to 7 water treatment works (WTWs) for treatment. Table 1 provides a summary of the 7 sewer catchments within the East Hampshire river basin. It includes the population equivalent that each serves and the approximate length of sewers within the sewer catchment.

Table 1: Sewerage Catchments in the East Hampshire River Basin

Sewer Catchment Ref	Sewer Catchment Name	Communities Served	*Population Equivalent	Length of sewers (km)
BUDD	BUDDS FARM HAVANT	Portsmouth, Southsea, Havant, Hayling Island, Port Solent, Waterlooville, Horndean, Rowlands Castle, Denmead, Hambledon,	366,725	2,984.30
PEEL	PEEL COMMON	Fareham, Gosport, Lee-on-the-Solent, Stubbington, Locks Heath, Netley, Bursledon, Hamble le Rice, Hedge End, Swanwick, Curdridge, Titchfield, Portchester	257,249	2,664.60
BISH	BISHOPS WALTHAM	Bishop's Waltham, Waltham Chase, Shirrell Heath, Swanmore	13,205	142.1
WICK	WICKHAM	Wickham	2,151	25.2
EMEO	EAST MEON	East Meon	690	6.7
SWIC	SOUTHWICK	Southwick	624	3.4
DROX	DROXFORD	Droxford	47	0.406

*The population equivalent is a quantity measure used to represent how much sewage the treatment facility needs to treat. It consists of the calculated equivalent number of people who are likely contribute to the amount of sewage in the catchment.

Of the 7 WTWs in the catchment, three serve more than 10,000 population equivalent per day: Budds Farm Havant, Peel Common and Bishops Waltham.

Budds Farm Havant serves a population equivalent of 366,725 and is permitted to recycle 108,853 m^3 of wastewater per day during periods of dry weather. Budds Farm WTW serves Portsmouth, Southsea, Havant, Hayling Island, Port Solent, Waterlooville, Horndean, Rowlands Castle, Denmead and Hambledon. The connecting sewage network is a combination of gravity sewers and sewers where the wastewater is pumped (called rising mains). A total of 52 wastewater pumping stations (WPS) are included in the network. Budds Farm also serves as a sludge treatment centre (STC) to process and recycle the 'solids' from within the sewage. It receives around 1,000 m^3 of liquid sludge per week, delivered to site by tankers, from several other sites in and around the catchment. Budds Farm WTW recycles the sewage and discharges the final treated water to the Solent via a long sea outfall.

Peel Common WTW catchment serves a population equivalent of 257,249. The site was commissioned in 1980 to treat wastewater from a contributing catchment of nearly 97 km^2 between Portsmouth and Southampton, including the towns of Gosport and Fareham. There are 155 wastewater pumping stations (WPS) in the catchment. These pump wastewater to the WTW for recycling before it is discharged to the Solent. The site has a consented dry weather flow of 59,683 m^3 per day. Peel Common also serves as a sludge treatment centre (STC). It usually receives around 140 m^3 of liquid sludge weekly from Chichester and Romsey WTWs.

Bishops Waltham receives flows from the town and surrounding villages by gravity. It serves a population equivalent of 13,205 and has a consented DWF of 3,100 m3/d. The recycled water is discharged into the River Hamble. The liquid sludge is removed from the site by tanker and taken to Slowhill Copse Marchwood WTW for processing.

Wickham WTW was built in the 1960s. It serves a population equivalent of around 2,151 people. Sewage is collected by gravity sewers and discharged to a single terminal pumping station, Farham Road Wickham. It has a consented DWF of 750 m3 per day and discharges recycled water into the River Meon.

East Meon WTW serves East Meon village. The sewerage network is mainly gravity with one wastewater pumping station (WPS) at East Meon followed by a short rising main serving a small number of properties to the east the village. The site has a DWF of 175 m3/d and discharges to the River Meon. The liquid sludge is removed by tanker and taken to Budds Farm sludge treatment centre for treatment.

Southwick WTW, sewage is pumped to the site via Newmans Bridge WPS in Southwick village. This is the only WPS feeding the site. It has a consented DWF of 540 m3/d and discharges treated sewage effluent to the River Wallington.

Droxford WTW is a small package plant which serves around 47 people in the village of Droxford, in the Meon valley. It has a consented DWF of 10 m3/d and discharges via a soakaway.

Known issues associated with the catchment's WTW includes asset deterioration due to age and asset incapacity caused by growth. We have work planned for several of the sites in this catchment including a phosphorus removal scheme at Bishops Waltham and a scheme to increase treatment capacity at Budds Farm WTW. By upgrading the treatment works at Budds Farm the environment will be better protected from pollution events in future. For more information see here.

The Environment Agency (EA) sets limits on the quality and quantity of recycled water (known as effluent) that can be discharged from WTW. The EA issues discharge permits to ensure the recycled water released from WTW complies with three main legal provisions:

(i) The Water Resources Act (WRA) 1991;

(ii) The Environmental Permitting (England and Wales) Regulations 2010 and

(iii) The Urban Wastewater Treatment Regulations (UWWTR) 1994.

The permits ensure that the quality of the receiving water (i.e. river, stream, or sea) is protected and that the discharges do not cause an unacceptable impact on the environment. The flow that may be discharged (released) in dry weather is one of the limits set by permits. Our 7 WTWs operate in accordance with their permits and recycle the wastewater to the specifications set out by the EA to ensure it is safe and clean to be released back into the rivers and streams or directly to the sea.

Under heavy storm conditions, rainfall can enter the sewerage systems and significantly increase the flow in the system. The flow of water arriving at the WTW can exceed the recycling capacity of the works, so any excess water is temporarily stored in large storm tanks. If these tanks ever fill to capacity, then they would discharge water into the rivers or sea through storm overflows. Our aim is to prevent any discharge of water that has not been fully recycled to the required standards. Any water released from storm tanks is screened to remove items such as wet wipes and solids. This

control mechanism is required to prevent the backing up of water within the sewers and putting homes at risk of flooding and these discharges are permitted by our regulator and monitored carefully.

Wastewater System Performance

We routinely monitor, analyse and report the performance of our wastewater sewerage networks and treatment processes to enable us and our regulators to assess the service provided to our customers and the impact of our activities on the environment.

The current performance on the sewerage systems is a good starting point for the DWMP, and enables current issues to be highlighted so the planning objectives can be identified and defined for use throughout the DWMP. These planning objectives will determine the metrics that we used in the next stage of the DWMP, which is to determine the current and future risks to people, property and the environment of changes in the river basin catchment and in the performance of our sewerage systems.

The current performance, based on the last three years of date, is summarised below.

Sewer blockages

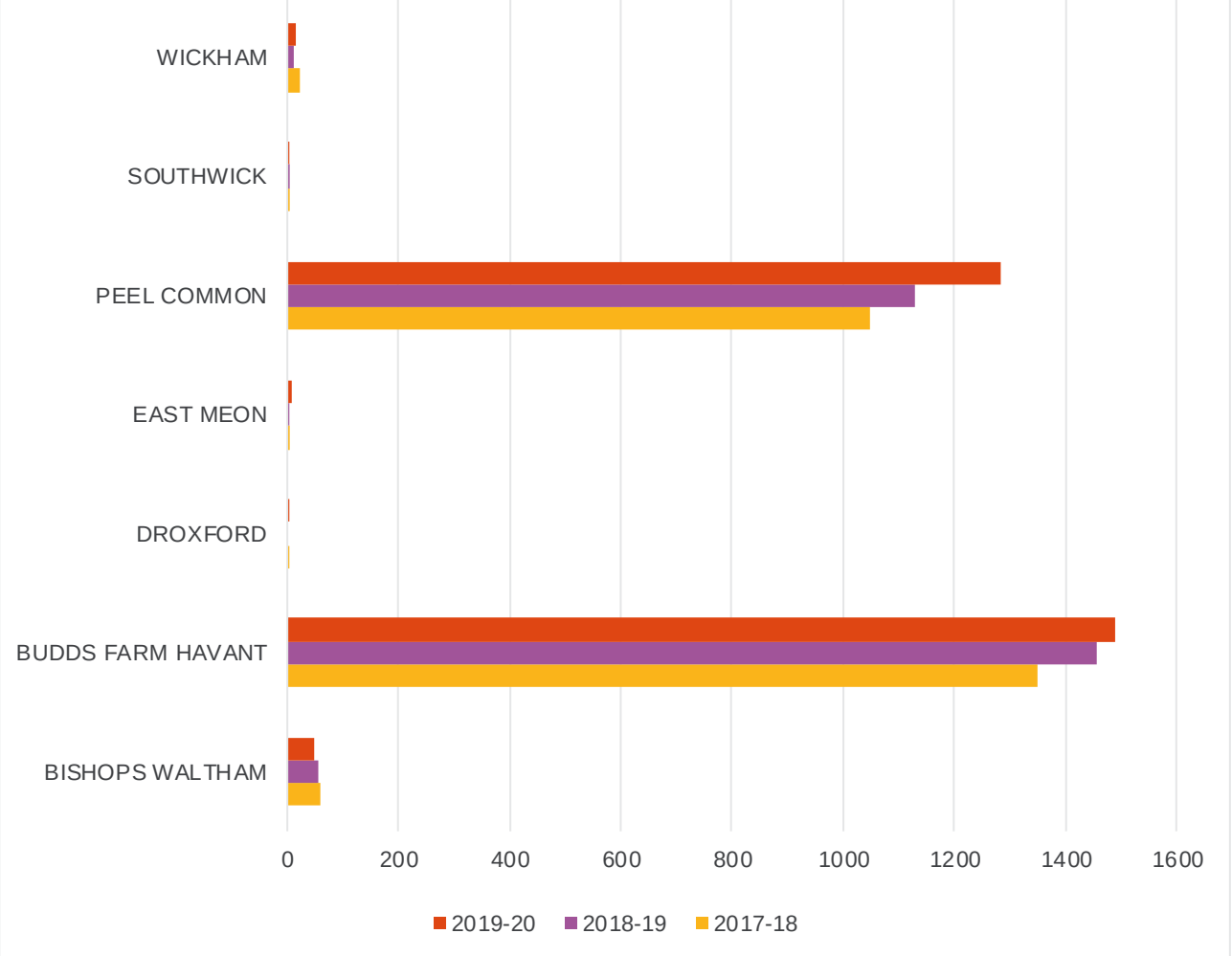
Every year there are thousands of avoidable blockages in our sewers caused by the flushing of wet wipes, cotton buds and other inappropriate items down the toilet, or by pouring fat, oil and grease down the sink. These items cause blockages within the sewer systems, and these blockages often result in flooding to customers' properties or impact upon pollution to watercourses or coastal waters.

Figure 3 shows the number of blockages recorded in the East Hampshire catchment. We have noticed an increasing trend in the number of blockages, which we are tackling through our pollution and flooding reduction programmes.

Budds Farm Havant, closely followed by Peel Common, had the highest number of blockages.

We use high-powered water jets to clear blockages and ensure our sewers are running freely. In 2015, we launched our 'Keep it Clear' campaign which involves teams visiting 'blockage hotspot' areas to educate customers on how to safely dispose of items rather than putting them down their sinks or toilets. We visit almost 20,000 customers a year across the region to promote correct disposal of 'unflushable' items.

Figure 3: Number of blockages in each of the sewer catchments in the East Hampshire river basin catchment

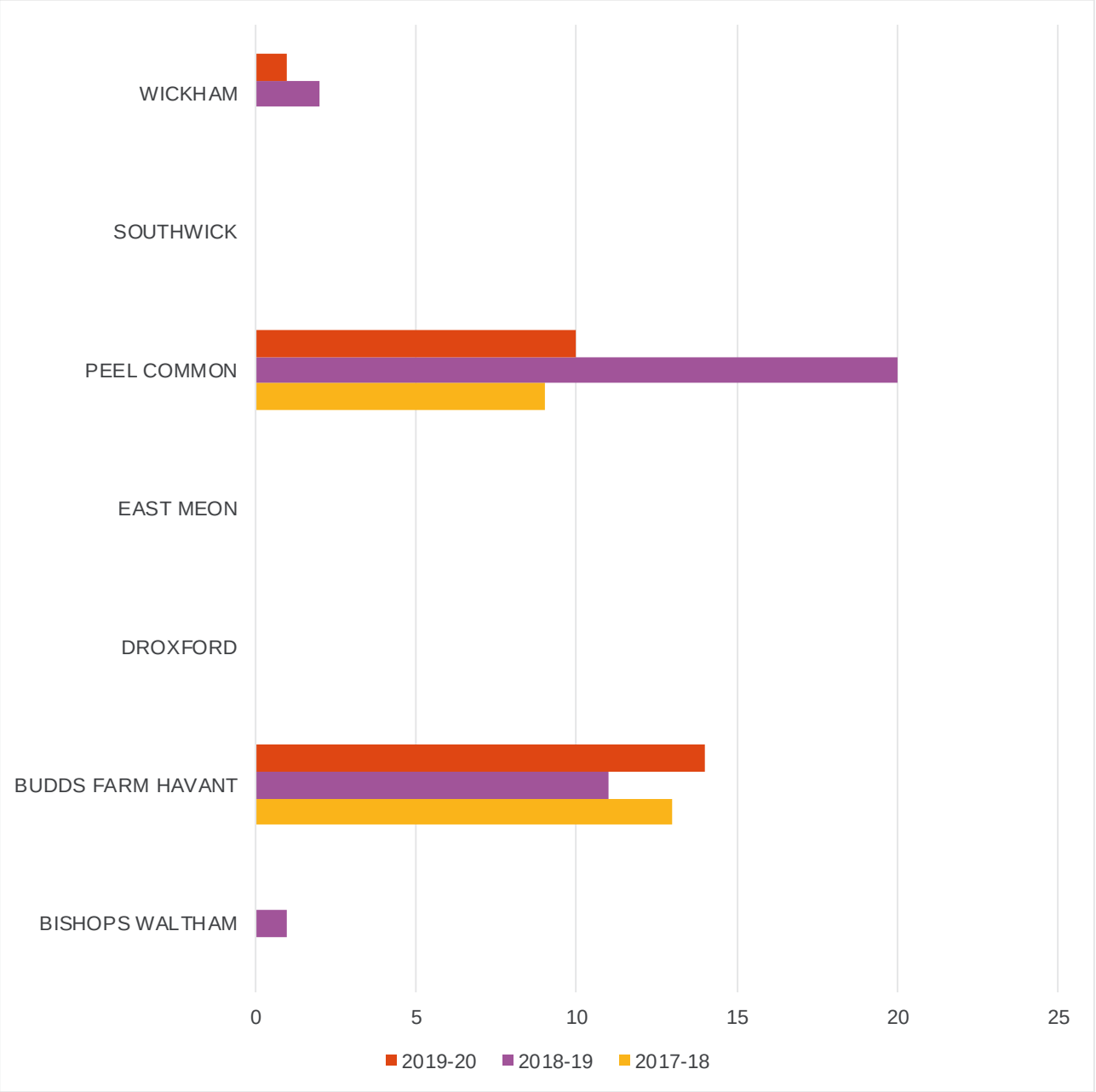


Sewer collapses and rising main bursts

Figure 4 shows the number of sewer collapses and rising main bursts recorded by our Sewer Incident Reporting for public sewers in the East Hampshire catchment over the last three years. Rising mains contain wastewater that is pumped under pressure from our wastewater pumping stations towards the treatment works.

The majority of these collapses and bursts were in Budds Farm Havant and Peel Common. Wickham had a relatively high number of collapses for a small catchment. A collapse or burst can result in a discharge to the environment or flooding. We have an ongoing programme to inspect (by CCTV), replace or refurbish ageing sewers at high risk of collapse or where bursts are likely.

Figure 4: Number of incidents of sewer collapses and rising main bursts in the East Hampshire River Basin by sewer catchment



Flooding Incidents

The most common cause of flooding is from blockages of debris such as wet wipes. However flooding can also occur in wet weather when the sewerage system becomes overloaded due to rainwater entering the sewer system.

Within the East Hampshire river basin catchment, several of our sewer catchments have both separate and combined sewer systems to carry wastewater. Combined systems convey both sewage from homes and businesses as well as rain and storm water collected from roofs and hard paved areas. During heavy rainfall, the capacity of combined sewers can be exceeded and lead to localised flooding as a result of the water backing up the system to the closest available escape route: manhole, toilet, sink, basement etc. In some combined sewer systems where flooding of properties could occur in heavy rainfall, there are built in overspill weirs, called storm overflows, which release excess water into rivers to prevent flooding of homes or businesses. Storm overflows (also known as Combined Sewer Overflows) are permitted by the Environment Agency (EA) to operate in certain conditions. The majority of storm overflows have equipment installed to record the number of times that water passes through the storm overflow. We monitor these carefully and report this information to the EA. There are 116 combined sewer overflows and emergency overflows in the East Hampshire catchment.

Sewer flooding can also occur as a result of rising groundwater seeping into the underground sewer systems and creating additional flow within the sewer network of pipes. This is called infiltration. High local levels of infiltration have been observed in the village of Hambledon, north-west of Havant. The infiltration has filled the sewer pipes and restricted our customers' use of toilets and washing facilities. When this has occurred, we have removed excess groundwater from the sewers by pumping out the water using road tankers. We have invested in surveys of the sewers and repair works to reduce infiltration. Further information is in the Hambledon Infiltration Reduction Plan which is available on our website here

Figures 5 and 6 show the number of internal and external flooding incidents respectively over the last 3 years in the East Hampshire catchment. For the purpose of the DWMP, sewer flooding is defined as incidents caused by an escape of water and sewage from a public sewer due to a blockage, sewer collapse, rising main burst, equipment failure or from too much water entering the system (known as hydraulic overload). Importantly, the definition of sewer flooding excludes extreme storms with a probability of occurring of less than once in 20 years (i.e. less likely than a 5% chance in any given year). Internal flooding occurs inside a building or cellar, whilst external flooding occurs within a curtilage (garden) or on a highway or public space.

Of the 263,500 homes connected to the 7 sewer systems within the East Hampshire river basin, 10 properties experienced some form of internal flooding (including sewage backing up into a bath or shower tray) during the financial year 2019-20. This figure is down from 39 properties that experienced flooding in 2017-18. The data shows a significant decrease in the number of floods from the sewer network in the Budds Farm Havant catchment which we have been targeting in our flooding reduction programme.

Figure 5: Internal Sewer Flooding within properties by sewer catchment (number of incidents)

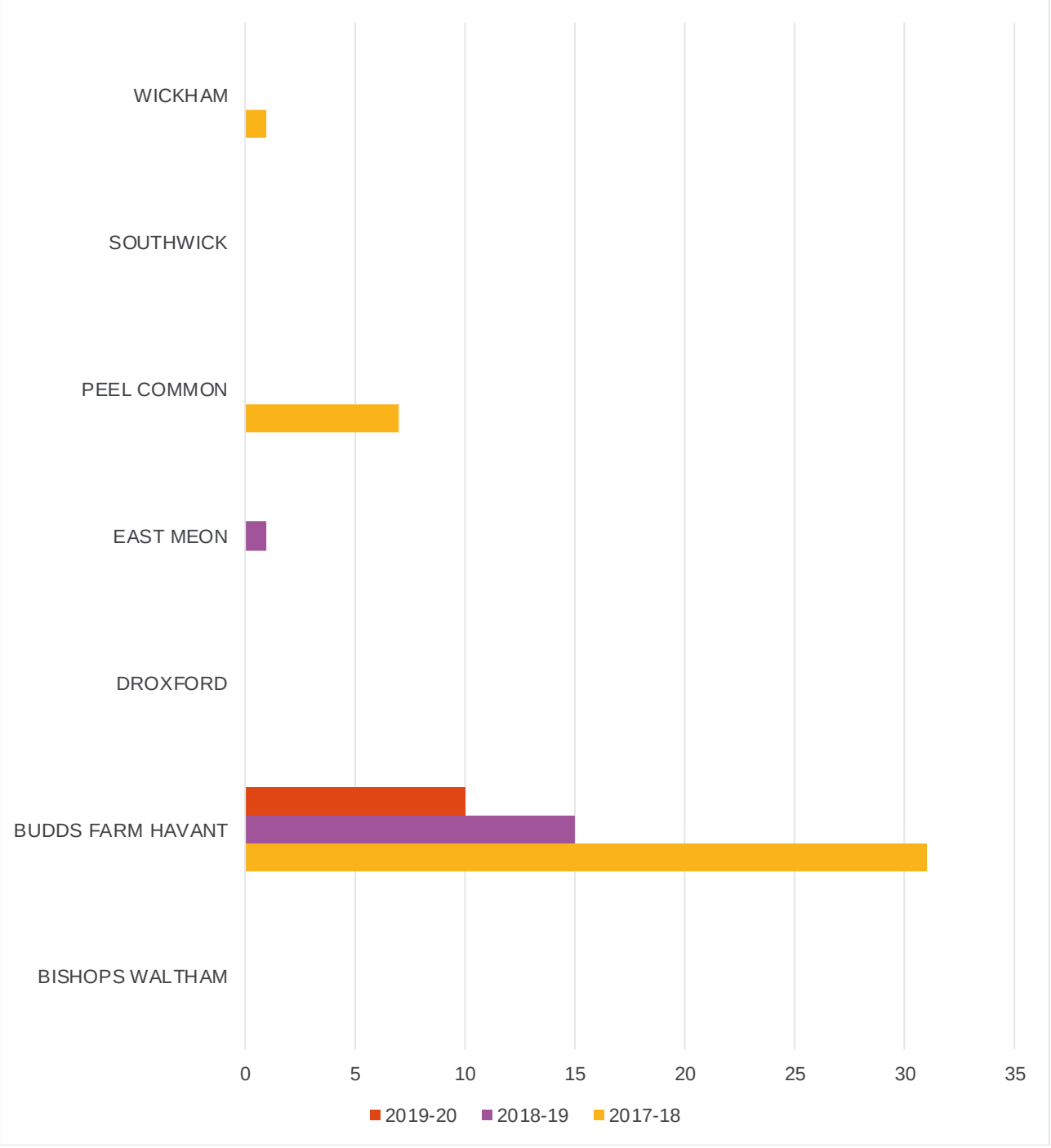
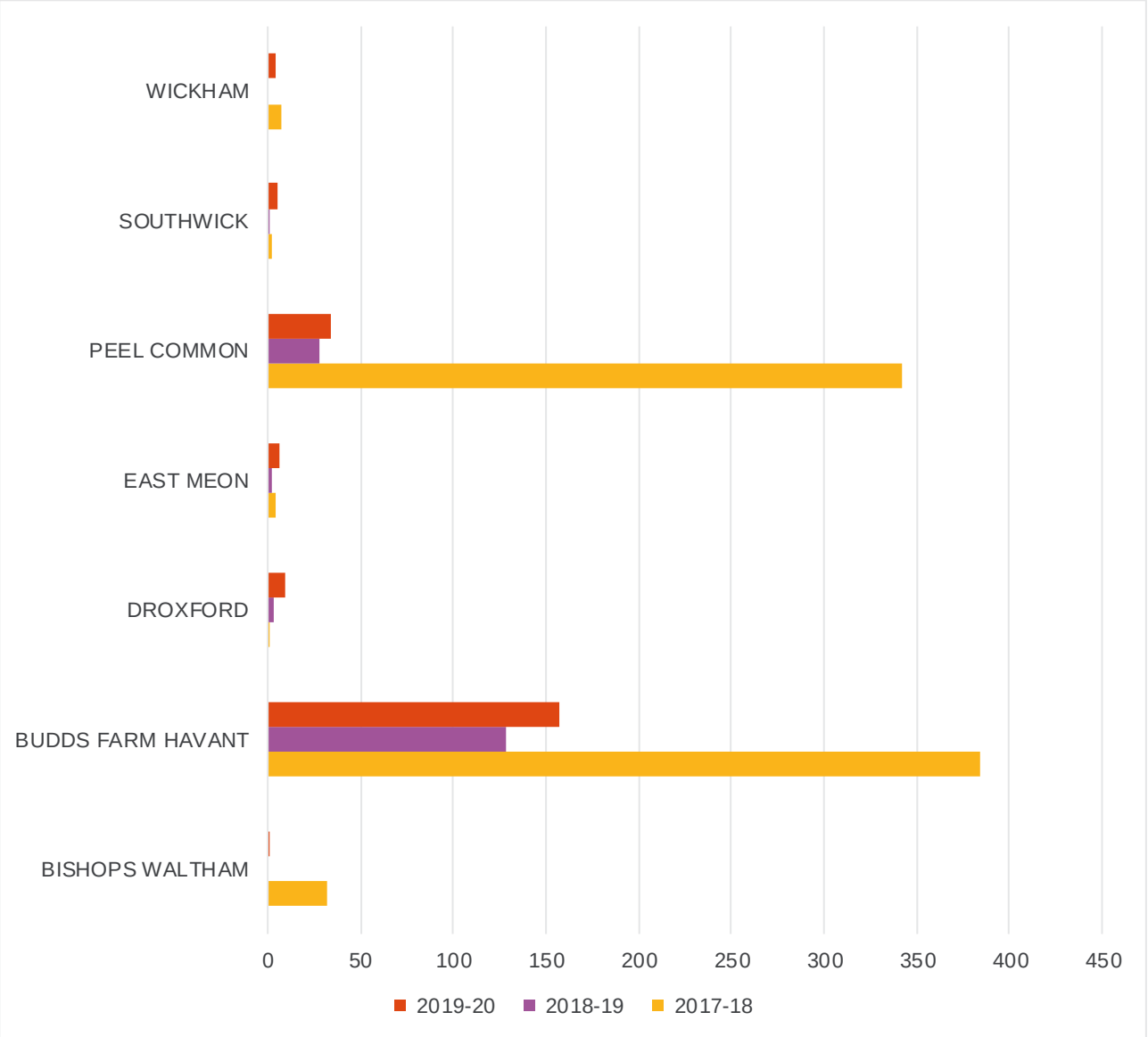


Figure 6: External Flooding within the curtilage of a property (not inside) by sewer catchment in the East Hampshire river basin (number of incidents)



Pollution incidents

Reducing the number of pollution incidents is a priority for us, our customers and our stakeholders. We have set the target to reduce the number of pollution incidents across the whole of our operating region to 79 incidents by 2024-25, and our aim by 2040 is to have zero pollution incidents. To achieve this we have created an extensive pollution incident reduction plan with the Environment Agency to significantly reduce pollution over the next five years in line with industry targets.

Pollution incidents connected with our wastewater assets (e.g. blocked sewers, pump failures) are reported to the Environment Agency.

The impact an incident has on the environment is categorised into one of four categories using the Common Incident Classification System (CICS). More information on the classification system can be found on the Ofwat website here. There are four categories for pollution incidents: 1 (major), 2 (significant), 3 (minor) or 4 (no pollution). Only category 1, 2 and 3 pollutions are reportable.

We continue to investigate the root causes of pollution incidents. Our improvements in monitoring of assets and data collection are informing our Pollution Reduction Programme and resulting in more pollutions being prevented. We have also strengthened our incident response team and arrangements to improve our response and reporting of a potential pollution incident.

In addition, our new Environment+ programme looks at all aspects of environmental compliance and performance. Our focus on wastewater treatment works compliance will bring about improved river quality, reduced pollution incidents and flooding, and enhance bathing water quality.

We publish pollution data in our Annual Report and on our website. However, we are not yet at the stage where we can publish that data in greater detail or make further detail publically available. To do so would also require the agreement of the Environment Agency as they provide some of the information. We are currently being investigated by the Environment Agency in relation to pollution events, and the management of some of our wastewater treatment works, so what we can say about these at this time is limited.

Wastewater treatment works compliance with permits

The Environment Agency sets limits on the quality and quantity of recycled water from WTWs entering rivers or the sea so the water does not cause an unacceptable impact on the environment. The flow that may be discharged in dry weather (known as Dry Weather Flow) is one of these limits. Dry weather flow (DWF) is the average daily flow to a wastewater treatment works during a period without rain. Exceedances of the DWF can be caused by a number of factors, but it can be due to the additional flow from new development in the sewer catchment. To enable further development, we work with planning authorities to understand where future development is planned and include growth schemes in our investment programme so we can increase the capacity of WTWs and continue to comply with our permits in the future.

We must comply with permits issued by the EA. Where we do not meet the permit requirement, we call this a compliance failure.

We are investing in improved operational resilience to maintain wastewater treatment compliance at a high standard by achieving 99.0% as a minimum, but continuing to aim for 100% compliance.

Southern Water
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