

# East Cowes - Section 19 Flood Investigation

## Final Report

August 2024

Prepared for:



Isle of Wight  
Council

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This report describes work commissioned by Isle of Wight Council, by an instruction dated 6th February 2024. Isle of Wight Council's representative for the contract was James Brewer. Bethan Griffiths, Timea Faber and Peter Rook of JBA Consulting carried out this work.

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## Acknowledgements

We would like to thank the Isle of Wight Council, Island Roads, Southern Water and the Environment Agency for their input and support. We would also like to thank the wider community for their contributions to the investigation.

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## Abbreviations

AEP	Annual Exceedance Probability
AOD	Above Ordnance Datum
BGS	British Geological Survey
DWF	Dry Weather Flows
DEFRA	Department of the Environment, Food and Rural Affairs (formerly MAFF)
DTM	Digital Terrain Model
DWMP	Drainage and Wastewater Management Plan
EA	Environment Agency
FCERM	Flood and Coastal Erosion Risk Management (R&D programme)
FEH	Flood Estimation Handbook
FMfP	Flood Map For Planning
IWC	Isle of Wight Council
LLFA	Lead Local Flood Authority
LRF	Local Resilience Forum
LiDAR	Light Detection And Ranging
OBCAM	One Business Condition Assessment Manual
PFR	Property Flood Resilience
RoFSW	Risk of Flooding from Surface Water mapping
S19	Section 19 post flood investigation
SFRA	Strategic Flood Risk Assessment
SuDS	Sustainable Drainage Systems
WPS	Wastewater Pumping Station
WWTW	Waste Water Treatment Works



# Executive Summary

## Background

Following the flooding events in East Cowes that occurred on 25 October 2023 after Storm Babet brought in heavy and intense rainfalls, Isle of Wight Council (IWC) as the Lead Local Flood Authority (LLFA) is undertaking a formal flood investigation under Section 19 of the Flood and Water Management Act 2021.

It is a statutory requirement for LLFAs to investigate flooding to the extent that it considers it 'necessary or appropriate'. The flooding that occurred in the East Cowes area caused internal flooding to at least 22 properties (10 residential, 12 commercial) and fulfils the criteria for a Section 19 investigation. IWC has appointed JBA Consulting to undertake this investigation on its behalf.

It is noted that East Cowes flooded whilst this investigation had been progressed, on the night of Monday 8<sup>th</sup> April 2024. It is understood that this flooding affected the areas in the vicinity of the ferry terminal which correspond to the worst hit areas from October 2023, as a result the recommendations and analysis of the flooding undertaken in this report will be relevant for both events.

## Overview of approach

In this study, the flood catchment characteristics and sources of flood risk in East Cowes are identified, supported by data collected on the site visit in February 2024, to provide a basis of understanding. The site visit also provided the basis for a condition assessment of assets such as the watercourse at Church Path. Desk-based analysis of the response to the flooding on 25 October is outlined. Source-pathway-receptor analysis is undertaken for the town centre where most of the flooding occurred.

As part of this investigation, data on the performance of the Albany Road pumping station was requested from Southern Water and reviewed. Similarly, the drainage proposals relating to proposed development at the Red Funnel Ferry Terminal have also been reviewed to understand any potential implications on flood risk to East Cowes. To conclude the study, a series of options were graded using a multi-criteria analysis, which generated a short-list of recommendations to mitigate future flood risk in East Cowes.

## Key findings

Hydrological analysis of the rainfall event on 25 October 2023 estimated the event to have been between a 1 in 49 and a 1 in 95 year event. This is a relatively extreme event and older drainage systems would not be designed to manage events such as this. The source of the flooding to East Cowes is likely to be the result of a combination of factors, namely an extreme rainfall event combined with tide locking

and hydraulic overloading of the watercourse in Church Path, and local drainage systems that discharge to this watercourse and the Medina Estuary.

Data provided by Southern Water indicates that the storm well was active during the event, with 2 of its 3 pumps running for 387 mins on 25 October and 728 mins on 26 October. The data shows that capacity in the wet well quickly reached 90% on the morning of the 25 October and the storm well came into effect. This data clearly shows that the pumping station was operating during the event and that it was forced to manage considerable flows. From a review of planning applications in relation to the Red Funnel Ferry Terminal, it is unlikely that the proposed surface water drainage would have impacted flood risk to East Cowes. However, opportunities to reduce flows to the combined sewer system should be explored further as part of any future proposals. Furthermore, future proposals will need to comply with Isle of Wight Council's SuDS Supplementary Planning Document which has been published in 2024.

A multi-criteria analysis identified the following options as the highest rated (score >12), and the most suitable options to prioritise for delivery:

Recommendation	Organisation (s) responsible	Multi-criteria analysis score	Timescale
Establish formal flood action group and develop community flood plan	Isle of Wight Council (LLFA and emergency planning)	12	<1 year
Replacement or improvement to existing tidal outfall	Environment Agency	12	1 – 2 years
Provide community training and exercising of the new Community Flood Plan	Isle of Wight Council (LLFA and emergency planning)	12	<1 year
Feasibility study in providing additional surface water drainage capacity	Southern Water	12	1 – 5 years
Feasibility study into increasing capacity of watercourse at Church Path	Environment Agency	12	1 – 5 years
Improve asset maintenance regimes for gullies and highway drainage	Isle of Wight Council (Highways)	12	<1 year
Establish procedures for compliance with Isle of Wight SuDS SPD for new developments	Isle of Wight Council (LLFA and LPA)	19	<1 year

# 1 Introduction

## 1.1 Background to investigation

Following flooding in East Cowes on 25<sup>th</sup> October 2023, Isle of Wight Council (IWC) as the Lead Local Flood Authority (LLFA) is undertaking a formal flood investigation under Section 19 of the Flood and Water Management Act 2010.

It is a statutory requirement for LLFAs to investigate flooding to the extent that it considers it necessary or appropriate. Isle of Wight Council has outlined its criteria for undertaking a Section 19 investigation in its Flood Investigation Protocol.

- *Where there is ambiguity surrounding the source or responsibility of a flood incident;*
- *Where internal flooding of one property has been experienced on more than one occasion; OR*
- *Where internal flooding of a group of properties has been experienced during a single flood incident; OR*
- *Where flooding resulted in disruption of one or more items of critical infrastructure; OR*
- *Where a single flood incident resulted in flooding that affects vulnerable individuals; OR*
- *Where there is risk to life as a result of flooding.*

Any flooding event that a risk management authority deems significant but does not meet the agreed thresholds may be assessed for consideration by the strategic flood management group.

The flooding that occurred in October caused internal flooding to at least 22 properties (10 residential, 12 commercial) in East Cowes and fulfils these criteria. Isle of Wight Council has appointed JBA Consulting to undertake this investigation on its behalf.

### 1.1.1 April 2024 flood event

It is noted that East Cowes flooded whilst this investigation had been progressed, on the night of Monday 8<sup>th</sup> April. It is understood that this flooding affected the areas in the vicinity of the ferry terminal which correspond to the worst hit areas from October 2023, as a result the recommendations and analysis of the flooding undertaken in this report will be relevant for both events.

Consequently, this report is largely made with reference to the October 2023 event. However, the impacts of the April 2024 event will be assessed as part ongoing work for Cowes and East Cowes. Please note that parts of this report may be updated at a later date to take into account the April 2024 event.

## 1.2 Investigation extent

The East Cowes study area covers the north-east tip of the island, along the east bank of the River Medina (and Medina Estuary). The River Medina is the main river that crosses through the island from the south approximately from St Catherine's Down and flows northward across Newport towards The Solent on the north.

## 1.3 Data collection

A wide range of data has been collected and assessed to inform the Section 19 investigation. This has been used to understand the cause of flooding in East Cowes and to establish the context of the area. This includes the following:

- Open-source data from GOV.UK
- Social media, photographs, newspaper articles and notes from the event
- Rainfall data
- Community surveys
- Flood grant applications
- Information from authorities on drainage infrastructure, such as highways and water companies
- Photographs from site visit, showing flood sources, pathways and receptors

## 1.4 Stakeholder engagement

We engaged with multiple local stakeholders in each location, including residents, community representatives, landowners, other Council departments, Council Members and RMA partners.

The objectives of engagement are to:

- Gather facts, opinions and data to aid the understanding of the investigation
- Enable the involvement and buy-in of the community in the investigation
- Provide more technical debrief with RMA and operational partners
- Disseminate the findings of the investigation to the community

A list of key stakeholders and how we engaged with them is given in **Error! Reference source not found.** The engagement terminology is taken from Environment Agency's 'Working with Others' (2013) methodology:

- Inform - provide information
- Consult - receive, listen, understand and feedback
- Involve - decide together
- Collaborate - act together
- Empower - support independent action

Table 1-1: Key stakeholders

Role	Organisation	How to engage	Type of engagement
Residents	N/A	Consult	Site visit, online questionnaire, correspondence
Parish/Town Council	East Cowes Town Council	Consult	Data provision/ site visit
Water and Sewerage Company (WASC)	Southern Water	Involve	Invitation to contribute, correspondence, data provision
Highways Authority	Isle of Wight Council / Island Roads	Involve	Invitation to contribute, correspondence, data provision
Environment Agency	Environment Agency	Involve	Correspondence, data provision
LLFA	Isle of Wight Council	Involve	Invitation to contribute, correspondence, online survey distribution, site visit, data provision
Council Members	Isle of Wight Council	Consult	Data provision/ site visit
Emergency Planning	Emergency Management IWC	Consult	Invitation to contribute, correspondence

## 2 Catchment characteristics

### 2.1 Topography

The East Cowes study area is relatively low-lying with elevations ranging between 2 and 53m AOD. Figure 2-1 shows the topography of the study area which is steeply sloping from higher areas in the east, towards the Medina Estuary in the west. The lowest elevations are along River Medina and the western area of East Cowes.

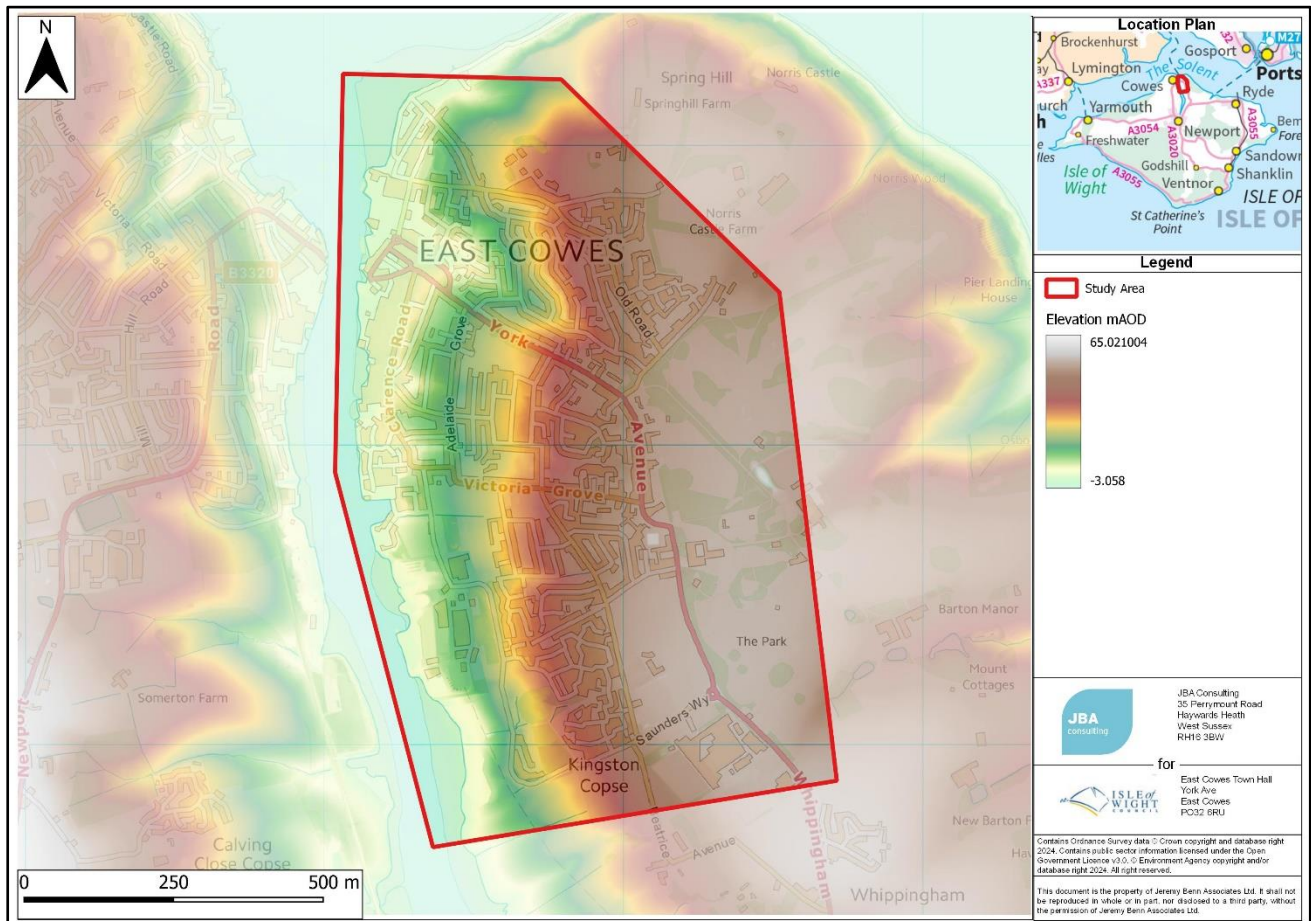


Figure 2-1: Topography map of East Cowes

### 2.2 Geology and soils

British Geological Survey (BGS) 50K mapping shows that the East Cowes area is underlain by bedrock of various lithologies. The bedrock of East Cowes mainly consists of mudstone and limestone formations near the coast. Further landward in East Cowes on the high elevated areas the bedrock geology is formed by clay, silt and sand. The BGS Aquifer Designation Map defines the bedrock as Secondary A aquifer, which are classified as permeable layers capable of supporting water supplies at a local scale and can form an important source of base flow to rivers.



### 2.3 Drainage system and river network

Watercourses in England are designated as 'main rivers' or 'ordinary watercourses' by the EA. Flood risk from main rivers is managed by the EA which in many cases also maintains and manages main rivers. Flood risk from ordinary watercourses is managed by the LLFA (Isle of Wight Council). Maintenance for both main rivers and ordinary watercourses falls to individual riparian landowners. However, the LLFA has a responsibility to ensure that riparian owners are undertaking the necessary responsibilities under the Land Drainage Act 1991.

East Cowes is situated along the right bank (east side) of the River Medina, which is a tidally influenced estuary at this location and is designated as a 'main river'. Additionally, there is an unnamed main river at Consort Gardens and Oak Tree Way which is culverted under Church Path and ultimately discharges into the Medina Estuary.

The wastewater drainage in East Cowes is managed by Southern Water. Sewage from East Cowes ultimately discharged to the Sandown New Waste Treatment Works (WTW) sewer catchment. The sewer network is predominantly combined at the centre of East Cowes with sewers taking both surface water runoff and foul flows, whereas newer developments to the east of the town have separate surface water and foul sewer networks. Some of these surface water sewer systems appear to discharge into the unnamed main river.

The highways drainage network across the Isle of Wight is managed by Island Roads, on agreement with the IWC. This includes maintenance of the drainage network, such as gully and drain cleansing, street cleansing, and maintenance of highway ditches.



Figure 2-2 Simple culvert with debris screen along main river at Church Path (looking west) during normal conditions.



### 3 Long-Term Flood Risk Information

#### 3.1 Risk of flooding from rivers and the sea

The Environment Agency’s Flood Zone data, shown in Figure 3-1, defines areas at risk of flooding from fluvial and tidal sources.

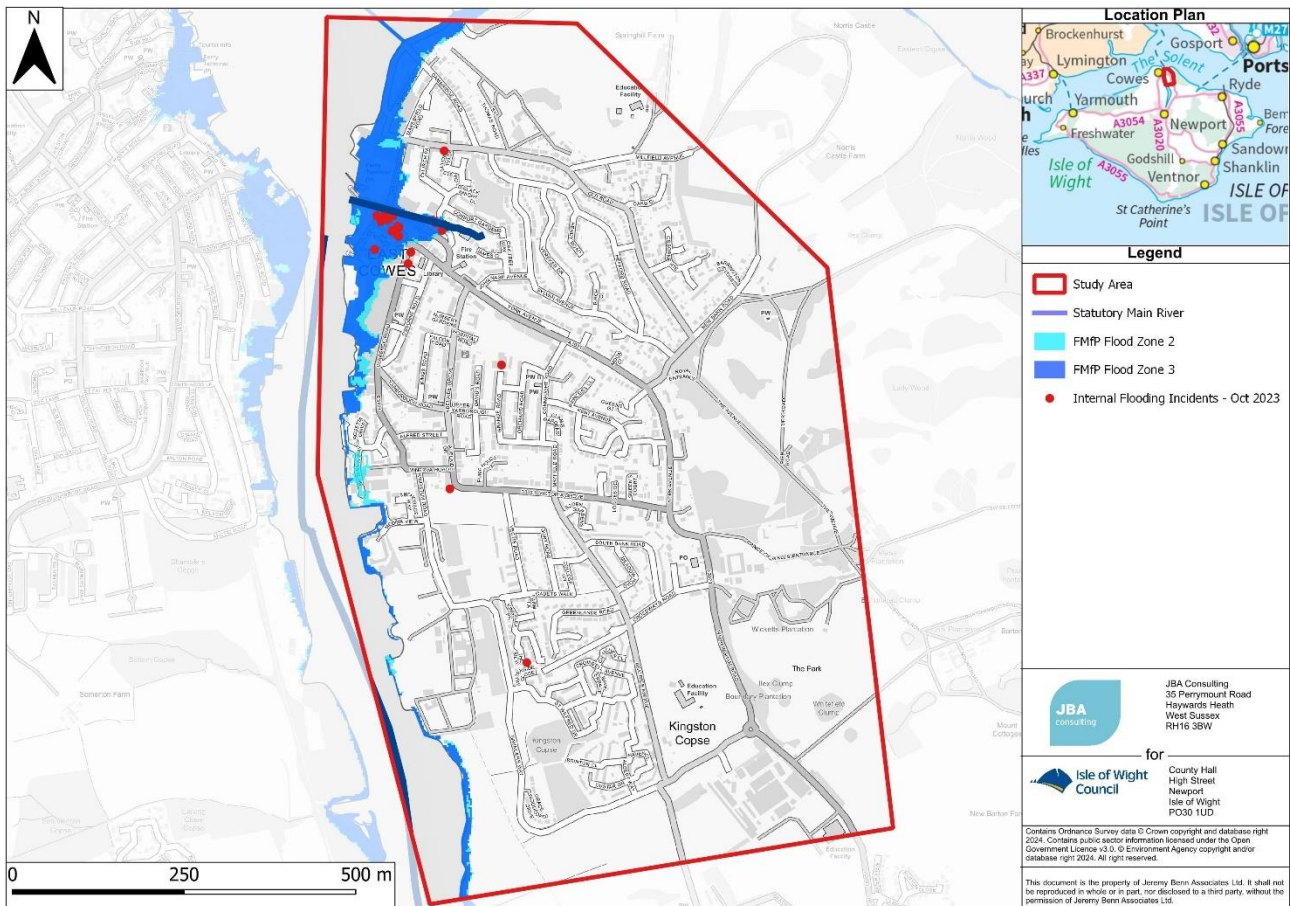


Figure 3-1 Flood Map for Planning Rivers and Sea with external and internal flood incidents in East Cowes

Areas within Flood Zone 2 have between a 0.1% and 1% chance of flooding from rivers (or between a 0.1% and 0.5% chance of flooding from the sea) in any given year. Areas within Flood Zone 3 have greater than a 1.0% chance of flooding from rivers (or greater than a 0.5% chance of flooding from the sea) in any given year. In the study area, the risk of flooding from rivers and the sea is mostly confined to the course of River Medina and along the coast, the majority of which is within Flood Zone 2. Significant tidal flooding occurs from the Medina Estuary and The Solent. These Flood Zones represent undefended flood risk and therefore do not take into account existing flood defences.

It should be noted that parts of East Cowes that experienced flooding on 25 October 2023, such as Well Road, Castle Street and York Avenue are within the tidal extent of Flood Zones 2 and 3.

### 3.2 Risk of flooding from surface water

Flooding from surface water runoff (or ‘pluvial’ flooding) is caused by intense short periods of rainfall. It often occurs where the natural (or artificial) drainage system is unable to cope with the volume of water. Surface water flooding problems are inextricably linked to issues of poor drainage (or drainage blockage by debris) and sewer flooding.

The Risk of Flooding from Surface Water (RoFSW) data is national scale mapping showing the risk of flooding from surface water runoff, published by the Environment Agency. The map in Figure 3-2 shows the areas at risk of flooding in response to rainfall events with the percentage chance of event occurring in any given year (Annual Exceedance Probability):

- High risk - greater than a 3.3% chance (1 in 30 years)
- Medium risk – between a 3.3% and 1.0% chance (1 in 100 years)
- Low risk – between a 1.0% and 0.1% chance (1 in 1,000 years)

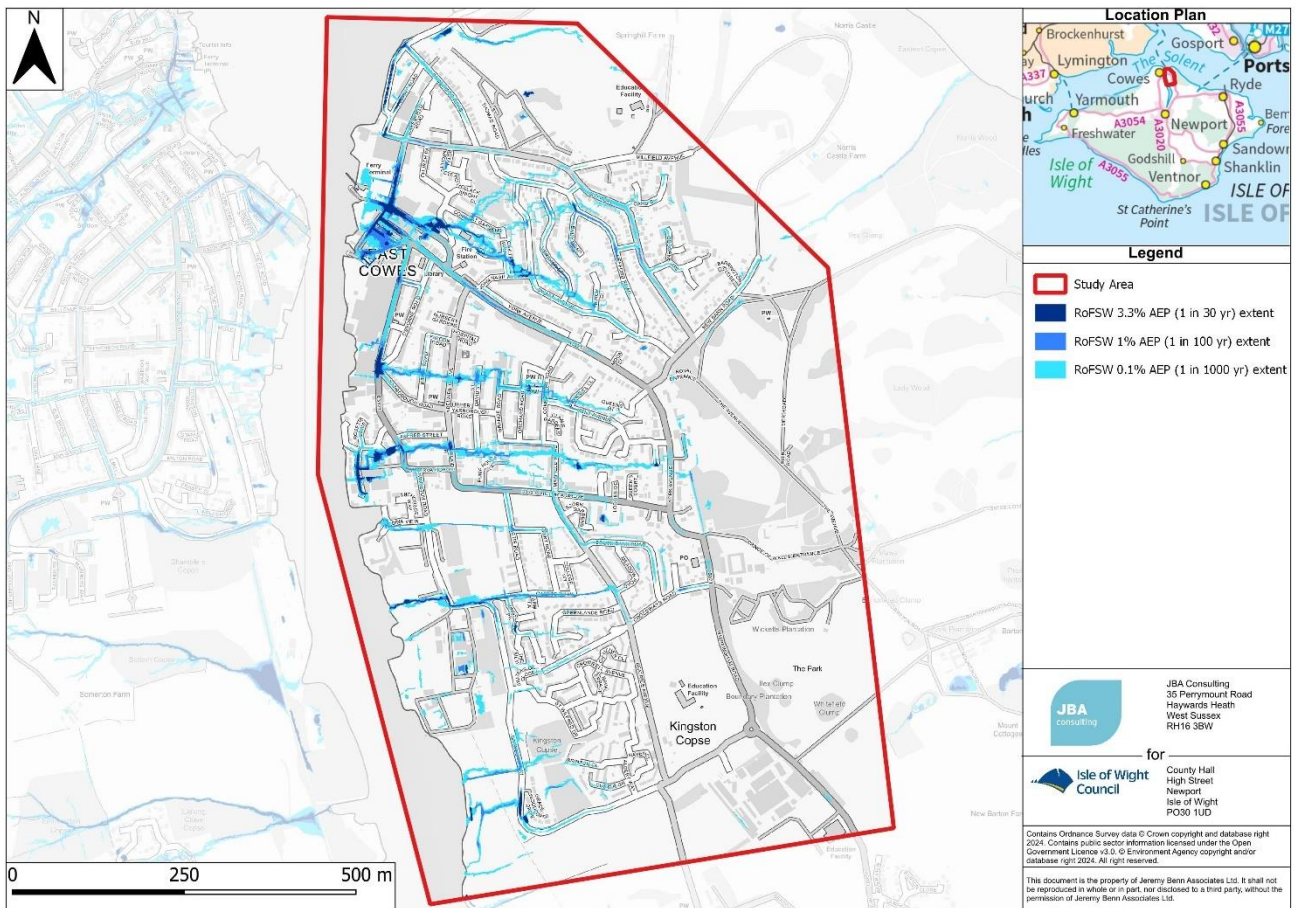


Figure 3-2 Risk of Flooding from Surface Water

There is high surface water flood risk along natural depressions. The highest risk of surface water flooding occurs just off the Ferry Terminal at the surrounding roads, such as Dover Road, Well Road, Castle Street, Marsh Road and Link Road which correspond to the areas impacted by the October 2023 flooding. The Well Road roundabout there has a high risk from surface water flooding. These areas are at risk of flooding during rainfall events with greater than a 1 in 30-year or 3.3% annual occurrence. Other areas within the study area



are also at risk of flooding with greater than a 1 in 100-year event or 1% annual exceedance probability. Figure 3-2 shows a pattern of the surface water flood runoff to low-lying areas from higher elevated areas gathering along the estuary shoreline, affecting the roads identified above, in the centre of East Cowes in and around the points of discharge for watercourses and surface water routes (i.e. following the topographic low points)..

### 3.3 Groundwater flooding

Flooding from groundwater occurs when the water table within the underlying rock or soil rises above ground level or interacts with properties or infrastructure below ground level. Data on groundwater was not available for the Section 19 investigation. However, based on the underlying geology and soil types, which are muddy limestones and soils with indications of impeded drainage, groundwater is not expected to be a significant flood risk in the East Cowes area. Furthermore, responses from stakeholders have not indicated groundwater flooding to have been a significant issue. Figure 3-3 shows the groundwater flooding depths below ground surface level (m) in East Cowes.

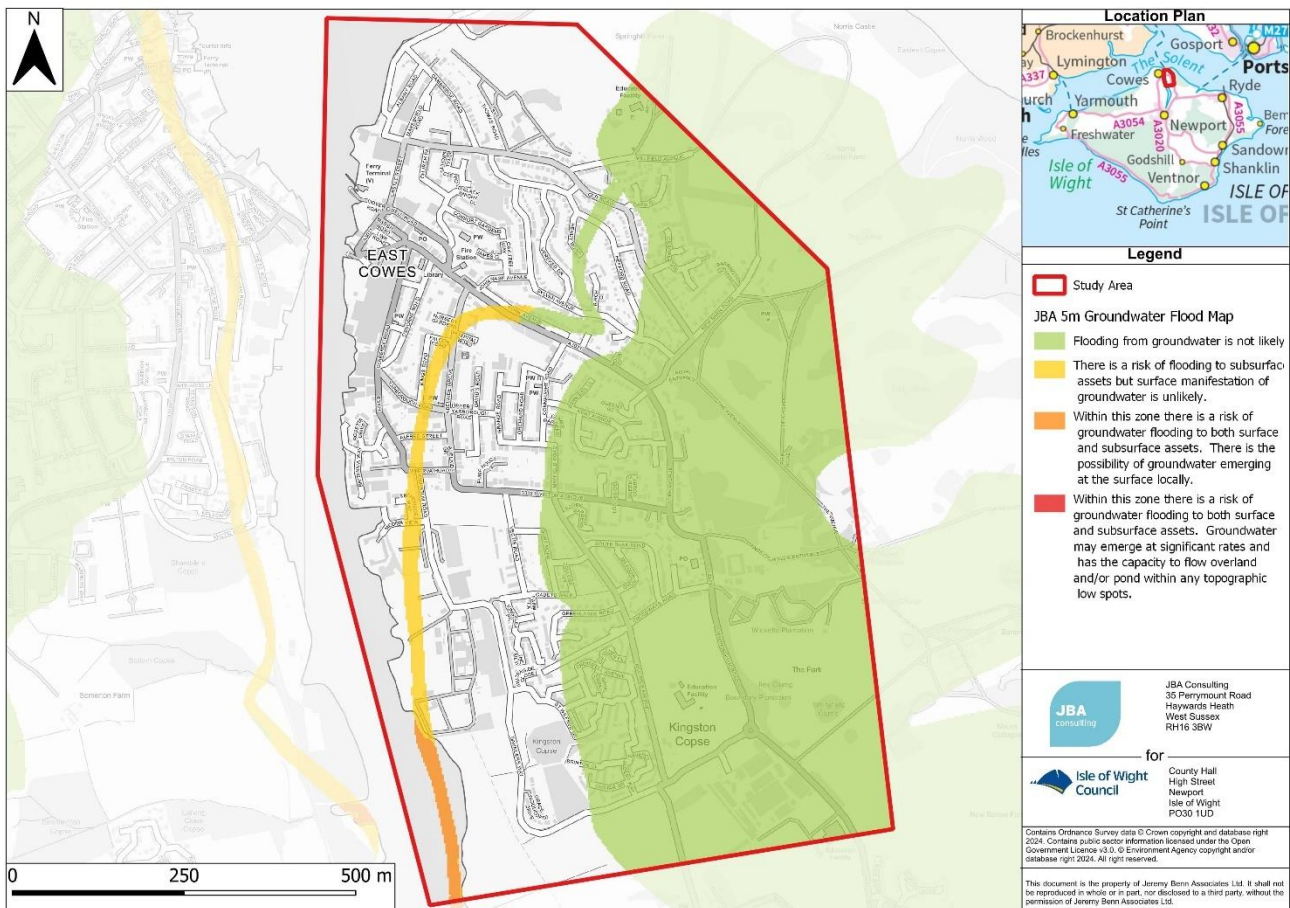


Figure 3-3 Groundwater flooding map

The East Cowes area has four types of underlying geology that is highly variable. For example, the Bembridge Marls are impermeable lagoon and freshwater blue and green clays (IoW SFRA reference). The Hamstead beds permeability is highly variable and with the sand deposits the water is allowed to pass through. As the high elevated areas are

mainly dominated by the Hamstead beds, it is more likely that the water will flow to lower lying areas such as that is in the urbanized areas in East Cowes.

### 3.4 Sewer flooding

East Cowes has a combination of both combined and separate sewer systems. Sewer flooding can often occur during heavy rainfall when sewer systems can surcharge, resulting in hydraulic overload of the sewer system and flooding at the surface. Combined sewer systems are particularly susceptible as they convey both surface water and foul sewage and are often older systems that may not be designed to modern standards.

Misconnections to foul sewers can also increase the risk of sewer flooding occurring. In East Cowes, the predominance of combined sewer systems in the town centre is a potential risk with regard to sewer flooding.

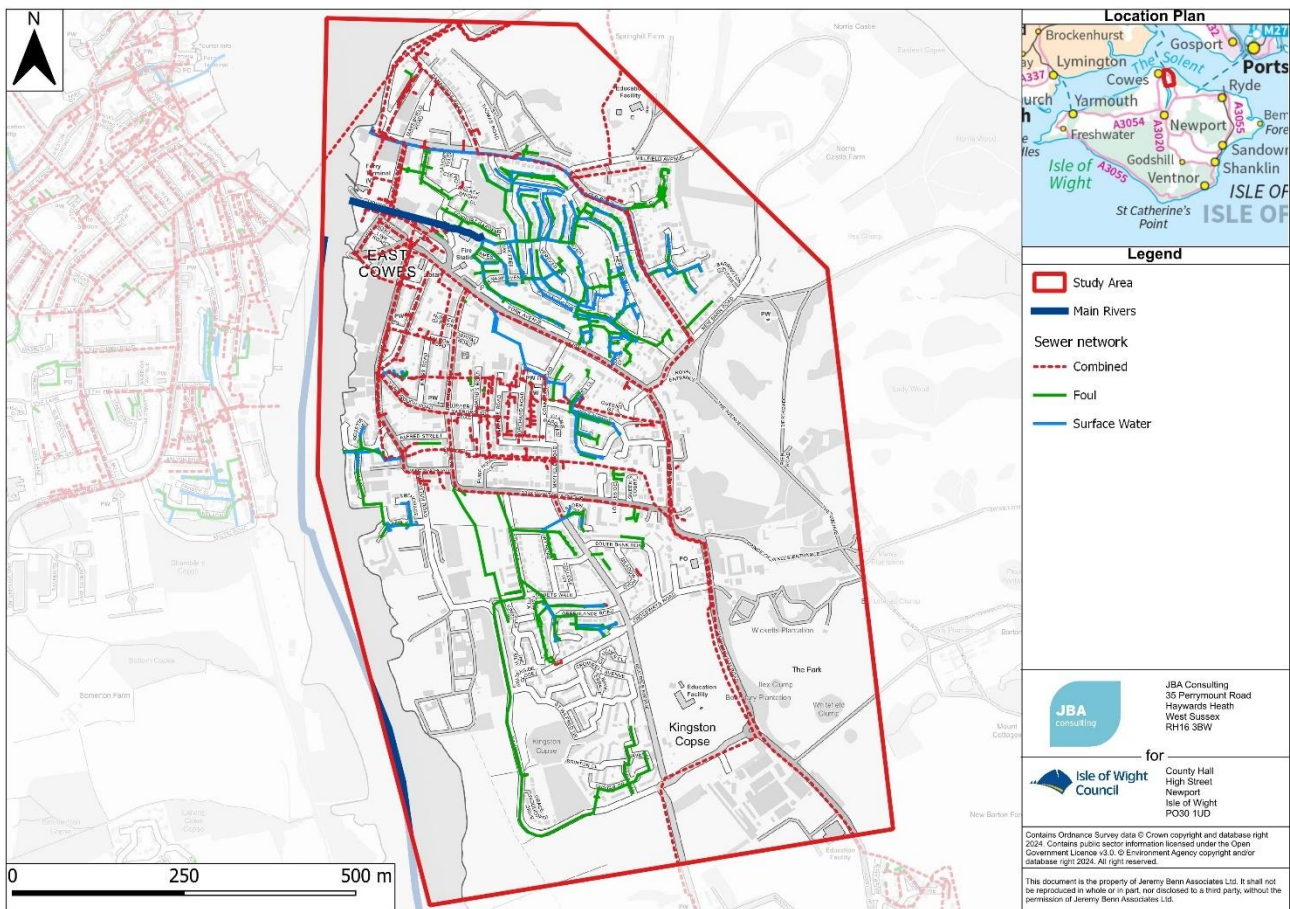


Figure 3-4 Southern Water Sewer Networks in East Cowes

### 3.5 Flood history

Table 3-1 details the known flood history in East Cowes sourced from the previous Strategic Flood Risk Assessment. It was noted that there were numerous flooding events in East Cowes in the past, mainly from surface water and tidal flood risks.

Isle of Wight Council has previously undertaken a Section 19 flood investigation in 2014. A number of properties along Ferry Road, York Ave, Castle Street, Dover Road and Well Road have flooded directly and indirectly during 14<sup>th</sup> and 15<sup>th</sup> of February 2014. The causes of flooding occurred from high tides and extreme weather events. On Castle Street the flooding has been so severe that it was necessary to pump water out of properties by the IWFRS. It was recorded that there were 14 commercial properties flooded during the February 2014 flood event.

The main flood risk to East Cowes is from the sea as a result of high tide levels, wave overtopping and coastal erosion which heavily influences the town and can lead to severe flooding to both commercial and residential properties.

Table 3-1 Flood history of East Cowes

Date	Source of flooding	Description of impacts
2014	Extreme weather event and high tide	Several residential and commercial properties flooded.
2023	Extreme weather event, high tide and combines sewer system fill up	14 properties flooded. Coincidence of high tide. Heavy rainfalls and pump failure.
2024	Extreme weather event, highest tide ever recorded, strong westerly force 6 winds	Red Funnel Terminal submerged, Esplanade impassable, properties flooded.

## 4 Flood Risk Management

### 4.1 Flood risk management roles and responsibilities

Flood risk in England is managed by a range of different Risk Management Authorities (RMAs). The Flood and Water Management Act places a duty on all flood risk management authorities to co-operate with each other. The act also provides Lead Local Flood Authorities and the Environment Agency with a power to request information required in connection with their flood risk management functions.

#### 4.1.1 Environment Agency

The Environment Agency is sponsored by the Government's Department for Environment, Food & Rural Affairs (DEFRA), and is tasked with the protection and conservation of the water environment in England, the natural beauty of rivers and wetlands and the wildlife that lives there.

The Environment Agency's responsibilities include: water quality and resources; fisheries; conservation and ecology; and operational responsibility for managing the risk of flooding from main rivers (usually large streams and rivers), reservoirs, estuaries and the sea.

Flood risk management work can include: constructing and maintaining 'assets' (such as flood banks or pumping stations) and works to main rivers to manage water levels and make sure flood water can flow freely; operating flood risk management assets during a flood; dredging the river; and issuing flood warnings.

The Environment Agency can also do work to prevent environmental damage to watercourses, or to restore conditions where damage has already been done.

#### 4.1.2 Lead Local Flood Authority (LLFA)

LLFAs are responsible for managing the risk of flooding from surface water, groundwater (water which is below the water table under the ground) and ordinary watercourses (non-main rivers) and lead on community recovery. The LLFA is also responsible for developing, maintaining and applying a strategy for local flood risk management in their area and for maintaining a register of flood risk assets.

Isle of Wight Council is the LLFA for East Cowes.

#### 4.1.3 Water and Sewerage Company

Water and sewerage companies are responsible for managing the risks of flooding from surface water and foul or combined public sewer systems providing drainage from buildings and yards. In East Cowes this responsibility falls under Southern Water.



#### 4.1.4 Highway Authority

The Highway Authority for East Cowes is Isle of Wight Council, and the highways function is managed by Island Roads. It is responsible for maintaining the highway drainage system to an acceptable standard and ensuring that road projects do not increase flood risk.

#### 4.1.5 Riparian landowners

Riparian landowners who own land or property next to a river, stream or ditch, (including where this runs through a pipe or culvert), have rights and responsibilities over the management of the land including: a responsibility to let water flow through the land without any obstruction, pollution or diversion which affects the rights of others; keeping banks clear of anything that could cause an obstruction and increase flood risk; maintaining the bed and banks of the watercourse; and keeping structures clear of debris. There is more information on these rights and responsibilities in the Environment Agency guide 'Living on the Edge', 'Owning a watercourse'.

#### 4.1.6 Local residents

Local residents should find out about any flood risk in the area, sign up for the Environment Agency's free flood warnings and make a written plan of how they will respond to a flood situation. Business owners should also make a flood plan for their business. There are measures that can be taken to reduce the amount of damage caused by flooding and properties at risk should be insured. Local residents can find out if their property is at risk, prepare for flooding, get help during a flood and get help after a flood.

BeFloodReady contains information for residents in understanding their flood risk and preparing for flooding:

<https://www.befloodready.uk/before-a-flood/understanding-your-flood-risk>

Further information, useful contact details and local information (such as sandbag locations) is available on Isle of Wight Council's website:

<https://www.iow.gov.uk/keep-the-island-safe/severe-weather/flooding/>

## 4.2 Emergency responsibilities

The emergency responsibilities of different organisations are outlined in Table 4 2 below. Please note that Parish and Town Councils do not have a legal obligation to respond to emergencies. Whatever service they provide is voluntary and unique to each Parish or Town Council.

Table 4-1 Roles and responsibilities in an emergency, during and after a flood event

Local (County and District) Authorities
<p>Coordinate emergency support within their own functions</p> <p>Deal with emergencies on 'non main rivers'</p> <p>Coordinate emergency support from the voluntary sector</p> <p>Liaise with central and regional government departments</p> <p>Liaise with essential service providers</p> <p>Open rest centres</p> <p>Manage the local transport and traffic networks</p> <p>Mobilise trained emergency social workers</p> <p>Provide emergency assistance</p> <p>Deal with environmental health issues, such as contamination and pollution</p> <p>Coordinate the recovery process</p> <p>Manage public health issues</p> <p>Provide advice and management of public health</p> <p>Provide support and advice to individuals</p> <p>Assist with business continuity</p>

Police Force	Utility Providers
<p>Save life</p> <p>Coordination and communication between emergency services and organisations providing support</p> <p>Coordinate the preparation and dissemination</p>	<p>Attend emergencies relating to their services putting life at risk</p> <p>Assess and manage risk of service failure</p> <p>Assist with recovery process, that is, water utilities manage public health considerations</p>

Fire and Rescue Service
<p>Save life rescuing people and animals</p> <p>Carry out other specialist work, including flood rescue services</p> <p>Where appropriate, assist people where the use of fire service personnel and equipment is relevant</p>

Ambulance Service	Town and Parish Councils
<p>Save life</p> <p>Provide treatment, stabilisation and care at the scene</p>	<p>Support emergency responders</p> <p>Increase community resilience through support of community emergency plan development</p>

Voluntary Services
<p>Support rest centres</p> <p>Provide practical and emotional support to those affected</p> <p>Support transport and communication</p> <p>Provide administration</p> <p>Provide telephone helpline support</p>



### Environment Agency

Issue Flood Warnings and ensure systems display current flooding information  
 Provide information to the public on what they can do before, during and after a flood event  
 Monitor river levels and flows  
 Work with professional partners and stakeholders and respond to requests for flooding information and updates  
 Receive and record details of flooding and related information  
 Operate water level control structures within its jurisdiction and in line with permissive powers  
 Flood event data collection  
 Arrange and take part in flood event exercises  
 Respond to flooding incidents  
 Respond to pollution incidents and advise on disposal  
 Assist with the recovery process, attending flood surgeries  
 Advise upon and regulate flood risk activities on, and within the flood plains of main rivers

#### 4.2.1 Local Resilience Forum (LRF)

Local resilience forums (LRFs) are multi-agency partnerships made up of representatives from local public services, including the emergency services, local authorities, the NHS, the Environment Agency and others. These agencies are known as Category 1 Responders, as defined by the Civil Contingencies Act.

LRFs are supported by organisations, known as Category 2 responders, such as the Highways Agency and public utility companies. They have a responsibility to co-operate with Category 1 organisations and to share relevant information with the LRF. The geographical area the forums cover is based on police areas.

The Local Resilience Forum is not a legal entity, nor does a Forum have powers to direct its members. Nevertheless, the Civil Contingencies and the Regulations provide that emergency responders, through the Forum, have a collective responsibility to plan, prepare and communicate for emergencies in a multi-agency environment.

The Local Resilience Forum for East Cowes is the Hampshire and Isle of Wight Local Resilience Forum (HIWLRF). The HIWLRF has identified coastal flooding, fluvial flooding and surface water flooding as very high risk. Therefore, the HIWLRF has a Multi-Agency Flood Response Plan that provides the framework for the multi-agency response to a flooding incident and details the roles and responsibilities of each agency, as well as the estimated time of onset for flooding, the number of properties at risk, vulnerable receptors and safe evacuation points. THE HIWLRF also work with communities at risk to create Community Emergency Action Plans.

### 4.3 Existing flood risk management activities

The Isle of Wight Catchment Flood Management Plan states that River Medina and estuary is highly responsive to heavy rainfall events and is affected by tide locking.

The Isle of Wight Shoreline Management Plan identifies the importance of coastal defence for East Cowes to protect the commercial and residential areas. The shoreline management plan recommends maintaining and raise the existing defences in the Medina Estuary.

#### 4.3.1 Flood warning service

The areas surrounding the River Medina are situated in the EA's Flood Warning and Alert Zones. This service provides communication of flood alerts and warnings via phone, text messages or email to anyone registered online through the government website. Flood warning and alerts are based on constant monitoring and forecasting of flooding from rivers and sea. Figure 4-1 shows the locations of the flood alert and warning areas within the East Cowes study area.

It should be noted that the EA's flood warning and flood alert service only covers flood events from main rivers and the sea. The service does not include flood warnings from other sources such as surface water, groundwater or smaller watercourses.

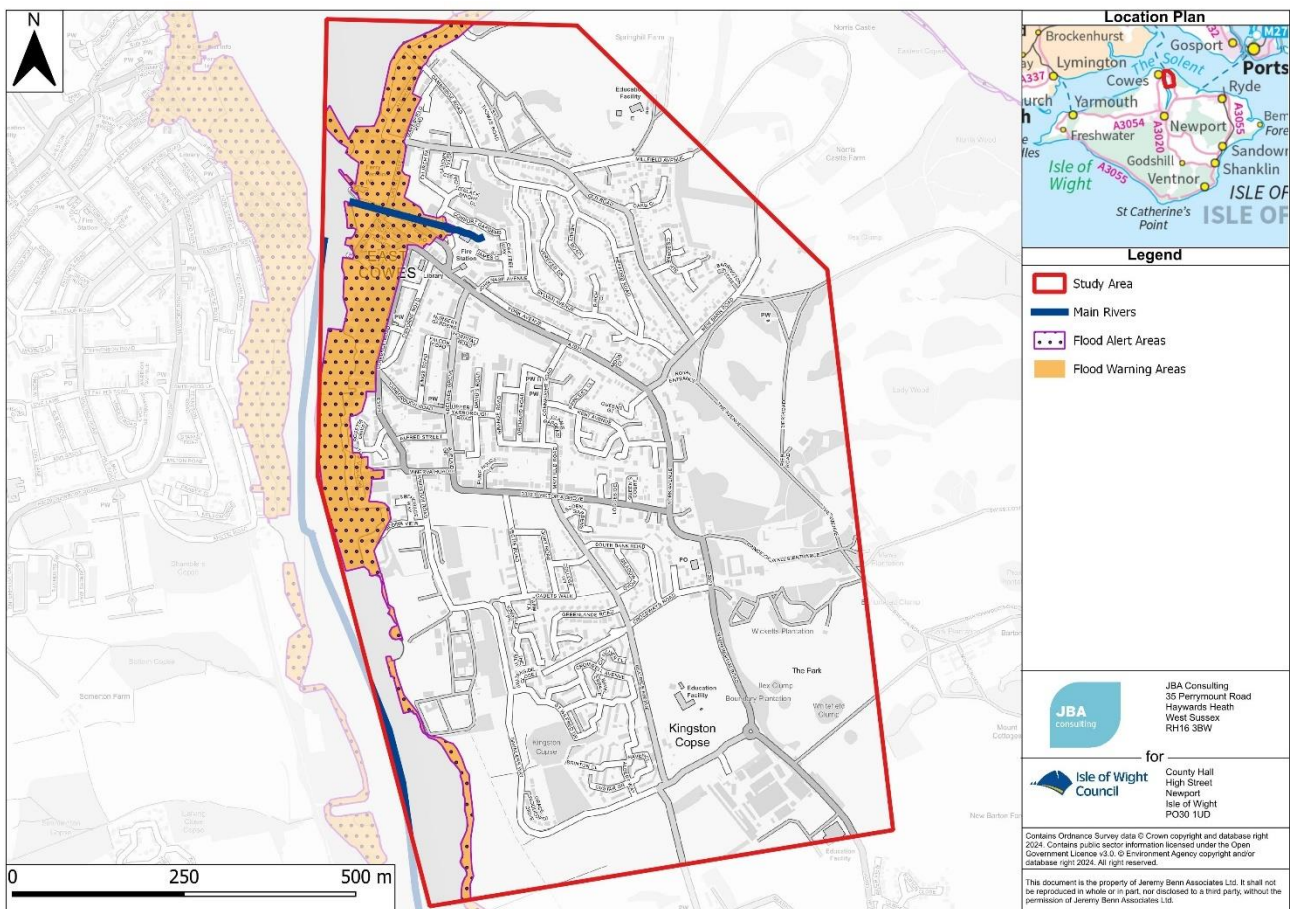


Figure 4-1 Flood warning and alert areas in East Cowes

## 5 Hydrological Analysis

A range of hydrometric data has been collected and analysed to understand the hydrological factors behind the flooding that occurred, this includes data from:

- Tipping bucket rain gauges;
- Rainfall radar (HydrologyDataset);
- River level gauges;
- Tide levels.

As there was only a single rain gauge that was local to the Cowes and East Cowes area, rainfall and tide level data from DEFRA Hydrology Dataset and from the Met Office has been obtained and analysed as a point of comparison to the rain gauge data and as a sensitivity check.

The River Medina is understood to have flooded during the event on 25 October 2023, and as a result river level gauge data has been requested to understand the magnitude of the fluvial flooding. Tide levels have also been obtained to understand whether tide locking may have been a factor during the event.

As it has been ascertained that the majority of internal flooding incidents occurred on 25 October 2023, this section focuses on that event in greater detail.

### 5.1 Conditions at the time

The rain gauge at Cowes shows that there was rainfall throughout the night of the 24th of October 2023, starting approximately at 19.45. This rainfall continued until 09.00 on 25th of October 2023. Rainfall intensity peaked between 20.00 and 21.00 on the 24th of October (Figure 5-1) when the tide level was also at its highest approximately 3.85m high. Rainfall continued throughout the night, peaking at around 02.45am with approximately 6.4mm, and again at 05.00am with approximately 4.76mm. The rain continued until 09.00am in the morning of 25th of October, when the tide level was 4.19m high. It is evident that a large amount of rainwater originated in Spring Hill, which flowed towards the low-lying areas of Dover Road, Castle Street and York Avenue.

### 5.2 Rainfall return period estimation

Rain gauge data provided by the Environment Agency has been used to estimate the return period of the storm event on the 25th of October 2023. The closest rain gauge to East Cowes is located in Cowes. The Flood Estimation Handbook (FEH) web service was used to purchase point descriptors for East Cowes, allowing the storm return period to be estimated.

The storm event that affected East Cowes on the 24th and 25th of October 2023 was likely to be between a 1 in 49 and a 1 in 95 year event. This is a relatively extreme event and older drainage systems would not be designed to manage events such as this.

### 5.3 Impact of river levels

An un-gauged main river is located east of Church Path, which is culverted from Church Path to the outfall and discharges into the Medina estuary. Although this is ungauged it is understood from photographs and anecdotal evidence, that highways drainage systems discharging into this watercourse surcharged (when a pipe or sewer is completely full and overloaded) leading to these systems backing up and causing flooding at the surface to properties in Church Path.

### 5.4 Impact of tide levels

During the flood events in October 2023, the tide was rising which may have resulted in tide locking of the watercourse at Church Path and other drainage systems which discharge into the Medina Estuary. It is understood that tide levels were particularly high during the April 2024 event, although as this investigation has already been progressed this data has not been requested from the Environment Agency.

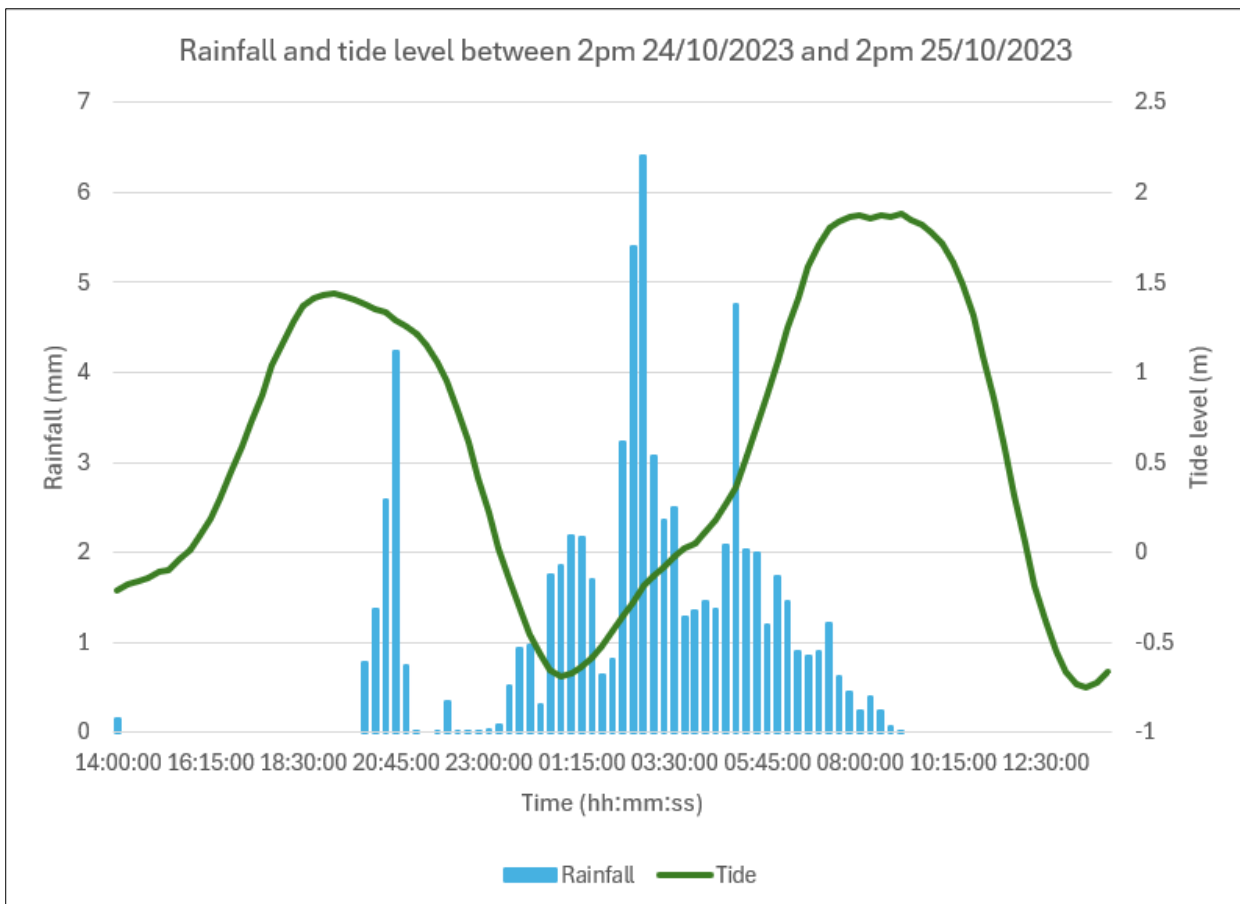


Figure 5-1 Tide level (m) and rainfall (mm) between the 24th and 25th of October 2023

Heavy rainfall throughout the evening of the 24th and the early hours of the 25th October, likely caused a hydraulic overload of the sewer system. This was likely exacerbated by tide locking of the culverted watercourse (near Church Path) where the highway drainage discharges to and would have led to surface water backing up and flooding the surrounding area.

## 6 Incident Response

### 6.1 Flood Warning and response during the event

The Met Office issued weather warnings corresponding with the period of flooding. These warnings were as follows:

- 24<sup>th</sup> October 2023 18:00 to 25<sup>th</sup> October 2023 10:00 – Yellow Warning: Rain
- 25<sup>th</sup> October 2023 06:13 to 10:00 – Amber Warning: Rain
- 26<sup>th</sup> October 2023 0400 to 12:00 – Yellow Warning – Rain

The Met Office issues the following guidance on what its weather warnings mean:

- Yellow: You should check the details of the forecast and consider taking steps to minimise impacts for you and your household. Even in a yellow warning area, people will see disruption to a greater or lesser extent, so it's important to check the details and see which steps you could take to prepare.
- Amber: Disruption from an Amber warning is more likely and more widespread. You should change plans that could be impacted by the weather and take action to protect yourself and your property.
- Red: These warnings are reserved for very dangerous weather with a high level of certainty. You should take direct action to keep yourself and others safe from impacts of the weather. It's likely there will be a risk to life, as well as substantial disruption to travel and infrastructure.

Isle of Wight Radio and Gurnard Parish Council published an article on its website to warn residents of the flooding at 7.52am 25 October 2023. Initial responses to the flooding occurred on the morning of the 25<sup>th</sup> October, with various calls made to the emergency services. It is understood that Isle of Wight Council provided advice, as appropriate, telling residents to protect their houses and obtain sandbags if safe to do so.

The flooding triggered a response from the council, with sandbags provided to the affected properties. Residents were able to place these sandbags by the doors of their property, to prevent internal flooding.

Additionally, it is evident that East Cowes council and the fire service contacted Southern Water, requesting the storm pumps at the Albany Road Pumping Station in East Cowes to be switched on, in order to alleviate capacity for the combined sewer network. An outline of the emergency response to the flooding on 25 October is provided in Table 5- 1.



Table 5- 1: Emergency response to the flood event on 25 October 2023

Date	Time	Activity/event	Agency
24/10/2023	11am	Yellow warning of rain has been issued for South East England including Isle of Wight.	Met Office
25/10/2023	06.17am	Amber Warning has been issued for between 06.13am and 10.00am on 25 October 2023 for South East England including Isle of Wight.	Met Office
25/10/2023	06.30am	East Cowes Councillor attended flooded properties.	Isle of Wight Council
25/10/2023	Morning	East Cowes Councillor called emergency services.	Isle of Wight Council
25/10/2023	Morning	Sandbags were placed at properties doors and on drains.	Isle of Wight Council
25/10/2023	Morning	Drivers were notified to slow down to prevent flood water from enter further properties.	Isle of Wight Council
25/10/2023	Midday	Storm pumps were turned on at Well Road roundabout to extract flood water.	Southern Water

## 6.2 Subsequent actions

### 6.2.1 Community Recovery Grant

Flooded households in affected areas were able to apply for up to £500 to get cash quickly to help with immediate costs. The grant was available to anyone whose primary home suffered internal flood damage, or for people who were not able to live in their property, as a direct result of Storm Babet between 19 and 25 October 2023. Flooded households were also eligible for a 100 per cent council tax discount for a minimum of three months — this means affected residents did not have to pay council tax during this period. It is understood that eight residential properties in East Cowes were awarded a Community Recovery Grant following the 25 October 2023 event.

### 6.2.2 Business Recovery Grant

Small-to-medium sized businesses were eligible for up to £2,500 from the Business Recovery Grant to help them return quickly to business as usual. The business had to be a Small and Medium Sized Enterprise (SME) at the point of grant award.

The business must have been trading at and/or from the property at the point that the property was impacted by Storm Babet. For the purposes of this grant scheme, a business is trading if it is engaged in business activity. The business must have been either:

- Directly impacted by Storm Babet – for instance the business suffered flood damage to the property, or

- Indirectly impacted by Storm Babet – for instance access to the business premises is severely restricted as a result of flooding, including restricted access for customers, suppliers or staff.

Businesses that have not been able to operate due to flooding at their premises may be eligible for 100 per cent Business Rates Relief for a minimum of three months.

Out of 12 commercial properties that applied for a Business Recovery Grant in East Cowes, 7 were awarded a grant. Applications that were not successful were rejected primarily because businesses did not have any insurance or in one case because the business was not trading.

### 6.2.3 Property Flood Resilience grant

Isle of Wight Council is administering a Property Flood Resilience grant on behalf of DEFRA, for properties affected by flooding between 19 – 25 October 2023. Eligible property owners (both domestic and commercial) can apply for up to £5,000 (including VAT) towards the cost of flood resilience and recoverability measures. Up to £500 of the grant must be for survey costs.

# 7 Source-pathway-receptor analysis

The Source-Pathway-Receptor model is a concept that can provide an understanding of all aspects of flood hazard. It breaks down each flood incident into the following three elements:

- Source – the origin of flood water
- Pathway – a route or means by which a receptor can be affected by flooding
- Receptor – something that can be adversely affected by flooding (e.g. people, property, infrastructure)

JBA compiled information from multiple sources regarding flood extent in East Cowes during the 25 October 2023 flooding event. Community surveys and flood grant data was compiled to generate maps which indicated flood patterns. This data indicated that flooding was mostly in the town centre and in the vicinity of York Avenue, Castle Street and Church Path; although there were a smaller number of isolated incidents in other parts of East Cowes.

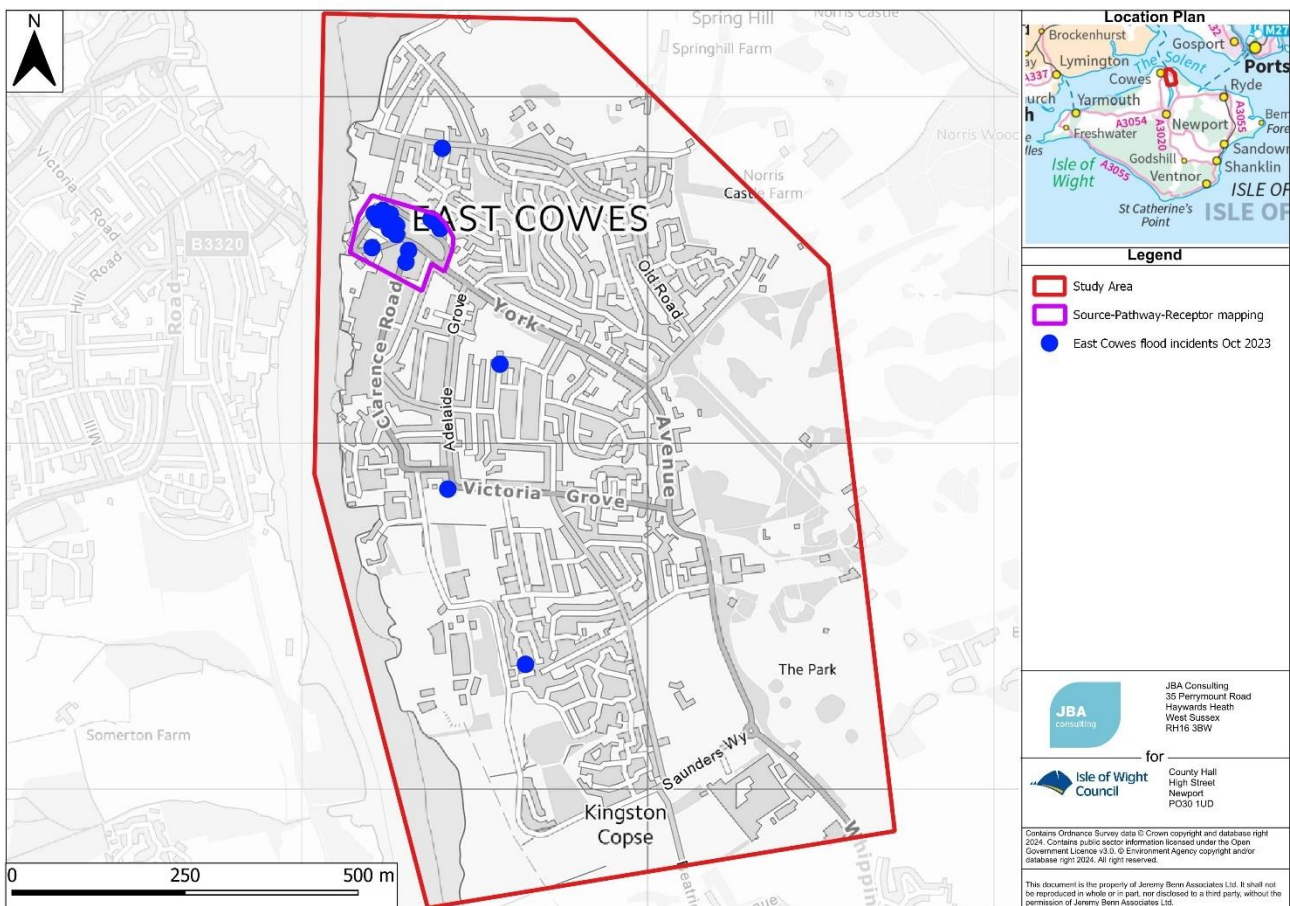


Figure 7-1: Reported flooding incidents in East Cowes following 25 October 2023 event

Available information has been analysed to determine the main sources of flood water, the pathways it took and the main receptors. The flooding in East Cowes occurred across the



town and mainly near the Medina Estuary. Based on the survey responses and the data received, a source-pathway-receptor mapping and analysis for the areas with the most significant flood impacts, this includes:

- York Ave
- Castle Street
- Dover Road
- Well Road
- Church Path
- Esplanade
- Red Funnel Ferry Terminal

## 7.1 York Avenue area

### 7.1.1 Source

The source of the flooding to East Cowes is likely to be the result of a combination of factors, namely an extreme rainfall event combined with tide locking and hydraulic overloading of the watercourse in Church Path and local drainage systems.

A major flood risk for East Cowes is tidal flood risk. Modelled tidal flood risk on Figure 3-3 shows that the town is mainly located in Flood Zone 2 and 3. The Medina Estuary and The Solent regularly causes flooding to the Red Funnel Ferry Terminal, Waitrose and the Esplanade during periods of high tide. Furthermore, the Chain Ferry, the High Street and the Esplanade are also at risk of tidal flooding.

The Church Path watercourse (designated as an EA main river) and local drainage systems (not associated with the adopted sewer network) discharge into the Medina Estuary and that the flooding occurred when tide levels were rising. As a result, it is likely that tide locking played a role in the flooding through a combination of blocking discharge of drainage and watercourses and subsequently backing up blocked water to contribute to the overtopping and exceedance of drainage channels.

East Cowes is part of the Sandown New Sewer Catchment, which has a combination of gravity sewers and rising mains (where wastewater is pumped). This sewer catchment is a combined sewer system which collects sewage from properties and surface water. During the October 2023 flood event in East Cowes, the sewage systems experienced an overload of floodwater, with water reported to overspill and burst manhole covers. It was reported by several residents that their downstairs toilets were bubbling. It was further noted that the drains on the roads were clogged, resulting in flooding of surrounding properties.

### 7.1.2 Pathway

Figure 7-2 indicates the likely pathways of the water during the flood event based on a combination of information collected, such as community surveys and footage from the event. Flood water likely originated from drainage systems as a result of hydraulic overloading which was likely exacerbated by tide locking and the volume of rainfall entering drainage systems. It is understood this caused manholes in Castle Street, Well Road and Church Path to surcharge and flood these roads with a significant volume of water.

Flood water then followed the local topography which is relatively flat causing internal property flooding to a number of commercial buildings and residential dwellings, including those along Castle Street, York Avenue and Church Path.

### 7.1.3 Receptor

Residential properties on York Avenue, Castle Street, Albany Road and Esplanade were heavily affected by flooding on the morning of 25 October 2023. The images below show the flooded areas that are close to the estuary shoreline.

Responses to the stakeholder engagement survey indicate that the flooding had an impact on residents' mental health, causing stress and anxiety. A major impact of the flooding has been the disruption to normal lives experienced by the residents. Residents have had to move out of their homes into alternative accommodation, either on a temporary or permanent basis. This includes vulnerable residents who cannot stay in their homes whilst repairs are being carried out. People have lost carpets, floorboards, furniture, and belongings from the ground floor of their properties.

The majority of properties affected were local businesses and the flooding led to a number of businesses having to close and resulting in loss of income and economic impacts. Many businesses have had to claim on their insurance policies.

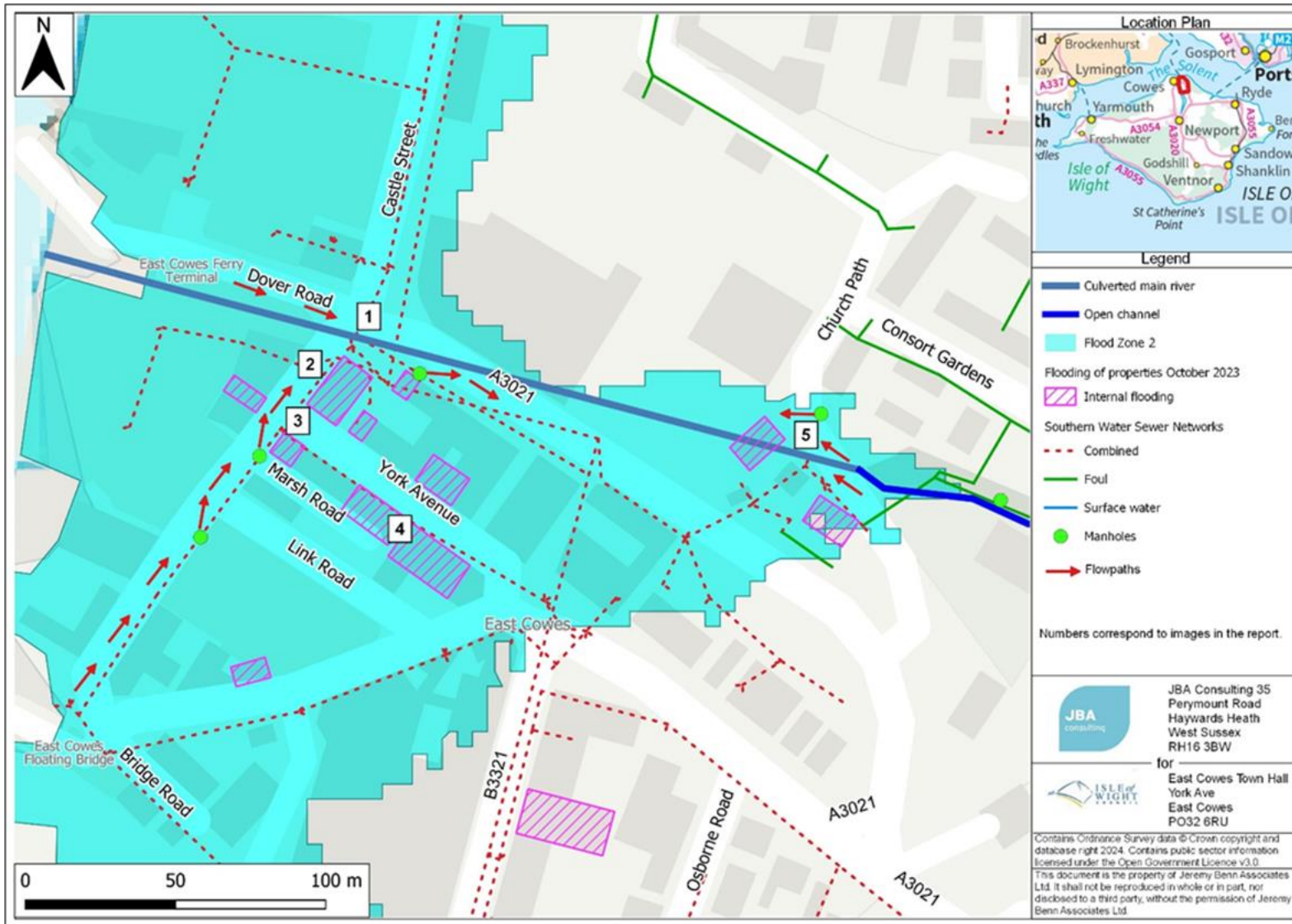


Figure 7-2 Source-Pathway-Receptor map for the flooded area



1. Dover Road and Well Road roundabout, looking north-westward from Well Road towards the Red Funnel Ferry Terminal



2. Castle Street, looking southward towards the Chain Ferry Terminal



3. Castle Street and York Avenue facing north-westward from York Avenue



4. York Avenue





1. Church Path in rainy conditions facing north-westward during the flood event

Figure 7- 3: Photographs of flooding in East Cowes on 25 October

## 7.2 Other affected areas

The majority of flooding impacted the area in the vicinity of York Street and Well Road, however a number of properties also reported flooding internally during this event. This includes properties in:

- Old Road
- Grange Road
- Adelaide Close
- Meadow View

Due to the isolated nature of the flooding at these locations, it is likely these properties flooded from surface water runoff as a result of the rainfall event which is noted to be infrequent. The condition of the drainage system at these locations is not known, however if there were issues with the condition or capacity of these systems it may have exacerbated flooding.

## 7.3 April 2024 event

It is understood that many of the same areas were affected by the flooding that occurred on the night of April 8<sup>th</sup> 2024, with roads and properties in the vicinity of the floating bridge and ferry terminal being impacted. It is understood that tide levels were high during this time, due to the similarities between the areas affected it is highly likely that the root cause of the flooding was the same in both instances.

# 8 Surface Water Drainage Assessment

## 8.1 Surface water drainage

The majority of surface water drainage in East Cowes is discharged to a combined sewer network, which will take both surface water and foul sewage. A large part of East Cowes, north of York Avenue has been developed more recently and has a separate surface water and foul sewer system. The surface water system is indicated to discharge into the watercourse at Church Path through a 750mm outfall, this is inferred through a review of Southern Water’s sewer network and was not observed on site. Highway drainage adjacent to the watercourse also discharges into the watercourse and was observed on site.

### 8.1.1 Albany Road Wastewater Pumping Station

The majority of flows into the combined sewer network as well as foul flows where there are separate sewer systems are discharged to Albany Road Wastewater Pumping Station. From there, sewage is pumped to Spring Hill Transfer Pumping Station and ultimately pumped to Sandown Wastewater Treatment Works. A review of flow data from the Albany Road WPS was provided by Southern Water from October to November 2023.

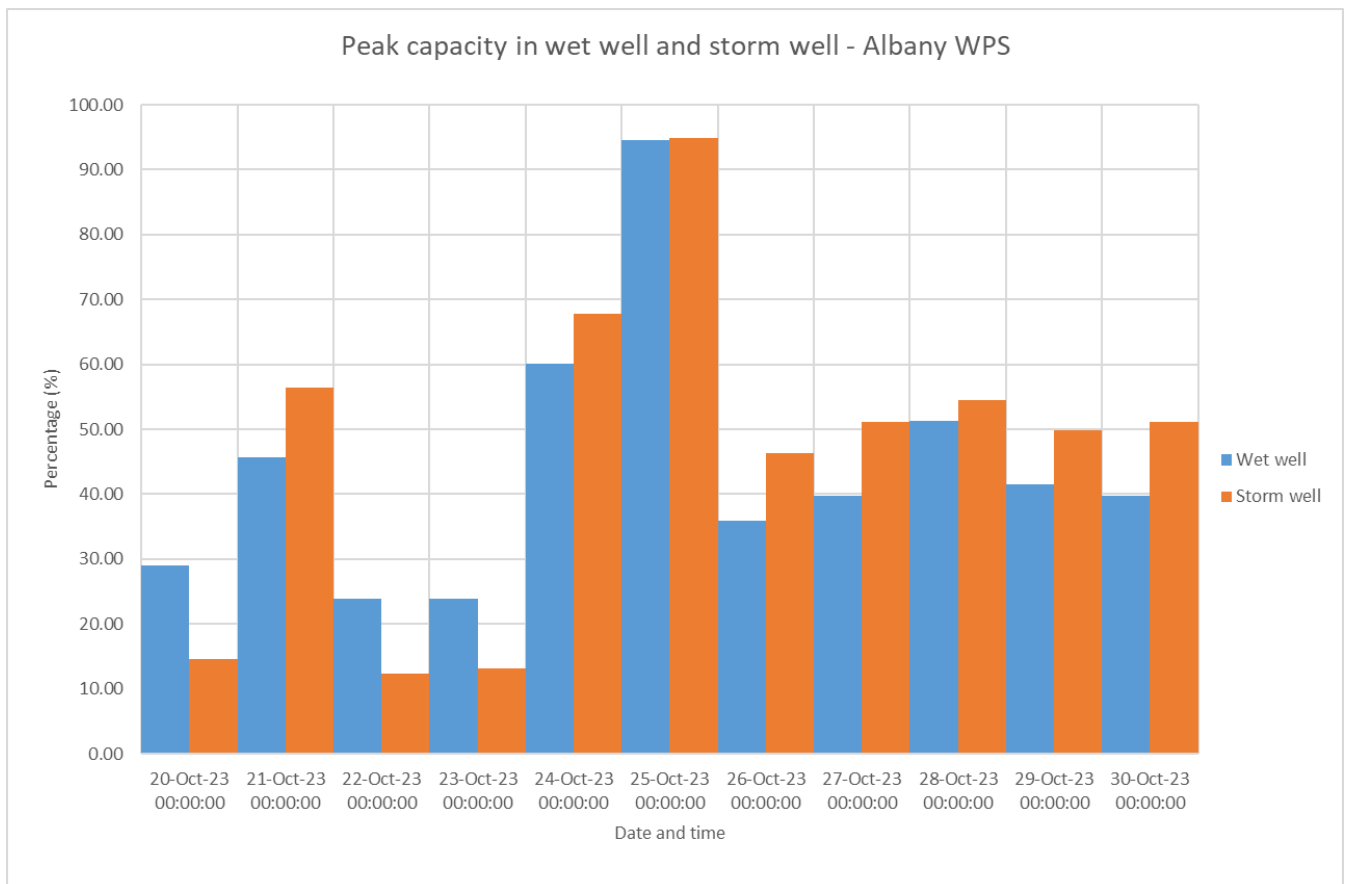


Figure 8-1: Albany Road WPS – wet well and storm well capacity

It is understood that Albany WPS has two wet wells one for normal dry weather flow or DWF with three pumps working in duty, assist, standby configuration. If the flows to the site

overwhelm the duty & assist pumps, flows overtop through a screen to the storm well which has three pumps in the configuration as the DWF pumps, if the level in the storm tanks rises sufficiently the pumping station will discharge to the sea.

Data provided by Southern Water indicates that the storm well was active during the event, with 2 of its 3 pumps running for 387 mins on 25 October and 728 mins on 26 October. The data shows that capacity in the wet well quickly reached 90% on the morning of the 25 October and the storm well came into effect. This data clearly shows that the pumping station was operating during the event and that it was forced to manage considerable flows.

## **8.2 Impact of development**

It is understood that concerns have been raised over the potential for development at the current Red Funnel Ferry Terminal site, and proposals have been previously submitted to relocate the ferry terminal and re-develop the site with a mix of uses including residential and commercial. An application was previously submitted in 2015 (P/01065/15) which was refused by Isle of Wight Council as the Local Planning Authority for reasons unrelated to flood risk and drainage.

A Flood Risk Assessment and Surface Water Drainage Strategy was previously submitted as part of these proposals, which have been reviewed. It should be noted that this would not have increased the overall impermeable area as the existing area is considered completely impermeable. The proposed drainage was to discharge partly to the Medina Estuary through existing surface water outfalls and partly to the existing sewer network.

It is unlikely that the development proposals would have impacted flood risk to East Cowes. However, opportunities to reduce flows to the combined sewer system should be explored further as part of any future proposals. Furthermore, future proposals will need to comply with Isle of Wight Council's SuDS Supplementary Planning Document which has been published in 2024.



## 9 Condition assessment

### 9.1 Methodology

During the site walkover in East Cowes there were several flood risk assets identified for a visual asset condition grading and assessment. The visual asset condition assessment was carried out by using the Environment Agency's One Business Condition Assessment Manual (OBCAM). The assets are graded and assessed in Table 9-1 to 9-4 below with the following OBCAM Condition Grading system.

- Very Good (1)
- Good (2)
- Fair (3)
- Poor (4)
- Very Poor (5)
- ENI (Element not inspected)

### 9.2 Condition grading and assessment

Near Church Path there is an open channel watercourse that runs along the church and then culverted and runs down under the ground north-eastwards connecting to the sea. The downstream end of the culvert was not located during the survey due to high tide. The simple culvert is provided with a debris screen on the upstream end where it ties into the open channel. The open channel has a natural high ground on its right bank and a wall on its left bank. The wall on the left bank of the watercourse merges into the wall of the church.

During the site walkover the following assets were identified for a visual inspection.

- Simple culvert
- Debris screen
- Natural high ground
- Wall

Table 9-1 Simple culvert condition grading and assessment

Asset type	Elements	Material	Condition	Comments
Culvert	Upstream headwall	Concrete	Fair (3)	Some wear to concrete and spalling but no major damages observed.
	Downstream Headwall	N/A	ENI	Was unable to locate exact location of element.
	Culvert barrel	Concrete	ENI	Unable to see element.
	Channel bed	Earth	Fair (3)	Some soil accumulation at the channel bed.
	Apron	Earth	Fair (3)	Soil accumulation and overhanging vegetation.

Further comments: The simple culvert overall seems to be in Fair (3) condition. The concrete material has some wear to it, but no major damages were seen from point of view during the assessment. To note that the culvert upstream headwall was assessed only, and a full visual (CCTV) inspection would need to be carried out by a drone or other available equipment to see for any damages inside the culvert barrel.



Figure 9-1 Simple culvert, looking northwest from further down on the right bank

Table 9-2 Debris screen condition grading and assessment

Asset type	Elements	Material	Condition	Comments
Debris Screen	Screen	Metal	Good (2)	Minor cosmetic defect such as corrosion. No distortion or damage to bars.
	Frame	Metal	Good (2)	Minor cosmetic defect such as corrosion. Screws are in place.
	Upstream Headwall	Concrete	Fair (3)	Some wear to concrete and spalling but no major damages observed.
	Left bank wall	Concrete	Fair (3)	Some wear to concrete, moss cover.
	Right bank wall	Concrete	Fair (3)	Some wear to concrete, moss cover.

Further comments: The debris screen on the culvert seems to be in Good (2) condition. There was minor corrosion to the screen and frame but no distortion to the bars, or no missing screws. The concrete walls of the debris screen are in fair condition, only some spalling to the concrete was observed. The upstream headwall of the debris screen has some wear to it otherwise it is in fair condition. There was some debris (tree branches and leaves) at the screen and on the gantry.



Figure 9-2 Debris screen, looking at asset from the left bank



Table 9-3 Natural high ground condition grading and assessment

Asset type	Elements	Material	Condition	Comments
Natural High ground	Channel side	Earth	Fair (3)	Undercutting and erosion to channel side.
	High ground	Earth	Fair (3)	Vegetation growth and uneven high ground.

Further comments: The water flows through channel clearly. Where the screen wall ties into the high ground there are concrete sandbags are present for unknown length of the asset. The channel seems to be narrow and overgrown. Water level during the inspection was low.



Figure 9-3 Natural high ground, looking north from the left bank





Figure 9-4 Natural high ground and debris screen, looking northeast from the left bank



Table 9-4 Wall condition grading and assessment

Asset type	Elements	Material	Condition	Comments
Wall	Exposed face	Concrete	Fair (3)	Erosion and undermining at the toe of the wall. Cracks visible on exposed face.
	Crest	Concrete	Fair (3)	Overhanging vegetation on crest.
	Landward face	Concrete	Fair (3)	Spalling to concrete.
	Berm	Earth	Good (2)	Well vegetated.

Further comments: The condition of the wall overall is Fair (3). There are cracks and erosion to the exposed face with overhanging vegetation on the crest.

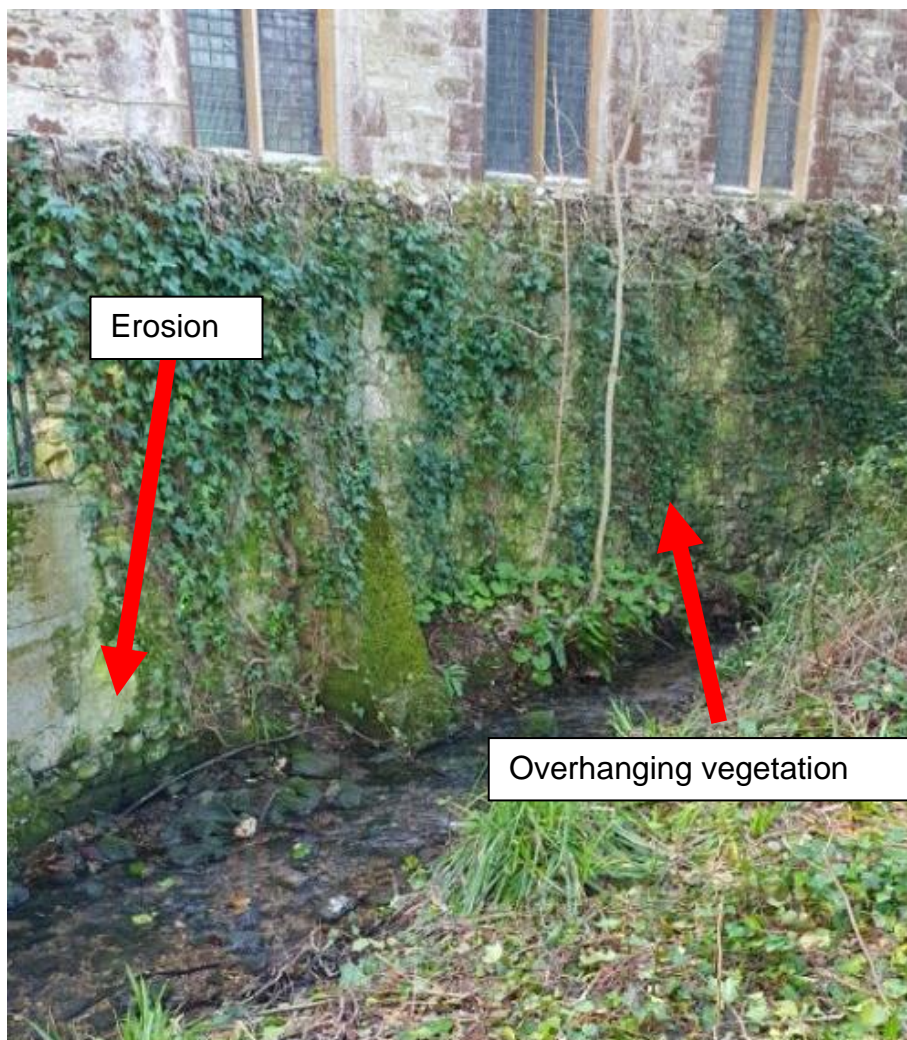


Figure 9-5 Wall, looking southwest from the right bank





Figure 9-6 Wall, looking south from the right bank

### 9.3 Impact of condition on flood risk

There is flow in the channel with soil and vegetation obstructions. If vegetation were to fall into the channel, it could block the debris screen and therefore the clear flow of the water. At the base of the debris screen in the channel on the right side, there is some soil accumulation which could affect the capacity of the channel. The right side of the channel which is bordered with natural high ground is vegetated and there is a minor level of erosion to the sides of the channel.

The culvert headwall seems stable with some wear to the concrete. It is not known whether there is a damage within the culvert barrel therefore further inspection via a drone or other equipment for CCTV inspection would be required.

The channel seems to be narrow and if a large amount of water is released into the channel it might not have the capacity to store water, which could back up from the culvert. Therefore, it is recommended that the channel is cleared and widened to be able to accommodate a larger capacity of water in there.

# 10 Preliminary appraisal

## 10.1 Multi-criteria analysis methodology

We undertook a high-level option appraisal focussing on benefit, practical and viability considerations. We carried out a multi-criteria analysis to compare each option, which included consideration of relative costs and timescales, buildability, health safety and environment, stakeholder perceptions and public acceptability, land ownership etc. This included consideration of:

- Contribution to reducing flood risk to property.
- Contribution towards reducing flood impacts to people/communities.
- Contribution to improving the availability of data, evidence and modelling to support options for development or flood incident response.
- Deliverability (including construction complexity, access, designations, space, land ownership, availability of resources, equipment or advice required)
- Community acceptability
- Contribution towards biodiversity and water quality betterment
- Amenity benefits
- Contribution towards carbon reduction
- Maintenance requirements

Relative costs and timescales have been provided for information only and are not included in the scoring. The scoring criteria provided in more detail in Appendix A. Options with a score of 7 or above were taken forward to become recommendations.

It is important to note that this is a high-level, preliminary assessment undertaken on behalf of Isle of Wight Council. The LLFA must adopt a strategic approach to flood risk management by integrating recommendations from this Section 19 into the broader Local Flood Risk Management Strategy (LFRMS), to ensure that localised action aligns with long-term objectives, funding and resources. In particular, where taking forward a recommendation is likely to be reliant on securing grants from central government to fund the project, significant further work by the responsible organisation will be required to assess the costs/benefit of the proposals, and consideration will need to be given to the timing and availability of funding. This is likely to be the case for the recommendations within this section. For such projects to be taken forward to design and construction, a business case may need to be made into a national programme, with the success of the bids being dependent on the following:

- Any works are cost beneficial and financially viable
- The works will provide a sufficient level of benefit for the residents at flood risk
- Any project has considered all sources of flood risk



- The project does not increase flood risk to others (people, property, business)
- The works do not cause environmental harm
- Any proposals are accepted by the community and residents

## 10.2 Long list of options

Based on the identified causes and mechanisms of flooding, the long list of options below have been identified and brought forward for assessment in the Multi-Criteria Analysis (Appendix A) to produce a short list of suitable recommendations.

### 10.2.1 Replacement or improvement to existing outfall

Tide locking likely played a role in this flood event, replacement of the outfall of the main river to where it discharges into the sea could limit or prevent backflow when tide levels are high. For example, the addition of a duckbill type flap valve can be more effective at preventing backflow than other designs and could lead to improvements in terms of flood risk in situations where tide levels are high.

### 10.2.2 Establish formal flood action group and develop community flood plan

It is understood that a group of residents and a local councillor in East Cowes provided assistance during the flooding on 25 October 2023. A formal flood action group with a community flood response plan could be set up with the support of Risk Management Authorities to better improve resilience of the community. Residents could be provided with training and exercising of the new community flood plan and could support each other in response to flood events.

This would likely require support from organisations such as the Lead Local Flood Authority and Emergency Planning at Isle of Wight Council. Resources such as BeFloodReady and organisations such as the National Flood Forum could also assist the community in developing a Community Flood Plan.

### 10.2.3 Provide community training and exercising of the new Community Flood Plan

Isle of Wight Council and Emergency Planning could provide training and exercising of the community flood plan once developed, to improve the resilience of the community to flooding. This could involve setting up designated roles for community members and ensuring those with PFR understand how to take action to improve their own resilience, and how to respond to flood warnings and flood alerts.

### 10.2.4 Appraise the feasibility of providing additional surface water drainage capacity

It is unlikely that existing sewer systems, which are mostly combined have the capacity to manage surface water flows during less frequent rainfall events. Options to limit surface water flows, such as disconnecting downpipes or retrofitting SuDS could reduce runoff before it enters the sewer network and should also be considered as part of this study.



### 10.2.5 Feasibility study in providing additional surface water drainage capacity

This recommendation involves identifying current and potential issues that could contribute to flooding, by assessing flow capacity, condition of its banks, sediment levels and any obstructions or debris that could impede water flow. The watercourse is culverted and it is unclear what the capacity of the culverted section is, or how the outfall may be impacted by tide levels. It is recommended that the condition of this watercourse is assessed and that targeted interventions are undertaken to improve its condition, capacity and ability to discharge flows during high tides.

### 10.2.6 Enhanced Property Flood Resilience (PFR) Scheme

Property Flood Resilience (PFR) can provide effective resistance and resilience to flooding at an individual property level. PFR measures include flood barriers and seals, non-return valves and automatic airbricks. These are methods of flood resistance, which aim to limit to the ingress of water. Other methods of flood resilience exist, to prevent the effects of flooding once water has accessed a property, these include sump pumps, elevated electrical ports, quick drying or easy cleaning materials, raised level of appliances.

Some properties in East Cowes have already received PFR measures, however this is generally limited to only residential dwellings. Expanding PFR measures to consider commercial and enhancing uptake of PFR from other residential properties that were affected could improve the resilience of the community to flooding.

### 10.2.7 Improved asset maintenance regimes

During the survey and from stakeholders response it was noted that some of the drains were blocked due to the buildup of leaves and debris. Gullies can become blocked from debris washing or falling into them, which reduces their drainage capacity. Therefore, blockages can worsen due to weather conditions, time of year, poor usage and damage.

Responses to the stakeholder engagement survey and correspondence with stakeholders has highlighted specific areas where gully blockages and impeded drainage issues have been witnessed. In some cases, the removal or coverage of gullies has been reported. A recommendation for inspecting the reported issues, increased gully maintenance and clearance in priority areas could help to reduce surface water flood risk to properties, by increasing the rate and the volume of water conveyed into the highway drainage and sewer systems. Areas of interest for further consideration are:

- York Avenue
- Well Road
- Church Path

### 10.2.8 Alterations to kerb levels

From the responses to the stakeholder engagement survey and the site visits, it was noted that kerb levels seem to be low on York Avenue and Castle Street. It is evident that during the event, flood water encroached on to properties, causing internal flooding. Flooding was

exacerbated by ongoing traffic, with several cars driving through the floodwater. Installation of higher kerbs and speed bumps along the roads to slow down traffic during flooding, can divert flood water away from reaching property thresholds allowing it to discharge into the existing drainage system.

Further investigation would be required to consider other locations on a smaller scale, with the aim of protecting properties and diverting flood water towards the drainage network. Raising these dropped kerbs and raising the remaining kerb heights where possible could allow water to be retained within the highway and encourage flood waters to be directed towards highways drainage instead of property, reducing the risk of flooding during less extreme events.

#### 10.2.9 Upgrade existing sewer network capacity

Upgrading existing sewer systems can be expensive and disruptive, however it is recommended that the feasibility of improving sewer capacity is investigated further. This could be through upgrading existing pumping stations or re-directing surface water runoff away from the combined sewer network.

#### 10.2.10 Establish procedures for compliance with Isle of Wight SuDS SPD for new developments

Whilst the review of planning applications has not highlighted any issues that would have increased flood risk to East Cowes, it should be noted that the drainage is complex, with the Town Centre being highly developed and influenced by tide levels. It is recommended that Isle of Wight Council puts in place measures to ensure that surface water drainage proposals comply with its recently published SuDS SPD and there is sufficient technical review of drainage proposals as part of new developments.

# 11 Conclusion and recommendations

## 11.1 Conclusions

The flooding that occurred in East Cowes on 25 October 2023 caused internal flooding to at least 22 properties (10 residential, 12 commercial). Isle of Wight Council has exercised its powers to undertake a Section 19 investigation as this fulfilled its criteria of 'significant flooding'. The council has appointed JBA Consulting to undertake this investigation on its behalf.

East Cowes flooded whilst this investigation had been progressed, on the night of Monday 8th April. It is understood that this flooding affected the areas in the vicinity of the ferry terminal which correspond to the worst hit areas from October 2023, as a result the recommendations and analysis of the flooding undertaken in this report are relevant for both events.

Analysis of rain gauge, rainfall radar and tide gauge data from the storm event that affected East Cowes on 25 October 2023, indicates that this was likely to be between a 1 in 49 and a 1 in 95-year event. Therefore, the storm event was significant, with a large volume of rainfall occurring in a relatively short amount of time. The drainage capacity restrictions and tidal levels likely contributed to the flooding that occurred.

The reported cases of flooding were mostly in the vicinity of York Avenue in the town centre. Responses to the stakeholder engagement survey identified several problems with drainage as a cause of flooding, with the high tide level and with issues such as blockages and storm pump failure generating sewer system overload.

The emergency services were overwhelmed with calls concerning the flooding and therefore their physical response was limited. Isle of Wight Council members were present to help residents clear out their flooded properties. The responses from the stakeholder engagement survey describe the stress and impact on mental health that has occurred due to flooding. Residents are stressed about future flooding events, resulting in anxiety, depression and loss of sleep. Residents have kept sandbags outside their homes in response to the flooding, as seen during the site visit.

A major impact of the flooding has been the disruption to normal lives experienced by the residents. Residents have had to move out of their homes into alternative accommodation, either on a temporary or permanent basis. This includes vulnerable residents who cannot stay in their homes whilst repairs are being carried out. People have lost carpets, floorboards, furniture, and belongings from the ground floor of their properties. The majority of properties affected were local businesses and the flooding led to a number of businesses having to close and resulting in loss of income and economic impacts. Many businesses have had to claim on their insurance policies.

The majority of surface water drainage in East Cowes is discharged to a combined sewer network, which accepts both surface water and foul flows. A large part of East Cowes, north of York Avenue has been developed more recently and has a separate surface water and

foul sewer system. The surface water system is indicated to discharge into the watercourse at Church Path. The majority of flows into the combined sewer network as well as foul flows where there are separate sewer systems are discharged to Albany Road Wastewater Pumping Station. From there, sewage is pumped to Spring Hill Transfer Pumping Station and ultimately pumped to Sandown Wastewater Treatment Works. A review of flow data from the Albany Road WPS was provided by Southern Water from October to November 2023.

Data provided by Southern Water indicates that the storm well was active during the event, with 2 of its 3 pumps running for 387 mins on 25 October and 728 mins on 26 October. The data shows that capacity in the wet well quickly reached 90% on the morning of the 25 October and the storm well came into effect. This data clearly shows that the pumping station was operating during the event and that it was forced to manage considerable flows.

It is understood that concerns have been raised over the potential for development at the current Red Funnel Ferry Terminal site. An application was previously submitted in 2015 (P/01065/15) which was refused by Isle of Wight Council as the Local Planning Authority for reasons unrelated to flood risk and drainage. A Flood Risk Assessment and Surface Water Drainage Strategy was previously submitted as part of these proposals, which have been reviewed.

It is unlikely that the development proposals would have impacted flood risk to East Cowes. However, opportunities to reduce flows to the combined sewer system should be explored further as part of any future proposals. Furthermore, future proposals will need to comply with Isle of Wight Council's SuDS Supplementary Planning Document which has been published in 2024.

## 11.2 Recommendations

Carefully considering all possible recommendations for East Cowes to mitigate future flood events, the following recommendations are highlighted.

It is recommended that all options with a score of **12 or greater** are prioritised for delivery.

Table 11-1: Options that are recommended to be prioritised for delivery in East Cowes

Recommendation	Organisation (s) responsible	Multi-criteria analysis score	Timescale
Establish formal flood action group and develop community flood plan	Isle of Wight Council (LLFA and emergency planning)	12	<1 year
Replacement or improvement to existing tidal outfall	Environment Agency	12	1 – 2 years
Provide community training and exercising of the new Community Flood Plan	Isle of Wight Council (LLFA and emergency planning)	12	<1 year
Feasibility study in providing additional surface water drainage capacity	Southern Water	12	1 – 5 years
Feasibility study into increasing capacity of watercourse at Church Path	Environment Agency	12	1 – 5 years
Improve asset maintenance regimes for gullies and highway drainage	Isle of Wight Council (Highways)	12	<1 year
Establish procedures for compliance with Isle of Wight SuDS SPD for new developments	Isle of Wight Council (LLFA and LPA)	19	<1 year



# A Multi-Criteria Analysis

As part of the East Cowes Section 19 flood investigation, a quantitative assessment was carried out on the long list options, to compare their relative benefits and limitations. The scoring was informed by site conditions, site visit observations and discussions within stakeholders.

The scores were totalled, with:

- A negative score meaning the option has high constraints or meets fewer objectives.
- A score of 0 meaning the option had a neutral impact
- A positive score meaning benefits outweigh constraints and the intervention meets more objectives. The larger the positive score, the more beneficial the scheme.

Table 11-2: Criteria used to assess long list options

Multi-criteria analysis category	Assessment criteria
Contribute towards reducing flood risk to property	Increase in flood risk to any property
	No perceived change
	Reduction in flood risk to property
Contribute toward reducing flood impacts on people/communities	Major / minor negative change in flood impacts on people/communities
	No perceived change
	Minor / medium / major positive change in flood impacts on people/communities
Contribute to improving the availability of data, evidence and modelling to support option development or flood incident response	Does not improve the availability of data, evidence and modelling
	Will provide additional data, evidence or modelling, helpful in development of interventions
	Improvement to data, evidence and modelling which is essential to the development of a capital scheme
Deliverability	Deliverability is at high risk of complexity/constraints
	Not known/not applicable

Multi-criteria analysis category	Assessment criteria
	Deliverability is at low risk of complexity/constraints
Community / resident acceptability	Community/residents are likely to have objections
	No known objections / constraints
	Community/residents are likely to be receptive and have no constraints
Contribute towards biodiversity and water quality betterment	Significant detriment
	No perceived change
	Significant betterment
Contribute towards amenity benefits	Significant detriment
	No perceived change
	Significant betterment
Contribute to carbon reduction	Significant net carbon increase
	Not known/no effect
	Significant net carbon reduction
Maintenance	High cost/frequency maintenance, requires new and specialised maintenance routines
	Not known/no effect
	No active maintenance required (passive maintenance designed)
Timescale	Long term strategic aim (>10yrs to progress, funding route unclear)
	Likely to be able to progress in next 1 – 5yrs
	Quick win (<1yr)
Cost	>£2m
	£500 - £1m
	<£100k

## Long-list options results

Table 11-1: Multi-criteria analysis total scores for long list options

Recommendation	Organisation (s) responsible	Multi-criteria analysis score	Timescale
Do nothing	N/A	-2	N/A
Business as usual	N/A	0	N/A
Establish formal flood action group and develop community flood plan	Isle of Wight Council (LLFA and emergency planning)	12	<1 year
Replacement or improvement to existing tidal outfall	Environment Agency	12	1 – 2 years
Provide community training and exercising of the new Community Flood Plan	Isle of Wight Council (LLFA and emergency planning)	12	<1 year
Feasibility study in providing additional surface water drainage capacity	Southern Water	12	1 – 5 years
Feasibility study into increasing capacity of watercourse at Church Path	Environment Agency	12	1 – 5 years
Enhanced Property Flood Resilience scheme	Isle of Wight Council (LLFA)	10	1 – 5 years
Improve asset maintenance regimes for gullies and highway drainage	Isle of Wight Council (Highways)	12	<1 year
Alterations to kerb levels	Isle of Wight Council (Highways)	6	1 – 5 years
Upgrade existing sewer network capacity	Southern Water	5	> 10yrs
Establish procedures for compliance with Isle of Wight SuDS SPD for new developments	Isle of Wight Council (LLFA and LPA)	19	<1 year



**East Cowes Section 19 Investigations**  
Multi-Criteria Appraisal Matrix

<b>Originated</b>	Timea Faber	31/05/2024
<b>Checked</b>	Peter Rook	24/06/2024
<b>Approver</b>	Anna Beasley	24/06/2024

**Evaluation Scoring: See tab 'Scoring Criteria' for details**

-2	Major negative impact.
-1	
0	Neither positive or negative impacts
1	
2	
3	
4	
5	Major positive impact



Reference	Opportunities	Lead PMA	1	2	3	4	5	6	7	8	9	10	11	TOTAL
			Flood risk benefit to property	Flood impact on people	Data and evidence	Deliverability	Community/ resident acceptability	Biodiversity and water quality betterment	Amenity benefits	Carbon reduction	Maintenance costs	Timescale	Cost (for information only)	
1	Do nothing	N/A	-2	-2	0	0	0	0	0	0	2	0	5	-2
2	Business as usual	All	0	0	0	0	0	0	0	0	1	0	5	1

Data and evidence														
3	Establish formal flood action group and develop community flood plan	Isle of Wight Council (LLFA and emergency planning)	0	4	0	2	1	0	0	0	0	5	5	12
4	Replacement or improvement to existing tidal outfall	Environment Agency	3	2	0	0	2	0	0	0	1	4	5	12
5	Provide community training and exercising of the new Community Flood Plan	Isle of Wight Council (LLFA and emergency planning)	0	4	0	2	1	0	0	0	0	5	5	12
6	Feasibility study in providing additional surface water drainage capacity	Southern Water	2	2	5	1	-1	0	0	0	0	3	5	12
7	Feasibility study into increasing capacity of watercourse at Church Path	Environment Agency	2	2	5	1	-1	0	0	0	0	3	5	12
8	Enhanced Property Flood Resilience scheme	Isle of Wight Council (LLFA)	2	4	0	2	-1	0	0	0	0	3	5	10
9	Improve asset maintenance regimes for gullies and highway drainage	Isle of Wight Council (Highways)	2	2	0	2	1	0	0	0	0	5	5	12
10	Alterations to kerb levels	Isle of Wight Council (Highways)	1	1	0	2	-1	0	0	0	0	3	5	6
11	Establish procedures for compliance with Isle of Wight SuDS SPD for new developments	Isle of Wight Council (LLFA and LPA)	1	3	3	2	2	1	1	1	0	5	5	19
12	Upgrade existing sewer network capacity	Southern Water	4	4	0	-2	-1	0	0	0	-1	1	2	5

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