South West Water

Drainage and Wastewater Management Plan

Camel

May 2023

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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 Camel 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

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www.southwestwater.co.uk

Overview

Area Details

The Camel catchment sits within the administrative district of Cornwall. It covers the main settlements of Bodmin, Wadebridge, Rock, Padstow, Camelford, Delabole, Lanivet, St Merryn, St Breward, Trevone, Trebetherick, St Tudy, Polzeath, Egloshayle, Pityme, St Teath, Constantine Bay, St Mabyn, Blisland, Nanstallon, New Polzeath, St Issey, St Kew Highway, St Minver, St Kew, Treyarnon, Helland, Harlyn, Dunmere and Tregoodwell.

The population of the Camel catchment in 2020 was 36,762 and is projected to grow to 50,295 by 2050, an increase of 36.8 %. The catchment is also impacted by the influx of tourists during the summer, with an increase of 18,015 or 49 % over the existing resident population.

The Camel catchment contains 19 km of watercourses including 11 km of Main River as designated by the Environment Agency (EA). This includes the Polmorla River, River Allen, River Amble, River Camel and Treguddick Stream.

Discharges in the Camel catchment may impact on the bathing waters of Harlyn Bay Beach and Rock Beach and the shellfish waters of Camel.

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

Wastewater Network

The Camel catchment area has approximately 305km of mapped sewers and 15 sewage pumping stations (SPS) to convey wastewater away from homes and businesses to 17 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 36 overflows of which 5 are emergency overflows in the Camel catchment (which should only operate as a result of other asset failure or power loss). There are 36 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)
Combined	153.7
Surface	69.4
Foul	81.5

Area Overview

Table 2 summarises the number of critical assets within the Camel 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	2	15	31	5	36

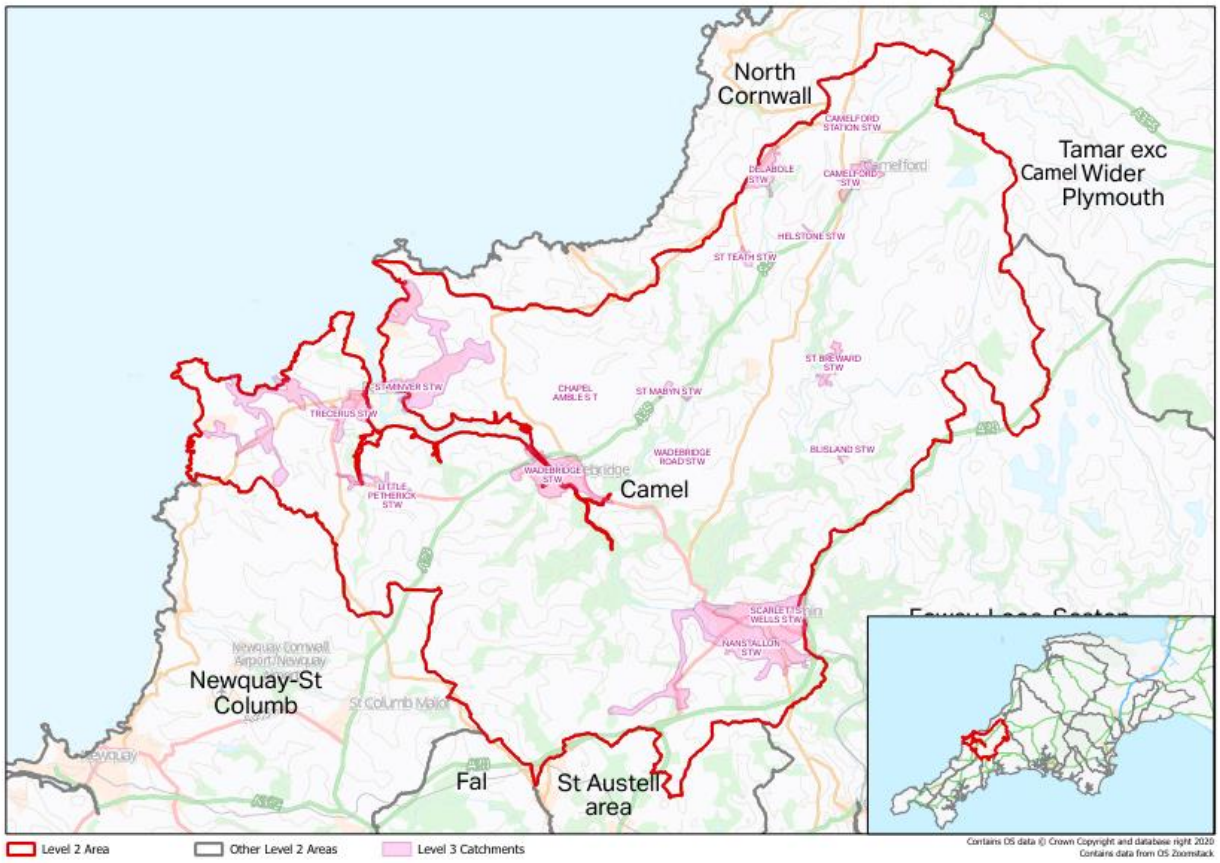

Figure 1: Catchment Overview

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 Camel catchment they are shown in Figure 2 below.

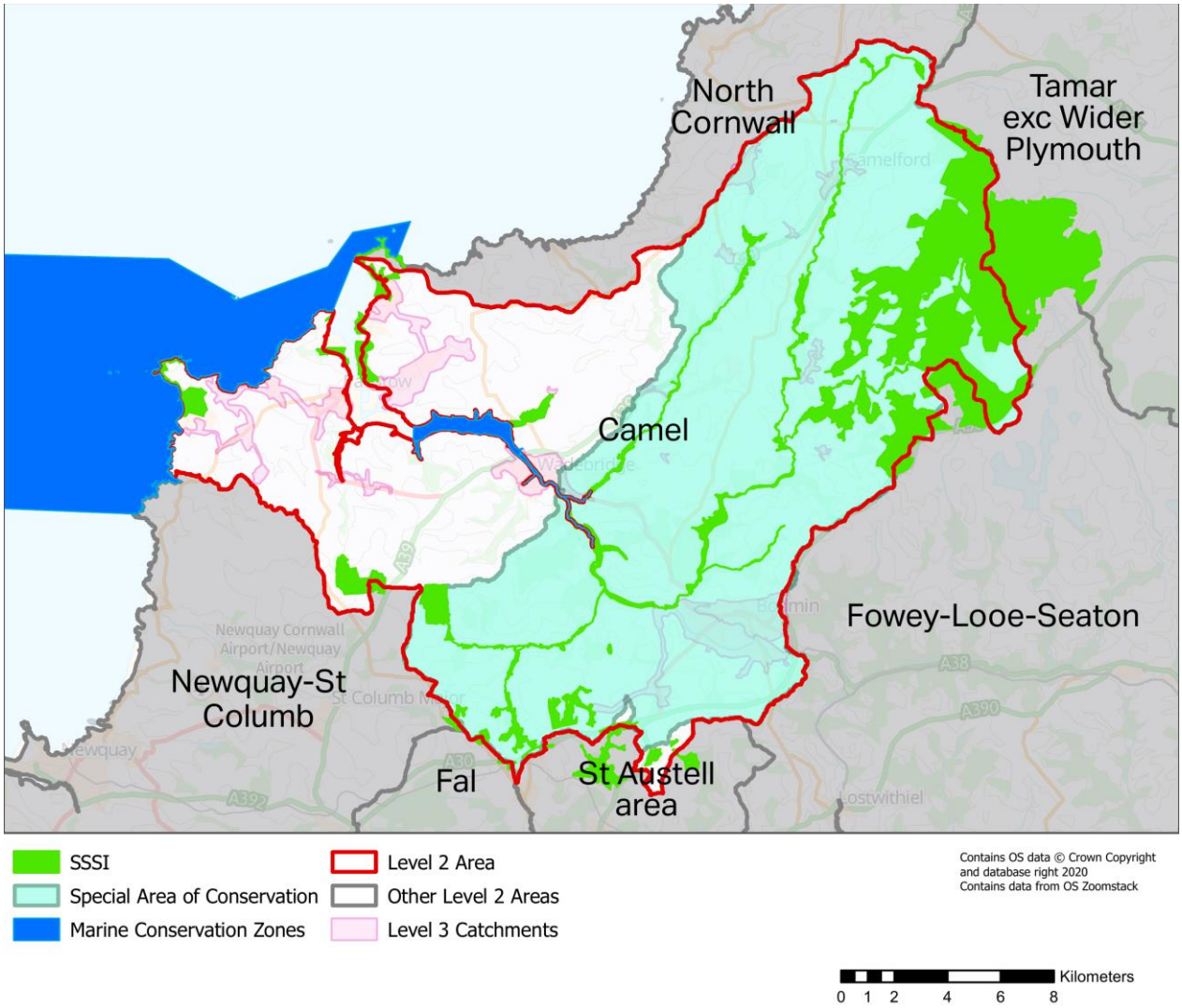

Figure 2: Designated Areas

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 Camel catchment is 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	2
2020	Internal	Other	4
2021	Internal	Other	4
2022	Internal	Other	2

The rate (events/km) of external sewer flooding in the Camel 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	47
2020	External	Hydraulic Overload	8
2020	External	Other	56
2021	External	Hydraulic Overload	5
2021	External	Other	48
2022	External	Hydraulic Overload	3
2022	External	Other	42

Year	Flooding Location	Flooding Cause Category	Count/km
2023	External	Hydraulic Overload	1
2023	External	Other	71

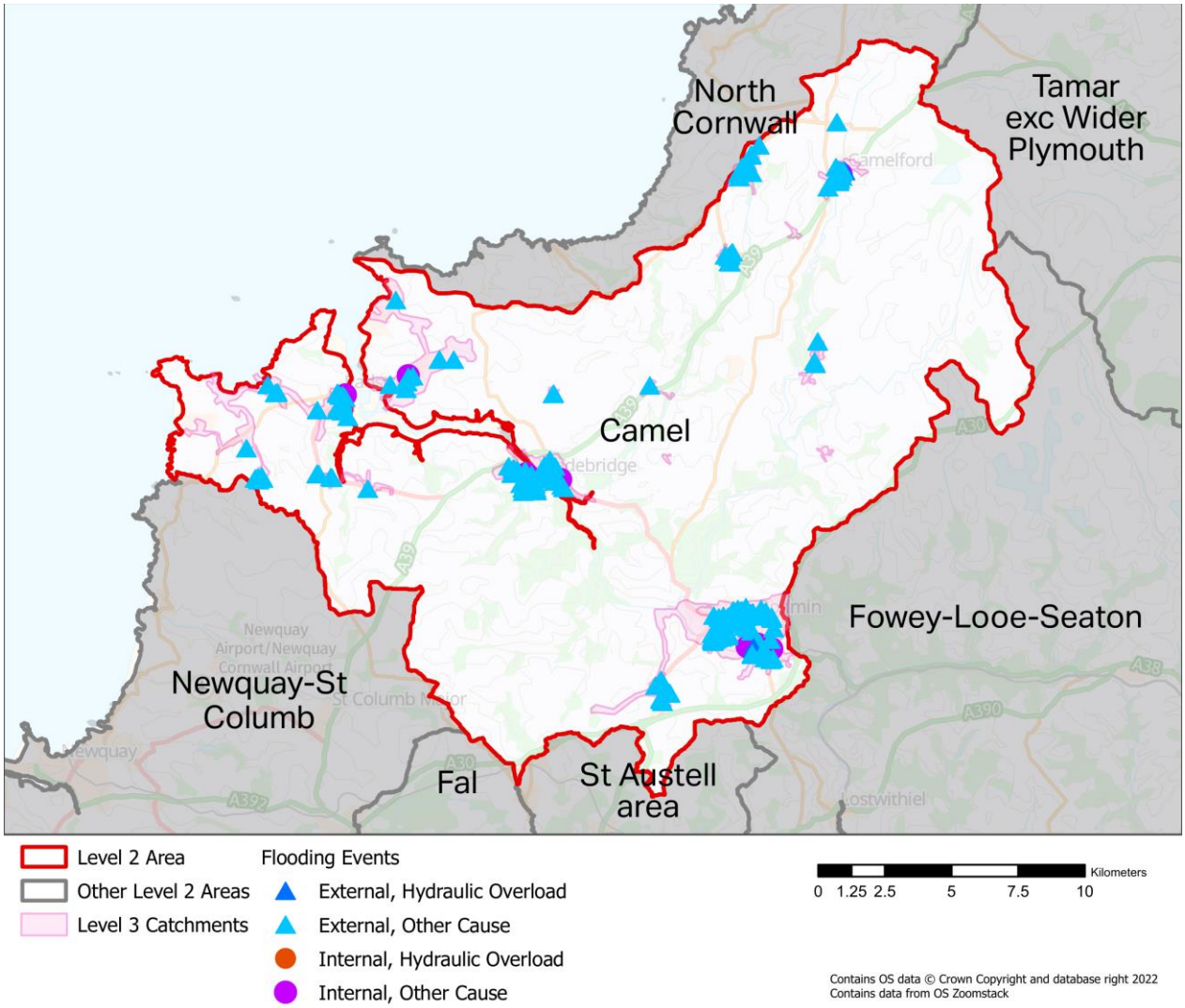

Figure 3: Sewer Flooding by location and cause

An assessment of future flooding risk has been carried out; the modelling approach is summarised 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.

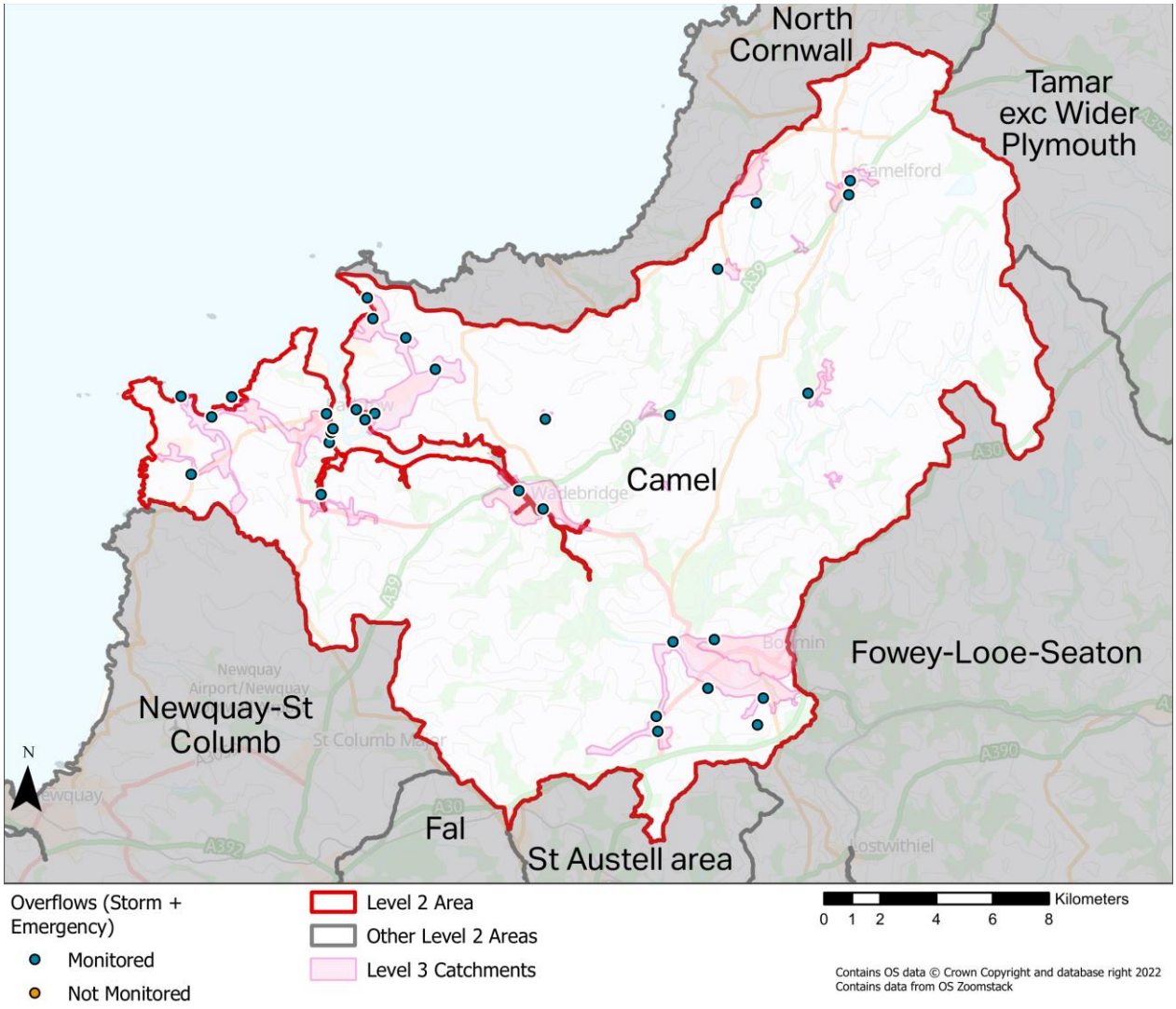

Figure 4: Overflow locations by monitoring status

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

Year	2019	2020	2021
No. Monitored	27	27	30
No. Spills	1014	1164	1101

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 Camel catchment is average 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 Camel catchment.

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

Year	Debris	Fat	Paper/Rag	Roots	Silt
2019	18	17	173	20	8
2020	15	8	145	18	2
2021	18	9	123	13	
2022	29	17	129	17	3
2023	38	13	175	19	2

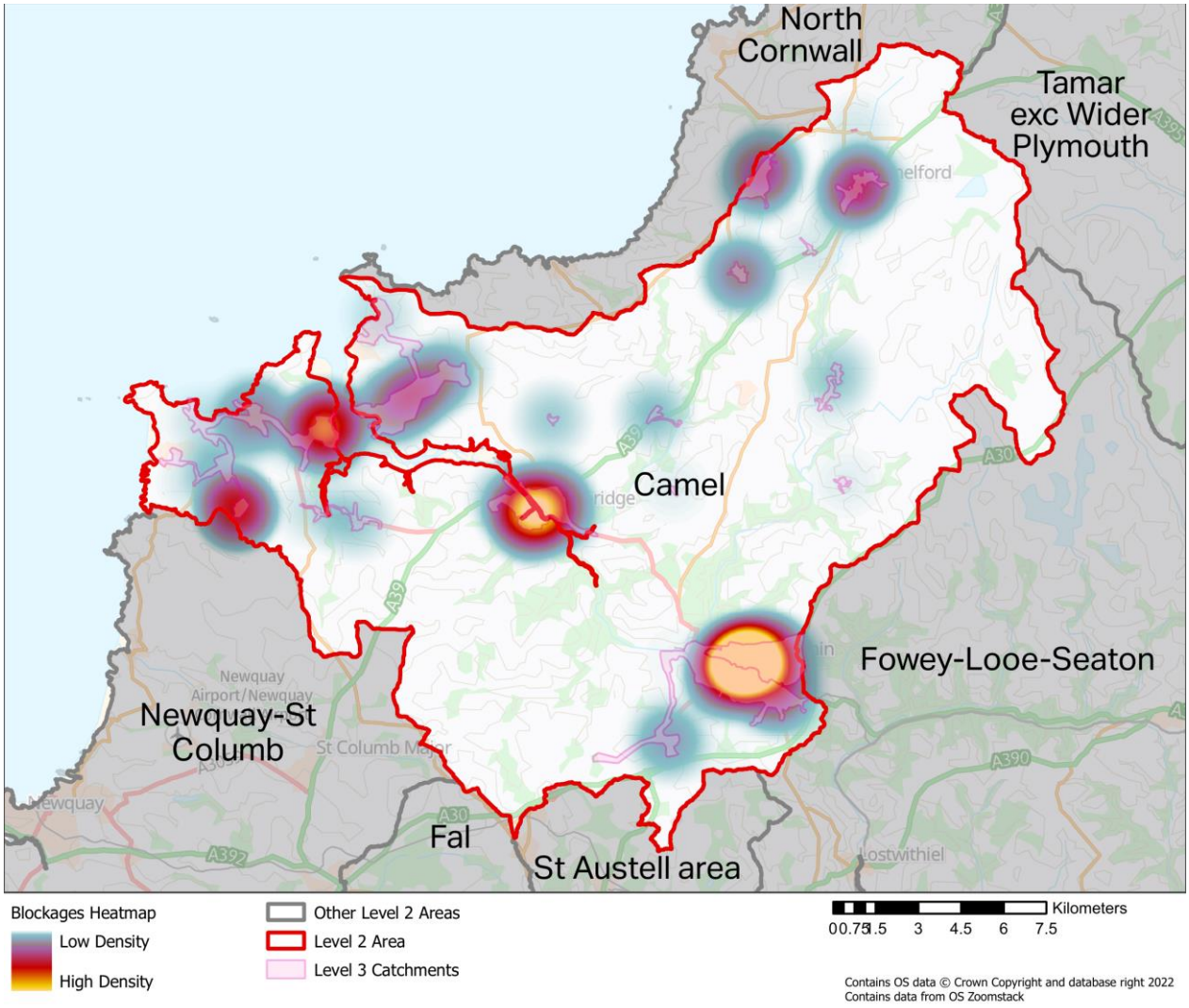

Figure 5: Blockage Event Heatmap

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 Camel 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
2019	4	5
2020	5	2
2021	2	0
2022	1	0
2023	1	0

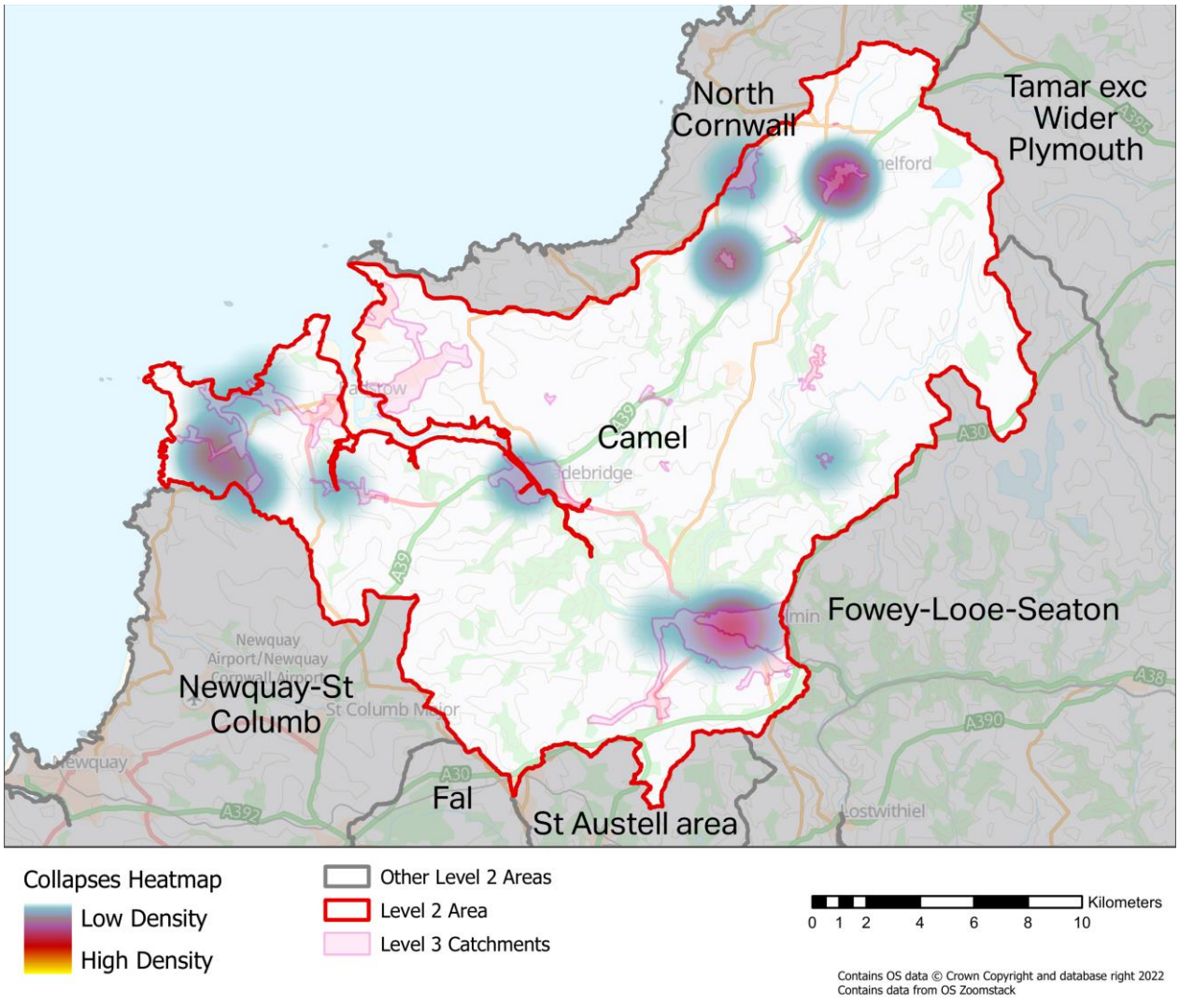

Figure 6: Sewer Collapse Heatmap

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.

Table 9 provides a count of flooding events caused as a result of issues at pumping stations and Table 10 provides a count of rising main bursts since the 2018/19 reporting year. Flooding and burst locations are shown in Figure 7.

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

Year	Feedback Cause	Count
2021	Pump Station Breakdown	1
2023	Pump Station Breakdown	1

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

Year	Feedback Cause	Count
2020	Collapse/Burst	2
2021	Collapse/Burst	3
2022	Collapse/Burst	2

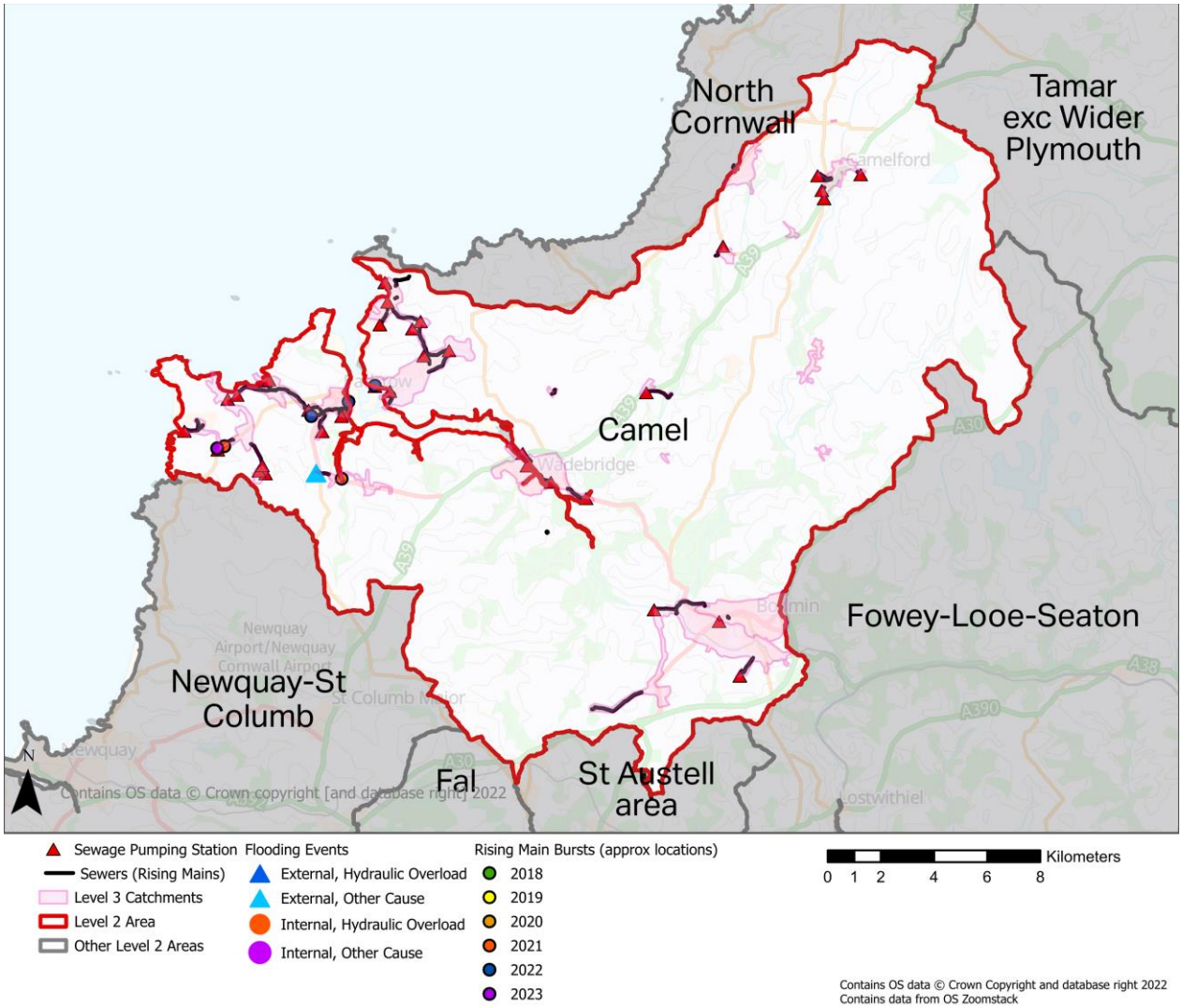

Figure 7: SPS/Rising Main flooding and burst events

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 26 category 3 (minor) pollution incidents in the Camel 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	8
2020	3	8
2021	3	7
2022	3	3

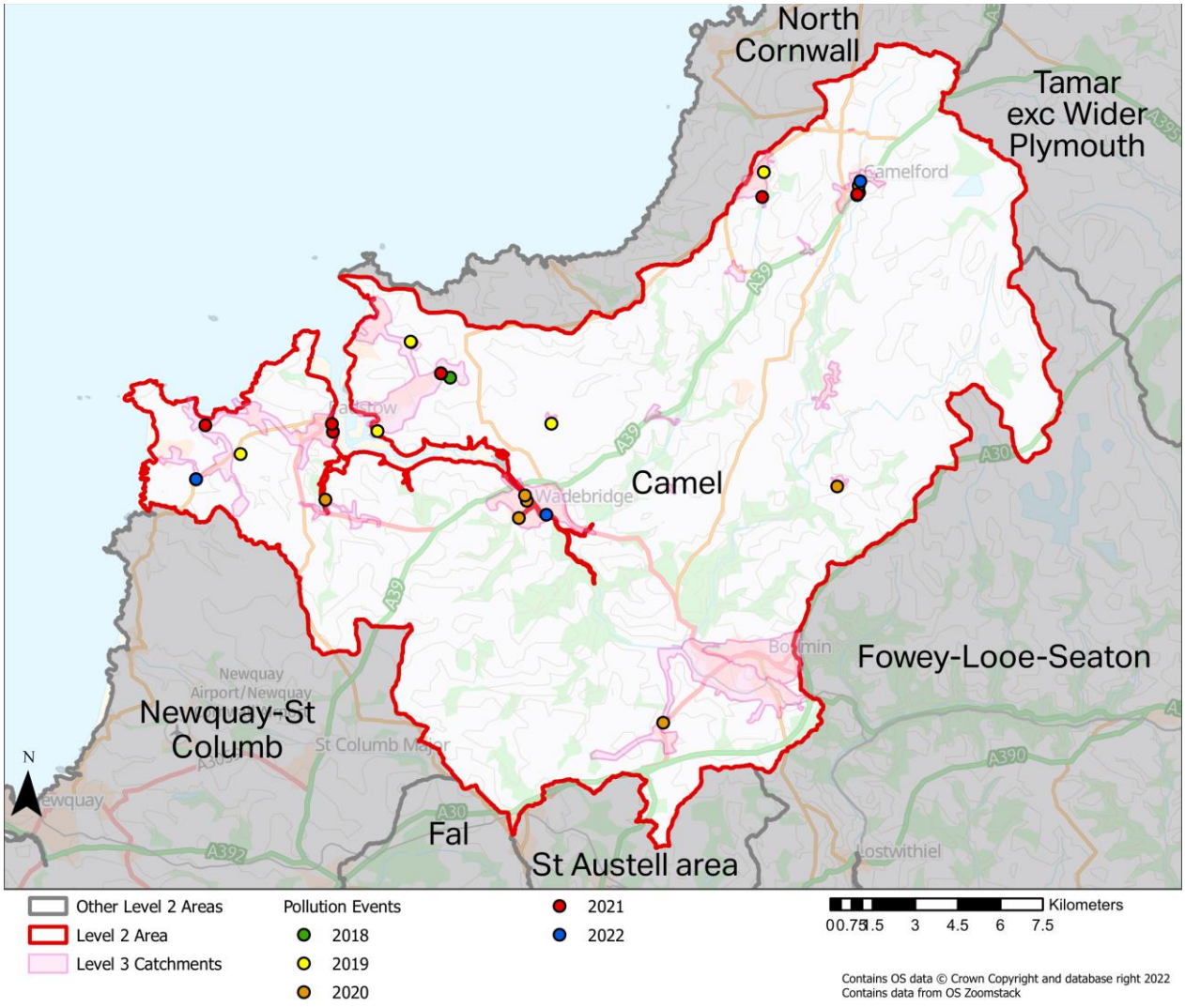

Figure 8: Pollution Events

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 Camel catchment.

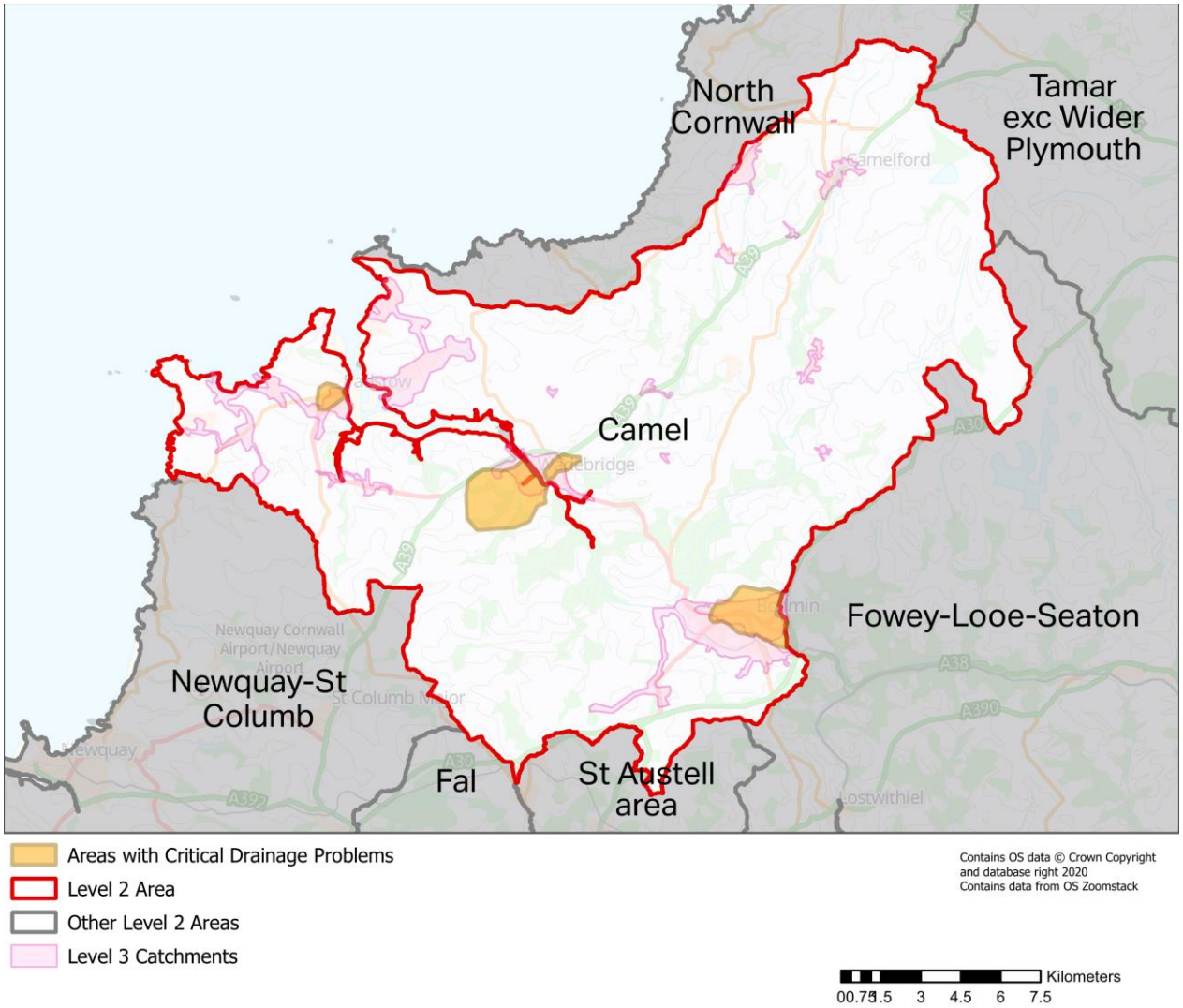

Figure 9: Critical Drainage Areas

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 Camel catchment has failed some wastewater treatment compliance checks since the 2018/19 reporting year. These are shown in Table 12.

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

Asset Equipment Name	Year	Fail Type	Parameter
DELABOLE_STW_DELABOLE	2019	Absolute Non Sanitary	Aluminium

Dry Weather Flow compliance has been achieved. Table 13 below shows the annual results since the 2018/19 reporting year.

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

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

Asset Name	Permitted (m3/d)	Comments
CAMELFORD_STW_CAMELFORD	338	Spare capacity available
DELABOLE_STW_DELABOLE	240	Spare capacity available
LITTLE PETHERICK_STW_WADEBRIDGE	187	Spare capacity available
NANSTALLON_STW_BODMIN	3,588	Spare capacity available
SCARLETTS WELL_STW_BODMIN	1,270	Spare capacity available
ST BREWARD_STW_ST BREWARD	308	Spare capacity available
ST MABYN_STW_ST MABYN	282	Spare capacity available
ST MINVER_STW_PORTHILLY	968	Spare capacity available
ST TEATH_STW_ST TEATH	126	Spare capacity available
TRECERUS_STW_PADSTOW	2,333	Spare capacity available
WADEBRIDGE_STW_WADEBRIDGE	3,370	Spare capacity available

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 Camel 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	2
Physical modifications	Flood protection - other operational management	1
	Land use - improved grassland	1
	Other (not in list, must add details in comments)	2
	Reservoir / Impoundment - non flow related	1
Pollution from abandoned mines	Abandoned mine	5
Pollution from rural areas	Farm/site infrastructure	2
	Incidents	1
	Land use - arable	2
	Poor Livestock Management	7
	Poor nutrient management	6
	Poor pesticide management	1
	Poor soil management	3
	Riparian/in-river activities (inc bankside erosion)	4
Pollution from towns, cities and transport	Private Sewage Treatment	1
Pollution from wastewater	Discharge	2
	Drought	1
	Natural conditions - other	1
	Not applicable	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

56 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	1
Employment	3
Hotel	1
Housing Development	45
Mixed Use Development	10
Tourist Accommodation	1
Tourist Park	2

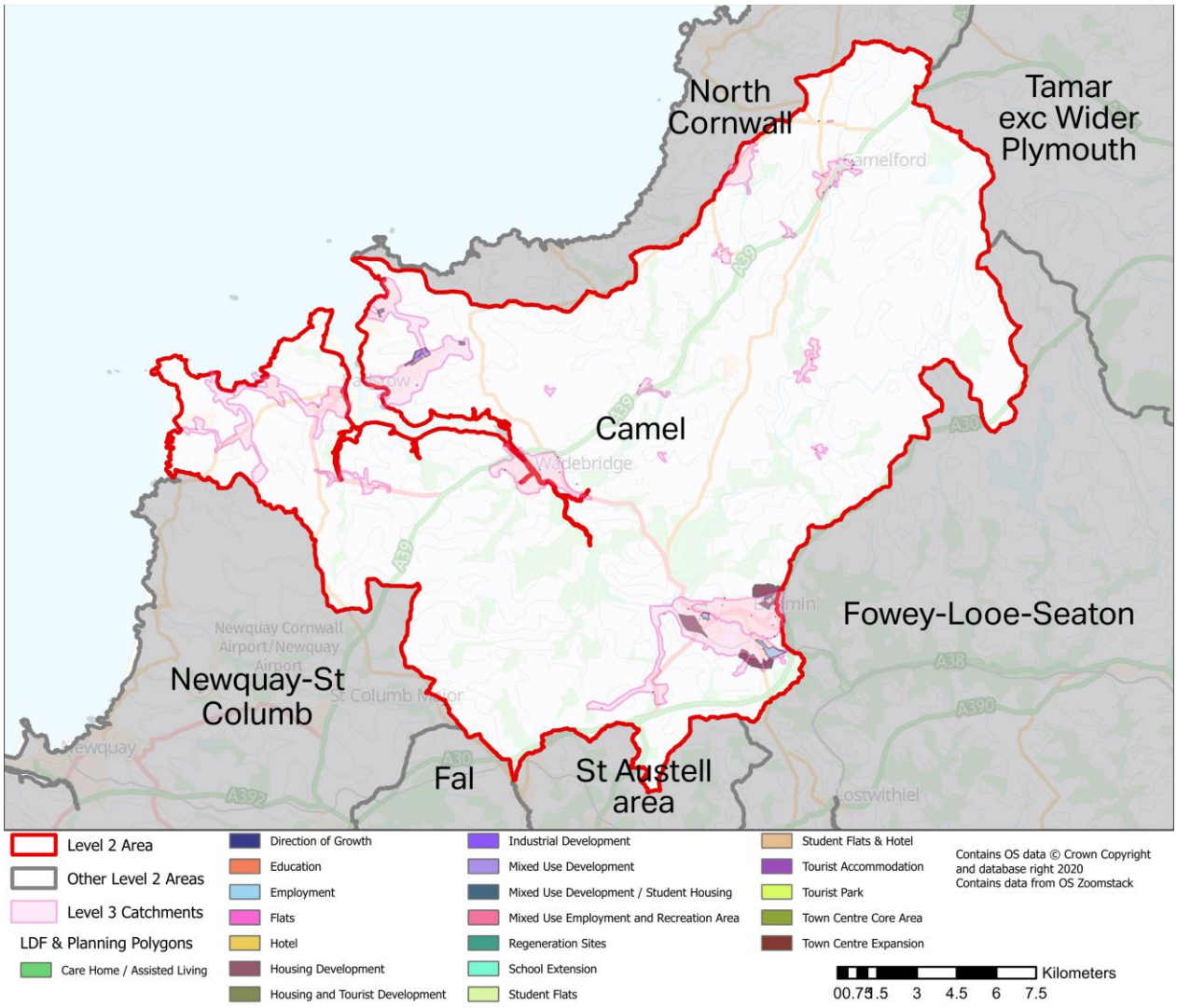

Figure 10: Local Development Framework Areas

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 Camel catchment are summarised in Table 16.

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

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

	Capital Maintenance	Quality	Total
Completed	1		1
Confirm Scope	4		4
Review Scope	2	1	3
Total	7	1	8

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 Camel catchment if present, with locations are shown in Figure 11.

There are currently 7 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
DCS01079	Camel (De Lank to Stannon)	River	U_INV2	2022-03-31	n/a	U_INV2 Investigation required as to suitability of existing inlet or outlet monitor to measure PFF.
DCS01134	Allen	River	U_INV2	2022-03-31	n/a	U_INV2 Investigation required as to suitability of existing inlet or outlet monitor to measure PFF.
EDM00533	Allen	River	U_INV	2022-03-31	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

WINEP ID	Name of Waterbody	Waterbody Type	Driver Code	Planned Completion Date	Investigations Scope	Additional Comments
EDM00535	Allen	River	U_INV	2022-03-31	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
EDM00562	n/a	n/a	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
EDM00563	n/a	n/a	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
FLO00697	n/a	n/a	U_INV2	2022-03-31	n/a	U_INV2 Investigation required as to suitability of existing inlet or outlet monitor to measure PFF.

There are currently 1 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
DCS01123	Allen	River	HD_IMP	2025-03-31	n/a	AMP 6 investigation outcome. Agreed with NE and SWW.

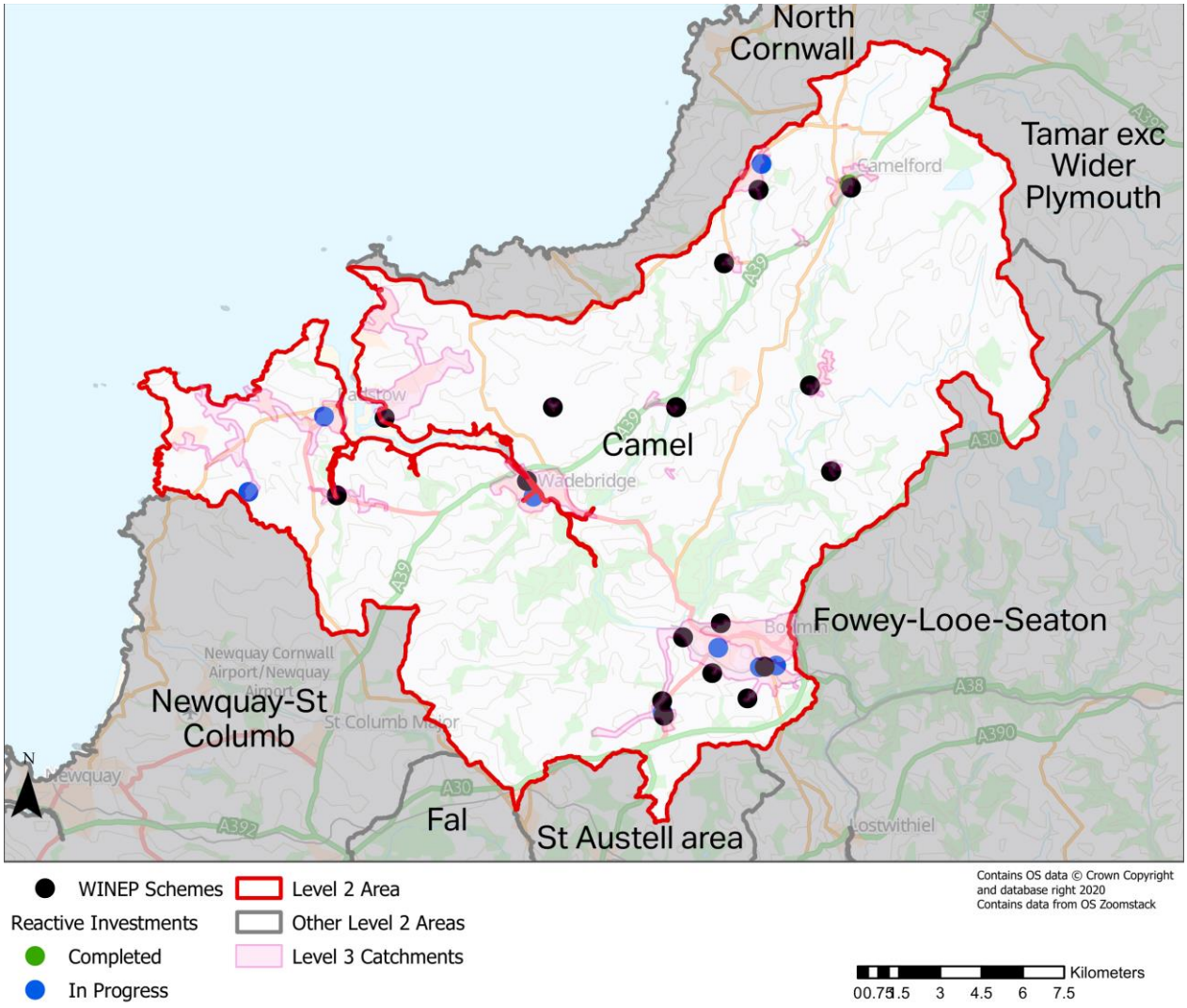

Figure 11: Reactive and WINEP Investment locations

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 Camel 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 Camel 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?
52295	Initial	17,320.3	NO	YES	NO	NO	YES	NO	YES	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	4	NO	YES
52306	Initial	783.2	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	1	YES	YES
52317	Initial	1,951.1	NO	NO	NO	NO	YES	NO	NO	YES	YES	YES	NO	NO	NO	NO	NO	NO	YES	4	NO	YES
54124	Initial	7,521.5	NO	YES	NO	NO	YES	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	YES	YES	3	NO	YES
52312	Initial	7,425.8	YES	YES	NO	NO	NO	NO	YES	YES	YES	NO	NO	NO	NO	NO	NO	YES	YES	5	NO	YES
53889	Initial	109.5	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	YES	1	YES	YES
52323	Initial	142.7	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0	NO	NO
52300	Initial	622.3	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	0	NO	NO
52327	Initial	733.0	NO	YES	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	YES	2	NO	YES
52292	Initial	272.5	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO	1	YES	YES
52298	Initial	4,389.4	NO	YES	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	YES	2	NO	YES
10102334	Initial	0.5	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?
53022	Initial	18.9	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	0	NO	NO
52293	Initial	5,311.8	YES	NO	NO	NO	NO	NO	YES	YES	NO	NO	NO	NO	NO	NO	NO	YES	YES	3	NO	YES
10356154	Initial	18.0	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	0	NO	NO
53021	Initial	2,885.2	YES	NO	YES	NO	NO	NO	YES	YES	YES	NO	NO	NO	NO	NO	NO	YES	YES	5	NO	YES
52305	Initial	436.4	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	1	YES	YES

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	Camel
Physical Characteristics	Total Population Equivalent	42131
	Baseline sewer length (km)	510
Baseline Score 2020	Planning Objective - Internal Sewer Flooding Risk	0
	Planning Objective - Pollution Risk	0
	Planning Objective - Sewer Collapse Risk	0
	Planning Objective - Risk of Sewer Flooding in a 1 in 50-year storm...7	1
	Planning Objective - Storm Overflow performance...8	1
	Planning Objective - Risk of WwTW Compliance Failure...9	0
Score 2050	Planning Objective - Risk of Sewer Flooding in a 1 in 50-year storm...10	1
	Planning Objective - Storm	1

Group	Description	Value
	Overflow performance...11	
	Planning Objective - Risk of WwTW Compliance Failure...12	0

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 Camel 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 2: DELABOLE_STW_DELABOLE	A	F	F	A	A	G	A	A	G
TPU 3: ST TEATH_STW_ST TEATH	A	F	F	A	A	G	B	A	G
TPU 16: SCARLETTS WELL	A	F	F	A	A	A	G	A	A
TPU 1: CAMELFORD_STW_CAMELFORD	F	F	F	G	A	A	G	A	G
TPU 11: TRECERUS_STW_PADSTOW	A	F	F	A	A	F	A	A	A
TPU 12: LITTLE PETHERICK_STW_WADEBRIDGE	A	F	F	G	A	F	A	A	G
TPU 15: WADEBRIDGE_STW_WADEBRIDGE	A	F	F	A	A	A	A	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 14: ST MINVER_STW_PORT HILLY	A	A	A	G	A	A	F	A	A
TPU 13: NANSTALLON_STW_ BODMIN	A	F	F	A	A	F	A	A	A
TPU 8: CHAPEL AMBLE S T_SEPTNK_CHAPEL AMBLE	A	F	F	G	A	G	A	A	A
TPU 4: ST BREWARD_STW_ST BREWARD	A	A	A	A	A	A	A	A	A
TPU 5: ST MABYN_STW_ST MABYN	A	A	A	A	A	A	A	A	A
TPU 6: BLISLAND_STW_BLIS LAND	A	A	A	A	A	A	G	A	A
TPU 7: HELSTONE_STW_HEL	A	A	A	A	A	A	A	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
STONE									
TPU 9: CAMELFORD STATION_STW_CAMELFORD STATION	A	A	A	A	A	A	A	A	A
TPU 10: WADEBRIDGE ROAD_STW_ST MABYN	A	A	A	A	A	A	A	A	A

RISK PATTERN	Assessment
A	No risks – system is resilient
B	Long term moderate risk
C	Long term high risk
D	Medium term moderate risk
E	Medium term high risk
F	Immediate moderate risk
G	Immediate high risk

Figure 14: Problem Characterisation legend

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

TPU	Conclusion Narrative	Historical Pollution and Flooding	Future Flood Risk	Overflows	WwTW
CAMELFORD_STW_CAMELFORD	This catchment requires additional investment to make it resilient for the future.	There are 2 total internal flooding incidents in the catchment, this is 0.14% of the total number of properties within the catchment There are 2 external flooding hotspots attributed to other causes in the catchment, located near; Market Place Sportsmans Close There are 2 pollution hotspots in the catchment, located near; Camelford STW [186] Fore Street [97]	NON-MODELLED APPROACH	There are a total of 3 overflows in the catchment. They have been classified as follows Substandard (Medium) - 1 - 33% Not Classified - 2 - 66%	We are monitoring performance at the treatment works and there may be a need to increase capacity as part of a short/medium term strategy.
DELABOLE_STW_DELABOLE	This catchment requires additional investment to make it resilient for the	There are 2 external flooding hotspots attributed to other causes in the	NON-MODELLED APPROACH	There are a total of 2 overflows in the catchment. They have been classified	We are monitoring performance at the treatment works and we are not expecting

TPU	Conclusion Narrative	Historical Pollution and Flooding	Future Flood Risk	Overflows	WwTW
	future.	catchment, located near; High Street Westdown Road		as follows Unsatisfactory - 2 - 100%	any compliance issues due to lack of capacity between now and 2050.
ST TEATH_STW_ST TEATH	This 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; North Road Brambleside	NON-MODELLED APPROACH	There are a total of 1 overflows in the catchment. They have been classified as follows Unsatisfactory - 1 - 100%	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.
ST BREWARD_STW_ST BREWARD	This catchment is performing well and is resilient for the future.	There were no substantial flooding or pollution hotspots in the catchment.	NON-MODELLED APPROACH	There are a total of 1 overflows in the catchment. They have been classified as follows Not Classified - 1 - 100%	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.
ST MABYN_STW_ST MABYN	This catchment is performing well and is resilient for the future.	There were no substantial flooding or pollution hotspots in the catchment.	NON-MODELLED APPROACH	There are a total of 1 overflows in the catchment. They have been classified as follows Substandard (Medium) - 1 - 100%	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.
BLISLAND_STW_BLISLAND	This catchment is performing well and is resilient for the future.	There were no substantial flooding or pollution hotspots in the catchment.	NON-MODELLED APPROACH	N/A	We are monitoring performance at the treatment works and there may be a need to increase capacity as part of a short/medium term strategy.
HELSTONE_STW_HELSTONE	This catchment is performing well and is resilient for the future.	There were no substantial flooding or pollution hotspots in the catchment.	NON-MODELLED APPROACH	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.
CHAPEL AMBLE ST_SEPTNK_CHAPEL AMBLE	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; Chapel Amble STW There is 1 pollution hotspot in the catchment, located	NON-MODELLED APPROACH	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.

TPU	Conclusion Narrative	Historical Pollution and Flooding	Future Flood Risk	Overflows	WwTW
		near; Chapel Amble STW [177]			
CAMELFORD STATION_STW_CAMELFORD STATION	This catchment is performing well and is resilient for the future.	There were no substantial flooding or pollution hotspots in the catchment.	NON-MODELLED APPROACH	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.
WADEBRIDGE ROAD_STW_ST MABYN	This catchment is performing well and is resilient for the future.	There were no substantial flooding or pollution hotspots in the catchment.	NON-MODELLED APPROACH	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.
TRECERUS_STW_PADSTOW	This catchment requires additional investment to make it resilient for the future.	There are 3 external flooding hotspots attributed to other causes in the catchment, located near; St Merryn Padstowe Harbour SPS	NON-MODELLED APPROACH	There are a total of 6 overflows in the catchment. They have been classified as follows Substandard (Medium) - 5 - 83% Substandard (High) - 1 - 17%	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
		Souther Padstowe		Overflows in this catchment impact on the following bathing beaches/shell fish waters; ROCK BEACH HARLYN BAY BEACH TREVONE BAY BEACH Camel SFW	
LITTLE PETHERICK_STW_WADEBRIDGE	This catchment requires additional investment to make it resilient for the future.	There are 3 external flooding hotspots attributed to other causes in the catchment, located near; High Lanes SPS St Issey Tregonna There is 1 pollution hotspot in the catchment, located near; Little Petherick STW [172]	3.6% of the total number of properties within the catchment that are predicted to be at risk of sewer flooding. There is 1 predicted future flooding hotspot in the catchment, located near; Little Petherick	There are a total of 1 overflows in the catchment. They have been classified as follows Substandard (High) - 1 - 100% Overflows in this catchment impact on the following bathing beaches/shell fish waters; Camel SFW	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.
NANSTALLON_STW_BODMIN	This catchment requires additional	There is 1 external flooding hotspot	2.7% of the total number of properties	There are a total of 8 overflows in the	We are monitoring performance at the

TPU	Conclusion Narrative	Historical Pollution and Flooding	Future Flood Risk	Overflows	WwTW
	investment to make it resilient for the future.	attributed to hydraulic overload in the catchment, located near; Tretoil View There are 3 external flooding hotspots attributed to other causes in the catchment, located near; Higher Bore Street St Marys Lanivet	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; Juniper Close	catchment. They have been classified as follows Substandard (Medium) - 1 - 13% Substandard (High) - 3 - 37% Not Classified - 4 - 50% Overflows in this catchment impact on the following bathing beaches/shell fish waters; Camel SFW	treatment works and we are not expecting any compliance issues due to lack of capacity between now and 2050.
ST MINVER_STW_PORT HILLY	This catchment requires additional investment to make it resilient for the future.	There are 3 pollution hotspots in the catchment, located near; Roserrow SPS [36] St Minver STW [173] St Minver [89]	N/A	There are a total of 5 overflows in the catchment. They have been classified as follows Substandard (Medium) - 5 - 100% Overflows in this catchment impact on the following bathing beaches/shell fish waters;	We are monitoring performance at the treatment works and there may be a need to increase capacity as part of a short/medium term strategy.

TPU	Conclusion Narrative	Historical Pollution and Flooding	Future Flood Risk	Overflows	WwTW
				ROCK BEACH POLZEATH BEACH Camel SFW	
WADEBRIDGE_STW_ WADEBRIDGE	This catchment requires additional investment to make it resilient for the future.	There are 3 external flooding hotspots attributed to other causes in the catchment, located near; West Hill Wadebridge Centre South Wadebridge	5.4% of the total number of properties within the catchment that are predicted to be at risk of sewer flooding. There are 4 predicted future flooding hotspots in the catchment, located near; Trevilling Road Fair Park Road Molesworth Street Eddystone Road	There are a total of 3 overflows in the catchment. They have been classified as follows Substandard (High) - 2 - 66%Not Classified - 1 - 33% Overflows in this catchment impact on the following bathing beaches/shell fish waters; Camel SFW	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.
SCARLETTS WELL_STW_BODMIN	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; Higher Bore Road	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 short/medium term 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.

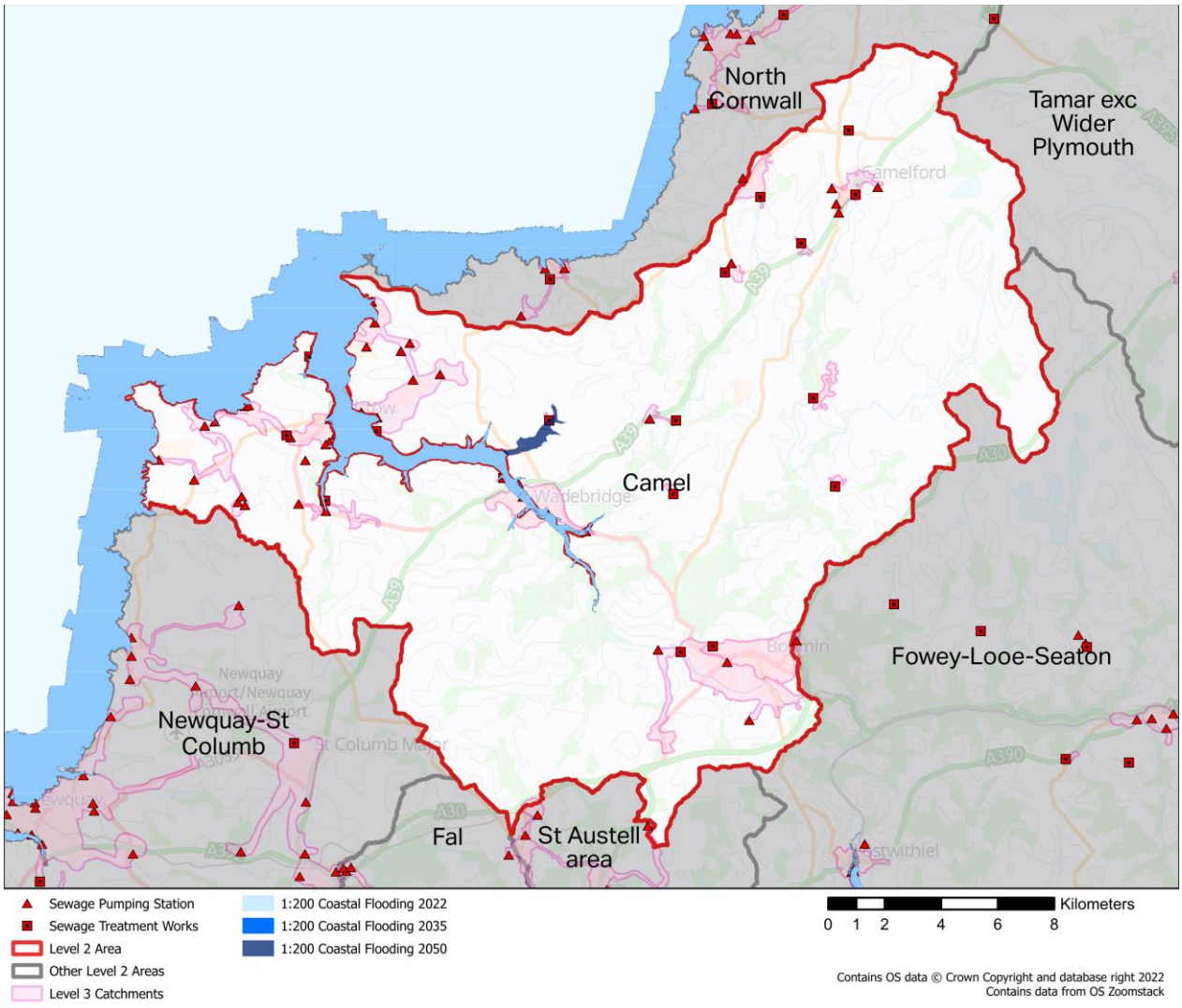

Figure 15: Extent of coastal flooding

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

[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'

collaboration with the EA and responsible RMAs. The sewer infrastructure identified at risk 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.

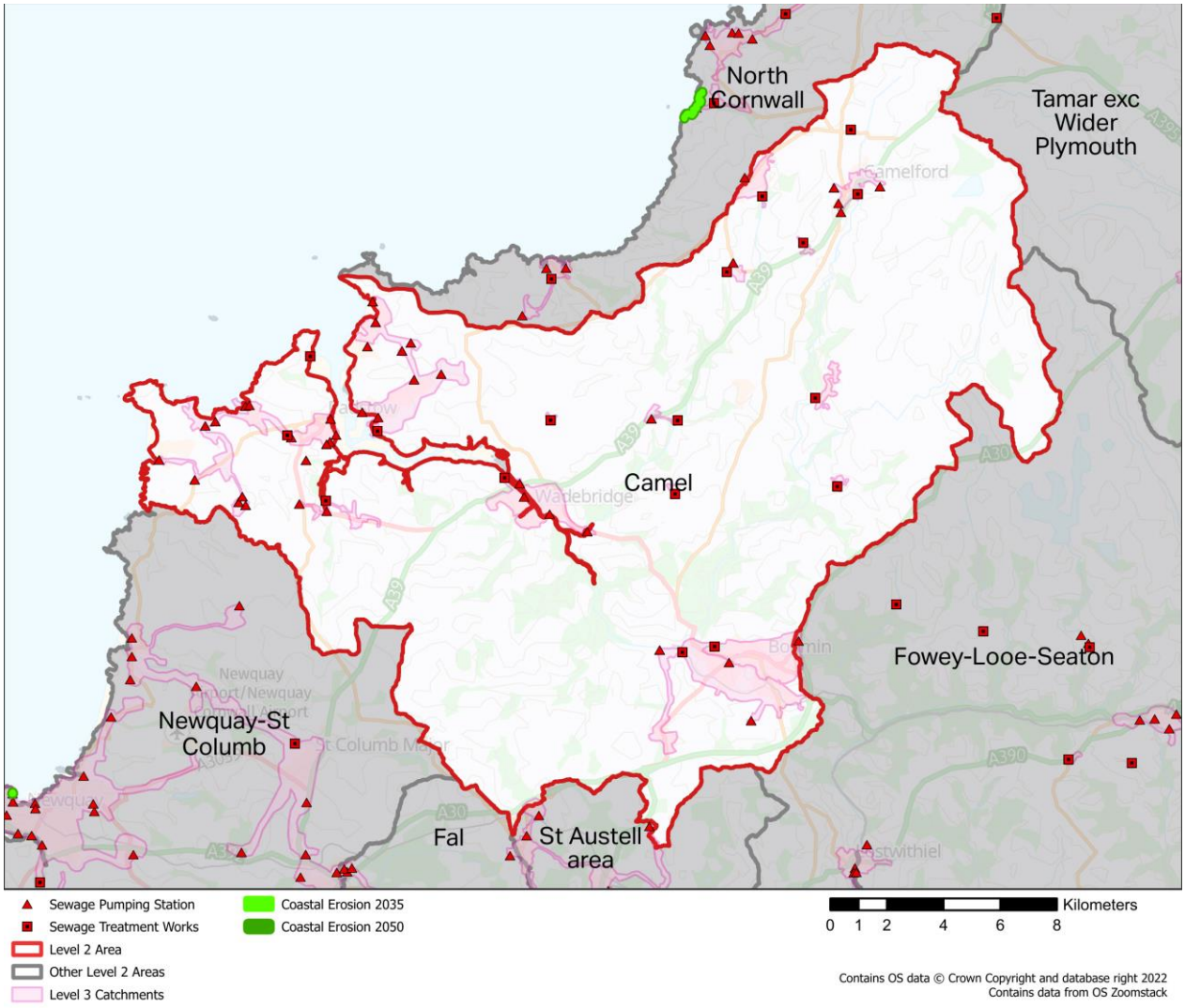

Figure 16: Extent of coastal erosion in 2035 and 2050

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
BLISLAND_STW_BLISLAND	YES	YES	YES	Standard
CAMELFORD STATION_STW_CAMELFORD STATION	YES	YES	NO	N/A
CAMELFORD_STW_CAMELFORD	YES	YES	YES	Extended
CHAPEL AMBLE S T_SEPTNK_CHAPEL AMBLE	YES	YES	YES	Standard
DELABOLE_STW_DELABOLE	YES	YES	YES	Standard
HELSTONE_STW_HELSTONE	YES	YES	NO	N/A
LITTLE PETHERICK_STW_WADEBRIDGE	YES	YES	YES	Complex
NANSTALLON_STW_BODMIN	YES	YES	YES	Extended
SCARLETTS WELL_STW_BODMIN	YES	YES	YES	Extended
ST BREWARD_STW_ST BREWARD	YES	YES	NO	N/A
ST MABYN_STW_ST MABYN	YES	YES	NO	N/A
ST MINVER_STW_PORTHILLY	YES	YES	YES	Standard
ST TEATH_STW_ST TEATH	YES	YES	YES	Extended
TRECERUS_STW_PADSTOW	YES	YES	NO	N/A
WADEBRIDGE ROAD_STW_ST MABYN	YES	YES	NO	N/A
WADEBRIDGE_STW_WADEBRIDGE	YES	YES	YES	Extended
HAWKERS COVE_STW_PADSTOW	YES	NO	NO	N/A

Of the 17 TPUs in the Camel catchment, 16 proceeded through RBCS to BRAVA (the 1 remaining catchments had 1 or no indicators breached, and if 1 indicator was breached it was not tier 1) and 10 proceeded to ODA. Of these, 4 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 Camel 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
BLISLAND_STW_BLISLAND	Standard	None	SWW: Potential SUDS	WWT3					Wastewater treatment intervention WWT3 carried over, both Surface water management interventions removed
CAMELFORD_STW_CAMELFORD	Extended	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. Wastewater treatment intervention WWT3 also

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
									carried over.
CHAPEL AMBLE S T_SEPTNK_CH APEL AMBLE	Standard	SWW: Potential SUDS for SW separation	SWW: Potential SUDS	CFS2	SWM4	SWM6			Surface water management SWM4 and SWM6 carried over, CFS2 replaced WWT3.
DELABOLE_ST W_DELABOLE	Standard	SWW: Potential SUDS for SW separation	SWW: Potential SUDS	CFS2	SWM4	WWT3			Surface water management intervention SWM4 and Combined and foul sewer systems CFS2 carried over. Customer side management options CE4 and Surface water management SWM6 removed. Waste Water Treatment WWT3 added in.

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
LITTLE PETHERICK_STW_WADEBRIDGE	Complex	SWW: Potential SUDS for SW separation	SWW: Potential SUDS						Continue to monitor risk, no intervention needed.
NANSTALLON_STW_BODMIN	Extended	SWW: Potential SUDS for SW separation	SWW: Potential SUDS	CFS2	SWM4	SWM6	WWT3		Combined and foul sewer systems CFS3 and Surface water management SWM3 removed and Wastewater treatment intervention WWT3 added. Combined and foul sewer systems CFS2 and Surface water management SWM4 and SWM6 carried over
SCARLETTS WELL_STW_B	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
ODMIN		SUDS for SW separation	SUDS						SWM6 and SWM4 retained with Combined and foul sewer systems CFS2. Wastewater treatment intervention WWT2 removed and WWT3 retained.
ST MINVER_STW_ PORTHILLY	Standard	SWW: Potential SUDS for SW separation	SWW: Potential SUDS	CFS2	SWM4	SWM6			Wastewater treatment intervention WWT2 and WWT3 were removed. Combined and foul sewer systems CFS2 and Surface water management SWM4 and SWM6 carried over

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
ST TEATH_STW_ST TEATH	Extended	SWW: Potential SUDS for SW separation	SWW: Potential SUDS	CFS2	SWM4	SWM6	WWT3		Customer side management options CE4 and Combined and foul sewer systems CFS1 were removed. Combined and foul sewer systems CFS2 and Surface water management SWM4 carried over. Wastewater treatment intervention WWT3 and Surface water management SWM6 were added
WADEBRIDGE_STW_WADEBRIDGE	Extended	SWW: Potential SUDS for SW separation identified	SWW: Potential SUDS identified	CFS2	SWM4	SWM6			Combined and foul sewer systems CFS2 and 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
									SWM4 & SWM6 carried over. Surface water management SWM1 was removed

For the Camel catchment, 10 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)	8
SWM5: Integrate surface water pathway measures into new and upgraded third party designs	0
SWM6: Develop a program to reduce infiltration	7
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	8
CFS3: Replace or upgrade existing networks	0
CFS4: Inter-catchment network transfers	0

INTERVENTION	Total selected Final
CFS5: inter-catchment WwTW's transfers	0
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)	6
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	29

There were no interventions selected in the Camel 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 Camel 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
BLISLAND_STW_BLISLAND	0	0.00	0.0	1	0	0
CAMELFORD STATION_STW_CAMELFORD STATION	0	0.00	0.0	0	0	0
CAMELFORD_STW_CAMELFORD	79	1.30	9.9	1	1	1
CHAPEL AMBLE S T_SEPTNK_CHAPEL AMBLE	40	0.63	0.4	0	0	0
DELABOLE_STW_DELABOLE	12,820	14.00	0.0	0	1	1
HAWKERS COVE_STW_PADSTOW	0	0.00	0.0	0	0	0
HELSTONE_STW_HELSTONE	0	0.00	0.0	0	0	0
LITTLE PETHERICK_STW_WADEBRIDGE	0	0.00	0.0	0	0	0
NANSTALLON_STW_BODMIN	1,184	6.45	36.1	0	0	1
SCARLETTS WELL_STW_BODMIN	306	2.76	36.1	1	0	1
ST BREWARD_STW_ST BREWARD	0	0.00	3.8	0	0	1
ST MABYN_STW_ST MABYN	27	0.23	2.1	0	0	1
ST MINVER_STW_PORTHILLY	42	0.67	21.6	0	0	0
ST TEATH_STW_ST TEATH	393	4.79	3.0	0	0	1
TRECERUS_STW_PADSTOW	311	4.60	0.0	0	0	0
WADEBRIDGE ROAD_STW_ST MABYN	0	0.00	0.0	0	0	0
WADEBRIDGE_STW_WADEBRIDGE	58	1.00	30.1	0	0	0

Our proposals for the Camel catchment include approximately 36ha of SWS by conventional or SUDS solutions, 15,259m^3 of storage, 143km of network enhancement, work to improve DWF compliance at 2 treatment sites, upgrading of capacity at 3 treatment sites and work to reduce nutrients at 7 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.

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 Camel 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.

[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.

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
CD401470	North Cornwall	Y	220	Y	231	Y	247
CD201470	North Cornwall	Y	142	Y	158	Y	134
CD403020	North Cornwall	Y	39	Y	146	Y	83
CD404880	North Cornwall	Y	125	Y	138	Y	112
CD513020	North Cornwall	Y	83	Y	83	Y	56
CD200450	North Cornwall	Y	43	Y	65	Y	56
CD513010	North Cornwall	Y	65	Y	62	Y	125
CD808150	Harlyn Water	Y	46	Y	60	Y	20
CD708130	North Cornwall	Y	38	Y	47	Y	21
CD512190	North Cornwall	Y	53	Y	33	Y	53
CD400890	Upper River Camel	Y	1	Y	30	Y	34
CD716930	North Cornwall	Y	35	Y	28	Y	24
CD707630	North Cornwall	Y	23	Y	22	Y	13
CD708160	CAMEL	Y	22	Y	18	Y	23
CD508190	n/a	Y	17	Y	9	Y	18

CD_Number	Waterbody	2019 Reportable	2019 Nr. Spills	2020 Reportable	2020 Nr. Spills	2021 Reportable	2021 Nr. Spills
CD708580	North Cornwall	Y	0	Y	6	Y	9
CD400990	North Cornwall	Y	14	Y	5	Y	0
CD709110	North Cornwall	Y	13	Y	5	Y	9
CD708830	North Cornwall	Y	4	Y	4	Y	1
CD807620	North Cornwall	Y	1	Y	4	Y	0
CD404810	North Cornwall	Y	13	Y	4	Y	8
CD708180	CAMEL	Y	12	Y	3	Y	13
CD808170	North Cornwall	Y	0	Y	2	Y	0
CD718930	North Cornwall	Y	0	Y	1	Y	2
CD513960	North Cornwall	Y	0	Y	0	Y	0
CD807600	North Cornwall	Y	0	Y	0	Y	0
CD708581	North Cornwall	Y	5	Y	0	Y	9
n/a	n/a	n/a	n/a	n/a	n/a	Y	28
n/a	n/a	n/a	n/a	n/a	n/a	Y	3
n/a	n/a	n/a	n/a	n/a	n/a	Y	0

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
BLOWING HSE LN_CSO_BODMIN	CD513010
HARLYN BAY_PSEO_ST MERRYN	CD808150
DELABOLE STW_SO_DELABOLE	CD401470
DELABOLE STW_SSO_DELABOLE	CD201470
DRAGONS PIT_CSO_BODMIN	CD513020
ST TEATH STW_SO_ST TEATH	CD404880
TREVONE SPST_PSCSOEO_PADSTOW	CD708130

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 Camel catchment are also shown in Table below.

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

IM Number	Driver	Route	Stage	Status	Stage No
N92273	Capital Maintenance	Rapid Investment - WWS-Networks (Flooding)	Review Scope	In Progress	Stage 6
N93116	Capital Maintenance	Rapid Investment - WWS-Networks (Flooding)	Review Scope	In Progress	Stage 6
N92766	Quality	Rapid Investment - WWS-Networks (Flooding)	Review Scope	In Progress	Stage 6
N73723	Capital Maintenance	Rapid Investment - WWS-Networks (Transferred Sewers)	Confirm Scope	In Progress	Stage 7
N71517	Capital Maintenance	Rapid Investment - WWS-Networks (Flooding)	Confirm Scope	In Progress	Stage 7
N91121	Capital Maintenance	Rapid Investment - WWS-Networks (Flooding)	Confirm Scope	In Progress	Stage 7
N77566	Capital Maintenance	Rapid Investment - WWS-Networks (Flooding)	Confirm Scope	In Progress	Stage 7
N78019	Capital Maintenance	Rapid Investment - WWS-Networks (Pollution)	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.

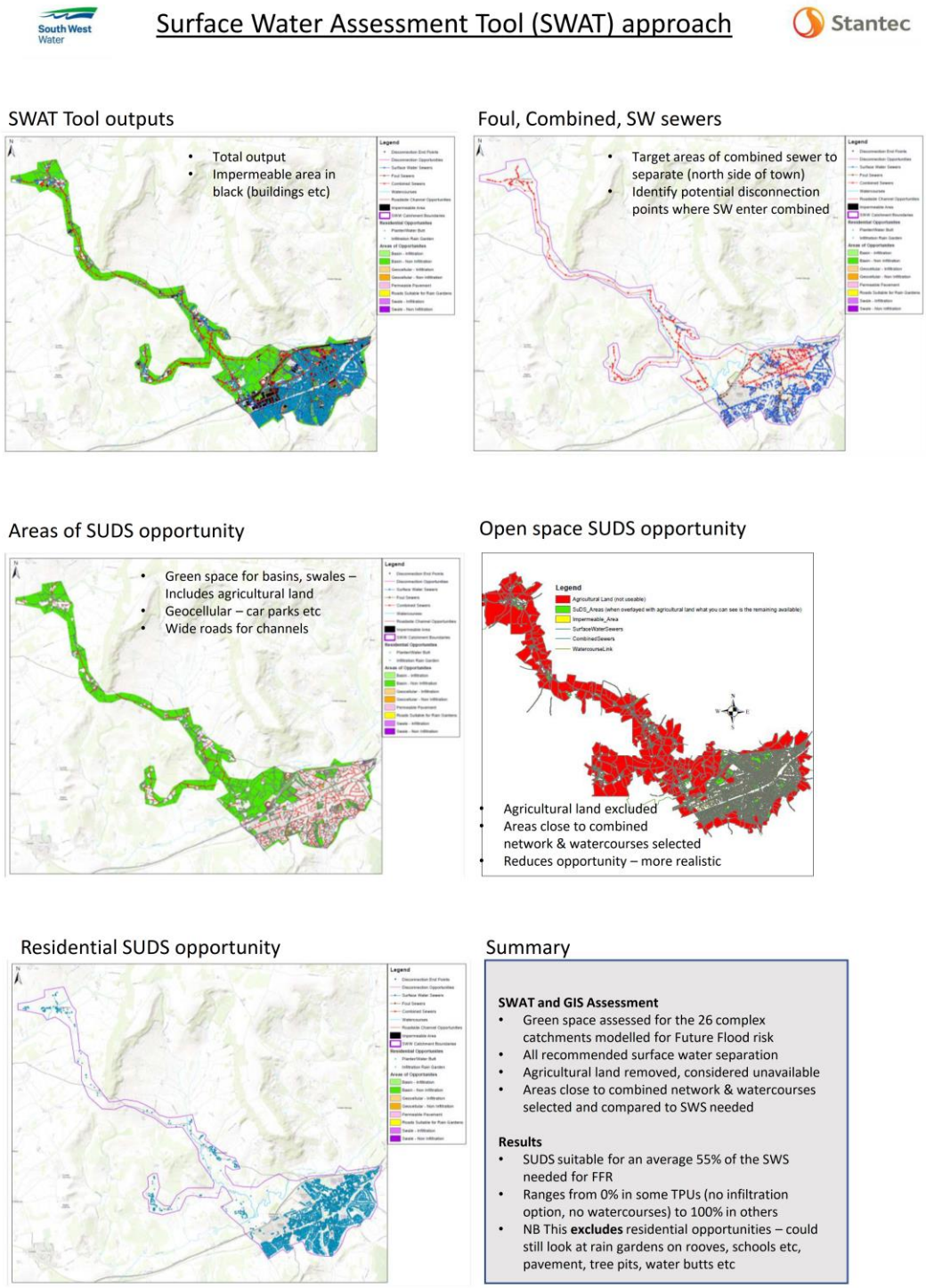

Figure 17: Approach to assessing opportunity for SuDS solutions for Surface Water Separation

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 Camel 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 Camel catchment where upper catchment solutions are being explored; the intention is to expand this approach.

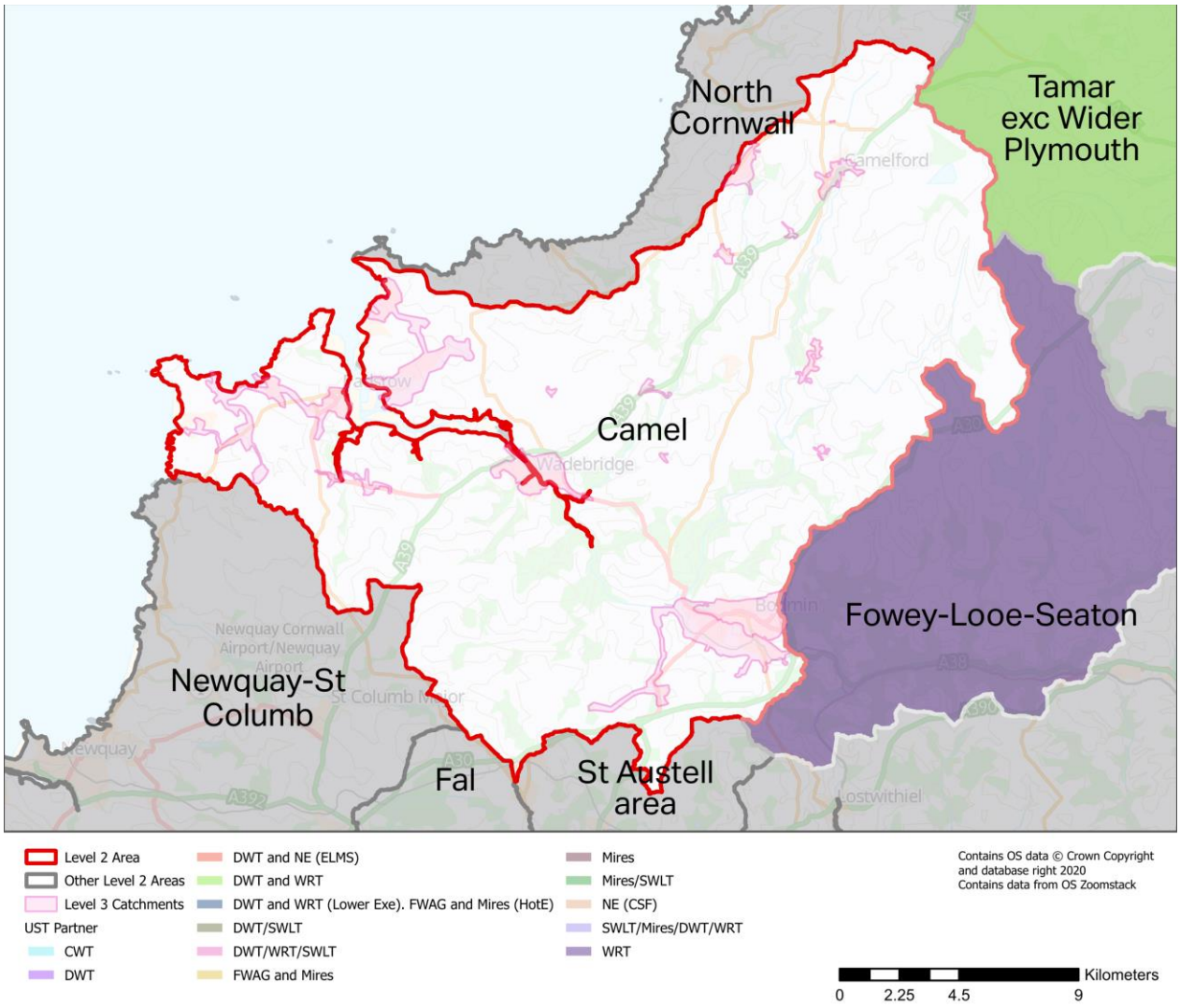

Figure 18: Catchments with Upstream Thinking Programmes