

KENT FLOOD RISK MANAGEMENT COMMITTEE

Wednesday, 9th March, 2022

2.00 pm

Council Chamber, Sessions House, County Hall,
Maidstone





AGENDA

KENT FLOOD RISK MANAGEMENT COMMITTEE

Wednesday, 9th March, 2022, at 2.00 pm

Ask for: **Andrew Tait**

**Council Chamber, Sessions House, County Hall,
Maidstone**

Telephone **03000 416749**

Membership (7)

Conservative (5): Mr A R Hills (Chairman), Mr N J Collor, Ms M McArthur,
Mrs L Parfitt-Reid and Ms L Wright

Labour (1): Mr B H Lewis

Liberal Democrat (1): Mr M J Sole

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UNRESTRICTED ITEMS

(During these items the meeting is likely to be open to the public)

1. Substitutes
2. Declarations of Members' Interest relating to items on today's agenda
3. Minutes of the meeting on 24 November 2021 (Pages 1 - 14)

4. Introduction to the work of the Committee - Presentation by Max Tant - KCC Flood and Water Manager
5. Southern Water Pathfinder Scheme - Presentation
6. Storms Eunice and Franklin - 18th to 21st February 2022 (Pages 15 - 20)
7. Environment Agency and Met Office Alerts and Warnings and KCC severe weather response activity (Pages 21 - 26)
8. Update on Little Venice Country Park and Marina (Pages 27 - 38)
9. Other items which the Chairman decides are Urgent

EXEMPT ITEMS

(At the time of preparing the agenda there were no exempt items. During any such items which may arise the meeting is likely NOT to be open to the public)

Benjamin Watts
General Counsel
03000 416814

Tuesday, 1 March 2022

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KENT COUNTY COUNCIL

KENT FLOOD RISK MANAGEMENT COMMITTEE

MINUTES of a meeting of the Kent Flood Risk Management Committee held in the Council Chamber, Sessions House, County Hall, Maidstone on Wednesday, 24 November 2021.

PRESENT: Mr A R Hills (Chairman), Mr N J Collor, Mr B H Lewis, Ms M McArthur, Mrs L Parfitt-Reid, Mr M J Sole, Ms L Wright, Mr S McGregor (Sevenoaks DC), Mr H Rogers (Tonbridge and Malling BC), Mrs G Brown (KALC), Mr C Mackonochie (KALC) and Mr G Brooker (Kent Fire and Rescue)

ALSO PRESENT: Mr M A J Hood, Mr H Rayner and Mr D Goff (Collier Street PC)

IN ATTENDANCE: Mr M Tant (Flood and Water Manager), Mr T Harwood (Resilience and Emergency Planning Manager) and Mr A Tait (Democratic Services Officer)

UNRESTRICTED ITEMS

13. Minutes of the meeting on 8 July 2021.

(Item 3)

RESOLVED that the Minutes of the meeting held on 8 July 2021 are correctly recorded and that they be signed by the Chairman.

14. Kent Flood Action Group Forum - Presentation by David Goff, Chairman of Collier Street Parish Council

(Item 4)

(1) Mr David Goff, Chairman of Collier Street PC said that the purpose of the Kent Flood Action Group Forum (KFAGF) was to help communities to be better prepared before, during and after flooding. It was accepted that, in general terms, a lot of protection measures had been put in place, although they could not completely prevent flooding from occurring. It was, nevertheless, very important that people were given confidence in response to the heavy rainfall that was often experienced.

(2) Mr Goff then said that the KFAGF wished to work with all the agencies involved in flood risk management at a strategic level to promote effective communication, collaboration, whilst working with other Flood Action Groups to ensure that collective knowledge and experiences could be shared and developed.

(3) Mr Goff continued by saying that water did not respect any boundaries. The KFAGF wished to provide clarity to their communities on the roles and responsibilities of the various flood risk management authorities and to ensure that it was informed of all flood risk activities in their local areas. It also wished to maximise opportunities to influence flood risk management strategies, by utilising their local knowledge.

(4) The KFGAF understood that flood risk management authorities often operated under significant resource pressure, but believed that by working together, benefits could be achieved and developed.

(5) Mr Goff said that Climate Change was very unlikely to cease to be a factor and that collaborative working was at the forefront of the KFGAF's thinking.

(6) The thinking behind the formation of the KFGAF had arisen following a contribution from Bob Hadden who was a Trustee of the National Flood Forum. It had been noted that there were many Action Groups who worked in isolation and it was understood that working together would lead to a deeper and more professional approach, saving both time and resources. Similar Flood Action Group Forums had also been set up in West Sussex and Cornwall. The idea had been taken to the National Flood Board in April 2020 and approval had been given to run pilot schemes in Kent and Shropshire.

(7) Mr Goff said that with the support of the Kent Flood Manager, Max Tant, good progress had been made despite the pandemic. The KFGAF consisted of people from Flood Groups across the County (Ightham, East Peckham, Hildenborough, Headcorn, Tunbridge Wells and Collier Street). The first meeting had taken place virtually in November 2020, and no physical meeting had yet taken place.

(8) Mr Goff then said that despite the different forms of flooding issues faced in the six constituent areas, areas of commonality had been identified and taken forward. The most important of these was riparian ownership, which provided perhaps the biggest challenge to rural areas in Kent. The existing system was failing and deteriorating year on year. There appeared to be a reluctance by the risk management authorities to address this issue. For example, Collier Street PC had written to a number of people in the village with no beneficial consequences because the Parish Council had no powers to compel. This problem had been raised with the government and was on its future agenda.

(9) The KFGAF also had great concern over the vast amount of development happening in Kent. There was a need to challenge local planning authorities in respect of inappropriate development being permitted, especially on identified flood risk areas. The water run off from some of the permitted developments was a major concern.

(10) Mr Goff said that the ageing drainage infrastructure and combined sewer and surface water flooding was becoming a significant issue for some of Kent's communities. This was particularly the case in Tunbridge Wells due to its Victorian drainage system.

(11) The KFGAF also sought to identify any funding strands that might be able to fund those communities and properties that fell outside the current funding criteria. The recent Environmental Bill, which had just received parliamentary assent, seemed to offer some help to landowners and farmers. This opportunity needed to be carefully understood if its potential were to be maximised in order to benefit everyone. Farmers and Landowners needed to work with their communities, Parish Councils and the role of the KFGAF would be paramount.

(12) The KFGAF stressed the role of joined up thinking in the light of Climate Change and limited resources. Flood Action Groups tended to be small in size with their memberships in the upper age bracket. Local knowledge therefore needed to be documented before it was lost.

(13) Mr Goff continued that Kent had seen an increase in ground and surface water flooding during the recent summer months, with some communities being affected for the first time. Funding for properties in these communities was not easy to access.

(14) Mr Gough then said that changes in agricultural practice were causing concern in some areas. Polytunnels, water run off and soil erosion into unmaintained ditches were all aspects of this problem. The KFGAF had written to District Councils about this problem and intended to follow this up in the near future.

(15) Other activities recently undertaken by the KFGAF included giving evidence to EFRA and the Leigh Storage Inquiry. It had also been invited to join the Medway Flood Partnership Strategic Group. KFGAF was inviting people to speak to them in order to gain a better understanding of their perspectives.

(16) Mr Goff concluded his presentation by saying that KFGAF would expand in the future and would be working with the National Flood Forum on a European funded project to bring greater flood resilience to people in Kent. It would also work on supplementing the flood information provided by other agencies such as KCC, including through social media. He looked forward to working constructively in partnership with the Kent Flood Risk management Committee.

(17) Mrs Parfitt-Reid noted that Mr Goff had said that a large number of people in flood risk areas had not registered to receive flood alerts. This was an issue that Local Councillors could help to mitigate by raising awareness and informing the communities that they represented of the benefits of doing so.

(18) Mr Hood asked whether Tonbridge (which he represented) could be admitted to the KFGAF as it had very active Flood Wardens were able to disseminate information very effectively. Mr Goff replied that the national Flood Forum had attempted without success to set up Flood Action Groups in many parts of the County. Flood Action Groups had a different role to Flood Wardens and the latter often chose not to get involved at a formal strategic level.

(19) Mr Sole referred to the River Stour and Nailbourne Management Group which had a similar function to the KFGAF. Mr Goff replied that he would be delighted to talk to any such Group. He agreed that it was very important to avoid duplication. The benefit of all groups working together was that they could speak professionally with one voice when making representations to flood risk management organisations.

(20) Mr Rayner asked whether the KFGAF had made any recommendations on how to contact riparian owners. Mr Goff replied that this was a massive problem and that a mechanism needed to be identified that could enable all the agencies to tackle this problem at the same time. Parish Councils had discovered that writing to people tended to be ineffective as there was no enforcement provision open to it to use. He then said that some Parish Councils and Flood Groups experienced a disconnect with the latter putting forward ideas that the Parish Council did not take up. He

offered KALC the opportunity to speak to the KFGAF in order to improve communication.

(21) Mrs Brown said that the work of KFGAF was very important as it was helping to improve communication between the various Groups, Parish Councils and the flood risk agencies. She added that it could be extremely difficult to persuade people to sign up to receive flood alerts. She hoped that one of the barriers had been removed in that flood alerts were no longer being sent out between 9 pm and 6 am. This had been a reason given by people for not registering.

(22) Mrs Wright suggested that the KFGAF could use a Facebook page, giving contact details and informing people of its existence. This would avoid the problem experienced in some parishes where different people were setting up their own Groups without being aware of the others. Mr Goff commented that this was an important idea. One of the things that had to be overcome was the amount of false information that often found its way onto social media during a flood.

(23) Mrs Brown said that KALC would be able to help because it had close contact with each Parish Council as well as the District and County authorities. She added that Flood Groups were sometimes formed independently of the Parish Councils, publishing material that revealed a misunderstanding of what was actually occurring and had the effect of scaring people.

(24) Mrs Parfitt-Reid said that it was possible to set up Facebook pages that were for information and did not allow other people to comment.

(25) Mr Mackonochie said that the Flood Wardens in his parish of Capel used *WhatsApp* which only the Flood Wardens could contribute to before disseminating the information locally.

(26) RESOLVED that Mr David Goff be thanked for his presentation and that its content be noted.

15. Southern Water future plans - Presentation (Item 5)

(1) Mr David Murphy (Southern Water DWMP Programme Manager) gave a presentation on Drainage and Wastewater Management Plans (DWMPs), the slides of which can be found on the KCC webpage for this meeting.

(2) Mr Murphy began his presentation by saying that the purpose of DWMPs was to ensure that Southern Water's drainage and wastewater management was fit for the future and that the necessary resources were provided to cater for present and future demand, taking account of factors such as growth and climate change.

(3) Mr Murphy said that DWMPs were new plans which had been developed by *Water UK*, an industry body that all water companies worked with. Water UK had formed a group consisting of experts and water company representatives to develop a framework for long term planning over the next 25 years. A similar statutory planning framework was already in place for water resources, and the government had considered that it was necessary to develop one for drainage and wastewater.

Drainage Area Plans and Surface Water Management Plans had already been developed by individual water companies but the significance of the DWMPs was that all the plans would now be developed in the same way.

(4) Mr Murphy continued that the benefits of the new DWMPs were that they could identify future risk in terms of flooding and pollution which would be shared with the customers. They would also identify investment needs to build resilience. They would support the applications for funding which were submitted to Ofwat every five years. The most important benefit was that they would enable partnership working with other organisations, particularly those with responsibility for flood and drainage management. He praised the work of Max Tant and of the Environment Agency in supporting the various webinars and seminars that were assisting in the development of the DWMPs.

(5) Mr Murphy then showed a slide demonstrating the DWMP boundaries in Southern Water's operating area (Kent, Sussex, Hampshire and the Isle of Wight). He said that the planning framework had to consider the region as a whole, as well as at a catchment scale. There were 11 district and river-based catchment areas in the region, four of which were in Kent. The Plan for each of these catchments had to take account of the systems in place within them, together with their performance and the impact on customers and the environment.

(6) Mr Murphy moved on to consideration of Risks. DWMPs were predominantly a risk-based approach to planning. Development of the Plans began with setting the strategic context, undertaking risk-based screening, the development of a baseline risk and vulnerability assessment, and the identification of the causes of the problem. This was followed through the identification and appraisal of options. The results of this work were then put together into the DWMP for the longer term. The process was currently at the appraisal of options stage, where the Team had to consider their feasibility before incorporating the best ones into the investment plan following consultation with all the partner organisations.

(7) Mr Murphy said that the identification of fourteen risk assessments for the DWMP had taken place following full consultation at the very beginning of the process. These risks from the wastewater and drainage systems included pollution, internal and external sewer flooding as well as environmental risks to the quality of bathing and shellfish waters.

(8) Mr Murphy identified the outputs from the risk assessments. In terms of storm overflows, the region had been broken down into three categories: Not Significant, Moderately Significant and Very Significant. In Kent, there were very significant concerns over North Kent. Identification of this area enabled Southern Water to focus on the reasons that this part of the county's water systems were more problematic than in the rest of Kent. There were 1038 storm overflows (release valves to discharge water when the capacity of the sewage system was exceeded) across the entire region. Not all of these were active, but those which were, were identified as "high spillage." Most of these were designed and permitted by the EA to spill in times of heavy rainfall. Southern Water's greatest concern was over those un-designed storm overflows were caused by the systems in place.

(9) Mr Murphy informed the Committee that all the risk maps could be found on Southern Water's website. These maps included information on the causes of the

risk. Mr Murphy recommended that all Committee Members should look at the website and, if necessary, let Southern Water know if they were able to identify any information that was either missing or inaccurate.

(10) Mr Murphy said that a public consultation period for the DWMP had just closed and that a further round of public consultation would take place in 2022. The appraisal stage was due to be completed by the end of 2021. Forward investment planning would take place in February and March 2022, including workshops with partner organisations. The final draft plan would be ready for a three-month consultation starting in June 2022. Finalisation and publication of the DWMP would take place in March 2023. All water companies were following the same timetable. This would enable Ofwat to have all the information to prepare its funding plan for the period 2025 to 2030.

(11) Mr Murphy moved on to identification of the risks in Kent. He began with the Medway catchment area where there were 77 sewer catchments, 69 wastewater treatment works, 635 water pumping stations, over 4,000km of sewers. Only some 17% of the land area (including the urban areas) was covered by the sewage network. This meant that some 5% of houses were not connected to the system and had to rely on septic tanks. This was a significant risk in terms of groundwater pollution affecting water supply. The risk was especially acute in those parts of the catchment area where development was planned.

(12) One of the risk assessments undertaken had been in respect of rainfall exceeding sewage capacity. The specific objective set had been for a 1 in 50-year storm. Other objectives had been 1 in 1, 1 in 2-year and 1 in 30-year storms. The most vulnerable parts of the Medway catchment had been identified as Tonbridge, Tunbridge Wells (south), Paddock Wood, Staplehurst, Pembury and East Peckham. Mr Murphy said that Tonbridge had suffered despite the protection of the Leigh Barrier but that investments in improvements at Leigh should protect the town to a greater extent in the future.

(13) Mr Murphy said that causes of flooding in the Medway catchment had been identified. He gave three examples. In Tunbridge Wells, only some 1% of the flow through the sewer came from homes and businesses. Rainfall accounted for 96% of water arriving at the wastewater treatment works. The rainfall was broken down into roads (37%), roofs (34%) and "permeable areas" (26%). Similar figures had been identified in Tonbridge and Paddock Wood, although it needed to be noted that 85% of the flow in Tonbridge came from roads.

(14) Mr Murphy's second catchment area was the Stour where about 16% of the land (including the urban areas) was covered by the sewage network. This equated to some 96% of homes in the catchment. There were 21 sewer catchments, 392 water pumping stations and 532km of sewers. The largest systems were in Margate and Broadstairs, Ashford, Weatherlees (Ramsgate, Sandwich and Deal) and Canterbury.

(15) One of the risk assessments carried out had been for internal flooding. Mr Murphy said that this criterion of risk ranged from back-up from the wastewater system (that could be cleared away fairly easily) to heavy flooding of the entire ground floor. It was therefore essential to identify the areas of greatest severity. These were Margate and Broadstairs, Weatherlees and Canterbury. The number of

severe instances in these three parts of the catchment (together with Sandown on the Isle of Wight) were far higher than across the entire region. At Weatherlees, 74% (20k per year) were caused by blockages (oils, wet wipes, greases, fats, etc). The percentage arising from blockages in Margate and Broadstairs was 96%.

(16) Mr Murphy continued by saying that Southern Water had carried out a series of activities to improve awareness of the problems created by blockages in the three areas. This was educational in nature and aimed to prevent sewer misuse.

(17) Mr Murphy then said that other causes of internal flooding were hydraulic overload and other operational issues. Some of the systems had not been designed to cope with the current climate. They were very old, having been installed some 150 years earlier when the properties had been built. These systems were vulnerable, particularly in areas where activity such as mining or quarrying was taking place. Southern Water was investigating these sewers, often by sending CCTV cameras through them. It also had an investment programme to reline or repair sewers when they were in danger of collapsing. Rising Mains could also burst and cause flooding and pollution.

(18) Mr Murphy then summed up the findings to date, including the challenges faced. He said that a very high percentage of flow in combined sewers (97%) was rainfall. Roads, drives, and paved areas accounted for a great deal of rainfall (80% in Tonbridge). Roofs and permeable areas were also significant factors. The sewage systems had been designed to prevent overflow of up to a 1 in 30-year event. They had often been installed more than 100 years earlier and were unable to cope with the extremely high levels of rainfall presently experienced. Some 70% of internal flooding, 80% of external sewer flooding and 65% of pollution incidents resulted from blockages caused by wet wipes, fats, oils and grease, presenting a major challenge.

(19) Mr Murphy identified Climate Change as a major challenge. He showed a slide for Budds Farm Wastewater Treatment Works in Hampshire which was expected to see an increase in floodwater volume of 67% by 2050 as a consequence of the predicted rise in intensity of rainfall. If the run-off from permeable could be reduced, the result at Budds Farm would be that the increase in floodwater volume would be reduced to 35%. This would be further reduced to 21% if all floodwater from permeable areas could be diverted to rivers and streams. If surface water from rainfall and roofs could be removed, the increase in flood volume would decrease to 12%. Future flood volume could only be reduced if surface water could be reduced by 40%. His conclusion was that at least 25% of surface removal would be needed by 2050 to offset the impacts of Climate Change, urban creep and growth.

(20) Mr Murphy then said that wastewater systems needed to be changed. At present, water was picked up from homes and businesses, directly from road or roof run-off. This water went into the combined sewage system which carried both wastewater and rainfall. Most systems contained storm tanks and storm overflows to accommodate peaks of demand.

(21) Mr Murphy said that building additional storm tanks was a traditional solution, but that its limitations could be demonstrated by the storm tank which had been installed on the Isle of Wight at a cost of £2.4m yet filled up within 7 minutes. Therefore, a more sustainable solution was needed. Could surface water be naturally separated and diverted to a water course? Could natural drainage systems

be introduced that could hold the water during future intense summer storms? This could only be done by changing and greening communities. Trees would not only provide shade and reduce carbon emissions. They would also stop water running off permeable areas.

(22) Mr Murphy continued that George Park in Margate was a brilliant sustainable drainage scheme which could, perhaps be introduced more widely to help communities adapt to Climate Change. The introduction of green roofs would enable water to run off into gutters and drains.

(23) Mr Murphy said that the successful introduction of sustainable drainage schemes would make a difference. An analysis of the impact of sustainable drainage schemes had been undertaken. If they were not introduced, all water runoff would drain into the sewer network. If home drainage systems were sustainable, the run-off would reduce to as little as 13%. The other 87% would return to the environment as groundwater or be diverted to ponds, streams, ditches and rivers and eventually into the sea.

(24) Mr Murphy concluded his presentation by showing slides of a raingarden and a wetland in a country park. He then asked the Committee to consider two questions. These were:

How do we encourage and enable communities to adapt to climate change and manage rainfall runoff differently?

How can we separate rainfall from foul water systems to reduce flooding and storm discharges, and create more capacity at the treatment works for wastewater from new homes?

(25) Mr Lewis said that he was speaking as a Local Member for Margate. He said that Southern Water had a very bad reputation amongst his constituents. Southern Water had been formed in 1989 as a monopoly.

(26) Mr Lewis then said that some privatisations had been successful but that this was certainly not the case with Southern Water which he described as “the unacceptable face of privatisation.” It had suffered from lack of investment because the company had been more interested in selling shares than in serving the needs of its customers.

(27) Mr Lewis continued by saying that there had been five illegal discharges in 2021 alone. He asked why the ideas put forward during the presentation had not been put into practice during the 1990s. He believed that Southern Water owed an apology to the people of Margate for ruining their summer and for being serial polluters (for which they had been fined). He gave the example of a school which had planned for its pupils to pick up litter on the beach but had been prevented from doing so because of an illegal discharge. He did not consider this to be an example of good communication on the part of the company. He believed that if Southern Water passed on the cost of its planned investment to the customers, many people would refuse to pay due to their lack of confidence in the company.

(28) Mr Lewis then referred to Southern Water’s campaign to educate people to avoid blockages. He asked whether the accompanying literature was sent out in more than one language. As far as he was aware, only the English language was ever used. The same could be said for advertising on the radio and television.

(29) Mr Murphy replied to Mr Lewis by saying that Southern Water had pleaded guilty for its misdemeanours between 2010 and 2015. In total, Southern Water had been fined £90m. None of this would be passed on to the customers. Southern Water now had a new Chief Executive who was making considerable changes to the way it operated. The company now had new owners and a new leadership team. It recognised that it had been at rock bottom and that it had to change and was investing heavily to ensure that it would no longer pollute the beaches. The pollution incidents in Margate and Broomfield in 2021 were bitterly regretted and Southern Water was working in partnership with Thanet DC to clean the beaches up. The company was heavily regulated by three different bodies. This included regulation on investment by Ofwat. Since being fined in the summer, Southern was committed to an investment of £250m to ensure that illegal discharges would no longer happen. This was accompanied by further investment in the “Storm Overflow Task Force” to reduce storm discharges by 20% by 2030. Although radio broadcasts only used English, literature was published and disseminated in other languages.

(30) The Chairman said that he would invite Southern Water to attend meetings of the Committee once a year in order to discuss progress and concerns.

(31) Mr Hood said that Southern Water’s communication in West Kent was appalling. He believed that there was an organisational problem of silo working. There were two teams working in Tonbridge who seemed not even to know who was working for the other one. He considered that Southern Water’s actions should be described as “environmental criminal behaviour” rather than “misdemeanours.” In 2020, Tonbridge and Hildenborough had experienced 267 storm overflows, contributing to some 2,521 hours of pollution. He asked what opportunity County and District Councillors had to be fully appraised about the local wastewater infrastructure and its capacity and ability to supply new developments. He added that he had asked for this information but that it had not been forthcoming. He then asked whether storm tanks were able to function if they were below the water table and how run off from roads was to be mitigated.

(32) Mr Murphy replied to Mr Hood by saying that he accepted the point about inter team communications and that he would seek to have it addressed. Southern Water was becoming far more transparent with respect to information on storm overflows. It had recently launched a “Beach Boy” app which provided nearly real time data on local storm overflow. DEFRA had identified local wastewater infrastructure as “critical” under the Security and Emergency Directive. This prevented Southern Water from identifying where it was, and also made it more difficult to consult local partners about DWMPs. The Southern Water website was now publishing as much information as it could on its website. He asked Members to contact him if they believed that there was any information that could helpfully be added to it. He agreed that storm tanks below the water table were not the best solution and that they were, therefore, inappropriate in some locations. A great deal of consideration was being given to the question of how to discharge runoff from roads, pavements and drives in the light of the danger of this water being polluted. The possibility of running it through wetlands was being explored.

(33) Mr Sole said that the Little Stour and Nailbourne area experienced flooding every year. This was dealt with by tankers which sucked the water away. He suggested that there had to be a better option which was more cost effective and less

noisy and cumbersome and asked when this method of working would stop. He agreed with those who had described Southern Water's actions in hostile terms, saying that they had let down the tourist and shellfish industries amongst others - without compensation. He asked how the wastewater and drainage infrastructure would be able to cope with the projected major increase in housing and when raw sewage would cease to be dumped into the sea.

(36) Mr Murphy replied to Mr Sole by saying that Southern Water had added additional manholes so that the tankers in the Nailbourne and Little Stour area would be less disturbed when they sucked up the sewage. Southern Water and the EA had developed a scheme to avoid tankering. This had, however, proved to be unviable on cost grounds as it would not have been able to attract the necessary funding. He was, therefore, unfortunately unable to give a date when this method of working would cease. Southern Water had carried out sewer lining of the public sewer. The problem lay with the private connections to the sewer (where Southern Water had no powers to reline), allowing groundwater to seep into the system. He assured the Committee that Southern Water was committed to resolving this issue.

(37) In response to Mr Sole's question on sewage being dumped into the sea, Mr Murphy said that the Environment Bill had gone through the parliamentary process. It included a requirement on water companies to reduce the harm from storm overflows. This would enable the investment to be made through the usual mechanisms, but Southern Water was already moving ahead with its commitment to reduce storm overflows by 80% by 2030. The problem was historic in that the storm overflows had been designed within the system ever since they had been built. They could not be blocked up without affecting people's homes, businesses, hospitals and schools. The present choice was whether to affect them or release heavily diluted water into the environment.

(38) Mrs Wright said that Thanet DC was continually working with Southern Water to try to resolve the local issues. She referred to a factory in Cornwall that was near to a sewage works. Following discussion, the two had worked together in a manner which enabled the pumping station to produce energy. She asked whether this was an approach that Southern Water had considered.

(39) Mr Murphy replied to Mrs Wright's question by saying that some 16% of current energy use was generated from Southern Water's Wastewater Treatment Works in the form of methane gas. It was aimed to increase this amount in future years.

(40) Mr Rayner said that Borough Green had experienced five related sewage bursts in 2021. These had all resulted from the same blockage in a 90-year-old sewer. This had resulted in the A25 being blocked up for four months. The resultant impact was still being felt by the community. He asked who the community should speak to in respect of this sewer, adding that local people were concerned that there could well be a repetition of this event in the future.

(41) Mr Rayner continued that Borough Green was expected in the Local Plan to take an additional 3,000 houses. This was attracting a great deal of opposition because the local infrastructure would not be able to cope with this increase. He again asked who the community should speak to within Southern Water to ask them to participate in the planning process to either give an assurance that the sewage

infrastructure was going to be satisfactorily upgraded, or to explain that it would not be able to accommodate the additional buildings.

(42) Mrs Brown said that Southern Water very often made no comment in respect of planning applications. She suggested that they should become more involved in commenting on the likely runoff. She then referred to local applications for between 600 and 1,000 new homes when Southern Water's response to the question of whether it could provide the necessary sewage infrastructure by saying that it could do so within five years. She was also concerned about the construction of huge polyhouses. These were 80m high with sloping roofs. When it rained it sounded like a series of explosions. She asked how the runoff from these buildings compared to that from the smaller polytunnels.

(43) Mr Collor commented that, whilst tree planting could be useful in mitigating flooding, there could also be a drawback in urban areas if the leaves were large enough to block drains.

(44) Mrs Parfitt-Reid said that Local Authorities should include provisions within their Local Plans specifying the actions that developers needed to undertake if planning permission were to be granted.

(45) Mr Rogers commented that building regulations were an invaluable tool in terms of specifying the types of materials that should be used in construction. He then said that in his experience, Southern Water's response time had improved greatly when flooding problems were reported.

(46) RESOLVED that:-

- (a) Mr David Murphy be thanked for his presentation and that its content be noted together with the comments made by Members of the Committee; and
- (b) Southern Water be invited to present an update report during the year 2022 and thereafter on an annual basis.

16. Presentation on the work of the Committee by Max Tant, KCC Flood and Water Manager
(Item 6)

(1) The Chairman informed the Committee that Mr Tant would not be able to provide a detailed presentation at this stage as he had only just recovered from illness. He would, instead, be asked to briefly introduce himself.

(2) Mr Tant introduced himself as the Flood and Water Manager for KCC. He said that he managed the Flood and Water Management Team which performed a number of functions around Flood Risk and Water Management. The Team had been set up following the commencement of the Flood and Water Management Act in 2010 when KCC became the Lead Local Flood Authority for the County.

(3) Mr Tant then explained that KCC was the Lead Authority for Local Flooding rather than the *Local Lead for Flooding*. “Local Flooding” was defined as flooding from surface water, groundwater and ordinary watercourses.

(4) Mr Tant continued by saying that the functions of the Lead Authority were firstly that of statutory consultees in planning for surface water in major planning applications in respect of how the proposed development intended to manage water runoff. This meant that they gave technical advice to the planning authority. He stressed that this did not give the Lead Local Flood Authority any decision-making powers. A major aspect of this function was the promotion of sustainable drainage. An explanation of how this role was carried out could be found on the KCC website.

(5) Another function of the Lead Local Flood Authority was to prepare a Local Strategy setting out how local flood risk was to be managed. The current version of the Strategy would run until 2023.

(6) Mr Tant then said that an additional function was to investigate floods. This could be any kind of flooding, although if another authority such as the EA was carrying out an investigation, the Lead Local Flood Authority would not seek to duplicate this work. The KCC Flood and Water Management Team was currently investigating four flooding events (each triggered by internal flooding to five properties or more) which had occurred over the summer.

(7) The KCC Flood and Water Management Team also had to maintain a register of structures and features which might have an impact on flood risk.

(8) Mr Tant said that, more broadly, the KCC Flood and Water Management Team also carried out work to help manage the risk of flooding. An example of this was the work carried out in Margate to support Southern Water in retro-fixing sustainable drainage. Another example was working in partnership with the National Flood Forum to support communities at risk of flooding.

(9) The KCC Flood and Water Management Team liaised with other partner organisations such as the Environment Agency and the Internal Drainage Boards. Mr Tant gave the example of the collaborative work undertaken with the EA on KCC’s investment in the works to improve the Leigh Flood Storage Area.

(10) Mr Tant went on to set out work carried out in related fields such as Water Management, the promotion of sustainable water use. They worked with water companies and farmers to seek to reduce water consumption. They worked with the South East Rivers Trust to encourage farmers to collect water that fell on polytunnels and use it for irrigation. More recently, the KCC Flood and Water Management Team had been involved in some water quality issues such as seeking to deliver nutrient neutrality in the Stour catchment.

(11) The Chairman said that he would like Mr Tant to provide a more detailed presentation to the Committee at a future meeting.

(12) Mr Hood said that he understood that KCC relied on the EA to provide its map or surface water flooding and that the next version was due to be finalised in 2026. Although the actual footprint was unlikely to change significantly, the categorisation of the likelihood of flooding events occurring was going to be revised in a number of

cases due to climate change and the increased prevalence of flash flooding. He believed that areas where the possibility of development was currently marginal would become less so as a result. He then asked about the process of initiating an investigation.

(13) In response to Mr Hood's question, Mr Tant clarified that a flood investigation sought to clarify what had actually taken place, including the cause and responsible persons or organisation. It was not an in-depth organisation that aimed to establish the answer to questions such as the nature of the hydraulic system. The Team relied on being notified by the public of any incident that should be investigated.

(14) In response to a question from Mr Sole, the Chairman said that Mr Earl Bourner from KCC Highways reported once a year to the Committee on drainage and blocked gullies. This would be the best forum to ask questions on this subject as Mr Tant's Team did not have responsibility for this particular issue. The Minutes from Mr Bourner's previous presentations were available on the KCC website. He hoped that Mr Bourner would be available in March.

(15) RESOLVED that Mr Tant be thanked for his introduction and that a more detailed presentation be provided to a future meeting of the Committee.

17. Environment Agency and Met Office Alerts and Warnings and KCC severe weather response activity
(Item 7)

(1) Mr Harwood began his introduction by saying that the figures in paragraph 2.5 of the report had changed since the papers had been published. The figure for Flood Alerts should now read 44 instead of 43. In paragraph 2.6, the figure for Met Office weather warnings was now 25 instead of 24 as a result of a new yellow warning for winds.

(2) Mr Harwood then said that the rainfall figures set out in paragraph 2.1 demonstrated that the summer had been extremely wet in the months of June, July and early August 2021. It was particularly notable that the long-term monthly average rainfall in June had been 192% of the long-term monthly average for that month. The effect of this very high level of rainfall had been seen on 12 July 2021 when the London Fire Brigade had declared a major incident for surface water flooding in the South East, including Kent. Homes had been flooded in Bethersden, Yalding and Horsmonden as well as in Urban Maidstone, where combined water drainage systems had discharged wastewater leading to a pollution incident in the River Len.

(3) Mr Harwood continued by saying that the most significant surface water flooding impacts of the summer had been experienced in residential areas on the scarp of the Greensand Ridge at Ulcombe. The investigation into its causes was ongoing.

(4) Mr Harwood said that August had been a dry period, after which there had been rainstorms in September and October. KCC had needed to intervene at the Stilebridge Caravan Site near Marden. Kent Highways in response, had worked with Kent Fire and other partner agencies very effectively.

(5) Mr Harwood then said that KCC's updated Emergency Plan was currently being consulted upon and would be validated through a table-top flood response training exercise (Exercise Basilea) on 6 December. This would simulate, in a Kent context, the weather conditions that had unleashed the destructive flooding in Germany and other parts of continental Europe during July. It would take the form of a Met Office warning involving surface water flooding leading to fluvial flooding on the Medway.

(6) Mr Harwood concluded his introduction by saying that an exercise had been undertaken on 28 October which modelled an event impacting on the Flood Storage area at Hothfield near Ashford. This exercise had resulted in many learning points being identified. These included evacuation and shelter, and warning and informing. Another exercise would be held on 10 December in Northwest Kent involving a breach of the tidal wall along the River Thames.

(7) In response to a question from Mr Mackonochie, Mr Harwood explained that the first part of Exercise Basilea on 6 December was to involve a significant impact particularly affecting East Sussex and West Kent which would lead to surface water flooding wherever there were drainage issues. The second part of the exercise would mainly focus on the impact on the Leigh Barrier and the Medway catchment area and its communities. As it was predominantly a responder exercise, the main participant would be statutory agencies (Fire and Rescue, the EA, KCC and the affected Districts). It was possible that a similar exercise, involving PCs and local groups might arise from this. The debrief document would be made readily available.

(8) The Chairman agreed that all KCC Members of the Committee would receive hard copies of the agenda papers in future and that if any Members from outside KCC wished to have one, they should contact the clerk: andrew.tait@kent.gov.uk with their details.

(9) In response to a question from Mrs Brown, Mr Harwood said that the Met Office's three-month outlook summary indicated a 10% chance that November to January would be cooler than average; 45% that it would be nearer average; and a 45% chance that it would be milder than average. In terms of rainfall, there was a 10% chance that it would be drier than average; 60% that it would be near average and a 30% chance that it would be wetter than average. It also appeared that a stormier period was to be expected. High tides were due between 3 and 7 December, suggesting that coastal areas would be most vulnerable at that time.

(10) RESOLVED that the content of the report be noted.

To: Kent Flood Risk Management Committee – 9th March 2022

From: Rebecca Spore, Director of Infrastructure, Strategic and Corporate Services

Subject: Storms Eunice and Franklin 18th – 21st February 2022

Classification: Unrestricted

Summary: This report describes the impacts upon Kent's communities, infrastructure and natural environment arising from named Storms Eunice and Franklin. Local preparation, response and recovery are also addressed, alongside the structured debrief framework that will ensure lessons are learned and assimilated into county council and partner policy and practice.

1. Background

- 1.1 The period between the 18th and 21st February 2022 saw the county battered by two damaging named storms:¹
- **Storm Eunice** struck on Friday 18th and was the first-ever Red Severe Weather Warning issued by the Met Office for Southeast England. Wind speeds of 77mph were recorded at Langdon Bay and Manston, and significant damage to trees and structures contributed to the widespread and prolonged disruption of local transport, electricity, water, and information communications technology (ICT) networks.
 - **Storm Franklin** was active between Sunday 20th and Monday 21st with wind speeds of 62 mph recorded at Manston. This storm saw the Met Office issue a Yellow Severe Weather Warning, compounded damage to trees and structures, disrupted recovery operations and drove a North Sea storm surge which resulted in localised tidal flooding impacts.
- 1.2 The threat and risk to Kent associated with Storm Eunice was starkly framed by Met Office colleagues' comparisons between the forecast Storm Eunice and the destructive power of the Burns' Day storm of 25th – 26th January 1990. It is also worthy of note that Storm Dudley preceded Storm Eunice, arriving in the British Isles on 16th February, but having far less of an impact on Kent.

¹ Please see appendix 1

2. Preparation

- 2.1 Early intelligence on the coming storm was received by the County Council and our Kent Resilience Forum (KRF) partners on Monday 14th February, in the form of a Yellow Met Office Severe Weather Warning for high winds, forecast to arrive on Friday 18th. This Warning was upgraded to Amber on Wednesday 16th and ultimately to Red, at 03:50 on Friday 18th. KCC Communications issued five media updates following the initial forecast of stormy weather on 14th February. These updates served to warn and inform, and summarise partner agency roles and responsibilities, to help keep communities safe.
- 2.2 Equipped with this vital early warning, the County Council convened the first in a series of multiagency SWAG (Severe Weather Advisory Group) meetings on Tuesday 15th February, chaired initially by Pauline Harmer, KCC Highways Senior Duty Officer. The KRF Severe Weather Framework confirms county council responsibility for chairing and providing secretariat for this group whenever a significant storm is forecast - for flooding the Environment Agency (EA) performs these roles.
- 2.3 The SWAG continued to meet daily to coordinate KRF partners' contingencies for the arrival of the storm until Thursday 17th when the group was upgraded to a Tactical Coordinating Group (TCG) and meeting frequency increased to twice daily. The TCG was chaired by Toby Howe, KCC Highways Senior Duty Officer, with secretariat provided by the County Council's Resilience and Emergency Planning Service. Media and communications activity for the forecast severe weather was also led and coordinated by KCC.
- 2.4 Preparations by KRF partners, including the emergency services, local authorities, NHS, EA, utilities, ports, and other transport providers, all supported by the SWAG and TCG, included rostering of additional personnel, pre-positioning of equipment, and ensuring appropriate public and stakeholder warning and informing messaging. The County Emergency Centre at Invicta House, County Hall was opened early on the morning of Friday 18th to support command and control, including oversight of business continuity impacts upon KCC services, buildings, ICT, and other infrastructure.

3. Impact and Response

- 3.1 The initial local impacts of Storm Eunice began late on Thursday 17th into the morning of Friday 18th, with isolated power outages reported from some rural locations, including Stile Bridge at Linton on the Low Weald, where UK Power Networks (UKPN) intervened quickly to restore supply. The QEII Bridge at the Dartford Crossing was closed from 05:00 on Friday morning, with southbound traffic diverted through the east bore tunnel, and reduced speed limits imposed

on trains. Around Kent's coastline, shipping made for anchorages in sheltered coastal waters.

- 3.2 However, the full force of the storm struck from around 10:00, when damage to trees and structures such as scaffolding, hoardings and roofs, and high-sided vehicles began to be widely reported. The risk posed by wind-blown debris led to the suspension of higher-risk services, including household waste sites and some refuse collection rounds. Ferry services at Port of Dover were also suspended at this time, resulting in congestion in and around Dover which was carefully managed due to the risk to high-sided vehicles from strong winds.
- 3.3 The ferocity of Storm Eunice at its height was such that operations to clear the transport network and undertake utility repairs were temporarily suspended. Rail services, including Eurotunnel, also effectively ceased in the County, with fallen trees and other debris blocking lines and commuters stranded at stations across Kent and London.
- 3.4 The damaging wind speeds associated with Storm Eunice gradually weakened from around 15:00 on the afternoon of Friday 17th, enabling an assessment of damage and mobilisation of resources to restore transport, power, and other critical infrastructure.
- 3.5 Local impacts included the evacuation of residential and commercial properties at risk from structural damage and unsafe trees, some 71,000 properties and much critical infrastructure was affected by power outages, including several water treatment and pumping stations. Identifying and providing appropriate support for vulnerable people and communities without power and often water supply, was a key priority. Residential care, children's and respite care centres, alongside accommodation for unaccompanied asylum-seeking children and Afghan refugees, were amongst the locations affected by outages. The County Council initiated and chaired a Vulnerable People and Communities Cell to support necessary identification and outreach.
- 3.6 This period of respite was short-lived, as strong gusts and squally rain associated with Storm Franklin arrived through the afternoon of Sunday 20th and into Monday 21st. Further damage to trees and other structures occurred and clean-up and utility restoration activity was disrupted.
- 3.7 However, the most significant impact upon the county from Storm Franklin related to the storm surge it drove into the southern North Sea. The Thames Barrier was closed, and tidal flooding occurred at locations along the North Kent coast during the afternoon of Monday 21st, including at Gravesend, Chatham, Gillingham, Faversham and the Isle of Sheppey. Inundation of commercial premises and trapped vehicles necessitated water rescue interventions by Kent

Fire and Rescue Service. EA modelling had struggled with the complexity of the prevailing storm conditions and as a result Flood Warnings were not issued until some flood impacts were already being felt.

- 3.8 The scale of the local response required during Storms Eunice and Franklin was unprecedented, with Kent Highways receiving 3,262 enquiries from the public and stakeholders, including 1,233 emergency alerts (such as debris on A roads), 661 reports of dangerous trees and 160 contacts regarding drainage matters. Kent Highways had more than 50 crews involved in clean-up operations, supported by Kent Voluntary Sector Emergency Group (KVSEG) partners, including SE 4x4, and undertook proactive inspections of tree safety along major routes. KCC Resilience and Emergency Planning Service also received 70 alerts to individual emergency situations developing across the county between the 18th and 21st February.

4. Recovery, Clean-up and Lessons Learned

- 4.1 Restoration of power, water and ICT and the clearing of unsafe trees and wind-blown debris from the local road and rail network continued into Wednesday 23rd, with some more complex impacts taking well beyond this date to fully resolve. Making safe, isolating power supply, and ensuring appropriate security provision for damaged buildings has been another priority for local partners.
- 4.2 A key concern arising from the storms is the risk from rogue traders looking to profit from others' misfortune. To counter rogue trader activity, helpful hints have been posted across partners' social media and other briefings, while KCC Trading Standards has provided interviews on local media. Advice on making insurance claims has also been shared by the Association of British Insurers, which includes keeping any emergency repair receipts and not automatically throwing away damaged items.
- 4.3 Though detailed figures have yet to be fully calculated, the cost to KCC and its partners for preparation, response and recovery to these damaging storms will be significant. All costs accrued, whether that be in relation to staff resources, materials, and contractors, will be borne by individual organisations. The Severe Weather Impacts Monitoring System (SWIMS) will assist with the collation of these costs by the County Council and our partners.
- 4.4 The Department of Levelling Up, Housing and Communities (DLUHC) administers the Bellwin Scheme of Emergency Financial Assistance to support emergency response activity. However, there is no automatic entitlement to financial assistance under this scheme. Ministers are empowered by section 155 of the Local Government and Housing Act 1989 to decide whether to activate the scheme after considering the circumstances of each individual

case. In cases where criteria of the scheme are met, the grant is normally payable to authorities at 85% of eligible costs incurred above a threshold set for each authority (for KCC this remains £1,764,324). The Bellwin scheme is intended to reimburse the cost of local authority actions taken in the immediate phase of an emergency, not those taken as part of the recovery. It appears unlikely that costs to the County Council arising from the response to Storms Eunice and Franklin will reach this threshold.

- 4.5 As both frequency and intensity of severe weather events accelerate, managing resultant cumulative budgetary impacts will likely become an increasingly significant element of financial planning and climate change adaptation work.
- 4.6 Kent County Council undertook its own internal debrief to capture lessons learned from the storms on 1st March and a multiagency KRF debrief is scheduled for 10th March.

5. Recommendations

- 5.1 That Members note the report and contribute to lessons learned through oversight and debate.

6. Contact Details

Report Author: Tony Harwood (Resilience and Emergency Planning Manager), Infrastructure, Strategic and Corporate Services, tel. 03000 413 386, e-mail tony.harwood@kent.gov.uk

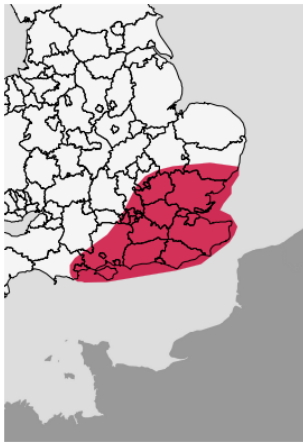
Relevant Director: Rebecca Spore (Director of Infrastructure), Strategic and Corporate Services tel. 03000 412 064, email rebecca.spore@kent.gov.uk

Appendix 1: Met Office Forecasts and Speeds for Storms Eunice and Franklin

Storm Eunice 18th February

**Red warning
Wind**

Between
10:00 Fri 18 Feb 2022 and
15:00 Fri 18 Feb 2022




Storm Eunice causing significant disruption and dangerous conditions due to extremely strong winds on Friday

What to expect

- Flying debris resulting in danger to life
- Damage to buildings and homes, with roofs blown off and power lines brought down
- Roads, bridges and railway lines closed, with delays and cancellations to bus, train, ferry services and flights
- Power cuts affecting other services, such as mobile phone coverage
- Large waves and beach material being thrown onto coastal roads, sea fronts and homes

Further details

Extremely strong west to southwesterly winds will develop mid morning on Friday, transferring eastwards across southern and southeast England through the middle of the day then slowly easing from the west during the afternoon. Gusts of 60-70 mph are likely widely, perhaps briefly 80 mph in a few places, mainly on English Channel coasts.



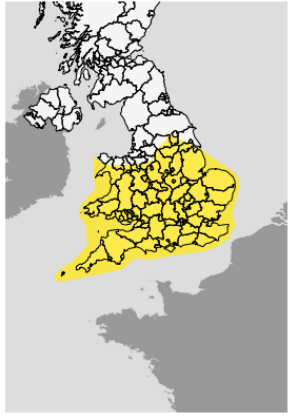
High likelihood of high impacts

Storm Eunice saw the first ever Red wind warning issued for south-east England
Max wind speed: 77mph at Langdon Bay & Manston

Storm Franklin 20th – 21st February

**Yellow warning
Wind**

Between
12:00 Sun 20 Feb 2022 and
15:00 Mon 21 Feb 2022



Further periods of strong winds are expected across much of England and Wales on Sunday and Monday which may cause some disruption.


What to expect

- Some delays to road, rail, and ferry transport are likely.
- Delays or restrictions for high-sided vehicles on exposed routes and bridges likely.
- It's likely that some coastal routes, sea fronts and coastal communities will be affected by spray and/or large waves.
- Some damage to infrastructure and trees/branches is possible, especially where made more vulnerable by Storm Eunice.
- Power outages are possible, and efforts to restore power to areas which have had interrupted supply in the wake of Storm Eunice are likely to be hampered.

Further details

Winds are likely to strengthen across England and Wales ahead of a band of rain, which itself will turn increasingly squally, as it moves southeast on Sunday afternoon. Gusts of 55-60 mph are expected widely around south and west facing coasts, some of which may be more vulnerable than usual in the aftermath of Storm Eunice. Some places inland may see similar strength gusts, and on the squally rain band itself, gusts potentially as high as 70 mph.

Blustery showers will follow with further gusts of 60-70 mph mainly confined to coastal areas in the west during Sunday evening.



Medium likelihood of low impacts

Max wind speed: 62mph at Manston

To: Kent Flood Risk Management Committee – 9th March 2022

From: Rebecca Spore, Director of Infrastructure, Strategic and Corporate Services

Subject: Environment Agency and Met Office Alerts and Warnings and KCC severe weather response activity.

Classification: Unrestricted

Summary: To update Kent Flood Risk Management Committee on the current water situation, weather statistics, Environment Agency and Met Office Warnings, and flood response activity since the last meeting of the Committee on 24th November 2021.

1. Background

- 1.1 This report is the latest of the regular updates to the Committee addressing the current water situation and severe weather and flood response activity.
- 1.2 The KCC Resilience and Emergency Planning Service Duty Emergency Planning Officer (DEPO) and Contact Point receive Environment Agency (EA) and Met Office alerts and warnings regarding severe weather on a 24/7 basis. Any site-specific severe weather impacts are notified to the DEPO by the emergency services and other resilience partners, with reports from the public received by Contact Point and passed on to the DEPO and/or Kent Highways. DEPO further initiates multi-agency reporting using the County Council's innovative Severe Weather Impacts System (SWIMS) to capture resources and costs arising from severe weather incidents.
- 1.3 Some 85,500 residential and commercial addresses across Kent are located within areas identified as at risk from fluvial (river) or tidal (coastal) flooding. Where possible, flood vulnerable properties are offered a Flood Warning Service by the EA. Early warning of flood risk to communities (including areas outside of floodplains) is delivered through Flood Guidance Statements, Severe Weather Warnings and mobilisation of the Kent Resilience Forum (KRF) Severe Weather Advisory Group (SWAG).

2. Kent water situation and weather statistics

- 2.1 Kent experienced an unusually dry November 2021, with 23% of long-term monthly average rainfall recorded. By contrast, December saw a marginally above average rainfall total, at 104% of the long-term monthly average. Temperatures between November and January were close to average.

- 2.2 January saw a return to drier conditions, recording 26% of the long-term monthly average. Rainfall totals for February are forecast to be around average and temperatures a little warmer than the norm, at +2.4 C for the month up to 20th.
- 2.3 The latest data available from the Environment Agency shows soil moisture deficits increasing across Kent but still close to the long-term average. The exceptions being the Isles of Sheppey, Grain and Thanet, which are notably below the long term average. Ground conditions remain receptive to further recharge.
- 2.4 Groundwater levels are best classified as **normal** across all major aquifers. Despite a dry January, groundwater resources remain in a favourable condition, and there are no imminent concerns from a water resources perspective. Meanwhile, the risk of groundwater flooding occurring this winter has reduced.
- 2.5 Reservoir levels in Kent are stable, with Bewl at 79% capacity, which is **normal**, while Bough Beech reached full capacity during January.
- 2.6 61 flood alerts and five flood warning were issued by the EA since the last meeting of the Committee in November 2021 (14 fluvial and 52 coastal)¹. This contrasts with 91 flood alerts and 26 warnings (107 fluvial and 10 coastal) in the corresponding period in 2020/21.
- 2.7 The Met Office issued 23 weather warnings covering Kent between November and February³ (15 warnings for wind, five for fog, two for thunderstorms and one for snow)². This contrasts with 47 Met Office weather warnings (seven for wind, six for fog, one for rain and snow, 10 for snow and ice, eight for ice, eight for rain, seven for snow) in the corresponding period last year.
- 2.8 The Thames Barrier was closed on five occasions since the last meeting of the Committee in November (all for flood defence)⁴. The figure for the corresponding period was eight (seven for flood defence and one for test purposes).
- 2.9 The most significant flooding experienced in the County since the last meeting was associated with high spring tides coinciding with wave and surge activity driven by Storms Eunice and Franklin. Overtopping of defences was recorded at Denge on 18th February. Varying degrees of tidal flooding also affected a swathe of the North Kent coast, from Gravesend through to the Isle of Sheppey, on the afternoon of Monday 21st February, resulting in inundation of roads and commercial property requiring rescue operations by Kent Fire and Rescue Service personnel.

¹ Please see appendix 1

² Please see appendix 2

³ Please see appendix 3

⁴ Please see appendix 4

3. Outlook

- 3.1 The Met Office three month outlook summary covering February to April indicates a 5% chance that this period will be cooler than average, a 40% chance that it will be near average and a 55% chance that it will be milder than average. In terms of rainfall, the summary indicates a 10% chance the season will be drier than average, 60% chance that it will be near average and a 30% chance it will be wetter than average.
- 3.2 The EA continuously runs surge forecasts, informed by astronomical tide calculations. If a risk of coastal flooding is forecast, then this information is communicated to partners. Indeed, the next notably high equinoctial spring tides, with a corresponding elevated risk of coastal flooding, if in combination with high winds, are forecast for 20th to 23rd March. However, coastal flooding can still occur outside of high spring tides, as the result of a storm or breach of defences.
- 3.3 To support local contingency planning for flood response, a multiagency flood response exercise was undertaken on 6th December 2021 to test and validate the updated [KCC Flood Response Plan](#). Further, an All Member Briefing, entitled Future Flooding, was delivered on 4th March, covering emergency planning, highways drainage, flood risk management and climate change adaptation subject matters.
- 3.4 Kent Flood Risk Management Committee will continue to receive regular updates on water resources, flood alerts, weather warnings and response.

4. Recommendations

- 4.1 That Members note the warnings received since the last meeting of the Committee; and contribute to planning and response policy and practice through oversight and debate.

5. Contact Details

Report Author: Tony Harwood (Resilience and Emergency Planning Manager), Infrastructure, Strategic and Corporate Services, tel. 03000 413 386, e-mail tony.harwood@kent.gov.uk

Relevant Director: Rebecca Spore (Director of Infrastructure), Strategic and Corporate Services tel. 03000 412 064, email rebecca.spore@kent.gov.uk

Appendix 1: EA Flood Alerts and Warnings issued since 24th November 2021

Date issued	Flood Zone	Status
07/12/2021	Hamstreet Arm area	Flood Alert
07/12/2021	Upper River Stour	Flood Alert
07/12/2021	Upper River Medway area	Flood Alert
08/12/2021	Lower River Medway area	Flood Alert
08/12/2021	River Beult from Pluckley and Bethersden to Hampstead Lock at Yalding	Flood Alert
25/12/2021	River Beult from Pluckley and Bethersden to Hampstead Lock at Yalding	Flood Alert
25/12/2021	Lower River Medway Area	Flood Alert
25/12/2021	Upper River Stour	Flood Alert
25/12/2021	River Rother and its tributaries from Turks Bridge to the Royal Military Canal	Flood Alert
27/12/2021	River Rother and its tributaries from Turks Bridge to the Royal Military Canal	Flood Alert
28/12/2021	Lower River Medway Area	Flood Alert
28/12/2021	Upper River Medway Area	Flood Alert
03/01/2022	Coast from St Margaret's at Cliffe to Sandgate	Flood Alert
03/01/2022	Coast from Ramsgate to Kingsdown	Flood Alert
04/01/2022	Coast from Dartford to Allhallows	Flood Alert
04/01/2022	Coast from Whitstable to Margate	Flood Alert
04/01/2022	Tidal Thames riverside from Dartford Creek and The Mardyke to the Thames Barrier	Flood Alert
04/01/2022	Isle of Sheppey and Coast from Kemsley to Seasalter	Flood Alert
04/01/2022	Tidal Medway, Medway estuary and Isle of Grain	Flood Alert
04/01/2022	Lower River Medway Area	Flood Alert
04/01/2022	Tidal Medway, Medway estuary and Isle of Grain	Flood Warning
05/01/2022	Tidal Thames riverside from Dartford Creek and The Mardyke to the Thames Barrier	Flood Alert
05/01/2022	Tidal Medway, Medway estuary and Isle of Grain	Flood Warning
31/01/2022	Tidal Thames riverside from Dartford Creek and The Mardyke to the Thames Barrier	Flood Alert
31/01/2022	Coast from Dartford to Allhallows	Flood Alert
31/01/2022	Tidal Medway, Medway estuary and Isle of Grain	Flood Alert
31/01/2022	Coast from Whitstable to Margate	Flood Alert
31/01/2022	Isle of Sheppey and Coast from Kemsley to Seasalter	Flood Alert
31/01/2022	Coast from St Margaret's at Cliffe to Sandgate	Flood Alert
31/01/2022	Coast from Ramsgate to Kingsdown	Flood Alert
01/02/2022	Coast from Whitstable to Margate	Flood Alert
01/02/2022	Isle of Sheppey and Coast from Kemsley to Seasalter	Flood Alert
01/02/2022	Coast from Dartford to Allhallows	Flood Alert
01/02/2022	Tidal Medway, Medway estuary and Isle of Grain	Flood Alert
04/02/2022	Coast from Whitstable to Margate	Flood Alert
04/02/2022	Coast from Dartford to Allhallows	Flood Alert
04/02/2022	Isle of Sheppey and Coast from Kemsley to Seasalter	Flood Alert
04/02/2022	Tidal Medway, Medway estuary and Isle of Grain	Flood Alert
04/02/2022	Tidal Thames riverside from Dartford Creek and The Mardyke to the Thames Barrier	Flood Alert
04/02/2022	Coast from St Margaret's at Cliffe to Sandgate	Flood Alert
04/02/2022	Coast from Ramsgate to Kingsdown	Flood Alert
06/02/2022	Coast from St Margaret's at Cliffe to Sandgate	Flood Alert
06/02/2022	Coast from Ramsgate to Kingsdown	Flood Alert
06/02/2022	Coast from Dartford to Allhallows	Flood Alert

06/02/2022	Tidal Medway, Medway estuary and Isle of Grain	Flood Alert
06/02/2022	Isle of Sheppey and Coast from Kemsley to Seasalter	Flood Alert
06/02/2022	Coast from Whitstable to Margate	Flood Alert
17/02/2022	Coast from Fairlight to Dungeness Including The Tidal Rother	Flood Alert
17/02/2022	Coast from Sandgate to Dungeness	Flood Alert
20/02/2022	Coast from Dartford to Allhallows	Flood Alert
20/02/2022	Tidal Medway, Medway estuary and Isle of Grain	Flood Alert
20/02/2022	Coast from Whitstable to Margate	Flood Alert
20/02/2022	Isle of Sheppey and Coast from Kemsley to Seasalter	Flood Alert
20/02/2022	Coast from Whitstable to Margate	Flood Alert
20/02/2022	Isle of Sheppey and Coast from Kemsley to Seasalter	Flood Alert
20/02/2022	Coast from Dartford to Allhallows	Flood Alert
20/02/2022	Tidal Medway, Medway estuary and Isle of Grain	Flood Alert
21/02/2022	Tidal Thames riverside from Dartford Creek and The Mardyke to the Thames Barrier	Flood Alert
21/02/2022	Properties seaward side of tidal defences from Greenhithe to Gravesend	Flood Warning
21/02/2022	Coast from Kemsley to Seasalter	Flood Warning
21/02/2022	Tidal River Medway and Medway estuary	Flood Warning
21/02/2022	Lower River Medway Area	Flood Alert
22/02/2022	Coast from Dartford to Allhallows	Flood Alert
22/02/2022	Tidal Medway, Medway estuary and Isle of Grain	Flood Alert
22/02/2022	Isle of Sheppey and Coast from Kemsley to Seasalter	Flood Alert
22/02/2022	Coast from Whitstable to Margate	Flood Alert

Appendix 2: Met Office Severe Weather Warnings by Element – November 2021 to March 2022

Weather Element	Number of Warnings	No of Different Events	Dates covered by Events
Thunderstorm	2	1	2 nd January
Snow	1	1	27 th November
Wind	15	4	5 th – 7 th December 18 th – 21 st February
Fog	5	5	13 th – 18 th January

Appendix 3: Met Office Severe Weather Warnings by Warning Level – November 2021 to March 2022

Warning Type	Number of Warnings
Yellow Warnings	16
Amber Warnings	2
Red Warnings	1
Total Warnings	19

Appendix 4: Environment Agency Thames Barrier closures since 24th November 2021

Thames Barrier closures	Date	Status
Thames Barrier closed	04/01/2022	Operational
Thames Barrier closed	30/01/2022	Operational
Thames Barrier closed	31/01/2022	Operational
Thames Barrier closed	04/02/2022	Operational
Thames Barrier closed	21/02/2022	Operational

To: Kent Flood Risk Management Committee – 9th March 2022

From: Ben Watts, General Counsel
Simon Jones, Director of Environment, Planning and Enforcement
Rebecca Spore, Director of Infrastructure

Subject: Update on Little Venice Country Park and Marina

Classification: Unrestricted

Summary: To update the Committee on Little Venice Country Park and Marina

1. Background

- 1.1 The issue of Little Venice was raised during the Kent Flood Risk Management Committee meeting on 9 March 2020.
- 1.2 A Virtual site visit was held on 23 September 2020. Notes of this visit were included within the report to the November 2020 meeting of the Committee **(Appendix 1)**.
- 1.3 The Committee received an update report on 8 July 2021 where it was agreed that a further update would be considered in November or March.
- 1.4 A meeting was held on 6 December 2021. It was attended by the officers who serve this Committee (Tony Harwood, Max Tant and Andrew Tait), the Site Owner, the Site Manager as well as representatives from Maidstone BC, Yalding PC, Collier Street PC, the Environment Agency, Kent Resilience Forum and Kent Fire and Rescue. The notes of this meeting are contained at **Appendix 2**.

2. The meeting on 6 December 2021.

- 2.1 The meeting on 6 December considered the site's resilience and emergency plan as well as broader issues relating to flooding in the Parishes of Yalding and Collier Street.
- 2.2 All parties agreed that very good progress had been made in terms of achieving enhanced preparedness to warn, inform and evacuate residents of Little Venice. It was particularly important to note that the Environment Agency has worked together with the site owner and that they considered the Evacuation Plan to be fit for purpose.

- 2.3 The meeting identified four issues that needed to be either improved or monitored. These were:-
- (a) Early Notification
 - (b) Communication
 - (c) Resilience of the Utility Networks
 - (d) Enforcement of Road Closures.
- 2.4 The identified issues relate mainly to Yalding and Collier Street themselves but, by implication, are matters which also impact on the Little Venice site.
- 2.5 The risk arising from flooding at the Little Venice site cannot be eliminated, but some of the impacts are capable of being mitigated through sound planning, improved notification, good communication and proactive testing.
- 2.6 The Committee has expressed its concern over the safety of the most vulnerable residents, accompanied by the hope that a wider re-organisation of the site layout can take place. This is not in the gift of any of the agencies to insist upon, due to the nature of the historic planning permission and the rights and wishes of the residents themselves. Nevertheless, the potential to reconsider the layout of the site has been discussed with the local planning authority and would be a significant feature in the consideration of any future planning application.

3 Recommendations

- 3.1 The Committee is invited to note the progress made together with any matters arising from the discussion with the site landowner.

5. Report Authors:

Andrew Tait (Senior Democratic Services Officer)
tel. 03000 416749,
email andrew.tait@kent.gov.uk

Tony Harwood (Resilience and Emergency Planning Manager)
Tel. 03000 413386
Email tony.harwood@kent.gov.uk

Max Tant (Flood and Water Manager)
Tel. 03000 413466
Email max.tant@kent.gov.uk

APPENDIX 1

To: Kent Flood Risk Management Committee – 23rd November 2020

From: Tony Hills, Chairman of the Kent Flood Risk Management Committee
Stephanie Holt-Castle, Interim Director of Environment, Planning and Enforcement

Subject: Virtual Site Visit to Little Venice

Classification: Unrestricted

Summary: To inform the Committee of the virtual site visit to Little Venice on 23 September 2020

1. Background

- 1.1 The issue of Little Venice was raised during the Kent Flood Risk Management Committee meeting on 9 March 2020. I therefore invited interested parties to participate in a site visit and discussion. At the same time, legal advice on the possibility of undertaking a compulsory purchase was sought in accordance with the Committee's wishes.
- 1.2 Due to the Covid-19 pandemic, it proved impossible to hold a physical site visit. Furthermore, the use of a drone to film the site was not possible due to GDPR considerations. Nevertheless, all the attendees were very familiar with the site which ensured that a productive discussion could take place on a Virtual basis.

2. The Virtual Site Visit

- 2.1 The Virtual site visit was held on 23 September 2020. The list of attendees was:

Tony Hills (KCC – Chairman of Kent Flood Risk Management Committee)

Max Tant (KCC – Flood and Water Manager)

Tony Harwood (KCC – Resilience and Emergency Planning Manager)

Derek Mortimer (Maidstone BC – Chairman of Communities, Housing and Environment Committee)

James Bailey (Maidstone BC – Development Manager)

Geraldine Brown (Yalding PC – Chairman)

Guy Gardener (Kent Resilience Team - Senior Resilience Officer)

Luke Thompson (Environment Agency – Area Incident Manager; Kent, South London and East Sussex)

Jonathan Alawo (Environment Agency - Team Leader Flood Resilience Team; Kent, South London & East Sussex)

Grant Brooker (Kent Fire and Rescue- Water Resource and Flooding).

Andrew Tait (KCC Democratic Services)

- 2.2 All participants agreed that the safety of the residents was paramount. They also noted that legal advice separately obtained by both Maidstone Borough Council and Kent County Council clearly stated that the CPO option suggested at the Committee meeting was incapable of being successfully pursued. The attendees therefore discussed what measures could be undertaken to improve health and safety on the site.
- 2.3 Major flooding events are expected to occur more often as a consequence of climate change. Research has established that a 1 in 100-year flooding event occurs every three years somewhere in the UK. This does not, however mean that any one location is at a level of risk substantially greater than that.
- 2.4 Little Venice is a site which is inhabited by a significant number of elderly and vulnerable residents. It is very prone to flooding. The evacuation of vulnerable people is typically a challenge to achieve safely.
- 2.5 The Environment Agency identified a Community Flood Plan for Little Venice had been developed following the event of 2013/14. This had provision for Flood Wardens, although there is not one there at this time. The aim is to rectify this through training for flood wardens which was due to be held shortly after our Virtual meeting took place. The updates to the Flood Plan will follow the flood warden training and be written bearing in mind the debrief following the events of the winter of 2019/20.
- 2.6 The draft Medway Confluence Flood Plan covers Laddingford, Yalding and Collier Street and sets out arrangements for sandbag provision and highways management in those localities during a localised event. As stated above, there was a debrief following the events of the winter of 2019/20.
- 2.7 Little Venice was previously covered by three different warning systems that were issued at different times. This has now been reduced to a single warning that is tailored to the site without warning the rest of the Yalding community unnecessarily.
- 2.8 Gauge boards have been installed on site to enable water height to be measured at Hampstead Lock so that the anticipated extent of the flooding can be communicated to the residents. The residents typically expect the site to be flooded to some degree every winter. The Flood Warning messaging service and the gauge boards improve the ability of site residents to understand the level of severity during any flooding event that is going to happen. The 2013/14 Flood Plan and the Evacuation Plan that arose from it have worked very well since its creation and the residents on site have been able to self-evacuate quite effectively. This was also the case during the 2019/20 event where there

was a *de facto* Flood Warden to assist. There were, however, significant issues for the most vulnerable residents.

- 2.9 One of the problems with the Evacuation Plan for Little Venice is that it is unclear who has the responsibility to decide who should be evacuated and who should remain on site. In March 2020, Little Venice was left with 16 very elderly and vulnerable people who the Fire Authority had to evacuate overnight by boat. It then proved problematic to move them to appropriate temporary accommodation. Maidstone BC as the evacuating authority bore the cost of doing so. This did not extend to returning those people to their homes once the Emergency was over. The aim should be to ensure that evacuation of all residents is undertaken at the same time rather than piecemeal as was the case on this occasion. Responsibility for returning people to their homes after the event needs to be clarified.
- 2.10 From an Emergency Planning perspective, it was a complex matter to resolve how to evacuate people, who were elderly and vulnerable, without inflicting harm. In March 2020, there were significant problems in persuading people to evacuate and to identify appropriate specialist accommodation. The difficulties experienced in evacuating the Little Venice site have grown between 2013 and 2020 as the residents have become older and more vulnerable.
- 2.11 There is an inherent risk to mobile homes, even though they are tethered. Furthermore, many of the residents initially reacted to the March 2020 flood event with complacency. Consideration needs to be given to how the site can be made safer in terms of layout. Some parts of the site are very vulnerable to flooding, representing a danger to life when taken in combination with the vulnerability of some of the residents. This risk is born by residents, rescue workers and volunteers, which also places pressure on Adult Social Care and Health staff, who must ensure safeguarding.
- 2.12 Mobile homes are still being advertised at Little Venice for sale at a price that is attractive for people who have retired. It is not clear whether people contemplating purchase have been informed of the risks associated with purchasing a mobile home in sites such as Little Venice. One suggested response is to warn the residents of the nature of the risks, possibly by a letter undertaken by the Parish Council.
- 2.13 The point was made that quite a few of the residents mistakenly believed that they had purchased permanent homes and had sold their former houses under this misapprehension. Furthermore, some of the more elderly and vulnerable residents have acquired the right to live there permanently over time.
- 2.14 Little Venice has an extensive planning history. An enforcement investigation was carried out by Maidstone BC some ten years ago because the lawful use was for temporary holiday homes rather than for permanent accommodation, and it was believed that a number of people had been living there permanently for a considerable period.
- 2.15 Maidstone BC informed the virtual site meeting that there are some planning restrictions, including a S106 Agreement which is effectively a tie within the

main park area for a restriction of usage for that area on site. There is also a permission for the access; a 2019 Lawful Development Certificate (LDC) for the ancillary recreational use of an area in connection with Little Venice Country Park. A new application has been received by Maidstone BC for quarter of the land covered by the LDC. If granted, this would lead to a further 40 caravans with the possibility of a further 120 if the planning process were to be repeated.

3. Conclusions

3.1 The meeting identified a number of aspects that would benefit from further multi-agency consideration. These are:-

3.1.1 exploring further were zoning the site by floodwater depth and velocity (although care would need to be taken to ensure that the residents would not be misled into believing that they would no longer be at risk if placed in a lower risk zone);

3.1.2 better informing the residents of the flood risks on site

3.1.3 establishing the exact level of responsibility for the duty of care at the site, including for evacuation and return of residents, and how this will be enforced if required.

3.2 The participants all agreed that they had become better informed of the full circumstances prevailing at the site, including options which could most productively be pursued.

3.3 The exercise was in my opinion an important step forward in improving health and safety at Little Venice. This meeting came about as an Initiative raised at the Committee. This reflects very well upon the manner in which it carries out its role. Whilst the site visit has not solved the problem, it has been able to facilitate work towards an improved situation.

3.4. I recommend that the Committee should receive an update report on progress at Little Venice within the next calendar year.

Recommendations

4.1 The Committee is invited to note the report and the three areas at 3.1 that will continue to be explored to a point of resolution

4.2 The Committee is invited to agree that an update will be presented within the next calendar year.

5. Report Author:

Tony Hills, Chairman of the Kent Flood Risk Management Committee

Contact Details

Andrew Tait (Senior Democratic Services Officer
tel. 03000 416749,
email andrew.tait@kent.gov.uk

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APPENDIX 2

NOTES OF A VIRTUAL MEETING HELD ON MONDAY, 6 DECEMBER 2021

PRESENT:

Tony Harwood: KCC Emergency Planning
Max Tant: KCC Flood and Water
Guy Gardner: KCC Emergency Planning and Link Officer to Maidstone BC

James Bailey: Maidstone BC Development
Uche Olufemi: Maidstone BC Emergency Planning

Geraldine Brown: Chairman Yalding PC
Angela Gent: Clerk to Yalding PC

David Goff: Chairman Collier Street PC

Mr Albert Lee: Owner of the Little Venice Site
Mrs Iris Lara: Manager of the Little Venice Site

Jonathan Alawo: Environment Agency (Flood Division)
Kirsty Aucott: Environment Agency (Kent Flood Partnership)

Ian Crouch: Kent Resilience Forum

Grant Brooker: Kent Fire and Rescue

IN ATTENDANCE

Laura Newman: KCC Emergency Planning
Andrew Tait: KCC Democratic Services

BACKGROUND AND PURPOSE OF THE MEETING

(1) The Purpose of the meeting was to consider the readiness of Little Venice Caravan Park to meet the emergencies of evacuation and shelter in the event of flooding occurring during prolonged periods of winter rainfall.

RESPONSE AND EMERGENCY PLAN

- (1) Jonathan Alawo: Environment Agency (Flood Division) said:
- There were 5 Flood Wardens for the Little Venice site, reporting to Mrs Iris Lara (Manager of the Little Venice Site). They were all trained and prepared for an emergency.
 - The Environment Agency had experienced a problem in contacting the Owner or the Site Manager.
 - The Environment Agency intended to provide sandbags for use at the site.

- (2) Albert Lee (Site Owner);
- Iris Lara was the contact for operations in the event of an alert arriving from Maidstone BC.
 - Home Owners had been written to in October, reminding them of the winter flood season and the evacuation plan in place (including the emergency park area to which they would initially be evacuated.
 - He was confident that the site could take all the actions that were necessary.
- (3) Guy Gardner (KCC Emergency Planning and Link Officer to Maidstone BC):
- He was very pleased with the progress that had been made and that it was now essential to maintain it.
 - The Agencies involved in flood response activity needed to provide a continuous stream of information in the event of a flood in order to counter potentially misleading information on social media.
- (4) Uche Olufemi (Maidstone BC Emergency Planning):
- Communication was key. At present, it was very difficult for MBC to get up-to-date information on which roads had been closed.
 - The Flotation Systems were designed to raise and lower in a controlled manner to 13ft.
- (5) Iris Lara (Manager of the Little Venice Site):
- The site had recently purchased a second rescue boat. These boats were motorised power boats.
 - The reason that major problems had occurred in 2013 was that the flooding event had happened so quickly that the site had been unable to cope without significant assistance.
- (6) Tony Harwood (KCC Emergency Planning):
- Warning Systems had been refined with the addition of a localised system, enabling all residents to be ready to evacuate.
 - It might be necessary to hold a “dry evacuation” to test whether all residents were all able to be accommodated in an emergency.
- (7) Geraldine Brown (Chairman Yalding PC):
- Very concerned about the arrangements for vulnerable people. In 2019, elderly and disabled people had needed to be evacuated to Yalding Church by Maidstone BC. Once at the Church they had been taken to Maidstone until the danger had passed. Once it had, Maidstone BC had no longer had responsibility for them.

(8) Albert Lee:

- During the previous winter, he had personally knocked on doors and sent text messages to all the residents (who had all complied). The early warning system had meant that no such problems had occurred on this occasion. He had compensated all the residents for their hotel expenses.

(9) Uche Olefemi:

- Agreed with Albert Lee that everything had gone very well in 2020/21. MBC and Iris Lee had taken part in the door-knocking exercise. Everyone had left the site and been taken to hotels.

GENERAL AND WIDER ISSUES IN THE PARISHES OF YALDING AND COLLIER STREET

(1) Geraldine Brown (Chairman Yalding PC):

- The Parish Council's problem was sorting out arrangements at the Sub Station.
- It would be helpful if a Police presence could be established in the event of road closures in order to ensure that the gates remained closed.
- Residents were always keen to help during an emergency.

(2) David Goff (Chairman Collier Street PC):

- Sandbag distribution was a great problem due to residents helping themselves.
- Teleconferencing was an invaluable tool in keeping everyone concerned up-to-date.
- Agreed that a Police presence would be helpful
- Diversion signs needed to be put up whenever roads were closed.
- It would be helpful if signs could be put up at the bridges naming the rivers and streams.

(3) Jonathan Alawo:

- The need to ensure that each portion of the site was part of the communication network.
- During the last incident, there had been abuse to the Flood Wardens from drivers. Kent Police had been advised accordingly.

(4) Tony Harwood (KCC Emergency Planning)

- The same problem also applied to KCC services and 4X4 rescue workers. This occurred in many parts of the County.

(5) Grant Brooker: Kent Fire and Rescue

- Arrangements were being considered to enable gates to be closed without being needing to be manned.
- Kent Fire and Rescue had a database enabling rapid communication of Environment Agency advice.
- Although consideration was being given to a reduction in sandbags, he did not believe that this should be done. This was because in both 2019 and 2020 the sub station had very nearly stopped working. If this were to occur, the electric pumps would cease to work.

SUMMARY

(1) Tony Harwood:

- There were four issues that had arisen out of the discussion that needed further consideration. These were
 - (a) Early Notification
 - (b) Communication
 - (c) The resilience of the utility networks
 - (d) Enforcement of road closures.