South West Water

# Drainage and Wastewater Management Plan

# Dart

May 2023

# Table of Contents

**Status and update information**

Version SWW_DWMP_2021/22_0_2023-05-31

This document provides asset, characteristic and performance data for Strategic Planning Areas (Level 2 catchments). Performance data for the time frame up to April 2023 has been utilised to populate these documents.

**Production Statement**

These documents are produced using an automated process. The process uses a mixture of standard data holdings such as records of assets within the Dart catchment and documents that are produced as part of modelling and analysis undertaken as part of the DWMP. The decision has been made to leave in tables and figures even if no performance or asset data exists for the catchment to serve as confirmation that no records are held for that particular item.

**Data Statement**

This document contains asset, characteristic and performance data for Strategic Planning Areas (Level 2 catchments) and has been prepared by South West Water Limited for the purposes of providing area specific detail on assets, risks and proposed interventions for our drainage and wastewater plans. Data records shown in the document for various performance and other metrics may not completely align with Regulatory reported data. This is partly due to the catchment based summation of some data and minor differences in time frames over which DWMP data has been collated compared to the Regulatory reporting time frames.

**Contact details**

If you have any queries or questions, you can email dwmp@southwestwater.co.uk.

South West Water, Peninsula House, Rydon Lane, Exeter, EX2 7HR

www.southwestwater.co.uk

## Overview

### Area Details

The Dart catchment sits within the administrative districts of South Hams District, Teignbridge District, Torbay (b) and West Devon District (b). It covers the main settlements of Totnes, Ashburton, Paignton, Dartmouth, Buckfastleigh, Ipplepen, Brixham, Dartington, Collaton St Mary, Stoke Gabriel, Kingswear, Princetown, Broadhempston, Buckfast, Harbertonford, Dittisham, Marldon, Postbridge, Denbury, Cornworthy, Staverton, Holne, Littlehempston, Ashprington, Harberton, Rattery, Tuckenhay, Warfleet, Lower Blagdon and Berry Pomeroy.

The population of the Dart catchment in 2020 was 30,377 and is projected to grow to 34,986 by 2050, an increase of 15.2 %. The catchment is also impacted by the influx of tourists during the summer, with an increase of 6,353 or 20.9 % over the existing resident population.

The Dart catchment contains 32 km of watercourses including 22 km of Main River as designated by the Environment Agency (EA). This includes the Beaston Brook, Bidwell Brook, Blackbrook River, Bow Creek, Dean Burn, Devonport Leat, East Webburn River, Harbourne River, Holy Brook, Malt Mill Lake, River Ashburn, River Dart, River Hems, River Mardle, River Wash and West Webburn River.

Discharges in the Dart catchment may impact on the bathing waters of Dartmouth Castle and Sugary Cove and the shellfish waters of Dart.

Details about local geology and soil structure can be found on the **British Geological Survey** website.

### Wastewater Network

The Dart catchment area has approximately 293km of mapped sewers and 16 sewage pumping stations (SPS) to convey wastewater away from homes and businesses to 31 Sewage Treatment Works. It has both separate (foul or surface water) and combined (foul and surface water) networks.

During severe rainfall events, where sewers convey foul and storm water, sewer capacity can be exceeded and to prevent flooding of homes and businesses, storm overflows act as built-in pressure relief valves and allow flows above a certain level to be discharged to rivers and seas. Storm overflows are permitted by the EA.

There are 68 overflows of which 12 are emergency overflows in the Dart catchment (which should only operate as a result of other asset failure or power loss). There are 68 Event Duration Monitors (EDM's) installed to monitor spill frequency and spill duration.

A summary of the mapped wastewater network lengths is included in Table 1 below:

***Table 1**: Wastewater network lengths by system type*

| Sewer Type | Length (km) |
|---|---|

| Sewer Type | Length (km) |
|---|---|
| Combined | 202.6 |
| Surface | 53.2 |
| Foul | 36.8 |

## Area Overview

Table 2 summarises the number of critical assets within the Dart catchment and a count of intersections with shellfisheries and bathing waters. The Level 3 (treatment works) catchments and neighbouring areas are shown in Figure 1.

***Table 2**: Count of key catchment environments/assets*

| Shellfisheries | Bathing Waters | SPS | Storm Overflows | Emergency Overflows | Monitored Storm Overflows |
|---|---|---|---|---|---|
| 1 | 1 | 16 | 56 | 12 | 68 |

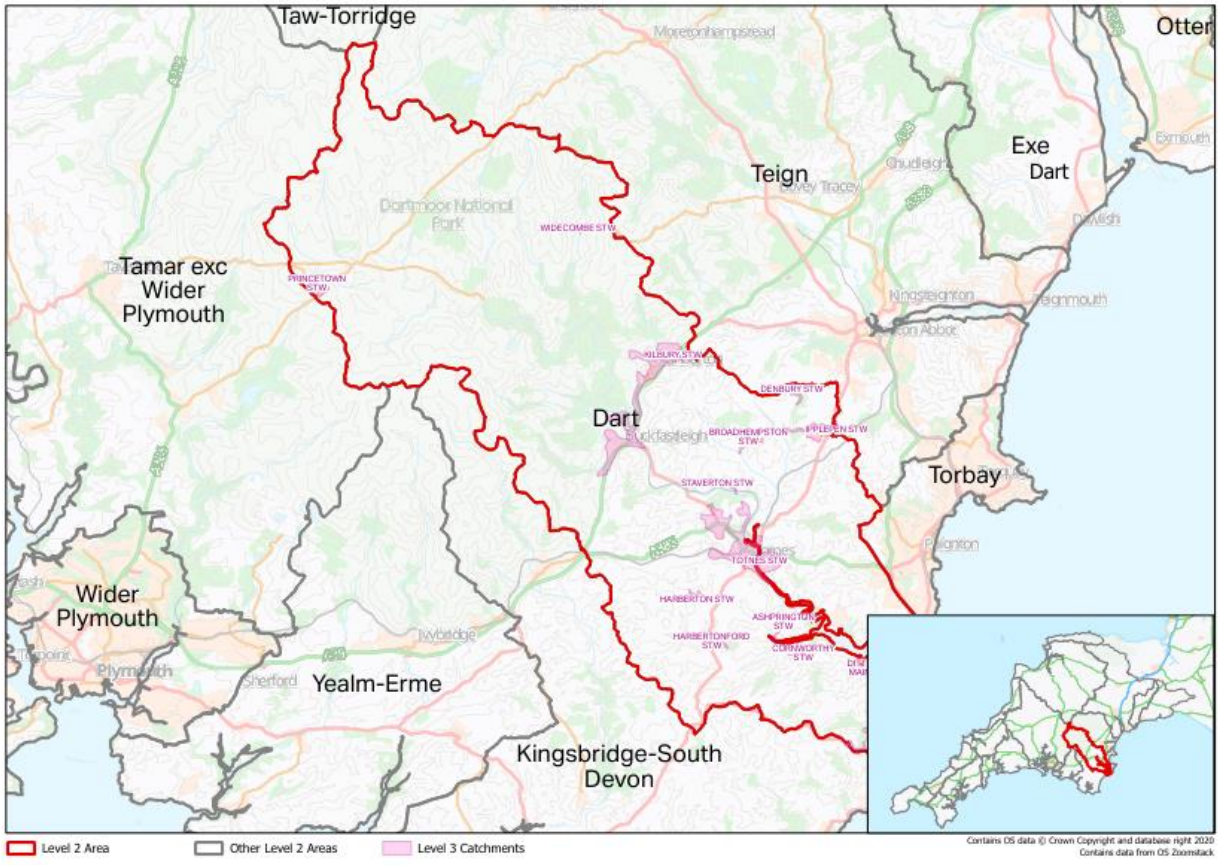


*Figure 1: Catchment Overview*

## Designated Areas

*Special Areas of Conservation*

Special Areas of Conservation (SACs) are protected areas in the UK designated under:

- the Conservation of Habitats and Species Regulations 2017 (as amended) in England and Wales (including the adjacent territorial sea) and to a limited extent in Scotland (reserved matters) and Northern Ireland (excepted matters)
- the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended) in the UK offshore area.

Under these regulations, the UK Government and devolved administrations are required to establish a network of important high-quality conservation sites that will make a significant contribution to conserving the habitats and species identified in Annexes I and II, respectively, of European Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, known as the Habitats Directive.

*Special Areas of Scientific Interest*

Under the Wildlife and Countryside Act 1981 (amended 1985) government has a duty to notify as a Site of Special Scientific Interest (SSSI) any land which in its opinion is of special interest by reason of any of its flora, fauna, geological or physiographical features.

SSSIs are designated by Natural England. An SSSI is not necessarily owned by a conservation organisation or by the Government - in fact, they can be owned by anybody. The designation is primarily to identify those areas worthy of preservation. A SSSI is given certain protection against damaging operations, and any such operations must be authorised by the designating body. The status also affords a certain amount of planning protection, depending on the reasons for designation.

*Marine Conservation Zones*

A Marine Conservation Zone (MCZ) is a type of marine nature reserve in UK waters. They were established under the Marine and Coastal Access Act (2009) and are areas designated with the aim to protect nationally important, rare or threatened habitats and species.

If any of these designated areas are within the Dart catchment they are shown in Figure 2 below.

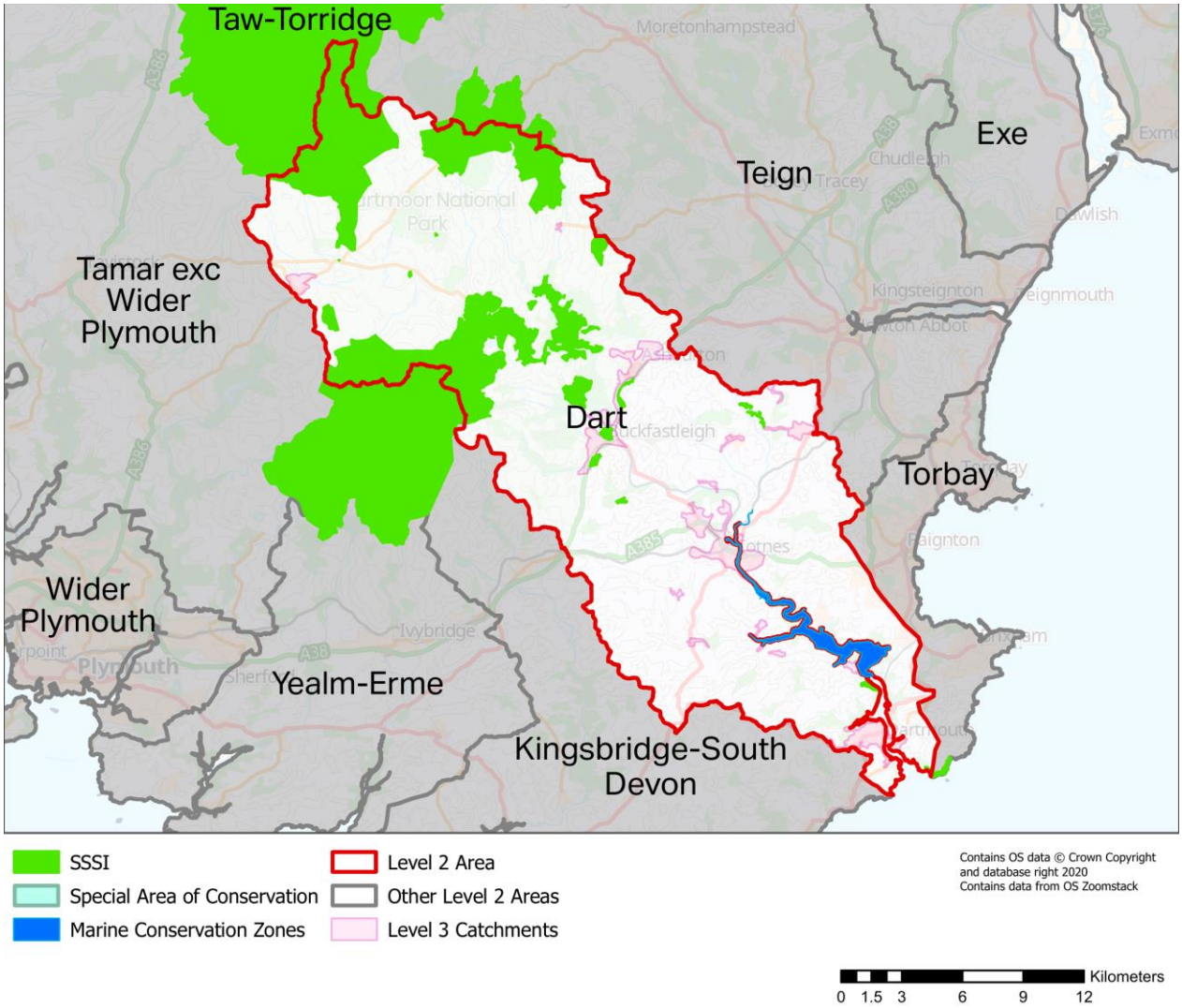


*Figure 2: Designated Areas*

## Flooding Responsibilities

The Flood and Water Management Act, 2010 (FWMA), identified new responsibilities for flood and coastal erosion risk management authorities, of which Water and Sewerage Companies are one, together with a duty on all relevant authorities involved to co-operate and share data.

***Table 3**: FWMA Responsibilities*

| Location | Description | Responsibility |
|---|---|---|
| Surface runoff/Land drainage | Landowners are responsible for their land drainage and must not cause problems for neighbours | • Lead Local Flood Authorities |
| | | • Landowners |
| Highways | Highways Surface water on roads, highways and pavements, blocked road drains/gullies and overgrown verges | • Highways Authorities |
| | | • Highways England/Welsh Government |
| | | • Transport for London |
| Groundwater | Waterlogged ground when water pools on the surface | • Lead Local Flood Authorities |
| | | • Landowners |
| Rivers and watercourses | Water draining into rivers and streams from nearby land | • Lead Local Flood Authorities |
| | | • Environment Agency /Natural Resources Wales |
| | | • Riparian Owners |
| | | • Landowners |
| Coastal/Tidal | Rough seas, high tides or storm inundation on lower land | • Local Authorities |
| | | • Environment Agency |
| | | • Natural Resources Wales |
| Surface water sewers | Most properties drain rainfall to a public sewer, including flows from gutters/roads that end up in public sewers. Highway drainage is provided for rainfall onto the highway but also includes water from fields/other property that finds its way onto the highway | • Water and wastewater companies |
| | | • Local Authorities |
| | | • Housing Associations |
| | | • Private landowners |
| | | • Highway Authorities |
| Public sewers | Sewer flooding from manholes and covers | • Water and wastewater companies |
| Private sewers | Flooding from cesspits/septic tanks, toilets or internal drains | • Homeowners |

South West Water needs clear long-term plans in order to engage with other Risk Management Authorities (RMAs) to produce joined-up approaches and deliver the best outcomes for customers and the environment.

## Current Performance

For all performance measures, the average number of events in a catchment/ Special Protection Area (SPA), is calculated from performance data and normalised to sewer length, (e.g., floodings/km of sewer). This catchment average is then compared to the average number of events across all SPAs and, using the Jenks Natural Breaks Classification System, catchments are defined as average, above average or below average.

### Sewer Flooding

Sewer flooding incidents may occur for a number of reasons, including network misuse, asset deterioration, asset failures (collectively referred to as "other causes") or hydraulic incapacity. Tables 4 and 5 provide a summary of internal and external flooding events respectively. Sewer flooding event locations are shown in Figure 3.

The rate (events/km) of internal sewer flooding in the Dart catchment is above average when compared to other Level 2 catchments.

***Table 4**: Count of Internal Flooding by location and cause*

| Year | Flooding Location | Flooding Cause Category | Count/km |
|---|---|---|---|
| 2019 | Internal | Other | 5 |
| 2020 | Internal | Other | 4 |
| 2021 | Internal | Other | 6 |
| 2022 | Internal | Other | 3 |

The rate (events/km) of external sewer flooding in the Dart catchment is above average when compared to other Level 2 catchments.

***Table 5**: Count of External Flooding by location and cause*

| Year | Flooding Location | Flooding Cause Category | Count/km |
|---|---|---|---|
| 2019 | External | Hydraulic Overload | 1 |
| 2019 | External | Other | 38 |
| 2020 | External | Hydraulic Overload | 3 |
| 2020 | External | Other | 34 |
| 2021 | External | Hydraulic Overload | 4 |
| 2021 | External | Other | 23 |
| 2022 | External | Hydraulic Overload | 3 |
| 2022 | External | Other | 29 |

| Year | Flooding Location | Flooding Cause Category | Count/km |
|---|---|---|---|
| 2023 | External | Hydraulic Overload | 5 |
| 2023 | External | Other | 44 |

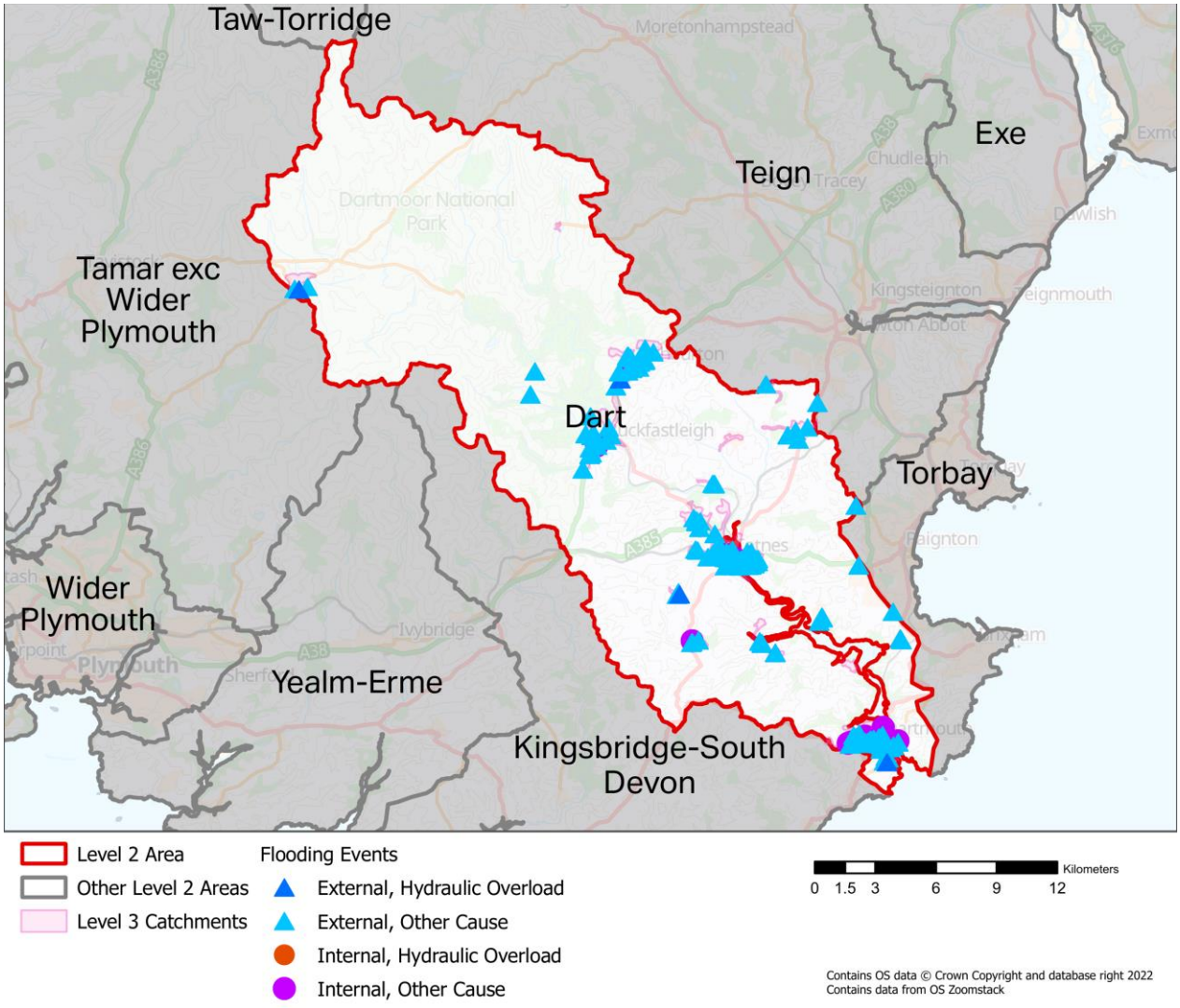


*Figure 3: Sewer Flooding by location and cause*

An assessment of future flooding risk has been carried out; the modelling approach is described further through this document in Table 22 (Future Flood Risk column).

## Storm Overflows

Hydraulic overload is when the network cannot convey the runoff from heavy rainfall and can lead to sewer flooding and spills from overflows. It can be exacerbated by groundwater and surface water entering the sewerage system.

Figure 4 shows the approximate locations of all overflows. South West Water has a programme to monitor the current use and performance of storm overflows and 100% of the overflows are currently monitored. Table 6 below provides a summary of any available performance data for storm overflows in the catchment.

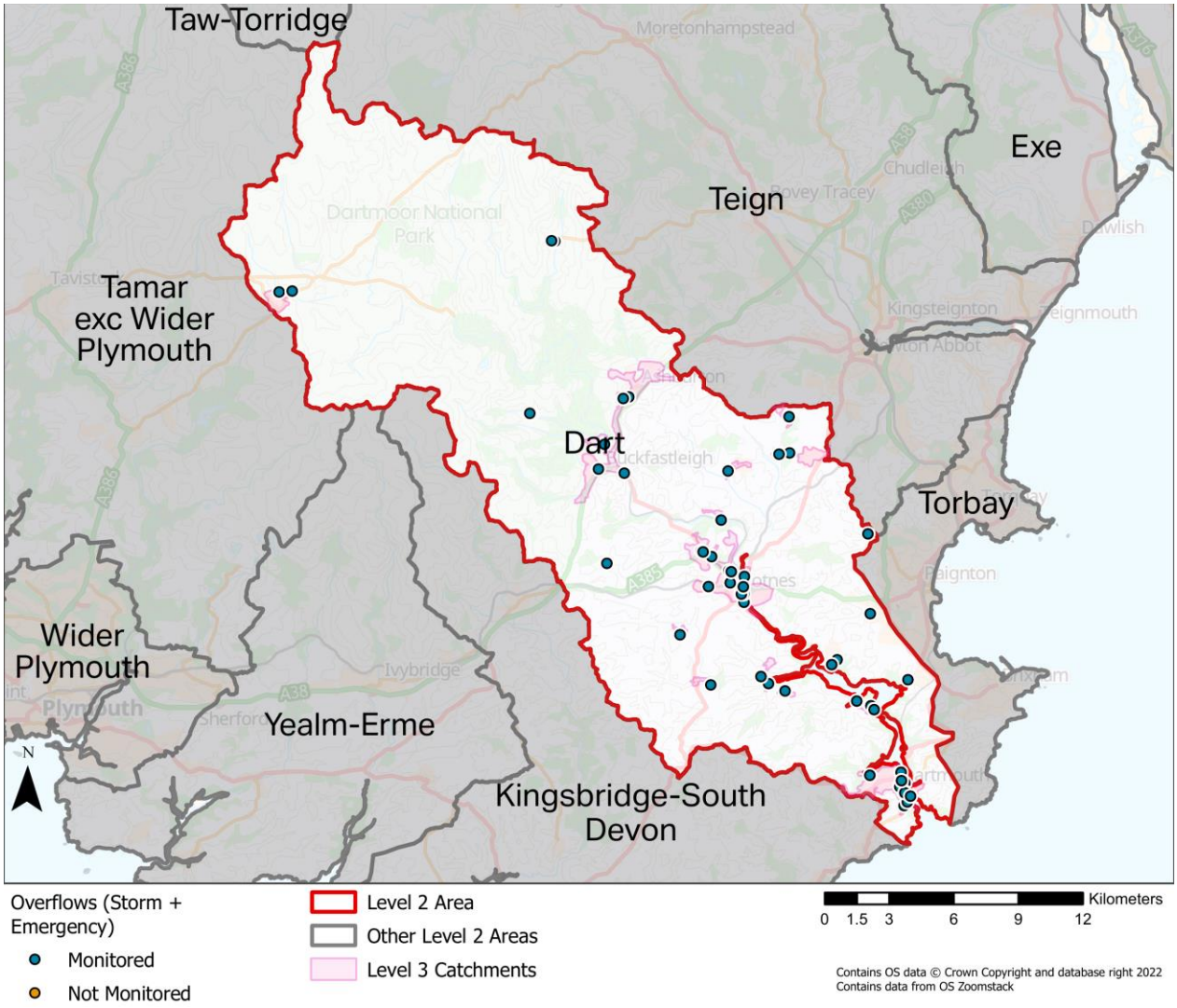


*Figure 4: Overflow locations by monitoring status*

***Table 6**: Storm Overflow Performance Summary*

| Year | 2019 | 2020 | 2021 |
|---|---|---|---|
| No. Monitored | 41 | 41 | 46 |
| No. Spills | 1741 | 2505 | 2979 |

## Blockages

Blockages are caused by a variety of items, materials, substances and vegetation entering the network. In the case of vegetation, this may be root ingress from trees/shrubs that enter through damaged areas and joints. In other cases, silt and debris may be washed in through the surface water network and items such as wet wipes, fat or grease may be flushed into the network directly from homes and businesses.

Misuse of the network continues to be a significant issue across the region. Network misuse is defined as flushing anything other than the three Ps (Pee, Poo and toilet Paper) down

toilets. Wet wipes, nappies and sanitary products should not be flushed regardless of their labelling. Fats, oils and grease should not be poured down sinks in the kitchen as these can congeal in and eventually block the sewer (known as a 'Fatberg'). Sewer misuse can lead to blockages which can cause sewer flooding and pollution.

South West Water has a number of community based education programmes including **Love your Loo** and **Think Sink!** That aim to prevent sewer misuse and reduce associated sewer flooding problems.

The rate of blockages in the Dart catchment is NA when compared to other catchments in South West Water area. Blockages since the 2018/19 reporting year are shown below in Table 7 (split by the blockage cause code) and the locations indicated by the heat map in Figure 5. Please contact us if you require additional information on blockages in the Dart catchment.

***Table 7**: Count of blockages by year and cause*

| Year | Debris | Fat | Paper/Rag | Roots | Silt |
|---|---|---|---|---|---|
| 2019 | 45 | 24 | 88 | 16 | 4 |
| 2020 | 43 | 12 | 77 | 21 | 3 |
| 2021 | 27 | 24 | 79 | 13 | 5 |
| 2022 | 24 | 18 | 110 | 17 | 2 |
| 2023 | 18 | 32 | 144 | 12 | 6 |

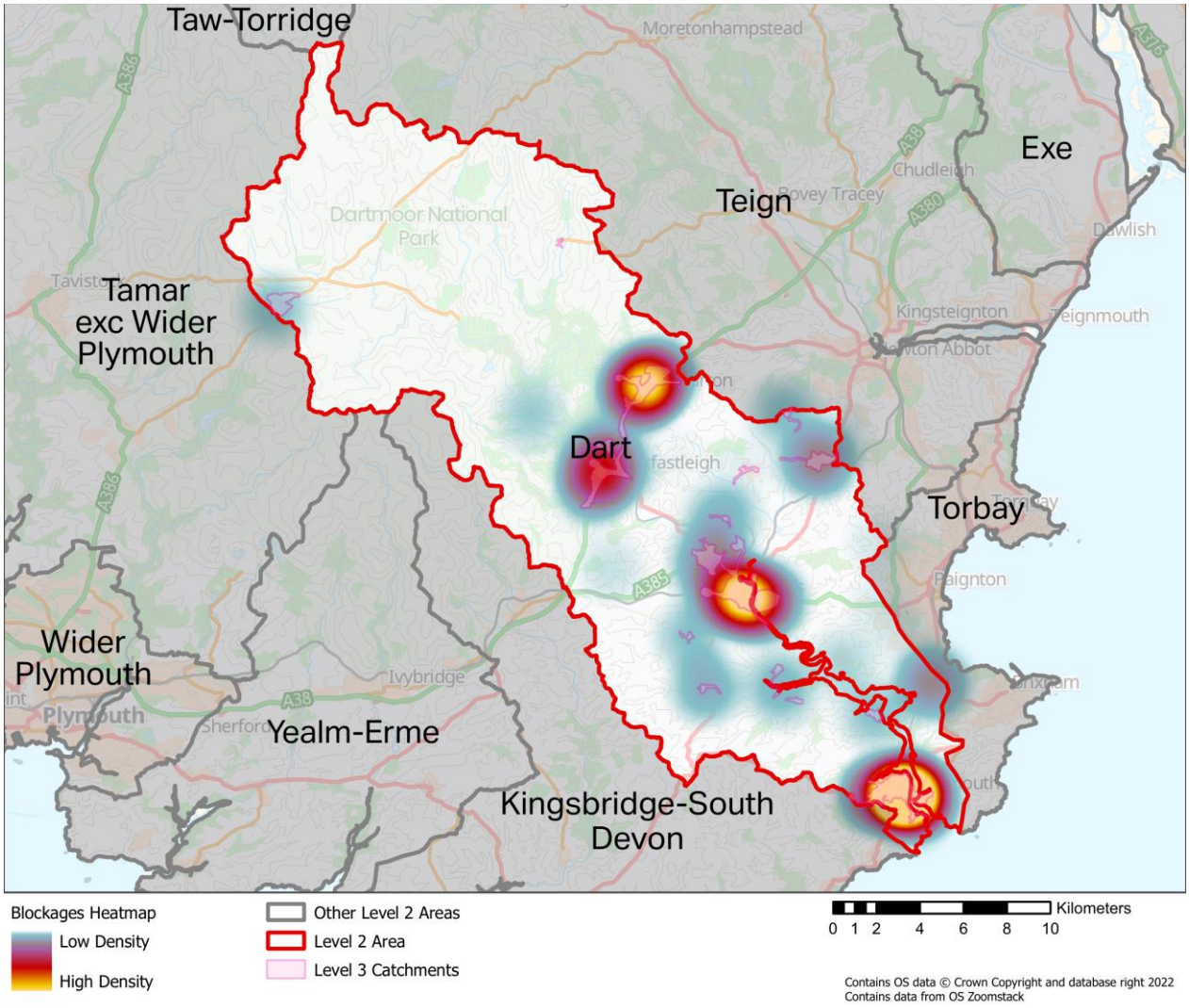


*Figure 5: Blockage Event Heatmap*

## Asset Condition

### Gravity Network

A programme of CCTV inspections is undertaken to determine the structural condition of sewers. A risk-based approach is applied, considering frequency of failure and consequence of failure. The sewers in most need of attention due to their condition are prioritised for more frequent inspection or rehabilitation.

The rate of collapses in the Dart catchment is average when compared to other catchments in the region. A heatmap of sewer collapses since the 2018/19 reporting year is shown in Figure 6 below. Table 8 provides a count of collapse and partial collapse events since the 2018/19 reporting year.

***Table 8**: Count of sewer collapse by year*

| Year | Collapse | Partial Collapse |
|---|---|---|

| Year | Collapse | Partial Collapse |
|---|---|---|
| 2019 | 0 | 2 |
| 2020 | 1 | 1 |
| 2022 | 1 | 1 |

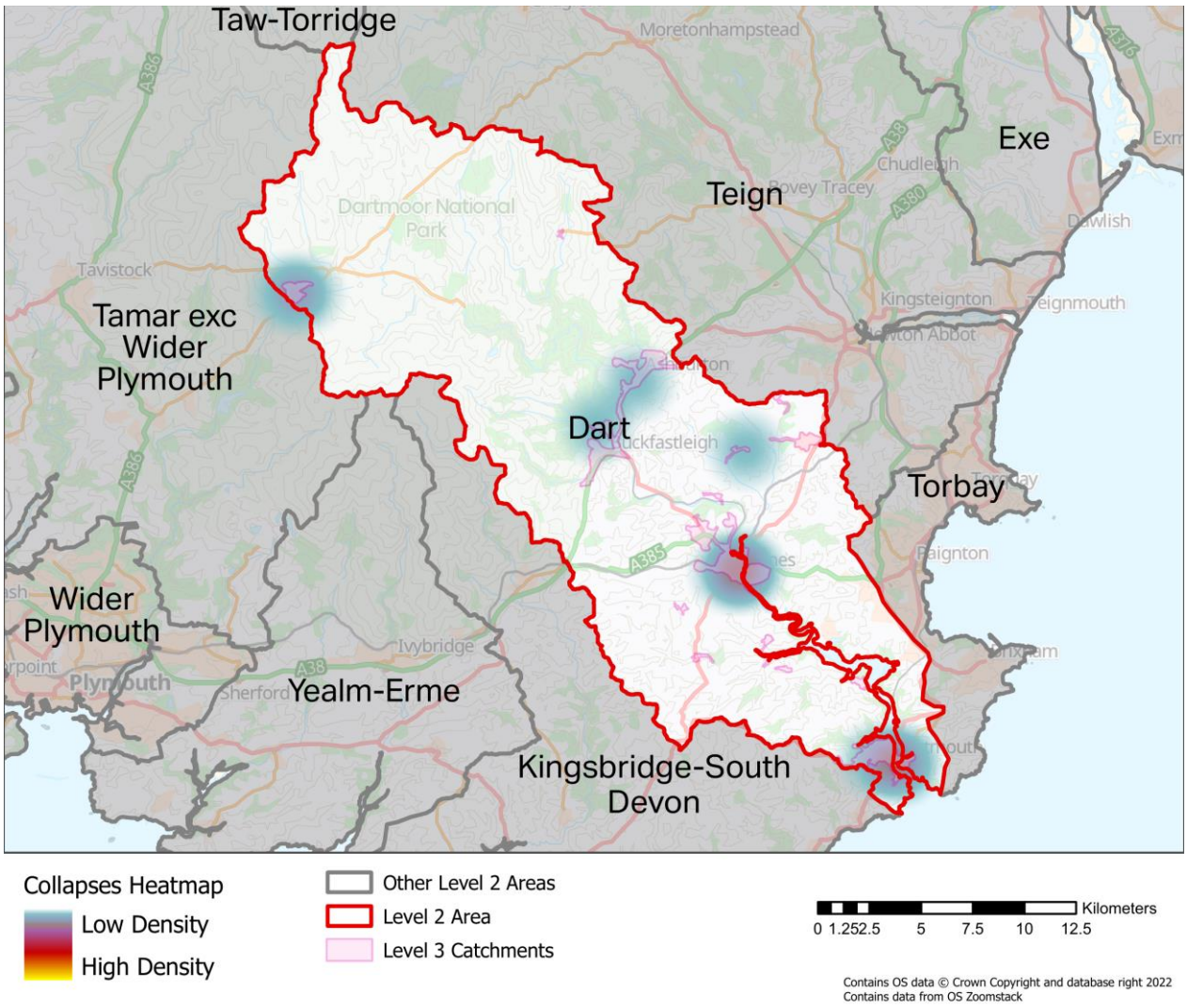


*Figure 6: Sewer Collapse Heatmap*

## Pumped Network (Rising Mains)

South West Water continuously invests in sewage pumping stations (SPS) and rising mains. Rising main failures are repaired promptly by reactive teams, and if repeat failures are experienced or immediate works are identified, they are prioritised for replacement.

There have been 5 rising main bursts as shown in Table 9 and no flooding caused by issues at sewer pumping stations (Table 10) since the 2018/19 reporting year.

***Table 9**: Count of SPS flooding by year/cause*

| Year | Feedback Cause | Count |
|---|---|---|
| 2019 | Pump Station Breakdown | 1 |
| 2020 | Pump Station Breakdown | 1 |
| 2021 | Hydraulic Overload Pumping Station | 3 |

***Table 10**: Count of Rising Main bursts by year/cause*

| Year | Feedback Cause | Count |
|---|---|---|
| | | 0 |

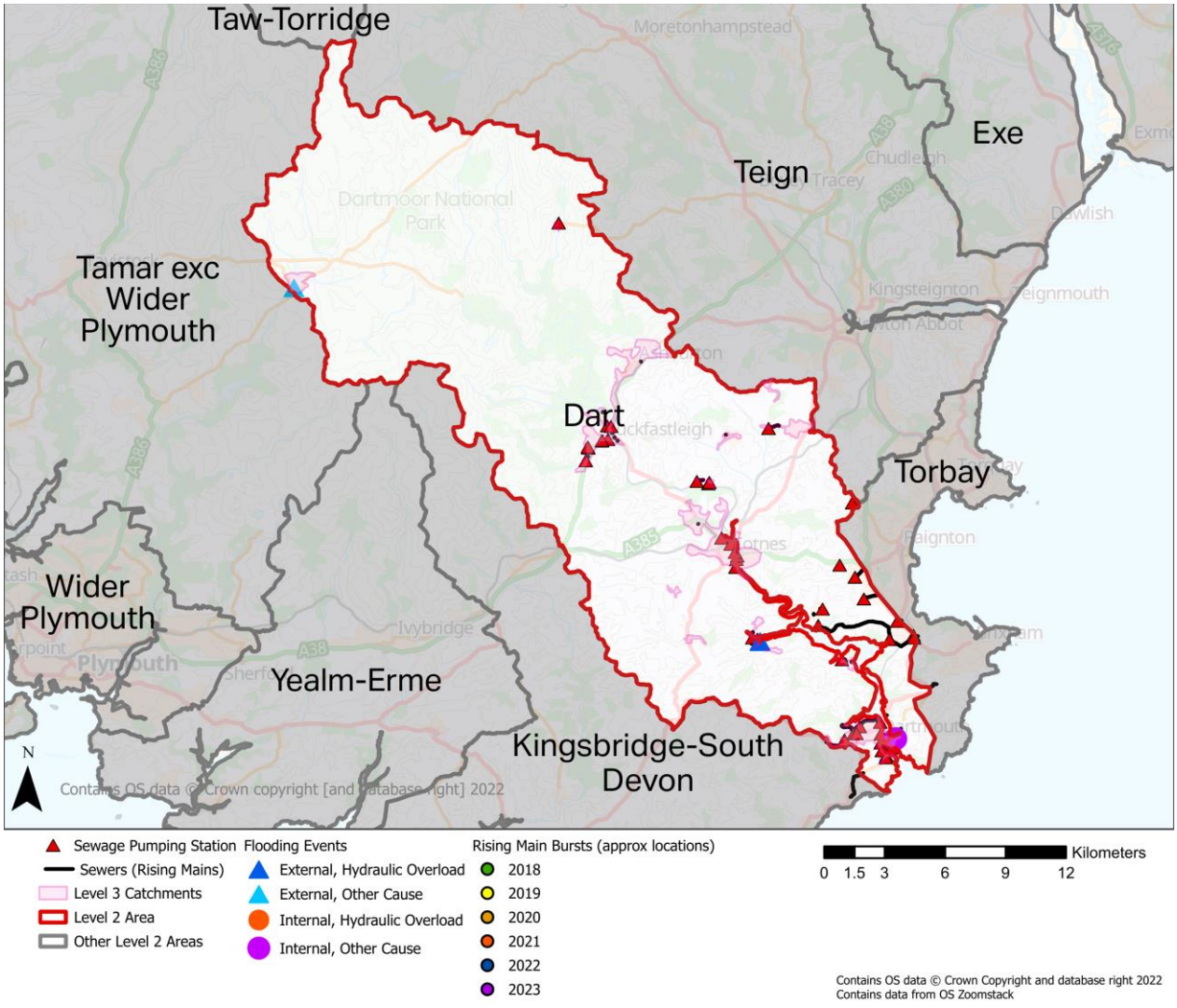


*Figure 7: SPS/Rising Main flooding and burst events*

## Environmental Performance

### Surface Water Flooding

South West Water is only responsible for sewer flooding. Areas prone to surface water flooding (due to rainfall and pooling at low points in the landscape) can be seen on the EA website. The responsibilities for other types of drainage and flooding are summarised in Table 3 earlier in this document.

### Pollution

South West Water is continuing to strive to eliminate harmful pollution to the environment. This includes there being no Category 1 and 2 (the most harmful) pollution incidents. South West Water's vision for Environmental performance can be found on the website here.

There have been 21 category 3 (minor) pollution incidents in the Dart catchment since the 2018/19 reporting year.

Table 11 provides a summary of pollution events by year and the category of environmental impact. The map in Figure 8 shows the location of pollution events. Clusters of pollution events are identified for further investigations and activities to reduce and/or remove the future risk of pollution events occurring.

***Table 11**: Count of pollution events by year and impact level*

| Year | Water Env Category Level | Count |
|---|---|---|
| 2019 | 3 | 6 |
| 2020 | 3 | 6 |
| 2021 | 3 | 3 |
| 2022 | 3 | 6 |

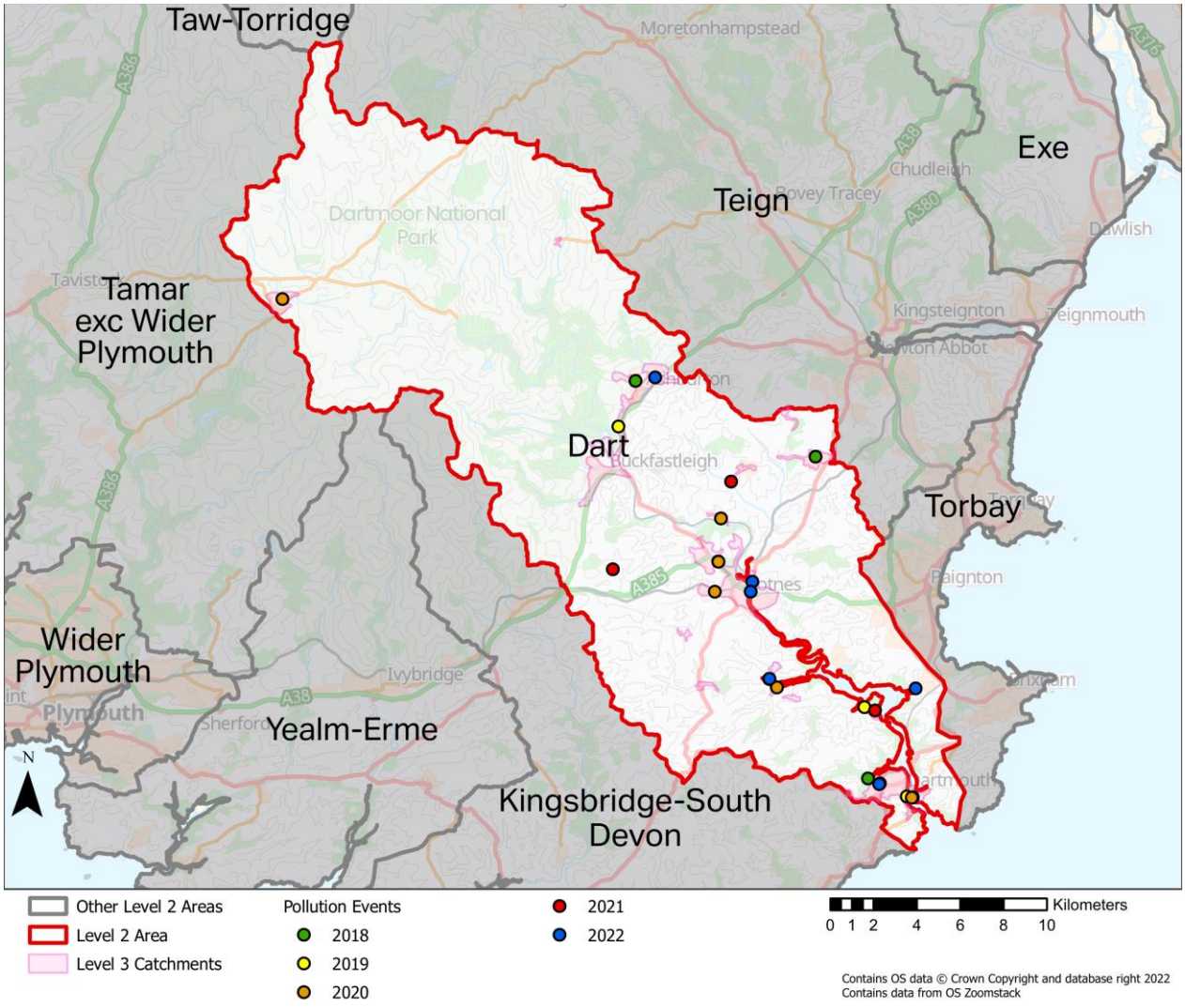


*Figure 8: Pollution Events*

## Critical Drainage Areas

A Critical Drainage Area (CDA) is an area with critical drainage problems, which has been formally notified to the Local Authority by the Environment Agency. Within CDAs, proposed development may present risks of flooding on-site and/or off-site if the surface water runoff is not effectively managed.

The purpose of creating the CDA allocation is to reduce downstream flooding by controlling the accumulative impact of surface water runoff from multiple development sites in sensitive catchment areas. This means that any site discharging surface water to a watercourse or public sewer must attenuate the flow to mimic the green field runoff for a 1:10 year rain fall event. Where the surface water can be managed within the site for the "1:100+40%" condition (i.e., an allowance of 40% over and above the 1:100 event), there is no change to the standard surface water drainage requirement.

The Development Management Procedure Order requires that the EA is consulted on developments within Areas with Critical Drainage Problems (ACDPs). The map in Figure 9 shows the geographical coverage of ACDPs in the Dart catchment.

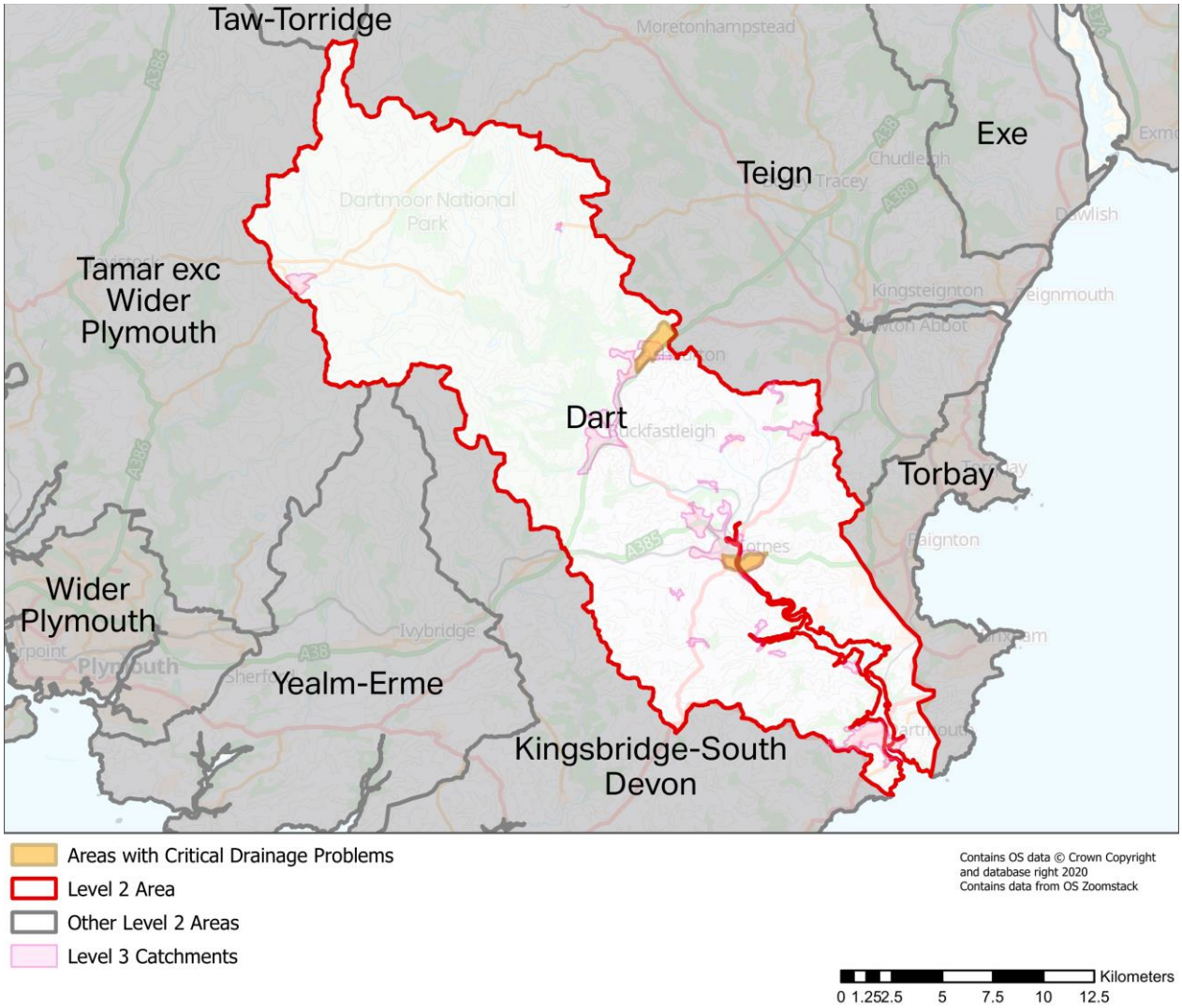


*Figure 9: Critical Drainage Areas*

## Wastewater Treatment Compliance

Each Wastewater Treatment Works has a permit, as agreed with the EA, for the quantity and quality of the water that is discharged to the environment.

The Dart catchment has not failed any quality compliance metrics since the 2018/19 reporting year. Table 12 illustrates that there are no compliance failures.

***Table 12**: Wastewater Treatment compliance failures*

| Asset Name | Year | Q90 (m3/d) | Permitted DWF (m3/d) |
|---|---|---|---|

Table 13 shows the Dry weather flow (DWF) performance of the treatment works in the Dart catchment.

***Table 13**: Dry weather flow results and permits from 2018-2020*

| Asset Name | Permitted (m3/d) | Comments |
|---|---|---|
| ASHPRINGTON_STW_ASHPRINGTON | 181 | Spare capacity available |
| BROADHEMPSTON_STW_BROADHEMPSTON | 75 | Spare capacity available |
| CORNWORTHY_STW_DARTMOUTH | 56 | Spare capacity available |
| DARTMOUTH_STW_DARTMOUTH | 4,644 | Spare capacity available |
| DENBURY_STW_DENBURY | 190 | Spare capacity available |
| DITTISHAM MAIN_STW_DITTISHAM | 66 | Spare capacity available |
| HARBERTONFORD_STW_HARBERTONFORD | 242 | Spare capacity available |
| HARBERTON_STW_HARBERTON | 150 | Spare capacity available |
| IPPLEPEN_STW_IPPLEPEN | 475 | Spare capacity available |
| KILBURY_STW_BUCKFASTLEIGH | 3,165 | Spare capacity available |
| PRINCETOWN_STW_PRINCETOWN | 1,023 | Spare capacity available |
| STAVERTON_STW_STAVERTON | 115 | Spare capacity available |
| TOTNES_STW_TOTNES | 3,967 | Approaching design capacity |

## Water Quality

When untreated/partially treated wastewater is discharged to a watercourse it may have potential to affect the downstream environment including river and coastal areas. This will be dependent on the duration of any discharge and the dilution offered by the receiving watercourse. This discharge could be from blockages in the sewerage network, wastewater spills or leaks, from misconnections (when wastewater from households is incorrectly connected to the surface water sewer) or from storm overflows. The EA has overall responsibility for water quality in water courses, although South West Water work in partnership to reduce and remove possible sources of pollution.

Our dedicated Upstream Thinking (UST) team engages with farmers and landowners to make changes in how land is managed, ensuring our drinking water sources are protected

from diffuse pollution. Starting on the high moorlands and focusing on the land next to rivers, we collaborate to make water management plans that protect streams and rivers while keeping farms productive.

The EA assesses why waterbodies do not achieve a "good" status. Table 14 below provides a summary of the significant water management issues and the associated activities identified as part of the analysis for the Dart catchment.

***Table 14**: Reasons for not achieving 'Good' water quality status*

| Significant water management issue (SWMI) | Activity | Count |
|---|---|---|
| Changes to the natural flow and levels of water | Surface water abstraction | 4 |
| Physical modifications | Other (not in list, must add details in comments) | 1 |
| | Reservoir / Impoundment - non flow related | 1 |
| Pollution from rural areas | Poor Livestock Management | 6 |
| | Poor nutrient management | 4 |
| | Poor soil management | 4 |
| Pollution from towns, cities and transport | Contaminated land | 1 |
| Pollution from wastewater | Discharge | 5 |
| | Atmospheric deposition | 1 |
| | Internal nutrient load (lakes only) | 1 |
| | Natural conditions - other | 4 |
| | Not applicable | 3 |
| | Other (not in list, must add details in comments) | 2 |

## Future challenges in the catchment

### Growth

New developments can cause an increase in the volume of wastewater requiring conveyance and treatment. Improvements to the foul sewerage system to support new development will be assessed by South West Water's New Developments Team and infrastructure charges paid by new developments will fund required upgrades to ensure sewer flooding risk is not increased. There are multiple sources of growth information for the region.

To understand where development and specific areas of growth can be expected, the local plans as published by the Local Planning Authority (LPA) are a reasonable source of information.

The LPA polygons showing areas earmarked for development can be found in Figure 10 at the end of this section.

### Climate Change and Urban Creep

Climate change is likely to increase the intensity of rainfall leading to higher risk of flooding in the future; however, the magnitude and timing of this change is highly uncertain.

The potential increase in rainfall intensity could inundate the combined sewer networks and cause surface water and sewer flooding. Changing patterns of summer storms could affect the frequency and volume of spills from storm overflows and consequently impact on the river and bathing water quality downstream.

Urban creep can also pose a challenge for managing South West Water's drainage and wastewater networks. Urban creep occurs when minor extensions to homes are built or when existing permeable areas e.g., gardens are paved over to provide patios or for car parking. The result is an overall increase in impermeable area contributing directly to fast runoff to the urban drainage system and consequent increase in the risk of flooding

### Future Challenges

34 potential development locations are recorded for this catchment. Table 15 summarises the different types of development planned in the catchment and Figure 10 shows the location and extent of land proposed for development that have been identified in local development plans at the time of writing. Please refer to the local authorities Local Plan for the most current information.

***Table 15**: Summary of Proposed Developments*

| Development Type | Number in Catchment |
|---|---|
| Care Home / Assisted Living | 2 |
| Hotel | 1 |
| Housing Development | 34 |

| Development Type | Number in Catchment |
|---|---|
| Mixed Use Development | 13 |

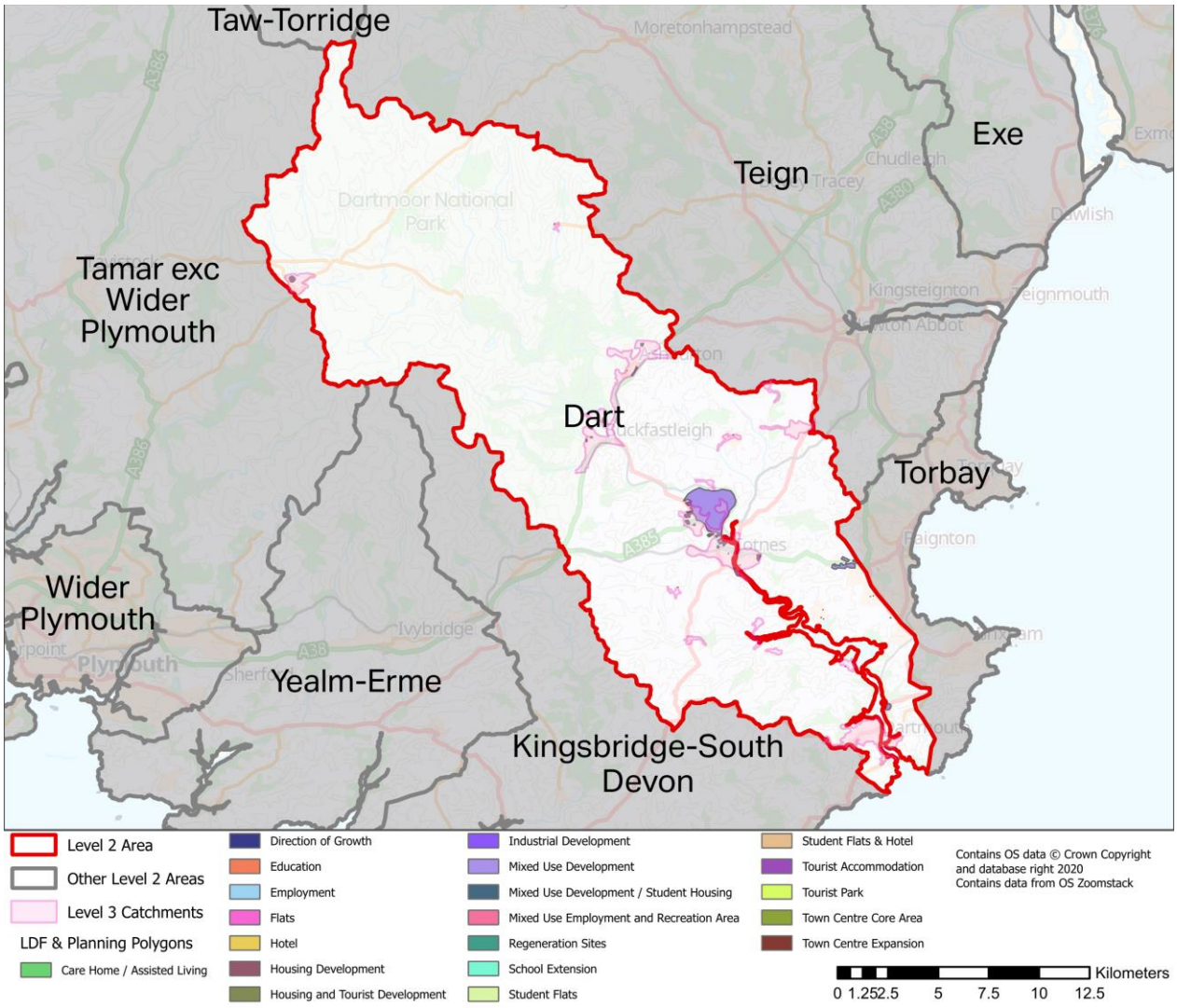


*Figure 10: Local Development Framework Areas*

## Catchment Strategy

### Partnership Working

South West Water is working in partnership with multiple organisations including the EA, local authorities and other stakeholders such as landowners, local residents and community groups. The purpose of this work is to understand the causes of drainage and wastewater issues and to progress joint projects to resolve them where appropriate. For example, partnership working opportunities may exist where properties are located within recognised flood zones (FZ2, FZ3 and/or Surface Water) which can be found here.

## Investment Routes

### Reactive Investment

Reactive investment needs are identified via investigations following reactive response to operational/customer issues and planned surveys that are targeted to detect and resolve problems before they have an impact on customers and the environment.

The investment needs are prioritised based on the risk to properties and the identification of repeat events. These needs then form a programme of targeted investments for delivery over the next 12 months. Details for any needs recorded for the Dart catchment are summarised in Table 16.

Twelve investment needs are recorded for this catchment. Locations are shown in Figure 11.

***Table 16**: Summary of Reactive Investment Opportunities*

| | Capital Maintenance | Enhanced Service Levels | Total |
|---|---|---|---|
| **Completed** | 2 | 1 | 3 |
| **Confirm Scope** | 6 | | 6 |
| **Investment Initialisation** | 1 | | 1 |
| **Programmed** | 2 | | 2 |
| **Total** | 11 | 1 | 12 |

## WINEP Investment

The Water Industry National Environment Programme (WINEP) is the programme of work where water companies work collaboratively with Environmental regulators and other stakeholders to investigate, identify and agree investment needs to deliver specific environmental improvements. Water companies in England then undertake to deliver this to meet their obligations from environmental legislation and UK government policy. The tables below indicate the WINEP investigation and implementation schemes for the Dart catchment if present, with locations are shown in Figure 11.

There are currently 11 investigations planned in this catchment, as shown in Table 17.

***Table 17**: WINEP Investigations*

| WINEP ID | Name of Waterbody | Waterbody Type | Driver Code | Planned Completion Date | Investigations Scope | Additional Comments |
|---|---|---|---|---|---|---|
| DCS00042 | DART | River | U_INV2 | 2022-03-31 | n/a | U_INV2 Investigation required as to suitability of existing inlet or outlet monitor to measure PFF. |
| DCS00173 | Hems - Upper | River | U_INV2 | 2022-03-31 | n/a | U_INV2 Investigation required as to suitability of existing inlet or outlet monitor to measure PFF. |
| DCS00322 | Dart | River | U_INV2 | 2022-03-31 | n/a | U_INV2 Investigation required as to suitability of existing inlet or outlet monitor to measure PFF. |
| DCS00359 | Am brook | River | U_INV2 | 2022-03-31 | n/a | U_INV2 Investigation required as to suitability of existing inlet or outlet monitor |

| WINEP ID | Name of Waterbody | Waterbody Type | Driver Code | Planned Completion Date | Investigations Scope | Additional Comments |
|---|---|---|---|---|---|---|
| | | | | | | to measure PFF. |
| DCS00364 | Dart (Tidal) | River | U_INV2 | 2022-03-31 | n/a | U_INV2 Investigation required as to suitability of existing inlet or outlet monitor to measure PFF. |
| DCS00523 | Harbourne River | River | U_INV2 | 2022-03-31 | n/a | U_INV2 Investigation required as to suitability of existing inlet or outlet monitor to measure PFF. |
| DCS00527 | Harbourne River | River | U_INV2 | 2022-03-31 | n/a | U_INV2 Investigation required as to suitability of existing inlet or outlet monitor to measure PFF. |
| DCS00609 | Am Brook | River | U_INV2 | 2022-03-31 | n/a | U_INV2 Investigation required as to suitability of existing inlet or outlet monitor to measure PFF. |
| DCS00625 | Dart | River | NERC_INV1 | 2022-03-31 | Investigate opportunities to restore or create new habitat to help achieve flood resilience at these SWW assets identified as part of the SWW flood resilience review. Investigation should identify opportunities for multiple benefits including natural flood management, habitat creation and biodiversity gains. | Investigation of Natural Flood Management in the catchment. Agreed With SWW. |
| DCS01146 | Dart | River | U_INV2 | 2022-03-31 | n/a | U_INV2 Investigation required as to |

| WINEP ID | Name of Waterbody | Waterbody Type | Driver Code | Planned Completion Date | Investigations Scope | Additional Comments |
|---|---|---|---|---|---|---|
| | | | | | | suitability of existing inlet or outlet monitor to measure PFF. |
| EDM00541 | Dart | Transitional | U_INV | 2024-03-31 | Undertake full investigation following the Storm Overflow Assessment Framework to Stage 4 (Decision), including Environmental Impact Assessment and Cost Benefit Assessment of Options to determine an agreed (between WaSC and Environment Agency) outcome (Need for spill reduction scheme and detail of that scheme). | n/a |

There are currently 3 implementations planned in this catchment, as shown in Table 18.

***Table 18**: WINEP Implementations*

| WINEP ID | Name of Waterbody | Waterbody Type | Driver Code | Planned Completion Date | Implementation Scope | Additional Comments |
|---|---|---|---|---|---|---|
| DCS00174 | Hems - Upper | River | U_IMP6 | 2023-03-31 | n/a | n/a |
| DCS00323 | Dart | River | U_IMP6 | 2023-03-31 | n/a | n/a |
| DCS00960 | Blackbrook River | River | U_IMP5 | 2024-03-31 | n/a | n/a |

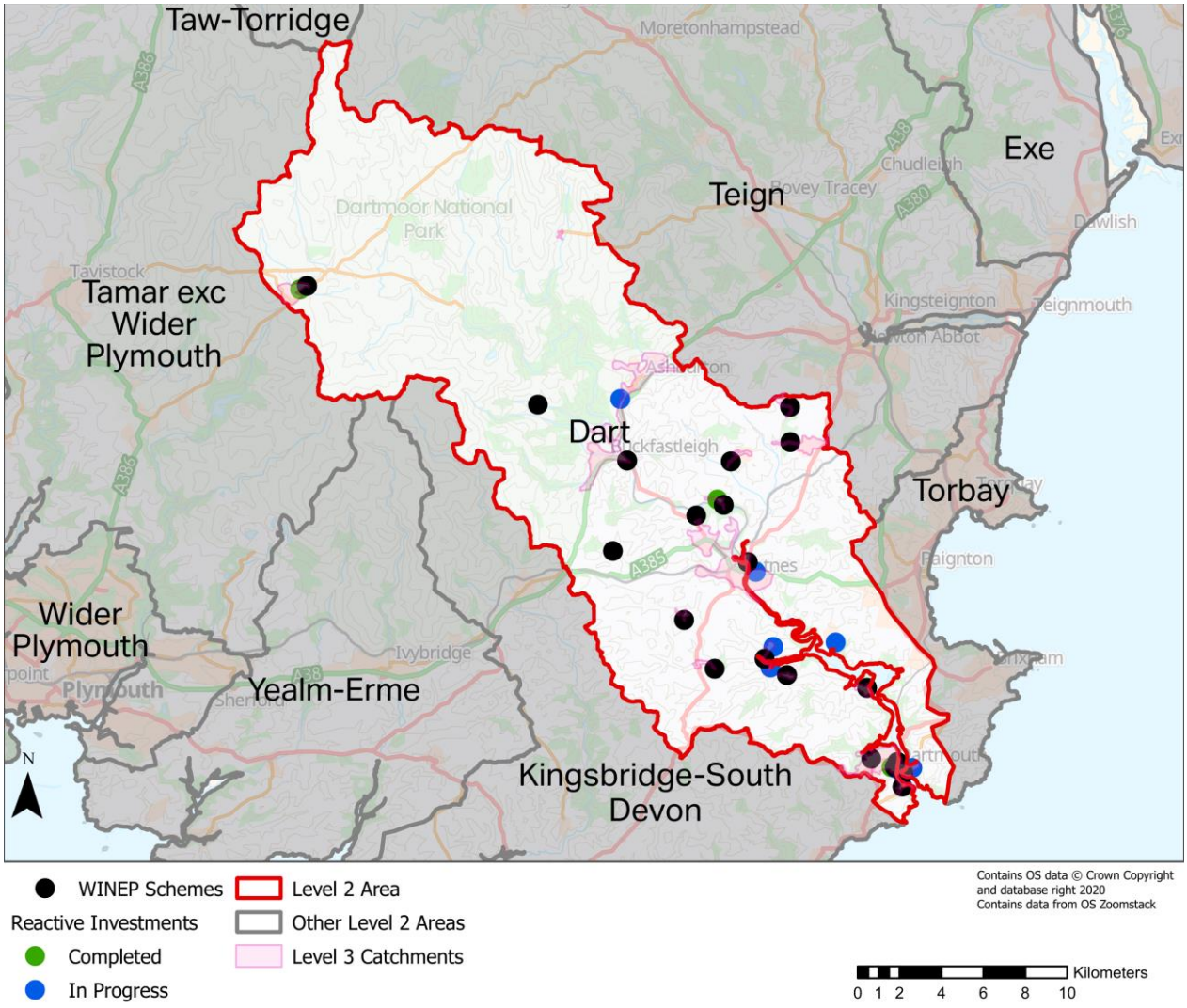


*Figure 11: Reactive and WINEP Investment locations*

## Medium and Long-Term Plans

### Overview

The following sections of this document outline South West Water's current analysis and medium to long-term proposals. In particular, they present the option developments and appraisals that will be used during the next price review and planning for future Asset Management Planning cycles (AMPs).

Outputs from the following DWMP process stages are summarised in the following sections and form the primary content for consultation:

- Risk-based catchment screening
- Baseline risk and vulnerability assessment
- Bespoke planning objectives
- Resilience scoring
- Problem characterisation
- Options appraisal

The DWMP will inform South West Water's future business plans based on the best available knowledge today. There is uncertainty in the future linked to finance, regulation/legislation, environmental and climate changes. This is a long-term, iterative process, so the plans may change in the future to reflect the future needs of the Dart catchment.

### Risk Based Catchment Screening

The Risk based Catchment Screening exercise (RBCS) was carried out across all of South West Water's 653 Level 3 Tactical Planning Units (TPUs), screening each one in order that the effort could be best focused where it was most appropriately needed. From this assessment exercise it was determined that 373 catchments were identified as being potentially 'at risk' of environmental or community impact deteriorating in the future and were to proceed to the Baseline Risk & Vulnerability Assessment (BRAVA) stage for assessment under those criteria. Each catchment was assessed against a range of indicators shown in Table 19, to identify the catchments that require a more detailed investigation. The information and data required for the assessment is readily available from company reporting systems and from stakeholders. Indicators have been classified into two tiers, which enables us to prioritise the indicators when assessing if further assessment is required. Only two indicators are Tier 2:

- Catchment characterisation
- Continuous or intermittent discharges impact upon sensitive receiving waters

All other indicators are Tier 1 indicators.

When a catchment or TPU is identified as needing further assessment, this is described as an "indicator breach" in the RBCS process. This is not a performance breach but rather a trigger to further evaluate or assess certain indicator/indicators in the next stage of the DWMP process.

The results for the Level 3 catchments within the Dart catchment are in the RBCS Summary (Table 19) below.

***Table 19**: RBCS Summary Table*

| Level 3 Equipment Number | C21st Pipe Metric | Total Population Equivalent | Catchment Characterisation | Bathing or shellfish waters | Discharge to Sensitive Waters (Part A) | Discharge to Sensitive Receiving (Part B) | SOAF | CAF | Internal Sewer Flooding | External Sewer Flooding | Pollution Incidents | WwTW Q Compliance | WwTW DWF Compliance | Storm Overflows | Other RMA Systems | Planned Residential Development | WINEP | Sewer Collapses | Sewer Blockages | Number of Indicators Breached (Excl | Single Indicator Breach is Tier 1 | Proceed to BRAVA? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 52195 | Initial | 240.0 | NO | YES | NO | NO | YES | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | YES | 2 | NO | YES |
| 53061 | Initial | 450.8 | YES | YES | NO | NO | YES | NO | NO | NO | YES | NO | NO | NO | NO | NO | NO | NO | YES | 4 | NO | YES |
| 53075 | Initial | 7,672.5 | YES | NO | NO | NO | YES | NO | NO | YES | YES | NO | NO | NO | NO | YES | NO | YES | YES | 5 | NO | YES |
| 53092 | Initial | 252.3 | NO | YES | NO | NO | YES | NO | NO | NO | YES | NO | NO | NO | NO | NO | NO | NO | YES | 3 | NO | YES |
| 53107 | Initial | 316.5 | NO | NO | NO | NO | YES | NO | NO | NO | NO | NO | NO | YES | NO | NO | NO | NO | YES | 2 | NO | YES |
| 53108 | Initial | 582.6 | NO | NO | NO | NO | YES | NO | NO | NO | NO | NO | NO | YES | NO | NO | NO | NO | YES | 2 | NO | YES |
| 53113 | Initial | 2,363.9 | YES | NO | NO | NO | YES | NO | NO | NO | YES | NO | NO | NO | NO | NO | NO | NO | NO | 3 | NO | YES |
| 53768 | Initial | 10,463.4 | NO | YES | NO | NO | YES | NO | YES | YES | YES | NO | NO | YES | NO | NO | NO | YES | YES | 6 | NO | YES |
| 10126999 | Initial | 8,024.5 | YES | YES | NO | NO | YES | NO | YES | YES | YES | NO | NO | YES | NO | YES | NO | YES | YES | 8 | NO | YES |
| 53122 | Initial | 4.2 | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | 0 | NO | NO |
| 53093 | Initial | 8.2 | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | 0 | NO | NO |
| 54081 | Initial | 9.2 | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | 0 | NO | NO |

| Level 3 Equipment Number | C21st Pipe Metric | Total Population Equivalent | Catchment Characterisation | Bathing or shellfish waters | Discharge to Sensitive Waters (Part A) | Discharge to Sensitive Receiving (Part B) | SOAF | CAF | Internal Sewer Flooding | External Sewer Flooding | Pollution Incidents | WwTW Q Compliance | WwTW DWF Compliance | Storm Overflows | Other RMA Systems | Planned Residential Development | WINEP | Sewer Collapses | Sewer Blockages | Number of Indicators Breached (Excl | Single Indicator Breach is Tier 1 | Proceed to BRAVA? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 53817 | Initial | 2,363.6 | NO | NO | NO | NO | NO | NO | NO | NO | YES | NO | NO | NO | NO | NO | NO | YES | NO | 1 | YES | YES |
| 53073 | Initial | 348.3 | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | 0 | NO | NO |
| 53110 | Initial | 209.2 | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | YES | 0 | NO | NO |
| 53136 | Initial | 42.4 | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | 0 | NO | NO |
| 53137 | Initial | 39.4 | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | 0 | NO | NO |
| 53111 | Initial | 113.6 | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | 0 | NO | NO |
| 53148 | Initial | 13.5 | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | 0 | NO | NO |
| 53149 | Initial | 222.7 | NO | NO | NO | NO | NO | NO | NO | NO | YES | NO | NO | NO | NO | NO | NO | NO | YES | 1 | YES | YES |
| 53143 | Initial | 40.1 | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | 0 | NO | NO |
| 53089 | Initial | 609.3 | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | YES | 0 | NO | NO |
| 11486542 | Initial | 0.5 | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | 0 | NO | NO |
| 53123 | Initial | 41.3 | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | 0 | NO | NO |
| 53106 | Initial | 131.3 | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | 0 | NO | NO |

| Level 3 Equipment Number | C21st Pipe Metric | Total Population Equivalent | Catchment Characterisation | Bathing or shellfish waters | Discharge to Sensitive Waters (Part A) | Discharge to Sensitive Receiving (Part B) | SOAF | CAF | Internal Sewer Flooding | External Sewer Flooding | Pollution Incidents | WwTW Q Compliance | WwTW DWF Compliance | Storm Overflows | Other RMA Systems | Planned Residential Development | WINEP | Sewer Collapses | Sewer Blockages | Number of Indicators Breached (Excl | Single Indicator Breach is Tier 1 | Proceed to BRAVA? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 53120 | Initial | 24.4 | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | YES | 0 | NO | NO |
| 53124 | Initial | 31.3 | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | 0 | NO | NO |
| 53078 | Initial | 79.3 | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | 0 | NO | NO |
| 53141 | Initial | 62.3 | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | YES | 0 | NO | NO |
| 53121 | Initial | 31.7 | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | 0 | NO | NO |
| 53138 | Initial | 200.7 | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | NO | YES | 0 | NO | NO |

| Score/Colour | Definition |
|---|---|
| No | No breach |
| Yes - Tier 1 | Tier 1 breach |
| Yes - Tier 2 | Tier 2 breach |

*Figure 12: RBCS scoring legend*

## Baseline Risk & Vulnerability Assessment (BRAVA)

For those catchments that were captured by the RBCS as being 'at risk' South West Water then progressed them through to the BRAVA process.

Through the BRAVA process South West Water's understanding of the risks facing the catchments, and at what scale and complexity, has been improved. This included an assessment into how external changes in the future may impact upon South West Water's catchment vulnerabilities and how they may be impacted by risks such as Climate Change and Urban Creep. The outputs from this process are summarised below in Table 20. The planning objectives used for this exercise were:

- Internal Sewer Flooding Risk
- Pollution Risk
- Sewer Collapse Risk
- Risk of Sewer Flooding in a 1 in 50-year storm
- Storm Overflow performance
- Risk of WwTW Compliance Failure

***Table 20**: BRAVA output summary table*

| Group | Description | Value |
|---|---|---|
| | L2_Area | Dart |
| Physical Characteristics | Total Population Equivalent | 31972 |
| | Baseline sewer length (km) | 364 |
| Baseline Score 2020 | Planning Objective - Internal Sewer Flooding Risk | 0 |
| | | 2 |
| | Planning Objective - Sewer Collapse Risk | 0 |
| | | 2 |
| | Planning Objective - Storm Overflow performance...8 | 1 |
| | Planning Objective - Risk of WwTW Compliance Failure...9 | 0 |
| | | 2 |
| | Planning Objective - Storm Overflow performance...11 | 1 |
| | Planning Objective - Risk of | 0 |

| Group | Description | Value |
|---|---|---|
| | WwTW Compliance Failure...12 | |

| Score/Colour | Definition |
|---|---|
| 0 | No signficance |
| 1 | Moderately Significant |
| 2 | Very Significant |

*Figure 13: BRAVA scoring legend*

BRAVA Risks were categorised from 0-2, with 0 being no significant risk identified, 1 for no immediate risk identified (although future risks may exist) and 2 showing that short- to medium-term risks of a significant nature having been recognised through the data analysis.

### Bespoke Planning Objectives

In addition to the six common planning objectives identified within the DWMP Framework, South West Water has included three bespoke planning objectives that are tailored to the South West Region.

### Problem Characterisation

Building on the outputs of the BRAVA process, South West Water examined the nature and complexity of the problems arising, how these relate to one another and what interventions could be put in place to mitigate them. The Problem Characterisation stage took the results from BRAVA and developed it further, providing insight into the risks around:

- Internal Sewer Flooding
- Pollution, dividing these between category 1 or category 2 & 3
- Sewer Collapse
- Sewer Flooding in a 1 in 50-year storm
- Sewer Flooding in a 1 in 10-year storm
- Storm Overflow performance
- WwTW Compliance Failure, including Dry Weather Flow scenarios

These ratings (shown in Table 21) were augmented with commentary (in Table 22) around how these risks have impacted the Dart catchment previously, with Flooding Heat Maps providing visual indicators of the scale of some of the potential problems within each catchment.

***Table 21**: Problem Characterisation*

| TPU2 | F1: Internal sewer flooding | F2: Risk of sewer flooding in a 1 in 10 year event | F3: Risk of sewer flooding in a 1 in 50 year event | P1: Pollution incidents (CAT 1-3) | P2: Severe Pollutions (Cat 1-2) | P3: Storm overflow performance | P4: WwTW (NUMERIC) compliance failure | P5: WwTW (DWF) compliance failure | A1: Sewer collapse |
|---|---|---|---|---|---|---|---|---|---|
| TPU 1: Denbury | A | A | A | A | A | | A | A | A |
| TPU 14: Ipplepen | F | B | G | A | A | F | F | A | A |
| TPU 2: Harbertonford | G | A | A | A | A | G | A | A | A |
| TPU 9: Ashprington | A | F | G | G | A | F | A | A | A |
| TPU 11: Kilbury | A | G | G | G | A | F | A | A | F |
| TPU 12: Totnes | F | F | G | G | A | F | B | A | A |
| TPU 10: Dartmouth | F | G | G | G | A | F | A | A | A |
| TPU 13: Cornworthy | A | A | A | A | A | A | G | A | A |
| TPU 6: Staverton | A | F | F | A | A | F | A | A | A |
| TPU 3: Dittisham Main | A | F | F | G | A | F | G | A | A |
| TPU 8: Princetown | A | F | F | A | A | | G | A | G |
| TPU 4: Broadhempston | A | A | A | A | A | | G | A | A |
| TPU 5: Harberton | A | A | A | A | A | F | B | A | A |

| TPU2 | F1: Internal sewer flooding | F2: Risk of sewer flooding in a 1 in 10 year event | F3: Risk of sewer flooding in a 1 in 50 year event | P1: Pollution incidents (CAT 1-3) | P2: Severe Pollutions (Cat 1-2) | P3: Storm overflow performance | P4: WwTW (NUMERIC) compliance failure | P5: WwTW (DWF) compliance failure | A1: Sewer collapse |
|---|---|---|---|---|---|---|---|---|---|
| TPU 7: Widecombe | A | B | B | A | A | | A | A | A |

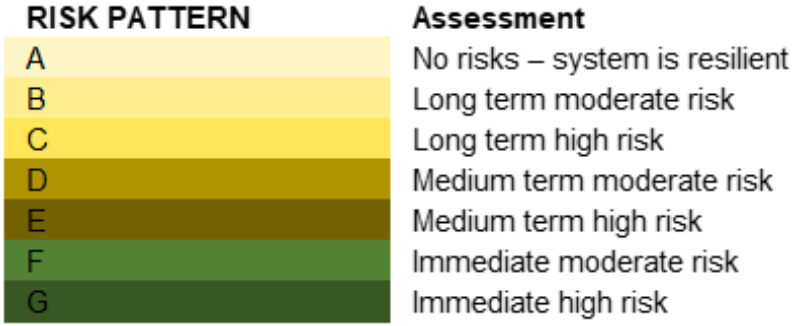


*Figure 14: Problem Characterisation legend*

***Table 22**: Problem Characterisation Description*

| TPU | Conclusion Narrative | Historical Pollution and Flooding | Future Flood Risk | Overflows | WwTW |
|---|---|---|---|---|---|
| DENBURY_STW_DENBURY | This catchment is performing well and is resilient for the future. | 4 external other causes | N/A | N/A | We are monitoring performance at the treatment works and we are not expecting any compliance issues due to lack of capacity between |

| TPU | Conclusion Narrative | Historical Pollution and Flooding | Future Flood Risk | Overflows | WwTW |
|---|---|---|---|---|---|
| | | | | | now and 2050 |
| HARBERTONFORD_STW_HARBERTONFORD | This catchment requires additional investment to make it resilient for the future. | There are 1 total internal flooding incidents in the catchment, this is 0.34% of the total number of properties within the catchment. There are 2 external flooding hotspots attributed to other causes in the catchment, located near; Old Road Bow Road | N/A | There is 1 overflow in the catchment. This has been classified as follows; Substandard (high) | We are monitoring performance at the treatment works and we are not expecting any compliance issues due to lack of capacity between now and 2050 |
| DITTISHAM MAIN_STW_DITTISHAM | This catchment requires additional investment to make it resilient for the future. | There is 1 pollution hotspot in the catchment located near; Dittisham Main WwTW | Non-modelled | There are a total of 3 overflows in the catchment. They have been classified as follows; Substandard (medium) - 1 Substandard (high) - 1 Unsatisfactory - 1 Overflows in this catchment impact | We are monitoring performance at the treatment works and there may be a need to increase capacity as part of a medium/long term strategy |

| TPU | Conclusion Narrative | Historical Pollution and Flooding | Future Flood Risk | Overflows | WwTW |
|---|---|---|---|---|---|
| | | | | upon the following shellfish waters; Dart | |
| BROADHEMPSTON_STW_BROADHEMPSTON | This catchment requires additional investment to make it resilient for the future. | There were no substantial flooding or pollution hotspots in the catchment. | N/A | N/A | We are monitoring performance at the treatment works and there may be a need to increase capacity as part of a medium/long term strategy |
| HARBERTON_STW_HARBERTON | This catchment is changing & requires a long-term strategy. | There were no substantial flooding or pollution hotspots in the catchment. | N/A | There are a total of 2 overflows in the catchment. They have been classified as follows; Substandard (high) | We are monitoring performance at the treatment works and there may be a need to increase capacity as part of a medium/long term strategy |
| STAVERTON_STW_STAVERTON | This catchment requires additional investment to make it resilient for the future. | There is 1 external flooding hotspot attributed to other causes in the catchment, located near; The Village Hall There is 1 pollution hotspot in the | Non-modelled | There is 1 overflow in the catchment. This has been classified as follows; Substandard (medium) | We are monitoring performance at the treatment works and we are not expecting any compliance issues due to lack of capacity between now and 2050 |

| TPU | Conclusion Narrative | Historical Pollution and Flooding | Future Flood Risk | Overflows | WwTW |
|---|---|---|---|---|---|
| | | catchment located near;<br>Nelsons Close SPS (ID 68) | | | |
| WIDECOMBE_STW_ WIDECOMBE IN THE MOOR | This catchment is changing & requires a long-term strategy. | There were no substantial flooding or pollution hotspots in the catchment. | N/A | N/A | We are monitoring performance at the treatment works and we are not expecting any compliance issues due to lack of capacity between now and 2050 |
| PRINCETOWN_STW_ PRINCETOWN | This catchment requires additional investment to make it resilient for the future. | There is 1 pollution hotspot in the catchment located near;<br>Princetown CSO (ID 118) | Non-modelled | N/A | We are monitoring performance at the treatment works and there may be a need to increase capacity as part of a medium/long term strategy |
| CORNWORTHY_STW _DARTMOUTH | Your catchment requires additional investment to make it resilient for the future | There is 1 external flooding hotspot attributed to hydraulic overload in the catchment, located near Abbey Road<br>There is 1 external | N/A | There are a total of 1 overflow in the catchment. They have been classified as follows;<br>Substandard (high) - 100%<br>Overflows in this | We are monitoring performance at the treatment works and there may be a need to increase capacity as part of a medium/long term |

| TPU | Conclusion Narrative | Historical Pollution and Flooding | Future Flood Risk | Overflows | WwTW |
|---|---|---|---|---|---|
| | | flooding hotspot attributed to other causes in the catchment, located near Abbey Road. | | catchment impact upon the following bathing waters; Mothecombe Beach | strategy |
| IPPLEPEN_STW_IPPLEPEN | Your catchment requires additional investment to make it resilient for the future | There are 1 total internal flooding incidents in the catchment, this is 0.09% of the total number of properties within the catchment. There are 8 external flooding hotspots attributed to other causes in the catchment, located near There are 1 pollution hotspots in the catchment located near; Tremlett Grove (ID 43) | 7% of the total number of properties within the catchment that are predicted to be at risk of sewer flooding. There are 3 predicted future flooding hotspots in the catchment, located near; Bridge Street (2) North Street | There are a total of 3 overflows in the catchment. They have been classified as follows; Substandard (high) 2 - 67% Not Categorised 1 - 33% | We are monitoring performance at the treatment works and there may be a need to increase capacity as part of a medium/long term strategy |
| ASHPRINGTON_STW_ASHPRINGTON | Your catchment requires additional investment to make | There are 2 external flooding hotspots attributed to other | 7% of the total number of properties within the catchment | There are a total of 2 overflows in the catchment. They | We are monitoring performance at the treatment works and |

| TPU | Conclusion Narrative | Historical Pollution and Flooding | Future Flood Risk | Overflows | WwTW |
|---|---|---|---|---|---|
| | it resilient for the future | causes in the catchment, located near There are 2 pollution hotspots in the catchment located near; Ashprington WwTW (ID 192) Tuckenhay, totnes (ID 109) | that are predicted to be at risk of sewer flooding. There is 1 predicted future flooding hotspot in the catchment, located near; Hill Park | have been classified as follows; Substandard (high) 2 - 100% Overflows in this catchment impact upon the following shellfish waters; Dart | there may be a need to increase capacity as part of a medium/long term strategy |
| DARTMOUTH_STW_ DARTMOUTH | Your catchment requires additional investment to make it resilient for the future | There are 8 total internal flooding incidents in the catchment, this is 0.17% of the total number of properties within the catchment. There are 3 external flooding hotspots attributed to other causes in the catchment, located near; Chestnut Grove SPS Victoria Road Broadstone There are 2 pollution | 18% of the total number of properties within the catchment that are predicted to be at risk of sewer flooding. There are 2 predicted future flooding hotspots in the catchment, located near; Broadstone Clarence Street | There are a total of 8 overflows in the catchment. They have been classified as follows; Substandard (medium) 1 - 12X% Substandard (high) 2 - 25X% Unsatisfactory 3 - 38% Not Categorised 2 - 25% Overflows in this catchment impact upon the following bathing beaches/shellfish | We are monitoring performance at the treatment works and we are not expecting any compliance issues due to lack of capacity between now and 2050 |

| TPU | Conclusion Narrative | Historical Pollution and Flooding | Future Flood Risk | Overflows | WwTW |
|---|---|---|---|---|---|
| | | hotspots in the catchment located near;<br>Dartmouth WwTW (ID 203)<br>Lower Ferry SPS, Kingswear (ID 69) | | waters;<br>Dartmouth Castle<br>Sugary Cove<br>Dart | |
| KILBURY_STW_BUCKFASTLEIGH | Your catchment requires additional investment to make it resilient for the future | There are 2 external flooding hotspots attributed to other causes in the catchment, located near; Eastern Road<br>Devon Expressway | 12% of the total number of properties within the catchment that are predicted to be at risk of sewer flooding.<br>There are 2 predicted future flooding hotspots in the catchment, located near;<br>West Street<br>Kingcome Court No.2 SPS | There are a total of 9 overflows in the catchment. They have been classified as follows;<br>Substandard (medium) 2 - 22%<br>Substandard (high) 2 - 22%<br>Unsatisfactory 1 - 11%<br>Not Categorised 4 - 44% | We are monitoring performance at the treatment works and we are not expecting any compliance issues due to lack of capacity between now and 2050 |
| TOTNES_STW_TOTNES | Your catchment requires additional investment to make it resilient for the future | There are 6 total internal flooding incidents in the catchment, this is 0.09% of the total number of properties within the | 5.1% of the total number of properties within the catchment that are predicted to be at risk of sewer flooding.<br>There is 1 predicted | There are a total of 13 overflows in the catchment. They have been classified as follows;<br>Satisfactory 4 - 31% | We are monitoring performance at the treatment works and there may be a need to increase capacity as part of a medium/long term |

| TPU | Conclusion Narrative | Historical Pollution and Flooding | Future Flood Risk | Overflows | WwTW |
|---|---|---|---|---|---|
| | | catchment.<br>There are 50 external flooding hotspots attributed to other causes in the catchment, located near There are 2 pollution hotspots in the catchment located near;<br>Quarry Close CSO (ID 39)<br>Shinners Bridge CSO (ID 99) | future flooding hotspot in the catchment, located near;<br>High/Fore Street | Substandard (medium) 3 - 23%<br>Substandard (high) 2 - 15%<br>Unsatisfactory 4 - 31%<br>Overflows in this catchment impact upon the following shellfish waters; Dart | strategy |

## Resilience Assessment

Resilience is a statutory duty for Ofwat under the 2014 Water Industry Act, but more importantly for us it is the philosophy that allows us to consider how we best manage our services to customers in a changing and sometime challenging environment. Such challenges encompass a wide range of factors such as extreme weather conditions; drought and flooding; land use and catchment pressures; power supply and communications reliability; skills and organisational capacity; supply chain capability; as well as changing environmental and public health challenges to meet the needs of consumers now as well as in the longer term. The details below form part of the Operational Resilience assessment within the DWMP. Namely:

- Coastal Flood Inundation
- Coastal Erosion
- Fluvial Flooding (Response and Recovery Plans)
- Power Outage
- Operational Telemetry (OT)

### Coastal flooding and Erosion

UK coastal flood and erosion risk is expected to increase over the 21st century due to the impact in sea level rise and climate change. Which means that we can expect to see both an increase in the frequency and magnitude of extreme water levels and weather events around the UK coastline. This is particularly significant for the SW region due to the extensive coastline and numerous coastal communities who rely on the safe and constant provision of clean and wastewater services. The South West's tourism economy is also dependent, to a large extent, on the extensive coastline, acknowledged by EA through improvements to coastal waters over decades of investment under the Bathing Water drivers. As a consequence, an assessment of the risks associated with present day and future projected coastal flood and erosion risk was undertaken utilising the latest available science.

### Coastal Flooding

Coastal flood risk was modelled for three climate scenarios, the first representing present-day risk in 2022 and second, the future climate change scenarios (RCP2.5 and RCP8.6) representing the projected risk in 2035 and 2050. To fully assess future risk for each of the above climate change scenarios four return events were evaluated, these were:

- Highest Astronomical Tide (HAT) event - represents the maximum observed tide under average atmospheric conditions
- 1 in 5-year storm return period event - a high probability event with a 20% chance of happening in any one year
- 1 in 50-year storm return period event – a moderate probability event with a 2% chance of occurring in any one year
- 1 in 200-year storm return period event – a low probability event with a 0.5% chance of occurring in any one year The EA Coastal Flood Boundary data for the assessment of extreme sea level rise was also used

A total of 653[1] Sewage Treatment Works (STW), 1235 Sewage Pumping Stations (SPS) plus the associated wastewater infrastructure were assessed for coastal flood risk. Sites have been assessed based upon a number of different storm and flood scenarios considering the risks to the site, the defence of the site and wider EA flood defence work. The 1 in 200-year flood extent for the three time periods is indicated in Figure 15 below.

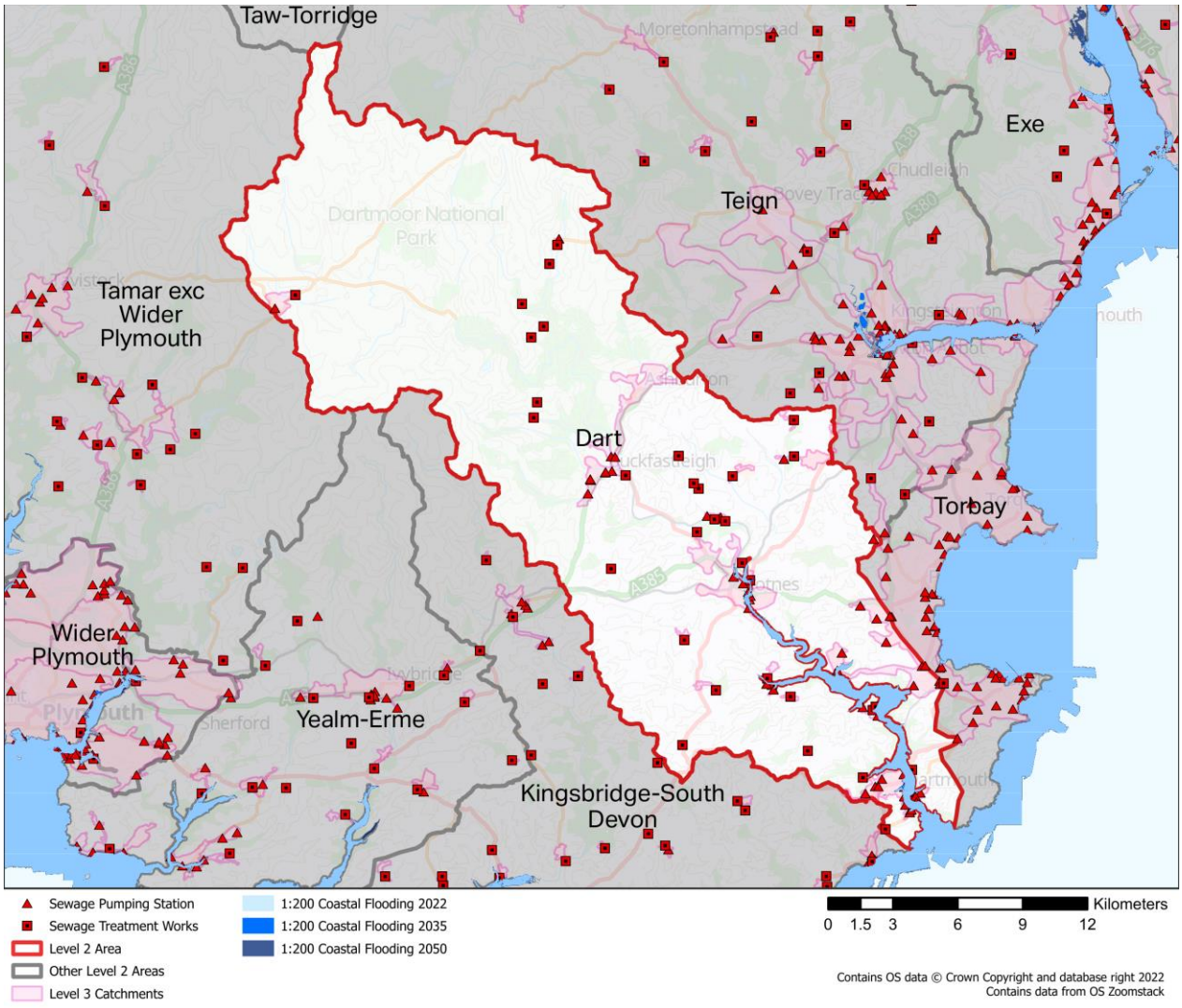


*Figure 15: Extent of coastal flooding*

Possible interventions to manage the risks have been identified as the provision of flood defences for the site, either as a SWW deliverable or as part of a wider programme of coastal defences working with EA and other RMAs. Thereby delivering greater benefit for coastal communities. An alternative intervention is to relocate the asset to a more secure location ensuring ability to continue to service local communities. This option is more likely to be part of a wider decision to relocate communities at risk and would be taken in close collaboration with the EA and responsible RMAs. The sewer infrastructure identified at risk

[1] Catchments are being continually reviewed as part of other workstreams and may be subject to change, Power Outage and OT defined in 'Our Regional Plan'

is associated with the hydrodynamic modelling outputs. This provides additional assurance for the network assessed as being at risk.

### Coastal Erosion

A hazard assessment of coastal erosion susceptibility was undertaken with the aim of better understanding the risk posed to SWW assets and provide information whereby asset investment can be effectively prioritised allowing for a more targeted approach for future allocation of operational and capital expenditure. A detailed assessment of coastal erosion risk was assessed for all of our operational wastewater sites (653 STW's and co-located Sludge Treatment Centre [STC], 1235 SPS's plus associated infrastructure). All sites were only at risk from erosion and not from coastal flooding.
The assessment combines two approaches:

- A high-level screening to identify sites at coastal erosion risk by 2118
- A detailed site-by-site erosion analysis for the three epochs: 2022, 2035, and 2050

The high-level coastal erosion risk assessment is based on the NCERM (National Coastal Erosion Risk Mapping) dataset. The erosion risk was calculated based on the distance of the asset from the projected cliff edge with a geological scaling factor applied based on the erodibility of the underlying geology. Each site identified at risk had detailed erosion analysis undertaken. This included site-specific conditions that influence the rate of coastal erosion, such as geology, for the three time frames 2022, 2035, and 2050. This produced a ranked output highlighting assets at greatest risk of coastal erosion. The extent of coastal erosion in 2035 and 2050 is indicated in Figure 16 below.

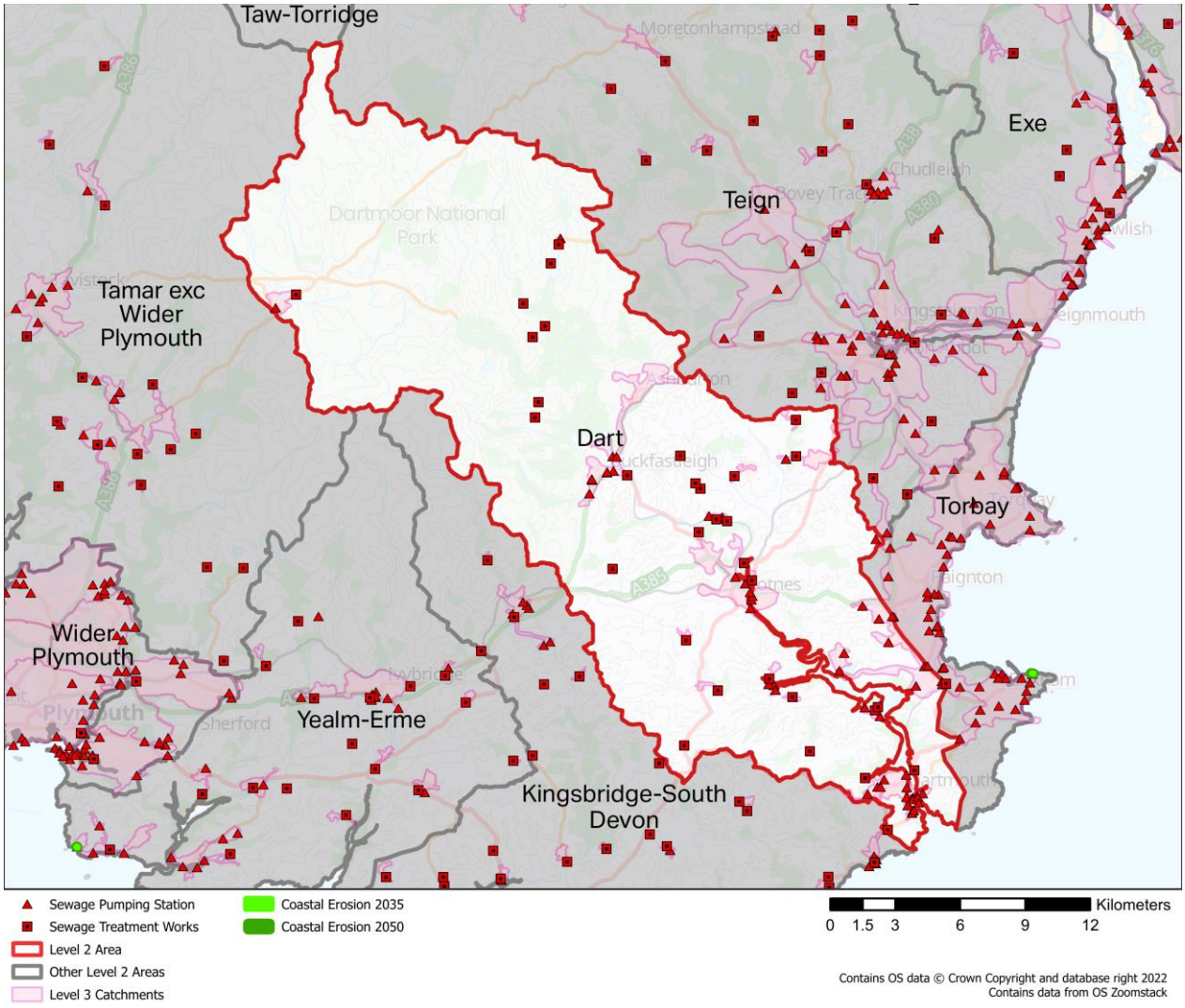


*Figure 16: Extent of coastal erosion in 2035 and 2050*

The EA have been allocated £2.5m capital funding to work with partners to deliver an update to the NCERM, across England by the end of 2023. The update to NCERM complements the dependent project to refresh the 20 Shoreline Management Plans (SMPs) across England, and other similar EA/DEFRA projects seeking to update flood and coastal erosion risk mapping, modelling and assessment. Combined, all of this activity will provide an essential body of data and evidence to underpin future adaptation and planning investment decisions of relevant coastal RMAs. This being the case the current strategy is to continue to evaluate the risks through AMP8 following the publication of the revised NCERM, working alongside other external agencies and key stakeholders including the relevant coastal risk management authorities to determine the level of risk, relevant SMP policy and therefore any subsequent required investment to mitigate coastal erosion impact.

### Fluvial and Pluvial Flooding

UK fluvial flood risk is expected to increase over the 21st century which means that we can expect to see both an increase in the frequency and magnitude of extreme water levels around the UK. As a consequence, an assessment of the risks associated with future fluvial

flooding due to projected climate change has been evaluated using the latest available science, UKCP18. The UKCP (United Kingdom Climate Projections) is a suite of climate models developed by the UK Met Office (Meteorological Office) and the Centre for Ecology & Hydrology to provide projections of future climate change in the United Kingdom. The UKCP models use data from global climate models to provide regional and local-scale projections of temperature, precipitation, and other climate variables over the coming decades. The UKCP models have been used to inform policy and decision-making in the UK on issues related to climate change adaptation and mitigation. The UKCP model projections are based on scenarios of future greenhouse gas emissions and consider the most up-to-date scientific understanding of the physical processes that drive the climate system. A total of 653 STW's, 1235 SPS's plus the associated wastewater infrastructure were assessed.

There was a phase 1 screening to identify sites at risk and a high-level screening exercise was undertaken against existing known flood zone extents. This utilised EA flood zone data sets and Defra surface water flooding data sets. A further step was taken in refining the fluvial flood zone data to exclude coastal flooding from the dataset as this risk was appraised separately as part of a Coastal Flood Risk Assessment.

Following a review of outputs from Phase 1 the assessment of sites identified at risk are taken forward to a Phase 2 assessment. The detailed assessment includes both present day risk and two climate change scenarios (RCP2.6 and 8.5) to understand the changes in flood risk over time. The assessment considers both the area flooded and a range of modelled flood depth statistics. These enhanced flood metrics can then be combined with asset information and external factors to develop a more detailed assessment of the risk to each shortlisted asset. For these sites detailed Flood Assessment Reports (FARs) are produced. These reports are designed to be used as a preliminary form of flood risk assessment identifying the potential flood risk for a specified location.

## Option Development and Appraisal

### Future WINEP Investment

Earlier this year, we presented our WINEP investment programme for 2025 onwards to the EA. Our programme includes substantial investment to improve and protect the environment from our drainage and wastewater activities. The plan focuses on the period between 2025-2030 but also considers our, and the government's, longer term strategy for environmental improvements over the next 25 years. The wastewater investments included in the WINEP for 2025 to 2030 include:

- Investigating and reducing storm overflow discharges
- Investigating and improving bathing water and shellfish water quality, usually through a reduction in storm overflow discharges
- Investigating and protecting high priority sites such as SSSIs and SACs that are impacted by our drainage and wastewater treatment activities
- Investigating and reducing the impact of nutrients and chemicals from our WwTW discharges, especially Phosphorus, usually by increasing treatment capacity to meet more stringent permit levels

- Investments at WwTWs to meet more stringent requirements under the Urban Waste Water Treatment (England and Wales) Regulations 1994, driven by population growth and to provide increased treatment capacity at septic tanks
- Increased monitoring at WwTWs, SPSs, emergency overflows, and in rivers close to our storm overflow discharge points
- Investment in bio-resources
- Investigations into future potential improvements in the treatment of nitrogen and microplastics

In all cases, we have reviewed a number of different options for each investment and have taken into account the wider environmental and societal benefits, including impacts on embodied and operational carbon. We also spoke to our customers about the types of investments, as well as solutions, that they would prefer to see in our plan. All of this, combined with a long-term 30-year view of Total Expenditure (Totex) expenditure allowed us to present a preferred option to the EA for assessment. The investments in the WINEP programme have been produced in alignment with our DWMP. The final WINEP programme is expected to be agreed in July 2023 and hence is not presented here in detail.

### ODA Prioritisation

The RBCS and BRAVA steps identified the Level 3 TPUs that were likely to need interventions to mitigate future risk. The PC step then assessed the severity and timing of these risks from 2020 to 2050. To further prioritise ODA effort and future interventions, ODA performance thresholds were applied to all TPUs as follows:

- Collapse Risk – < 10 collapses
- Pollution & Flooding Risk – incidents < 0.1% catchment total, external issues, hydraulic issues, hotspots present
- Future Flood Risk (FFR) – < 5% properties at risk of internal flooding in a 1 in 50 event
- Storm Overflow (SO) Risk – < 10 spills from any SO
- WWTW Compliance – Best judgement

Where no thresholds were met, risk was considered low and TPUs did not proceed to ODA. Performance will continue to be monitored through the DWMP process.

The TPUs that proceeded to ODA were then classed as Standard, Extended or Complex based on the total risk score and quality of hydraulic models, to determine our ODA approach taken in ODA. Standard TPUs are small (average population 756) with simpler problems and more straightforward interventions. Extended TPUs are larger (average population 9,553), have more risks and more complicated solutions. Complex TPUs are the largest (average population 23,132) with more complex systems and solutions, but better hydraulic models.

***Table 23**: Level 3 TPUs - Progression through DWMP stages and ODA class*

| TPU | RBCS | BRAVA | ODA | TPU Class |
|---|---|---|---|---|
| ASHPRINGTON_STW_ASHPRINGTON | YES | YES | YES | Extended |
| BROADHEMPSTON_STW_BROADHEMPSTON | YES | YES | YES | Standard |
| CORNWORTHY_STW_DARTMOUTH | YES | YES | YES | Standard |
| DARTMOUTH_STW_DARTMOUTH | YES | YES | YES | Extended |
| DENBURY_STW_DENBURY | YES | YES | NO | N/A |
| DITTISHAM MAIN_STW_DITTISHAM | YES | YES | YES | Extended |
| HARBERTON_STW_HARBERTON | YES | YES | YES | Standard |
| HARBERTONFORD_STW_HARBERTONFORD | YES | YES | YES | Standard |
| IPPLEPEN_STW_IPPLEPEN | YES | YES | YES | Extended |
| KILBURY_STW_BUCKFASTLEIGH | YES | YES | YES | Extended |
| PRINCETOWN_STW_PRINCETOWN | YES | YES | YES | Standard |
| STAVERTON_STW_STAVERTON | YES | YES | YES | Standard |
| TOTNES_STW_TOTNES | YES | YES | YES | Complex |
| WIDECOMBE_STW_WIDECOMBE IN THE MOOR | YES | YES | NO | N/A |
| CAPTON_STW_CAPTON | YES | NO | NO | N/A |
| GULLAFORD FARM S T_SEPTNK_LANDSCOVE | YES | NO | NO | N/A |
| HALWELL_STW_HALWELL | YES | NO | NO | N/A |
| HILLCROFT_STW_LANDSCOVE | YES | NO | NO | N/A |
| HOLNE_STW_HOLNE | YES | NO | NO | N/A |
| HUXHAMS CROSS_STW_DARTINGTON | YES | NO | NO | N/A |
| KINGSWEAR S T_STW_KINGSWEAR | YES | NO | NO | N/A |
| LADY MEADOW_SEPTNK_WIDECOMBE | YES | NO | NO | N/A |
| LEUSDON_STW_LEUSDON | YES | NO | NO | N/A |
| LITTLEHEMPSTON WTW S T_STW_TOTNES | YES | NO | NO | N/A |
| MEMORY CROSS_STW_LANDSCOVE | YES | NO | NO | N/A |
| PONSWORTHY_STW_PONSWORTHY | YES | NO | NO | N/A |

| TPU | RBCS | BRAVA | ODA | TPU Class |
|---|---|---|---|---|
| POUNDSGATE_STW_POUNDSGATE | YES | NO | NO | N/A |
| RATTERY_STW_RATTERY | YES | NO | NO | N/A |
| RIVERSIDE ROAD S T_STW_DITTISHAM | YES | NO | NO | N/A |
| SCORRITON_STW_SCORRITON | YES | NO | NO | N/A |
| SOUTHFORD_SEPTNK_STAVERTON | YES | NO | NO | N/A |

Of the 31 TPUs in the Dart catchment, 14 proceeded through RBCS to BRAVA (the 17 remaining catchments had 1 or no indicators breached, and if 1 indicator was breached it was not tier 1) and 12 proceeded to ODA. Of these, 6 were classed as Standard, 5 Extended and 1 Complex.

### Intervention Selection and Assessment

Catchment area teams reviewed each TPU and assigned up to 3 interventions to address the specific catchment risks from the standard list in the DWMP guidance (Table 24 below).

***Table 24**: Generic Interventions*

| Management Area/Option Type | Description | Generic option examples- Standard TPU's | Sub-option examples- Extended & Complex TPU's | Option ID |
|---|---|---|---|---|
| Customer side management options | Generic options to manage the use of water in and arising from customer properties | Water efficient appliances | Promote and make available water efficient appliances to reduce production of domestic wastewater | CE1 |
| | | Rainwater harvesting | Promote and make available rainwater harvesting systems | CE2 |
| | | Customer incentives | Promotion of incentives to reduce impermeable areas | CE3 |
| | | Domestic and business customer education (Targeted Customer Behaviours) | Love Your Loo, etc. Likely focus at L1; however, where location specific issues are identified activities could be targeted around what should and shouldn't be put down sewers | CE4 |
| Surface water management - Pollution & Flooding, Overflows | Generic options within catchments to manage surface water flows entering the conveyance system | Surface water source control measures | Company installation of source control sustainable drainage systems (SuDS) | SWM1 |
| | | Surface water source control measures | SuDS partnerships with key stakeholders | SWM2 |
| | | Surface water source control measures | Upper Catchment Solution/Upstream Thinking | SWM3 |
| | | Surface water pathway measures | Separate surface water from combined systems by constructing new surface water networks (and/or | SWM4 |

| Management Area/Option Type | Description | Generic option examples- Standard TPU's | Sub-option examples- Extended & Complex TPU's | Option ID |
|---|---|---|---|---|
| | | | modify existing) | |
| | | Surface water pathway measures | Integrate surface water pathway measures into new and upgraded third party designs | SWM5 |
| | | Surface water infiltration measures | Develop a program to reduce Surface Water Infiltration | SWM6 |
| Combined and foul sewer systems - Overflows, Pollution & Flooding Collapses | Generic options to manage flows within the conveyance system to minimise impacts on customers and the environment | Intelligent network operation | Implement widespread sewer/pumping station level monitoring, live network modelling linked to operational responses such as proactive jetting | CFS1 |
| | | Increase the capacity of existing foul/combined networks | Construct new stormwater storage systems | CFS2 |
| | | Increase the capacity of existing foul/combined networks | Replace or upgrade existing networks | CFS3 |
| | | Wastewater transfers | Inter-catchment network transfers | CFS4 |
| | | Wastewater transfers | inter-catchment WwTW transfers | CFS5 |
| Wastewater treatment | Generic options to manage flows and loads at wastewater treatment works to minimise impacts on customers and the environment | Treat or pre-treat wastewater in the network | Treat or pre-treat flows at existing pumping stations or within sewer network | WWT1 |
| | | Increase treatment capacity | Upgrade existing works using more intensive processes | WWT2 |

| Management Area/Option Type | Description | Generic option examples- Standard TPU's | Sub-option examples- Extended & Complex TPU's | Option ID |
|---|---|---|---|---|
| | | Increase treatment capacity | Add additional process streams (increase plant capacity) | WWT3 |
| | | Treatment works rationalisation/ decentralisation | Replace existing treatment works with one large scale installation | WWT4 |
| | | Treatment works rationalisation/ decentralisation | Replace existing treatment works with several smaller scale installations | WWT5 |
| | | Modify consents and permits | Catchment consenting | WWT7 |
| | | Modify consents and permits | Adaptive consenting (e.g. "wet weather" relaxation) | WWT8 |
| | | Catchment management initiatives | Initiatives to address fertiliser use and application | WWT9 |

These initial selections were then subject the following checks and reviews:

- Internal review by Catchment Managers (all) and WwTW experts (WwTW)
- External review by key stakeholders (all)
- Internal hydraulic modelling of selected catchments and extrapolation of modelling results to non-modelled catchments (FFR and SO risk)
- Internal review of the above by DWMP team

### Intervention Quantification and Costing

Preferred interventions were quantified using modelling and extrapolation. Up to 5 final interventions were selected, reflecting the need for a combination of solutions. Costs were provided by South West Water's cost consultants, using approved cost models based on South West Water data where possible, and from past South West Water scheme data or industry recognised estimates if not.

The approach was different for different risks:

*Collapses* – Quantification and costing not included in DWMP. Risks and interventions noted but plan already covered by wider programme of sewer rehabilitation and repairs.

*Pollution & Flooding* – Quantification and costing included in DWMP only where an enhancement over and above existing programmes of work were recommended.

*Future Flood Risk (FFR)* – 26 Complex catchments were hydraulically modelled to assess options to address risk. The results were used to extrapolate to non-modelled catchments. It was assumed at the outset that Nature Based solutions such as Sustainable drainage systems (SuDS) were a possibility wherever surface water separation (SWS) was suggested. Suitability of SuDS for surface water separation assessed at high level using Stantec's GIS based Surface Water Assessment Tool (SWAT) analysis.

*Storm Overflows (SO)* - 12 catchments (8 complex 4 extended) were selected for hydraulic modelling to give coverage of 233 SOs (c.20% of South West Water total) and a representative sample of receiving waters. Results were used to extrapolate to non-modelled DWMP TPUs. To meet the later DEFRA SO guidance, a separate top-down desktop model based on Event Duration Monitor (EDM) spill data was developed to assess total need for all TPUs.

*WWTW Performance* – Analyses of Biological Oxygen Demand (BOD) Capacity and DWF permit compared with future population and flow projections were used to assess sites at future risk of meeting permit requirements. The scale of upgrades needed was estimated using a calculation of the increase in population equivalent PE or additional capacity in cubic metres required at the works.

## Results - Interventions

Table 25 below outlines the final interventions selected for the TPUs in the Dart catchment, along with potential solutions involving partnership working or nature-based solutions. The intervention codes applied are defined in Table 24 above.

***Table 25**: TPU interventions selection and feedback*

| TPU | Class | Nature based solutions assessment Comments | Partnership working potential Comments | Final #1 | Final #2 | Final #3 | Final #4 | Final #5 | Final DWMP ODA assessment summary |
|---|---|---|---|---|---|---|---|---|---|
| ASHPRINGTON_STW_ASHPRINGTON | Extended | SWW: Potential SUDS for SW separation identified | SWW: Potential SUDS identified | CFS2 | SWM4 | SWM6 | | | Surface water management intervention SWM1 removed, Surface water management SWM4 and SWM6 carried over alongside Combined and foul sewer systems CFS2 |
| BROADHEMPSTON_STW_BROADHEMPSTON | Standard | SWW: Potential SUDS for SW separation | SWW: Potential SUDS | CFS2 | SWM4 | SWM6 | WWT3 | | Wastewater treatment intervention WWT3 carried over but WWT2 removed. SWM4 and SWM6 carried |

| TPU | Class | Nature based solutions assessment Comments | Partnership working potential Comments | Final #1 | Final #2 | Final #3 | Final #4 | Final #5 | Final DWMP ODA assessment summary |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | over with CFS2. |
| CORNWORTHY_STW_DARTMOUTH | Standard | SWW: Potential SUDS for SW separation | SWW: Potential SUDS | CFS2 | SWM4 | SWM6 | WWT3 | | Combined and foul sewer systems CFS2 carried over with Surface water management SWM4 and SWM6. Waste Water Treatment WWT2 replaced with WWT3. |
| DARTMOUTH_STW_DARTMOUTH | Extended | SWW: Potential SUDS for SW separation | SWW: Potential SUDS | CFS2 | SWM4 | | | | Surface water management SWM4 and Combined and foul sewer systems CFS2 carried over. intervention SWM6 removed |
| DITTISHAM MAIN_STW_DI | Extended | SWW: Potential | SWW: Potential | CFS2 | SWM4 | SWM6 | WWT3 | | Surface water management |

| TPU | Class | Nature based solutions assessment Comments | Partnership working potential Comments | Final #1 | Final #2 | Final #3 | Final #4 | Final #5 | Final DWMP ODA assessment summary |
|---|---|---|---|---|---|---|---|---|---|
| TTISHAM | | SUDS for SW separation | SUDS | | | | | | intervention SWM4 & SWM6, Combined and foul sewer systems CFS2, Waste Water Treatment WWT3 carried over. |
| HARBERTON_STW_HARBERTON | Standard | SWW: Potential SUDS for SW separation | SWW: Potential SUDS | CFS2 | SWM4 | SWM6 | | | Combined and foul sewer systems CFS2, Surface water management intervention SWM4 and SWM6 carried over. WWT2 and WWT3 Wastewater treatment removed. |
| HARBERTONFORD_STW_HARBERTONFORD | Standard | SWW: Potential SUDS for SW separation | Short term, EA: Consult EA on investment decisions - | CFS2 | SWM4 | SWM6 | WWT3 | | Combined and foul sewer systems CFS2, Surface water management |

| TPU | Class | Nature based solutions assessment Comments | Partnership working potential Comments | Final #1 | Final #2 | Final #3 | Final #4 | Final #5 | Final DWMP ODA assessment summary |
|---|---|---|---|---|---|---|---|---|---|
| | | | properties close to main river, relationship of tributaries and performance to operating rules of Palmer's Dam Flood Storage Area upstream. SWW: Potential SUDS | | | | | | intervention SWM4 and SWM6 carried over. WWT3 Wastewater treatment added. Combined and foul sewer systems CFS1 removed. |
| IPPLEPEN_STW _IPPLEPEN | Extended | SWW: Potential SUDS for SW separation | SWW: Potential SUDS | CFS2 | SWM4 | SWM6 | WWT3 | | Surface water management SWM6 and Surface water management SWM4 carried over. Wastewater treatment WWT2 replaced with WWT3. Combined and |

| TPU | Class | Nature based solutions assessment Comments | Partnership working potential Comments | Final #1 | Final #2 | Final #3 | Final #4 | Final #5 | Final DWMP ODA assessment summary |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | foul sewer systems CFS2 carried over. |
| KILBURY_STW_BUCKFASTLEIGH | Extended | SWW: Potential SUDS for SW separation | SWW: Potential SUDS | CFS2 | SWM4 | SWM6 | WWT3 | | Combined and foul sewer systems CFS2, Surface water management SWM4 and Surface water management SWM6 carried over. Wastewater treatment WWT3 added in. |
| PRINCETOWN_STW_PRINCETOWN | Standard | SWW: Potential SUDS for SW separation | Short term, EA: Upstream works unlikely to resolve problems, if this changes please consult EA and | WWT3 | | | | | Surface water management SWM4 and Combined and foul sewer systems CFS2 removed. Wastewater treatment intervention WWT3 was |

| TPU | Class | Nature based solutions assessment Comments | Partnership working potential Comments | Final #1 | Final #2 | Final #3 | Final #4 | Final #5 | Final DWMP ODA assessment summary |
|---|---|---|---|---|---|---|---|---|---|
| | | | Dartmoor NP on Dartmoor headwaters project SWW: Potential SUDS | | | | | | retained |
| STAVERTON_STW_STAVERTON | Standard | SWW: Potential SUDS for SW separation | SWW: Potential SUDS | CFS2 | SWM4 | SWM6 | | | Combined and foul sewer systems CFS2, Surface water management SWM4 and SWM6 carried over |
| TOTNES_STW_TOTNES | Complex | SWW: Potential SUDS for SW separation | SWW: Potential SUDS | CFS2 | SWM4 | SWM6 | WWT3 | | Combined and foul sewer systems CFS2 and Surface water management SWM4 & SWM6 carried over. Wastewater treatment interventions WWT3 added. |

For the Dart catchment, 12 TPUs progressed to ODA. Stakeholder feedback was received on 2 TPUs. The feedback was mainly on the need to:

- Consult the EA and partners on potential Surface Water Separation (SWS) plans
- Consider links to surface water, fluvial and sea flooding, planned schemes
- Consider coastal erosion risk

Potential Nature Based Solutions were identified for 12 catchments (largely SuDS for Surface Water Separation) and partnership opportunities were identified for 12 catchments (largely on SWS/SuDS).

Table 26 below summarises the final interventions selected now that the ODA stage is complete.

***Table 26**: Initial and Final Interventions selected by intervention type*

| INTERVENTION | Total selected Final |
|---|---|
| CE1: Promote and make available water efficient appliances to reduce production of domestic wastewater | 0 |
| CE2: Promote and make available rainwater harvesting systems | 0 |
| CE3: Promotion of incentives to reduce impermeable areas | 0 |
| CE4: Love Your Loo, etc | 0 |
| SWM1: Company installation of source control sustainable drainage systems (SuDS) | 0 |
| SWM2: SuDS partnerships with key stakeholders | 0 |
| SWM3: Upper Catchment Solution/Up Stream Thinking | 0 |
| SWM4: Separate surface water from combined systems by constructing new surface water networks (and/or modify existing) | 11 |
| SWM5: Integrate surface water pathway measures into new and upgraded third party designs | 0 |
| SWM6: Develop a program to reduce infiltration | 10 |
| CFS1: Implement widespread sewer/pumping station level monitoring, live; network modelling linked to operational responses such as proactive jetting | 0 |
| CFS2: Construct new combined or foul storage systems | 11 |
| CFS3: Replace or upgrade existing networks | 0 |
| CFS4: Inter-catchment network transfers | 0 |
| CFS5: inter-catchment WwTW's transfers | 0 |

| INTERVENTION | Total selected Final |
|---|---|
| WWT1: Treat or pre-treat flows at existing pumping stations or within sewer network | 0 |
| WWT2: Upgrade existing works using more intensive processes | 0 |
| WWT3: Add additional process streams (increase plant capacity) | 8 |
| WWT4: Replace existing treatment works with one large scale installation | 0 |
| WWT5: Replace existing treatment works with several smaller scale installations | 0 |
| WWT7: Catchment consenting | 0 |
| WWT8: Adapative consenting (e.g. "wet weather" relaxation) | 0 |
| WWT9: Initiatives to address fertiliser use and application | 0 |
| Total | 40 |

There were no interventions selected in the Dart catchment for customer education, although education to promote water efficiency, rainwater harvesting, reducing impermeable areas and preventing sewer misuse will be delivered across the region as part of a company-wide initiative. There were no interventions selected for CFS1 monitoring to direct proactive jetting effort to manage flooding and pollution incidents due to blockages.

Construction of storage systems (CFS2) was recommended based on the results of modelling for storm overflow risk and the preferred solution being a combination of surface water separation and storage.

Where a strategic network or treatment intervention was selected (CFS4,5 WWT4,5) the selection was noted but not progressed under DWMP. These strategic decisions will lead to bespoke plans which will be revisited for PR24 and captured separately in the programme.

The ODA process led to a lot more Surface Water Management (SWM) interventions being selected. Infiltration (SWM6) was selected in all catchments, with the view that this would be the first task to help understand flows and identify opportunities for Surface Water Separation (SWM4), SuDS (SWM1,2) and other nature-based solutions such as Upstream Thinking and Natural Flood Management (SWM3). Our assumption is that unless specifically ruled out, Nature Based solutions such as SuDS will be possible, so they will be explored wherever surface water separation was selected.

### Results – Quantities

Table 27 below outlines the quantities of interventions proposed by the DWMP for the Dart catchment.

***Table 27**: Quantities for proposed interventions*

| TPU | Storage (m3) | SWS (ha) | Network Enhancement (km) | No. WWTW for Capacity increase | No. WWTW for DWF increase | No. WWTW for Nutrient reduction |
|---|---|---|---|---|---|---|
| ASHPRINGTON_STW_ASHPRINGTON | 536 | 3.2 | 2.46 | 0 | 0 | 0 |
| BROADHEMPSTON_STW_BROADHEMPSTON | 7,820 | 7.0 | 0.81 | 1 | 0 | 0 |
| CAPTON_STW_CAPTON | 0 | 0.0 | 0.00 | 0 | 0 | 0 |
| CORNWORTHY_STW_DARTMOUTH | 4,400 | 5.2 | 0.83 | 1 | 1 | 0 |
| DARTMOUTH_STW_DARTMOUTH | 711 | 7.4 | 0.00 | 0 | 0 | 0 |
| DENBURY_STW_DENBURY | 1,522 | 7.0 | 2.33 | 0 | 0 | 1 |
| DITTISHAM MAIN_STW_DITTISHAM | 489 | 5.5 | 3.88 | 1 | 1 | 0 |
| GULLAFORD FARM ST_SEPTNK_LANDSCOVE | 0 | 0.0 | 0.00 | 0 | 0 | 0 |
| HALWELL_STW_HALWELL | 0 | 0.0 | 0.00 | 0 | 0 | 0 |
| HARBERTON_STW_HARBERTON | 10,000 | 14.0 | 1.51 | 0 | 0 | 0 |
| HARBERTONFORD_STW_HARBERTONFORD | 1,215 | 4.0 | 2.11 | 0 | 0 | 1 |
| HILLCROFT_STW_LANDSCOVE | 0 | 0.0 | 0.00 | 0 | 0 | 0 |
| HOLNE_STW_HOLNE | 3,415 | 5.0 | 1.00 | 0 | 0 | 0 |
| HUXHAMS CROSS_STW_DARTINGTON | 0 | 0.0 | 0.00 | 0 | 0 | 0 |
| IPPLEPEN_STW_IPPLEPEN | 585 | 5.2 | 13.36 | 0 | 0 | 1 |
| KILBURY_STW_BUCKFASTLEIGH | 4,066 | 16.1 | 46.59 | 0 | 0 | 1 |
| KINGSWEAR ST_STW_KINGSWEAR | 0 | 0.0 | 0.00 | 0 | 0 | 0 |
| LADY MEADOW_SEPTNK_WIDECOMBE | 0 | 0.0 | 0.00 | 0 | 0 | 0 |
| LEUSDON_STW_LEUSDON | 0 | 0.0 | 0.00 | 0 | 0 | 0 |

| TPU | Storage (m3) | SWS (ha) | Network Enhancement (km) | No. WWTW for Capacity increase | No. WWTW for DWF increase | No. WWTW for Nutrient reduction |
|---|---|---|---|---|---|---|
| MEMORY CROSS_STW_LANDSCOVE | 0 | 0.0 | 0.00 | 0 | 0 | 0 |
| PONSWORTHY_STW_PONSWORTHY | 0 | 0.0 | 0.00 | 0 | 0 | 0 |
| POUNDSGATE_STW_POUNDSGATE | 0 | 0.0 | 0.00 | 0 | 0 | 0 |
| PRINCETOWN_STW_PRINCETOWN | 0 | 0.0 | 0.00 | 1 | 0 | 0 |
| RATTERY_STW_RATTERY | 0 | 0.0 | 0.00 | 0 | 0 | 0 |
| RIVERSIDE ROAD ST_STW_DITTISHAM | 0 | 0.0 | 0.00 | 0 | 0 | 0 |
| SCORRITON_STW_SCORRITON | 82 | 1.3 | 0.45 | 0 | 0 | 0 |
| SOUTHFORD_SEPTNK_STAVERTON | 0 | 0.0 | 0.00 | 0 | 0 | 0 |
| STAVERTON_STW_STAVERTON | 65 | 1.1 | 1.37 | 0 | 0 | 0 |
| TOTNES_STW_TOTNES | 5,885 | 21.8 | 44.87 | 0 | 1 | 0 |
| WIDECOMBE_STW_WIDECOMBE IN THE MOOR | 0 | 0.0 | 0.00 | 0 | 0 | 0 |

Our proposals for the Dart catchment include approximately 103ha of SWS by conventional or SUDS solutions, 40,791m$^3$ of storage, 121km of network enhancement, work to improve DWF compliance at 3 treatment sites, upgrading of capacity at 4 treatment sites and work to reduce nutrients at 4 treatment sites. [2]

### Surface Water Separation and SuDS Assessment

To explore opportunities for SWS and SuDS, Stantec's GIS based Surface Water Assessment Tool (SWAT) was applied to the 26 Complex TPUs that were hydraulically modelled for future flood risk (FFR). The tool plots impermeable area, green space, existing networks, buildings, roads and watercourses. It plots existing foul combined and surface water networks and identifies where surface water sewers join combined sewers as potential points for disconnection. It identifies potential land and road space as well as residential and commercial properties for different interventions. Appendix F outlines the approach.

[2] Please note that these are high level strategic planning proposals and do not represent a commitment. The plans and overall programme need to be assessed against other risks and against the wider South West Water programme for risk and affordability.

The high-level results indicate that on average it is estimated that SuDS might be suitable for delivering approximately 55% of the SWS required to mitigate the future flood risk in modelled catchments. This ranged from 0% where there was limited space, impermeable land, and no water courses present to discharge to, to 100% in some TPUs. We intend to develop the tool and process in more detail in the future as we progress the first DWMP interventions through feasibility.

### Upstream Thinking and Natural Flood Management

Appendix G shows the coverage of current UST projects in the SWW region where upper catchment solutions are being successfully explored and the intention is to expand this approach. South West Water's infiltration and site surveys may identify opportunities for Natural Flood Management and Upstream Thinking interventions in the Dart catchment. South West Water intend to collaborate with the EA and take a similar GIS based approach to assessing Natural Flood Management options where tackling shared surface water flooding issues.

### Next Steps

A cornerstone of the DWMP framework and process is collaboration between water companies and key stakeholders. To be successful in developing an effective plan that provides innovative solutions and better value for customers, while protecting our environment and ensuring we meet the future pressure on our drainage systems, we need to work together, and we rely on the active participation of our stakeholders to engage with us in the concept, planning and delivery of this plan.

# APPENDICES

## APPENDIX A: SEWER OVERFLOW DETAILS

South West Water has a programme to monitor the use and performance of storm overflows and the number of monitors is planned to increase. The table below provides a summary of any available performance data for storm overflows in the catchment.

***Table 28**: Storm Overflow Performance Metrics*

| CD_Number | Waterbody | 2019 Reportable | 2019 Nr. Spills | 2020 Reportable | 2020 Nr. Spills | 2021 Reportable | 2021 Nr. Spills |
|---|---|---|---|---|---|---|---|
| CD402150 | Harbourne River | Y | 121 | Y | 189 | Y | 158 |
| CD202150 | Harbourne River | Y | 8 | Y | 158 | Y | 166 |
| CD201330 | Teign, Avon, Dart and Erme | Y | 154 | Y | 150 | Y | 119 |
| CD716470 | Teign, Avon, Dart and Erme | Y | 105 | Y | 134 | Y | 107 |
| CD402440 | Teign, Avon, Dart and Erme | Y | 0 | Y | 128 | Y | 130 |
| CD405180 | Teign, Avon, Dart and Erme | Y | 119 | Y | 127 | Y | 104 |
| CD200720 | Dart | Y | 95 | Y | 126 | Y | 107 |
| CD200100 | Teign, Avon, Dart and Erme | Y | 75 | Y | 118 | Y | 97 |
| CD400720 | Dart | Y | 81 | Y | 114 | Y | 112 |
| CD707010 | Teign, Avon, Dart and Erme | Y | 103 | Y | 106 | Y | 65 |
| CD516160 | Teign, Avon, Dart and Erme | Y | 0 | Y | 102 | Y | 100 |
| CD400100 | Teign, Avon, Dart and Erme | Y | 82 | Y | 97 | Y | 69 |
| CD713230 | Teign, Avon, Dart and Erme | Y | 79 | Y | 78 | Y | 44 |
| CD402570 | Am Brook | Y | 57 | Y | 76 | Y | 59 |
| CD401510 | Teign, Avon, Dart and Erme | Y | 73 | Y | 74 | Y | 44 |

| CD_Number | Waterbody | 2019 Reportable | 2019 Nr. Spills | 2020 Reportable | 2020 Nr. Spills | 2021 Reportable | 2021 Nr. Spills |
|---|---|---|---|---|---|---|---|
| CD706370 | Teign, Avon, Dart and Erme | Y | 47 | Y | 69 | Y | 71 |
| CD202160 | Harbourne River | Y | 93 | Y | 65 | Y | 109 |
| CD516100 | Bidwell Brook | Y | 48 | Y | 61 | Y | 64 |
| CD705890 | Teign, Avon, Dart and Erme | Y | 76 | Y | 57 | Y | 25 |
| CD516120 | Bidwell Brook | Y | 43 | Y | 57 | Y | 31 |
| CD202570 | Am Brook | Y | 51 | Y | 53 | Y | 34 |
| CD515430 | Teign, Avon, Dart and Erme | Y | 46 | Y | 53 | Y | 44 |
| CD517760 | Teign, Avon, Dart and Erme | Y | 42 | Y | 50 | Y | 45 |
| CD509450 | Teign, Avon, Dart and Erme | Y | 43 | Y | 38 | Y | 36 |
| CD204890 | Dart | Y | 40 | Y | 31 | Y | 13 |
| CD516140 | Teign, Avon, Dart and Erme | Y | 12 | Y | 30 | Y | 15 |
| CD709440 | Teign, Avon, Dart and Erme | Y | 6 | Y | 28 | Y | 18 |
| CD517770 | Teign, Avon, Dart and Erme | Y | 0 | Y | 28 | Y | 18 |
| CD515900 | Teign, Avon, Dart and Erme | Y | 0 | Y | 23 | Y | 13 |
| CD517740 | Teign, Avon, Dart and Erme | Y | 4 | Y | 16 | Y | 19 |
| CD520070 | Bidwell Brook | Y | 0 | Y | 15 | Y | 44 |
| CD520040 | Teign, Avon, Dart and Erme | Y | 4 | Y | 15 | Y | 23 |
| CD522040 | Teign, Avon, Dart and Erme | Y | 23 | Y | 11 | Y | 20 |

| CD_Number | Waterbody | 2019 Reportable | 2019 Nr. Spills | 2020 Reportable | 2020 Nr. Spills | 2021 Reportable | 2021 Nr. Spills |
|---|---|---|---|---|---|---|---|
| CD516130 | Bidwell Brook | Y | 0 | Y | 11 | Y | 34 |
| CD817791 | Wash | Y | 4 | Y | 5 | Y | 0 |
| CD803840 | Teign, Avon, Dart and Erme | Y | 0 | Y | 4 | Y | 0 |
| CD706130 | Teign, Avon, Dart and Erme | Y | 3 | Y | 4 | Y | 358 |
| CD515890 | Dart | Y | 3 | Y | 3 | Y | 10 |
| CD522030 | Teign, Avon, Dart and Erme | Y | 1 | Y | 1 | Y | 3 |
| CD818820 | Dart | Y | 0 | Y | 0 | Y | 1 |
| CD817780 | Teign, Avon, Dart and Erme | Y | 0 | Y | 0 | Y | 0 |
| n/a | n/a | n/a | n/a | n/a | n/a | Y | 303 |
| n/a | n/a | n/a | n/a | n/a | n/a | Y | 84 |
| n/a | n/a | n/a | n/a | n/a | n/a | Y | 63 |
| n/a | n/a | n/a | n/a | n/a | n/a | Y | 0 |
| n/a | n/a | n/a | n/a | n/a | n/a | Y | 0 |
| 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 | n/a | n/a |

## APPENDIX B: STORM OVERFLOW ASSESSMENT FRAMEWORK (SOAF) DETAILS

Storm overflows which do not affect Bathing Waters or Shellfish Waters, but may impact on amenity watercourses, are managed in accordance with the Storm Overflow Assessment Framework (SOAF) industry guidance. The following table shows the SOAF information for each storm overflow in the catchment

***Table 29**: SOAF triggered investigation sites*

| Site Name | CD Number |
|---|---|
| 31 FORE STREET_CSO_TOTNES | CD509450 |
| ASHPRINGTON STW_SO_ASHPRINGTON | CD400100 |
| ASHPRINGTON STW_SSO_ASHPRINGTON | CD200100 |
| BRIDGETOWN STEAMER QUAY_CSO_TOTNES | CD517760 |
| CORNWORTHY STW_SSO_DARTMOUTH | CD201330 |
| DARTHAVEN MARINA SPS_PSCSO_KINGSWEAR | CD705890 |
| DARTINGTON SCH TWO_CSO_DARTINGTON | CD516100 |
| FERRY BOAT SPST_PSCSOEO_DITTISHAM | CD713230 |
| HARBERTON STW_SO_HARBERTON | CD402150 |
| HARBERTON STW_SSO_HARBERTON | CD202150 |
| HARBERTONFORD STW_SO_HARBERTONFORD | CD202160 |
| HOLNE STW_SO_HOLNE | CD402440 |
| IPPLEPEN STW_SO_IPPLEPEN | CD402570 |
| IPPLEPEN STW_SSO_IPPLEPEN | CD202570 |
| KILBURY STW_SO_BUCKFASTLEIGH | CD400720 |
| KILBURY STW_SSO_BUCKFASTLEIGH | CD200720 |
| LOWER FERRY SPS_PSCSOEO_KINGSWEAR | CD706370 |
| MAYORS AVENUE_PSCSOEO_DARTMOUTH | CD707010 |
| SHINNERS BRIDGE_CSO_DARTINGTON | CD516120 |
| SMITH ST_CSO_DARTMOUTH | CD516160 |

| Site Name | CD Number |
|---|---|
| STONEPARK CRESCENT_CSO_ASHBURTON | CD515430 |
| TOTNES STW_SO_TOTNES | CD405180 |
| TOTNES TOWN SPST_PSCSOEO_TOTNES | CD716470 |
| TUCKENHAY BRIDGE SPS_PSEO_TUCKENHAY | CD817791 |

## APPENDIX C: RESPONSIVE INVESTMENT OPTIMISATION

Reactive investment needs are identified via investigations following reactive response to operational/customer issues and planned surveys that are targeted to detect and resolve problems before they have an impact on customers and the environment.

The investment needs are prioritised based on the risk to properties and the identification of repeat events. These needs then form a programme of works for delivery over the next 12 months. Details for any needs recorded for the Dart catchment are also shown in Table below.

***Table 30**: Reactive investment opportunities*

| IM Number | Driver | Route | Stage | Status | Stage No |
|---|---|---|---|---|---|
| N83216 | Capital Maintenance | Rapid Investment - WWS-Networks (Flooding) | Investment Initialisation | In Progress | Stage 1 |
| N74517 | Capital Maintenance | Rapid Investment - WWS-Networks (Flooding) | Confirm Scope | In Progress | Stage 7 |
| N80370 | Capital Maintenance | Rapid Investment - WWS-Networks (Pollution) | Confirm Scope | In Progress | Stage 7 |
| N73070 | Capital Maintenance | Rapid Investment - WWS-Networks (Flooding) | Confirm Scope | In Progress | Stage 7 |
| N65118 | Capital Maintenance | Rapid Investment - WWS-Networks (Flooding) | Confirm Scope | In Progress | Stage 7 |
| N82477 | Capital Maintenance | Rapid Investment - WWS-Networks (Flooding) | Confirm Scope | In Progress | Stage 7 |
| N72518 | Capital Maintenance | Rapid Investment - WWS-Networks (Flooding) | Confirm Scope | In Progress | Stage 7 |
| N81823 | Capital Maintenance | Rapid Investment - WWS-Networks (Pollution) | Programmed | In Progress | Stage 8 |
| N74019 | Capital Maintenance | Rapid Investment - WWS-Networks (Transferred Sewers) | Programmed | In Progress | Stage 8 |
| N78820 | Capital Maintenance | Rapid Investment - WWS-Networks (Pollution) | Completed | Completed | Stage 9 |
| N80419 | Capital | Rapid Investment | Completed | Completed | Stage 9 |

| IM Number | Driver | Route | Stage | Status | Stage No |
|---|---|---|---|---|---|
| | Maintenance | - WWS-Networks (Pollution) | | | |
| N79023 | Enhanced Service Levels | Rapid Investment - WWS-Networks (Flooding) | Completed | Completed | Stage 9 |

## APPENDIX D: SURFACE WATER SEPARATION AND SuDS APPROACH

To explore opportunities for SWS and SuDS, Stantec's GIS based Surface Water Assessment Tool (SWAT) was applied to the 26 Complex TPUs that were hydraulically modelled for future flood risk (FFR). The tool plots impermeable areas, green space, existing networks, buildings, roads and watercourses. It plots existing foul combined and surface water networks and identifies where surface water sewers join combined sewers as potential points for disconnection. It identifies potential land and road space as well as residential and commercial properties for different interventions.

Using this insight our approach for surface water separation and SuDS is to find an alternative pathway for surface water, where we identify surface water contributing to risks in our networks. Surface water can originate from buildings, roads/highways and paved areas. Surface water collection may also exist but be connected to the foul network at some point. In this case we would consider options to provide an alternative pathway for the surface water such a swale or other watercourse or SuDS solution where space and natural topography support this approach. This would include conveying the surface water to an appropriate location. Further modelling and investigations are required to ensure this will not generate a surface water flooding risk elsewhere.

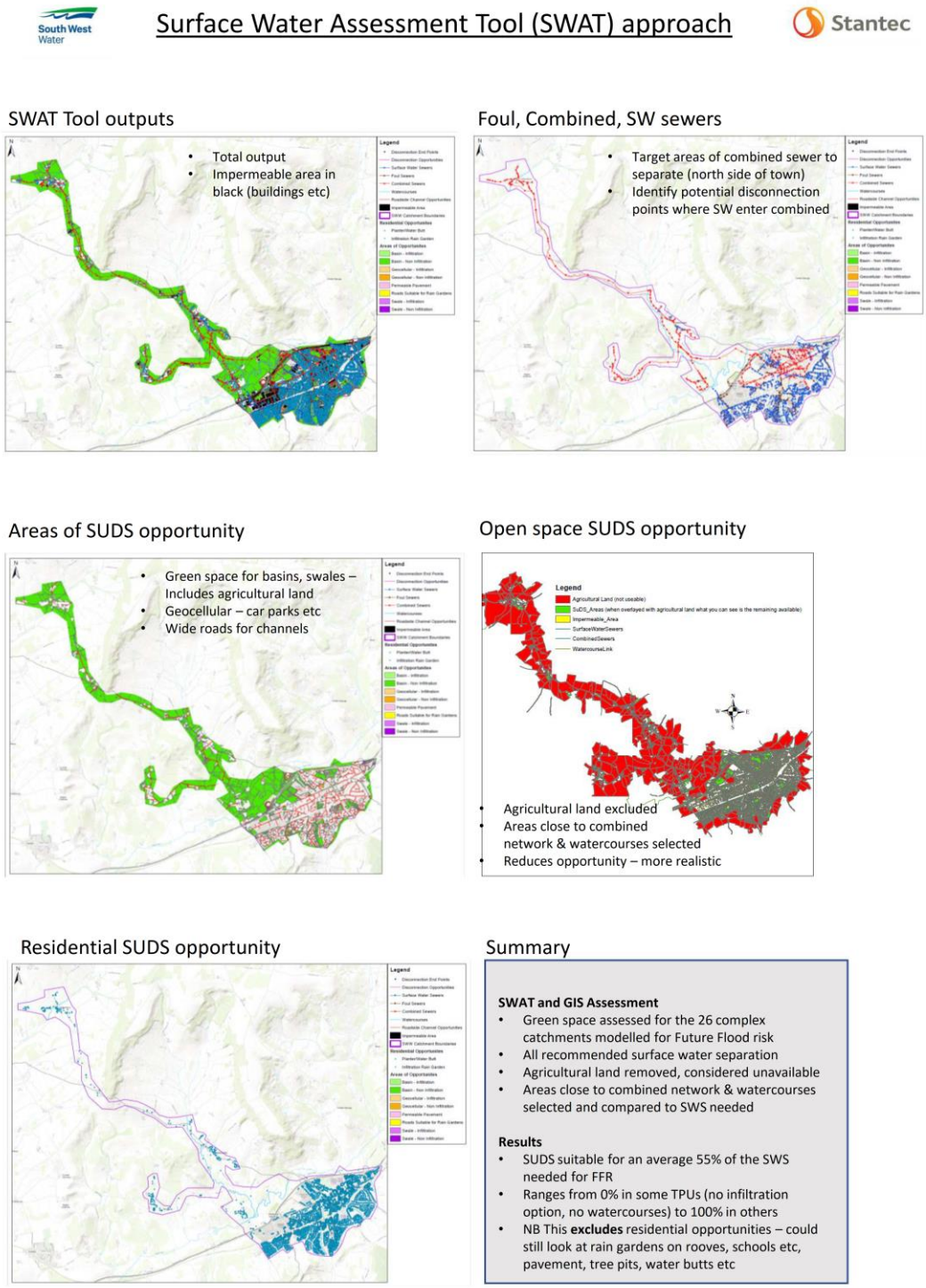


*Figure 17: Approach to assessing opportunity for SuDS solutions for Surface Water Separation*

## APPENDIX E: CURRENT AND PLANNED UPSTREAM THINKING (UST) PROJECTS

South West Water's infiltration and site surveys may identify opportunities for Natural Flood Management and Upstream Thinking interventions in the Dart catchment. South West Water intend to collaborate with the EA and take a similar GIS based approach to assessing Natural Flood Management options where tackling shared surface water flooding issues. The figure below shows the coverage of current upstream thinking (UST) projects in the vicinity of the Dart catchment where upper catchment solutions are being explored; the intention is to expand this approach.

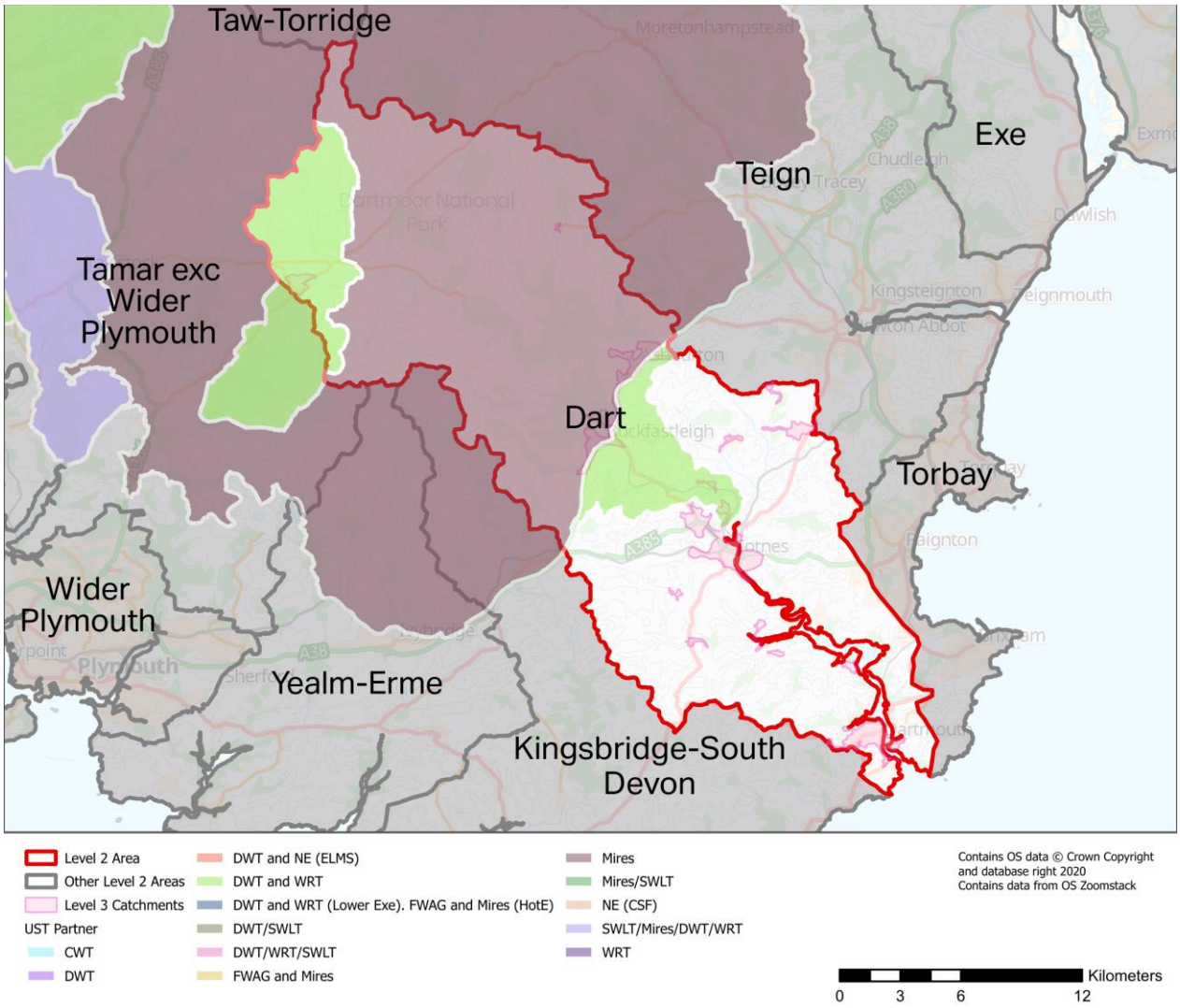


*Figure 18: Catchments with Upstream Thinking Programmes*