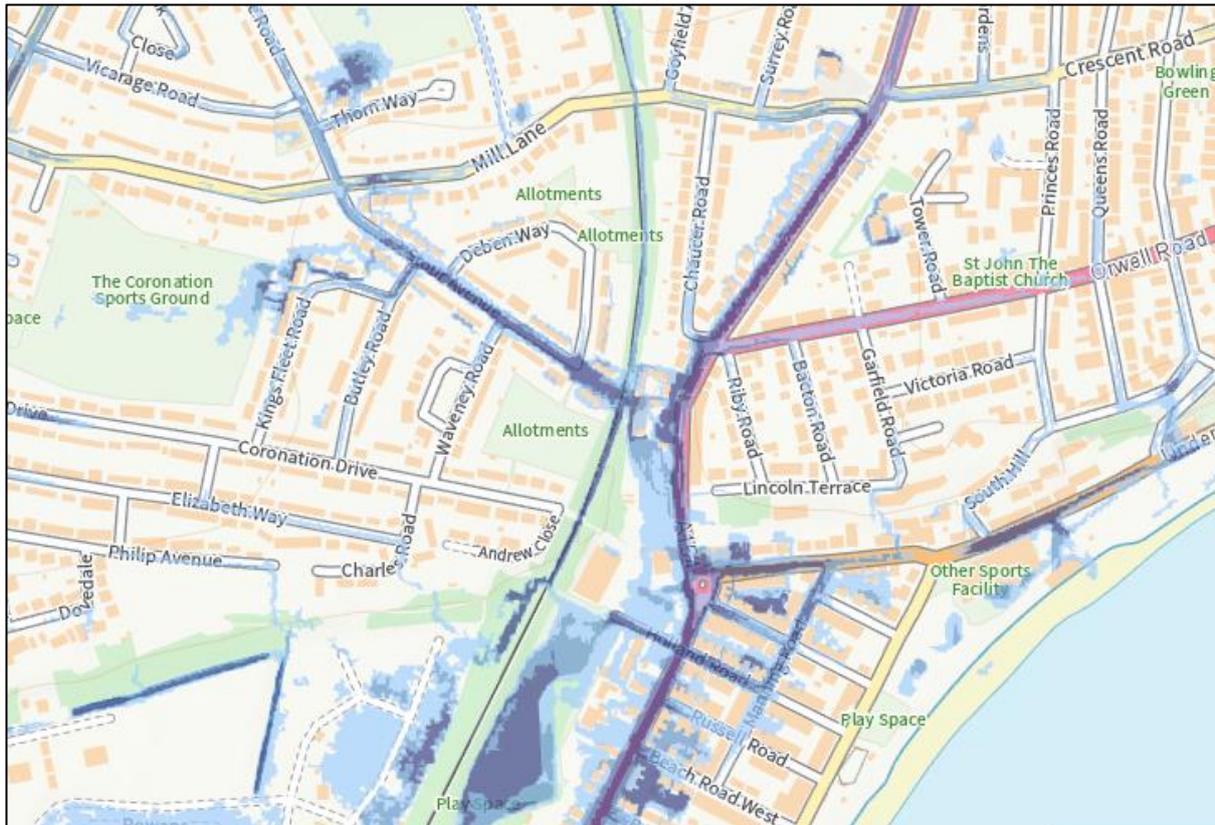


Section 19 Flood and Water Management Act 2010

Report Title: Garrison Lane, Felixstowe

Report References:

CRNos. 325731, 326167



	Name	Date
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Introduction

Suffolk County Council, Lead Local Flood Authority (LLFA) has determined that in accordance with our criteria, it is considered necessary and appropriate to carry out an investigation into this flood event.

This is in accordance with Sections 19 (1) & (2) of the Flood and Water Management Act 2010, to publish the results and notify the relevant risk management authorities (RMAs).

Section 19 Local authorities: investigations

(1) On becoming aware of a flood in its area, a lead local flood authority must, to the extent that it considers it necessary or appropriate, investigate—

(a) which risk management authorities have relevant flood risk management functions, and

(b) whether each of those risk management authorities has exercised, or is proposing to exercise, those functions in response to the flood.

(2) Where an authority carries out an investigation under subsection (1) it must—

(a) publish the results of its investigation, and

(b) notify any relevant risk management authorities

Criteria for an investigation (as per Appendix D of the Suffolk Flood Risk Management Strategy):	✓
There was a risk to life because of flooding?	✓
Internal flooding of one property (domestic or business) has been experienced on more than one occasion?	✓
Internal flooding of five properties has been experienced during one single flood incident	✓
Where a major transport route was closed for more than 10 hours because of flooding	
Critical infrastructure was affected by flooding	
There is ambiguity surrounding the source or responsibility of a flood incident	✓

1. Location of flooding

A severe and sudden localised rainfall event occurred on 25.06.2021 in Felixstowe. Nearby Environment Agency (EA) rain gauges record that 28.6mm fell within 60 minutes from 18.30 to 19.30, with 21.4mm falling in 15 minutes at its peak. To put this in context, the average monthly rainfall for July in Felixstowe is 62mm.

The majority of Felixstowe was impacted, with flooding was reported to Suffolk County Council (SCC) in Undercliff Road, Platters Road, Melford Way, Langer Road, Charles Road, Garrison Lane & High Road West. This triggered a number of Section 19 investigations, each based on a specific area affected.

This Section 19 investigation report focusses on the rainfall event and its aftermath in and around the properties to the west of Garrison Lane, Felixstowe. The postcode area is IP11 7ST. The location is shown in context with surrounding areas on the map extract below.

The properties which experienced flooding on Garrison Lane are located at a low point part way down the hill where the topography directs overland flows towards and past the site.

Stour Avenue marks a shallow “valley”, which also serves to funnel surface water (pluvial) runoff from surrounding areas towards the corner of Garrison Lane where the flooding occurred. These 2 flow paths can be seen in Figure 3.

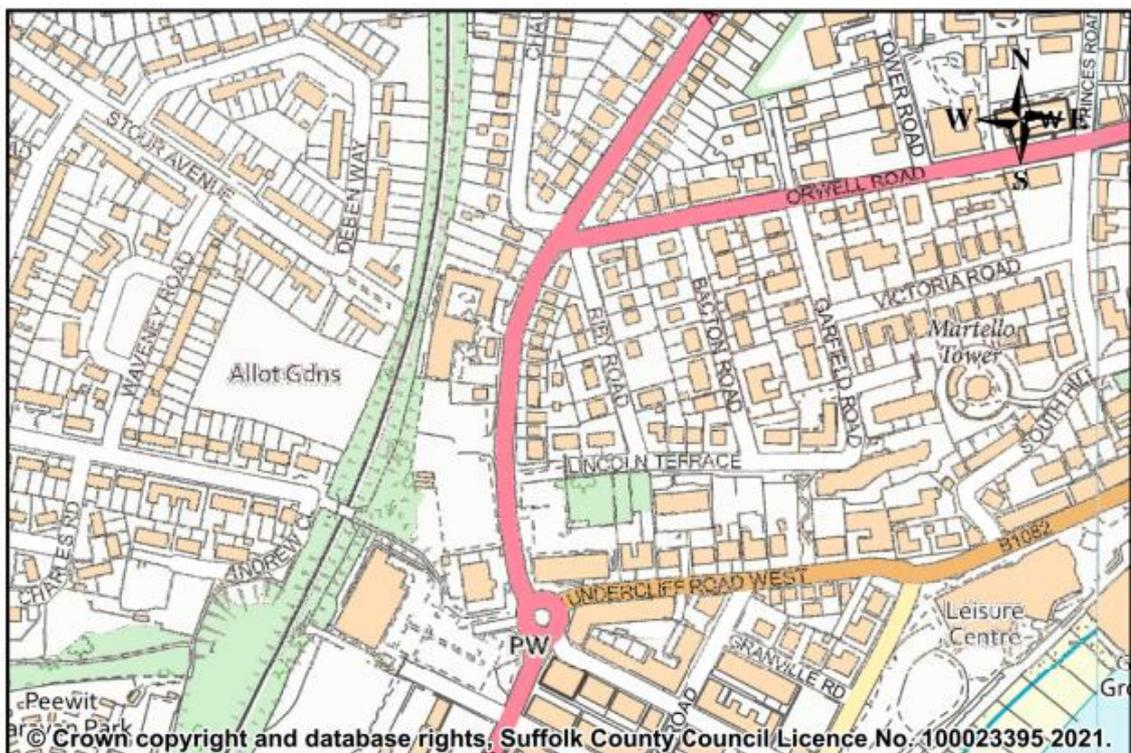


Figure 1 - Investigation Area Map

2. Records of any historical flooding

Whilst the East of England is typically one of the driest parts of the country, summer rainfall events can be very short and intense, leading to the drainage networks being overwhelmed and unable to cope with the volume of water.

Anecdotal evidence indicates that several of the properties in this area have experienced internal flooding on at least 3 occasions previously, the dates of these (including the most recent event) are as follows

- July 2015,
- October 2017,
- June 2019,
- June 2021.

Note three of the above events occurred in the summer which indicates this area is susceptible to flash flooding.

Shown in Figure 2 below is a map extract of the recorded historical pluvial flood events as held by SCC. Please note that as all of the above events were not formally reported to SCC, they do not all appear on the following extract.

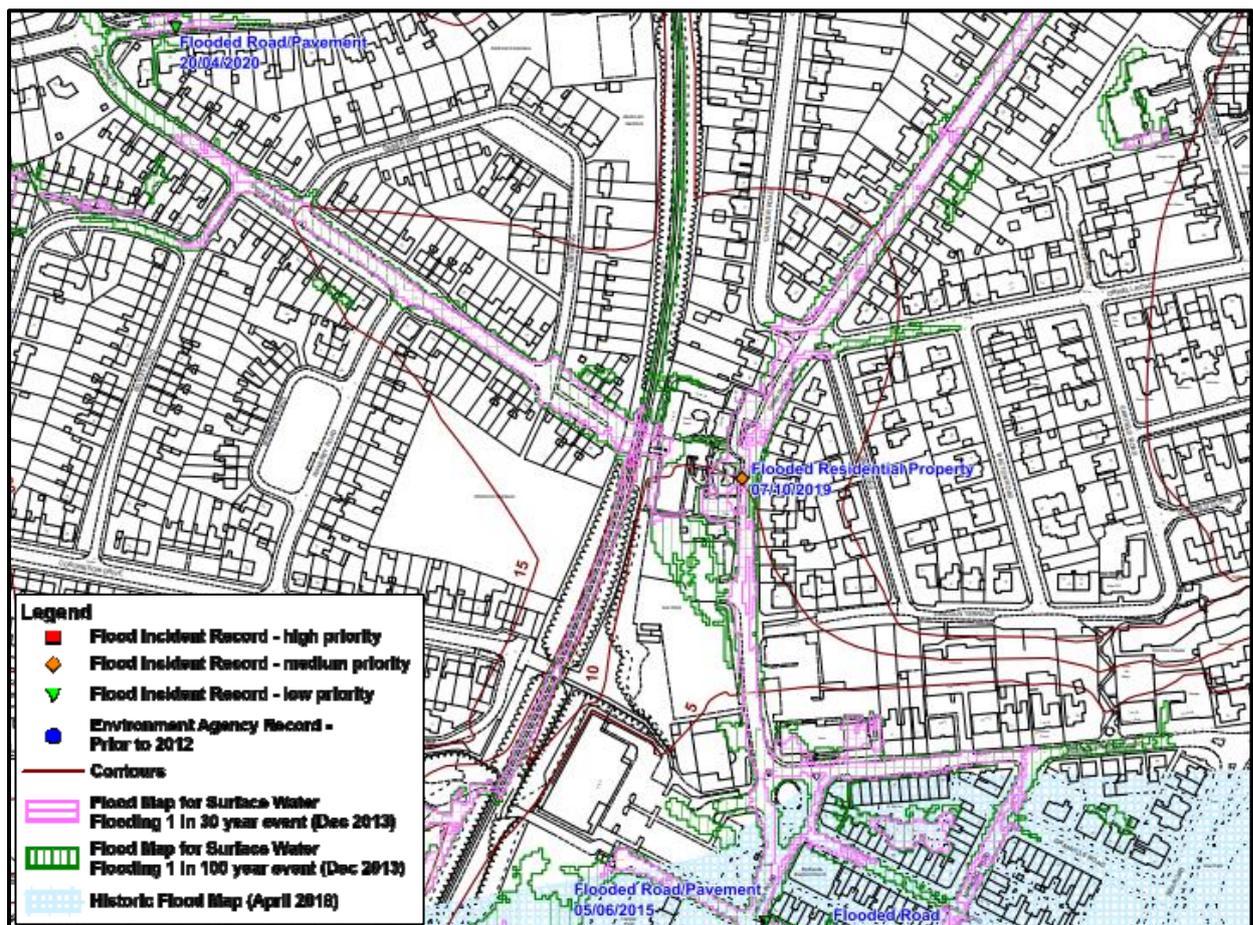


Figure 2 - Historical Pluvial Flood Incidents (to be updated once the 2021 events have been mapped)

3. Effects of flood event

The intense nature of the rainfall resulted in a large volume of surface water flowing down Garrison Lane overwhelming the highway drainage infrastructure and heading southwards towards the properties. Surface water also flowed down Stour Avenue, across the railway line and down the embankment flooding the area from the north-west. Short power cuts were experienced locally.

The retirement housing complex experienced significant flooding throughout in depths that present a risk to life. Residential flats, corridors, the lift and its workings, an ancillary laundry room, and the main office area were all inundated. To the front of the retirement flats, a series of lockup garages, in which mobility scooters and buggies were stored, were also flooded. These were reported to have sump pumps installed relatively recently however these were overwhelmed, due to the volume of water.

9 No. of the flats flooded internally. 8 No. of these are situated on a slope with ground levels to the rear higher than floor levels and thus experienced depths of flooding internally up to 1.2m within the access corridor and up to 0.6m in the flats. This resulted in deployment of the emergency services to pump out standing water and evacuate 12 No. residents. The 9th flat also experienced internal flooding but to a lesser extent due to its slightly elevated position.

2 No. adjacent semi-detached residential properties were also impacted, again with the fire service being required to pump out dwellings and rescue the inhabitants. These properties comprise 4 storey dwellings including a basement level in which the main access, kitchen and living areas are situated.

Flood depths within the basement areas reached 1.5m externally and over 0.6m internally. Bedrooms are located on upper floors and so safe refuge was available for the occupants temporarily until they could be rescued from the upper floors.

Neither the retirement complex nor the domestic properties had any specific property level flood resilience measures as far as SCC is aware (i.e. flood doors, boards etc). However, several of the retirement flats had previously been 'tanked' to prevent ingress of groundwater. Due to the nature of the flooding, this was of little benefit.

The floodwater was of sufficient volume that it lifted manhole covers and carried them into the retirement flats, a large planter (20kg+) was also moved from the garden area into the main corridor. The lifted manhole covers resulted in sewage mixing with the flood waters.

Anecdotal evidence indicates water began to recede after approximately 1 hour and within 24 hours had mostly drained away. This was aided by the emergency service's pumping out basements etc. onto surrounding areas.

4. Predicted Flood Risk

The national government indicative “flood risk for planning” map identifies that neither tidal (sea), fluvial (river) or reservoir flooding represent a significant risk to this location. Pluvial (surface water) flooding however is recorded to represent a High (each year this location has a greater than 3.3% chance of flooding) risk.

An extract of the pluvial flood mapping is shown below for reference. This demonstrates the direction and speed of flow during the worst-case scenario. Dark blue is flows over 0.25m/s with light blue denoting speeds of less than 0.25m/s. The small black arrows denote direction of flow. The cross hairs marker indicates the centre of the postcode area which was flooded.

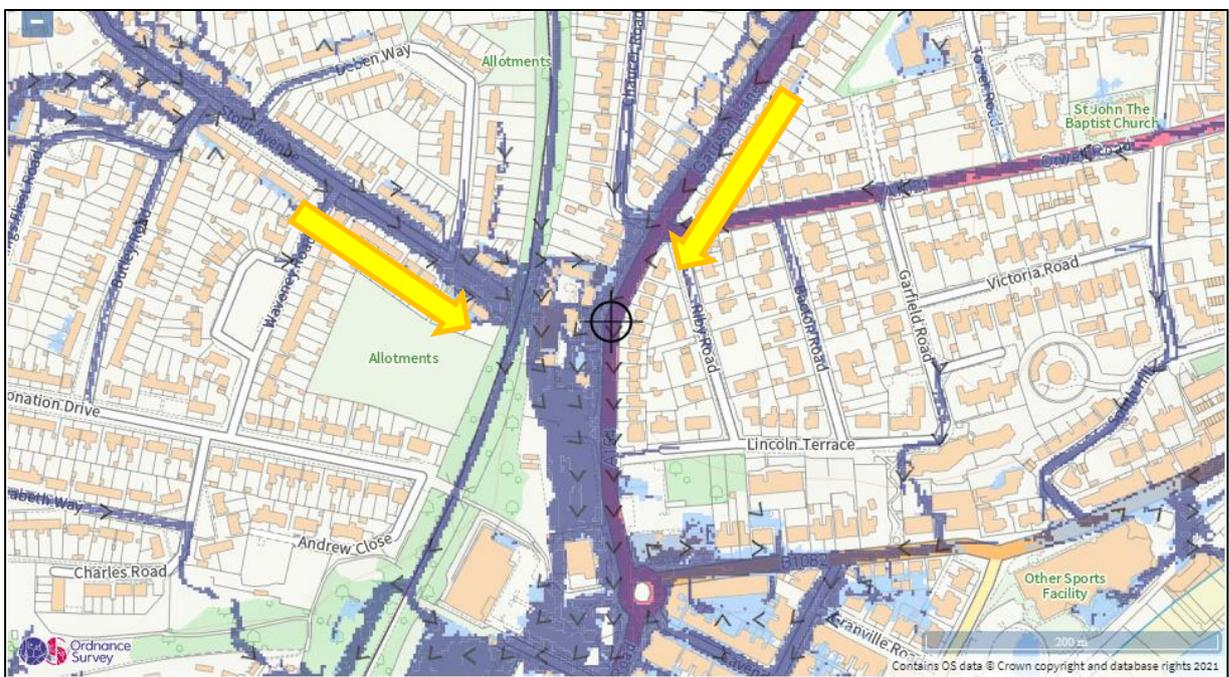


Figure 3 - Surface water flood risk: water velocity in low-risk scenario (main flow paths denoted by yellow arrows)

The flow path down Stour Avenue and across the railway line, and the second flow path along Garrison Lane can clearly be seen in the above extract (yellow arrows). It is understood that these are the main contributing sources of surface water which inundated the properties.

Whilst groundwater flooding is prevalent in parts of Felixstowe, it usually occurs following a prolonged period of low intensity rainfall rather than a short intense downburst. This suggests groundwater flooding is unlikely to have contributed to this part flood event.

5. Flooding Sources & Likely causes:

- **Significant rainfall:** the main cause of the flooding was the short, intense nature of the rainfall. 21mm of rain fell in less than 15min (with half of July's predicted rain falling in an hour) and overwhelmed the drainage systems which resulted in large volumes of surface water overland flow.
- **Topography:** the positioning of the buildings, the retirement flats and the semidetached properties are located at the meeting of point of 2 natural flow routes results in them being inundated as soon as the drainage system is overwhelmed. There is also an embankment to the rear of the retirement flats which directs water towards the building.
- **Building design:** the retirement flats are built on a slope with ground to the rear being higher than floor level, directing flows into the structure. The semi-detached buildings comprise 4 storeys including basement level gardens, access points and living areas. This creates a sump/reservoir capturing any overland flows.
- **Lifted manhole covers:** floodwater mixed with the sewage increasing the pressure within the foul sewer leading to the toilets and internal foul water drainage points (sinks etc) overflowing, flooding the properties internally.
- **Overwhelmed surface water sewer:** the intensity of the rainfall is likely to been greater than the capacity of the surface water sewer into which the roof areas, hardstanding and highway drainage discharges.
- **Overwhelmed highway drainage:** the rainfall intensity is likely to been greater than the capacity of the highway gullies.
- **Failure/malfunctioning of non-return valves:** anecdotal evidence suggests that non-return valves were fitted to the semi-detached properties however these did not work as expected and allowed ingress of waste water into the properties.
- **Overwhelmed sump pumps:** both the garages for the retirement flats and one the semi-detached properties had sump pumps fitted to clear small accumulations of water however these were quickly overwhelmed.
- **Absence of property level flood resilience:** it must be noted that resilience measures may have prevented ingress of water up to a depth of 600mm however the prevention of water ingress at depths greater than 600mm is likely to have damaged the structure of the property due to differential pressure.
- **Floor level power points/transformers:** Floor level power points and transformers led to localised power outages relatively quickly after the flood event started. This complicated the response to the flood event.

It must be noted that this area is at High Risk of surface water flooding, and will remain so, even following the implementation of any or all of the recommended actions, see the table in Section 8 of the report.

6. Photos of flooding



Depth of flooding externally adjacent semi-detached properties, marked by cable tie on downpipe



Depth of flooding internally within the corridor serving the retirement flats, see watermark



Looking NE 'up' Garrison Road where surface water flows travelled, sediments/debris carried by floodwater



Depth of flooding internally within 'basement' floor of semidetached property, see watermark

7. Risk Management Authorities, Non Risk Management Authority and flood risk function(s)

Risk Management Authority	Relevant Flood Risk Function(s)
Suffolk County Council - SCC	Lead Local Flood Authority (LLFA), Highways Authority (HA), Adult & Child Services (ACS) & Asset Owner
Anglian Water - AW	Asset Owner
East Suffolk District Council - ESDC	Local Planning Authority & Asset Owner
Non Risk Management Authority	Relevant Flood Risk Function(s)
Network Rail	Asset Owner
Property Owners	Landlords of Tenanted Properties
Care Provider	Owner/manager of retirement flats

8. LLFA Recommended Action(s):

Action	Risk Management Authority	Timescale for response	Latest Progress Update for Actions
Replace lifted drain covers in highway	SCC - HA	ASAP	Completed
Reactive Cleanse	SCC - HA	ASAP	Completed
Check condition and positioning of shared non-return valves	AW	December 2021	Pending
Check condition and positioning of private non-return valves	Property Owners	December 2021	Pending
Assess condition of sump pumps in garages and repair/replace if necessary	Care Provider for Retirement Properties	December 2021	Pending
Investigate through flow of surface water across railway tracks & if any mitigation measures are appropriate	Network Rail	June 2022	Pending
Review requirement for Flood Re with support from SCC LLFA	Landlords/ tenants	December 2021	Pending
Raise power points and transformers to reduce likelihood of further power outages	Property Owners	March 2021	Pending

Review risk assessment of surface water flooding for residents living in ground floor flats	Care Provider for Retirement Properties	March 2021	Pending
Create/renew business continuity plan and flood plan with support from SCC ACS	Care Provider for Retirement Properties	March 2021	Pending
Upgrade the existing 225mm sewer in Garrison Lane between MH6304 & MH6101 to remove the restriction	AW	December 2021 – March 2022	Pending
Potential SuDS Retrofit Scheme in Stour Avenue (to reduce overland flows) to be evaluated and assessed	AW, SCC LLFA & SCC HA	Jun 2022 – Jun 2023	Pending

9. Reviews

This report will be reviewed and updated every 3 months until actions are marked as complete

Reviewer	Date of Review

10. Disclaimer

This report has been prepared and published as part of Suffolk County Council's responsibilities under Section 19 of the Flood and Water Management Act 2010. It is intended to provide context and information to support the delivery of the local flood risk management strategy and should not be used for any other purpose.

The findings of the report are based on a subjective assessment of the information available by those undertaking the investigation and therefore while all reasonable efforts have been made to gather and verify such information may not include all relevant information. As such it should not be considered as a definitive assessment of all factors that may have triggered or contributed to the flood event.

The opinions, conclusions and recommendations in this Report are based on assumptions made by Suffolk County Council when preparing this report, including, but not limited to those key assumptions noted in the Report, including reliance on information provided by third parties.

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The implications for producing Flood Investigation Reports and any consequences of blight have been considered. The process of gaining insurance for a property and/or purchasing/selling a property and any flooding issues identified are considered a separate and legally binding process placed upon property owners and this is independent of and does not relate to Suffolk County Council highlighting flooding to properties at a street level. Property owners and prospective purchasers or occupiers of property are advised to seek and rely on their own surveys and reports regarding any specific risk to any identified area of land.

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