

# River Medway (Flood Relief) Act 1976

## Inquiry into the Environment Agency's revised Scheme for the Leigh Flood Storage Area, Kent

### Statement of Case

### Appendix 3 – Environment Agency responses to Objections

Date: 22/12/2020

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**RM REP001 Penshurst Parish Council representation**  
**Environment Agency technical response, September 2020**

Further to Penshurst Parish Council's representation to Defra, the Environment Agency summarised the letter into four specific issues concerning road flooding in and around Penshurst. Penshurst Parish Council agreed that this summary was an accurate representation of their concerns. These four issues are addressed below.

- 1. Key roads around Penshurst, including Chafford Bridge, Colliers Land Bridge, Rogues Hill and Long Bridge currently experience flooding. Penshurst Parish Council is concerned that future use of the Leigh Flood Storage Area (FSA) will exacerbate the situation and cause flooding of the roads on a more regular basis and for a longer period.**

Penshurst Parish Council (PC) have stated that:

*Roads generally flood and become impassable in the following order: 1) Chafford Bridge, 2) Colliers Land Bridge, 3) Rogues Hill, 4) Long Bridge.*

The locations are shown on the map below in Figure 1.

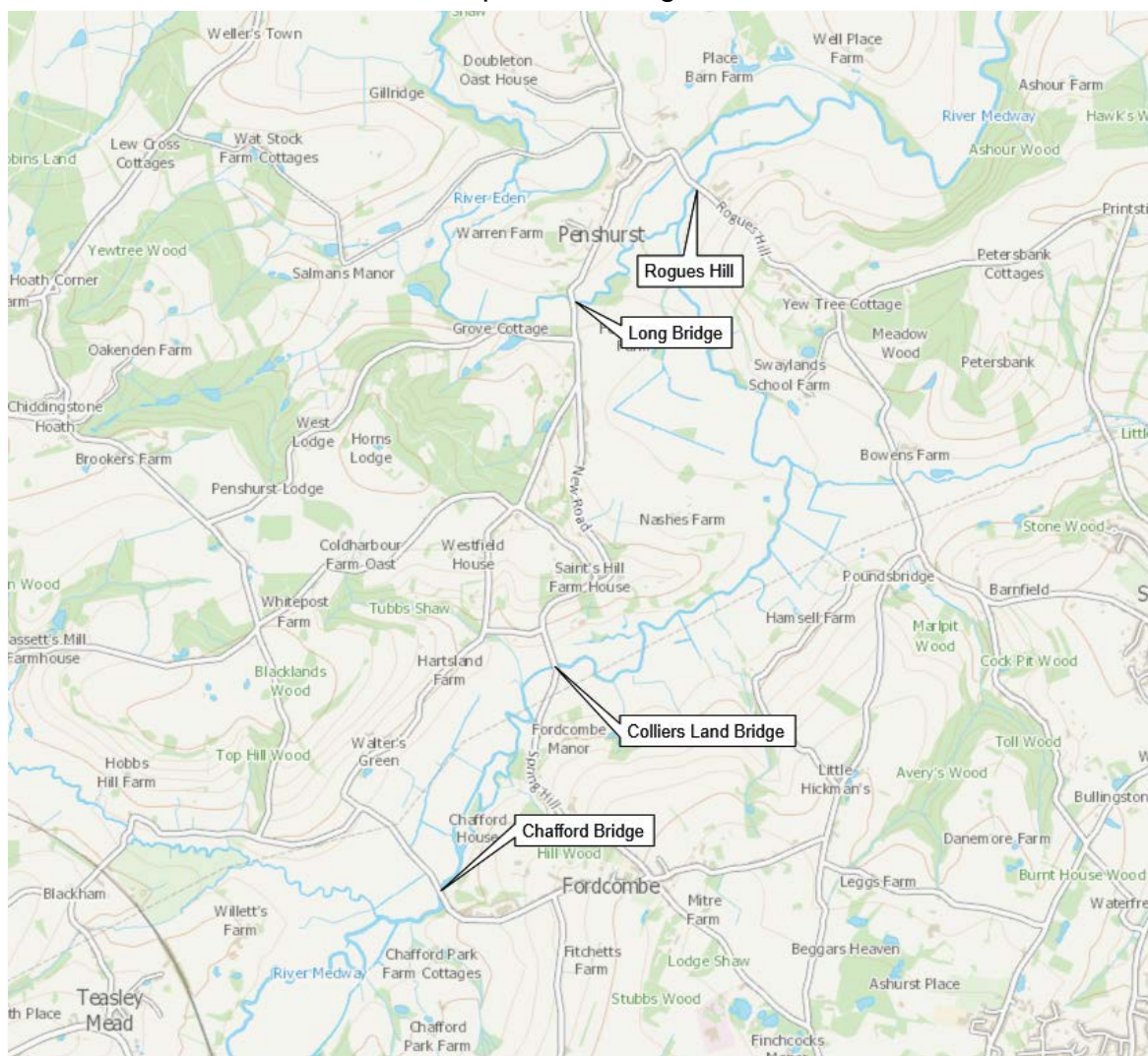


Figure 1: Key locations of road flooding identified by Penshurst PC

## Chafford Bridge and Colliers Land Bridge

As stated by Penshurst PC, these locations are the first to flood during a flood event. This is because flooding upstream of Penshurst is driven by high flows from the River Medway and River Eden flowing toward the confluence at Penshurst. As they are upstream of Penshurst, they will experience the peak of the flood first. For example, during the most recent flood event (February 2020) the roads at Colliers Land Bridge and Chafford Bridge were flooded approximately twelve hours before impounding started at the Leigh FSA. There is no influence from the Leigh FSA this far upstream.

The cause and impact of flooding at Colliers Land Bridge and Chafford Bridge can be considered together as they are broadly similar. The Environment Agency operates gauging stations at these locations so the depth and timing of flooding at these sites are known.

Again using the February 2020 flood as an example, the peak level at Colliers Land Bridge was reached at 17:00 on 16 February 2020. The water had been rising for two days and at this time the surrounding land and roads were flooded. The water levels at Colliers Land Bridge gauging station are shown in Figure 2 below. The Leigh FSA did not start impounding water until 17:15 on 16 February 2020 by which time, the peak level at this location had passed. Figure 3 shows the water level at the main embankment of Leigh FSA for the same period of time. This shows that, having peaked at 17:00, the water level at Colliers Land Bridge was falling by the time impounding began at the Leigh FSA. This shows how the water levels at these upstream locations rise before the operation of the Leigh FSA and are therefore not influenced by its operation.

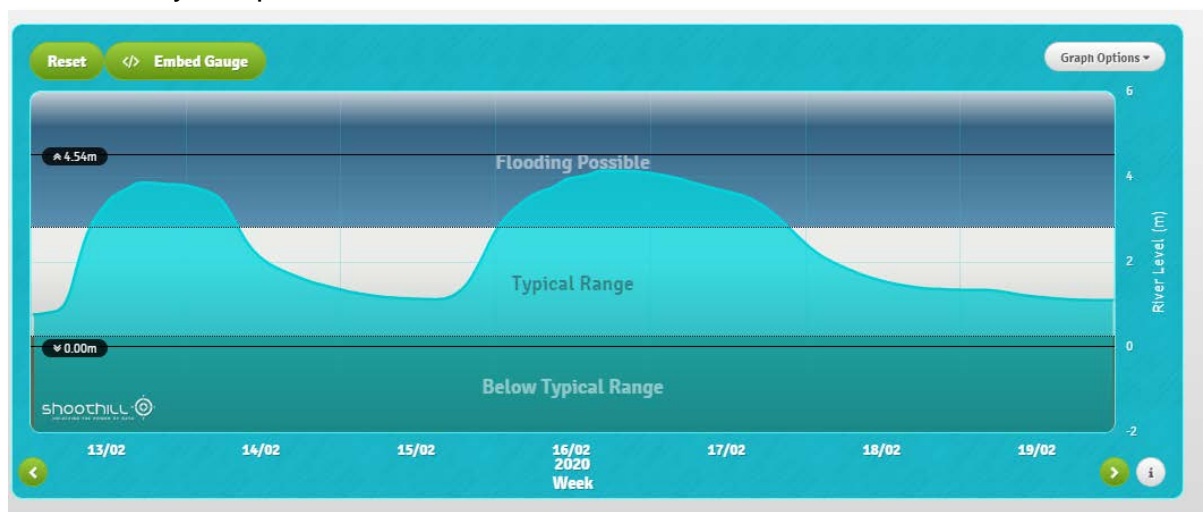


Figure 2: Water levels at Colliers Land Bridge gauging station 13 to 19 February 2020. Image from Shoothill Gauge map using data from an Environment Agency gauging station

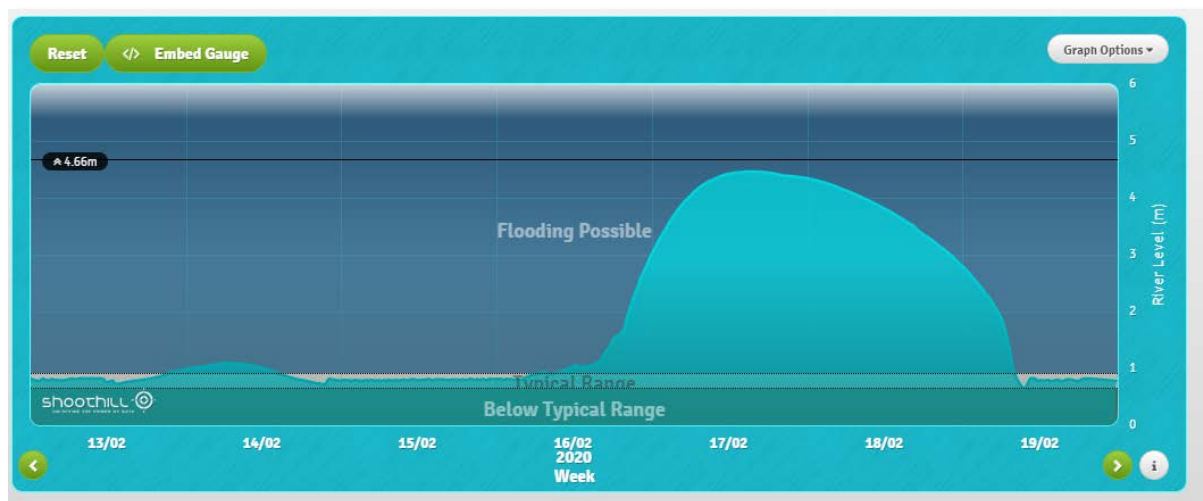


Figure 3: Water levels at Leigh Barrier upstream gauging station 13 to 19 February 2020. Image from Shoothill Gauge map using data from Environment Agency gauging station

The proposed change to increase the maximum impoundment level does not change this situation. This is demonstrated in Figure 4 below. Figure 4 shows the increase in flooding depth from raising the Leigh FSA maximum impoundment level from 28.05m AOD to 28.6m AOD (measured at the main Leigh FSA embankment) during a 1.33% flood event. Every flood event is different, depending on a number of factors including soil saturation and weather patterns. Modelling simulated flood events allow us to vary how much water flows down the catchment and when. The scenario in Figure 4 was chosen to demonstrate the impact of expanding the FSA because it shows the greatest change in flood depths.

There are other examples provide in section 5.1 and Appendix B of the Flood Risk Assessment. During more extreme flood events, the increase in depth as a result of the proposed change, reduces. This is because the natural flood level, which is greater, dominates.



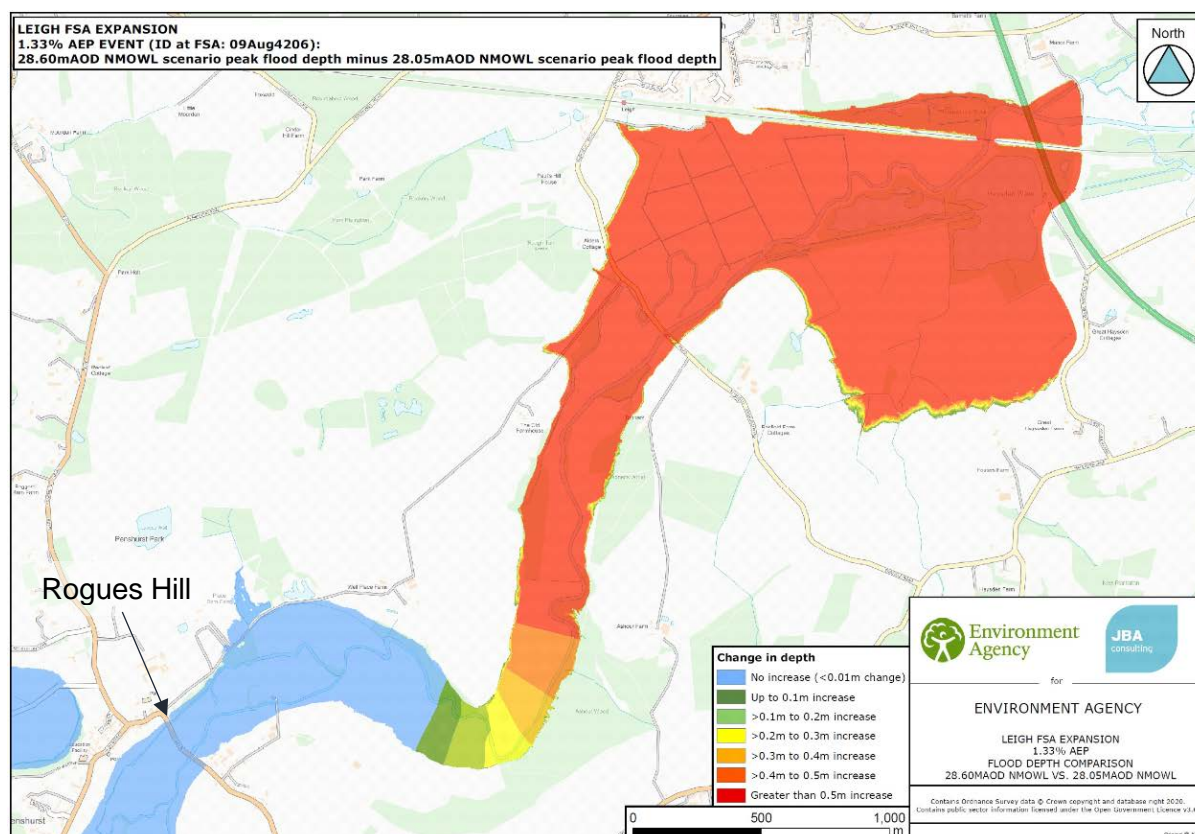


Figure 4: Increase in flood depth in a 1.33% flood event. 28.05m AOD vs 28.6m AOD

## Long Bridge

The Environment Agency does not have any gauging at Long Bridge. The nearest gauging station is Penshurst gauging station upstream of Long Bridge on the River Eden. The gauge is approximately 1km upstream of Long Bridge and therefore the level and flow conditions are comparable for the purposes of assessing local flooding because of the proximity and similarity in channel profile and level. Again, using the most recent flood to illustrate, Figure 5 shows the flood levels at Penshurst gauging station in February 2020. The timing of the peak at 01:30 on 17 February corresponds with Penshurst PC's information that Long Bridge floods after Chafford Bridge and Colliers Land Bridge. Comparing Figures 3 and 5 demonstrates that when the water levels in the Leigh FSA were rising as water was stored, the flood level at Long Bridge was decreasing. As with Colliers Land Bridge and Chafford Bridge, this is because the flooding at Long Bridge is caused by the volume of water from upstream on the River Eden, and not by the impounding of water downstream on the River Medway.

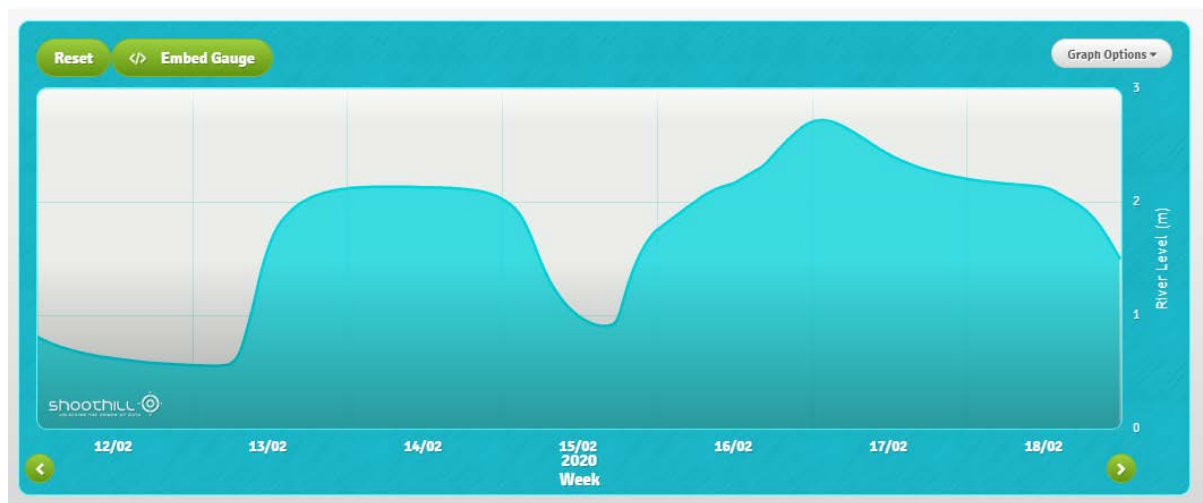


Figure 5: Water levels at Penshurst gauging station 12 to 18 February 2020. Image from Shoochill Gauge map using data from Environment Agency gauging station

## Rogues Hill

The road, Rogues Hill, is built on a causeway across the flat valley 200m downstream of the confluence of the Rivers Eden and Medway. Rogues Hill passes over the River Medway by Bridge House. The road bridge was repaired after it was damaged in the 1968 flood. Whilst the road is raised above the surrounding fields, the lowest part of Rogues Hill, continues to be particularly vulnerable to flooding. The road acts as a causeway across the floodplain and causes water to back up upstream of Rogues Hill. As the road is slightly raised, it floods later than the surrounding land.

Figure 6 shows how Rogues Hill remains passable whilst the surrounding land is flooded due to the raised road surface. As observed during the flooding in February 2020, even though Rogues Hill remains dry for longer (it remained dry until at least late afternoon on Sunday 16 February), when the depth of water on surrounding land becomes deep enough, the road floods. Flooding at this location is driven by the same upstream flows as the other locations identified by Penshurst PC. As the upstream water level rises, eventually Rogues Hill floods and becomes impassable to most traffic.



*Figure 6: Rogues Hill looking North West toward Penshurst. Taken at 13:00 on 16/02/20*

Although it is known that Rogues Hill flooded prior to the construction of the Leigh FSA, the Environment Agency sought to understand if the operation of the Leigh FSA causes the road flooding to be deeper than occurred prior to the construction of the FSA. As part of the development of the Leigh Expansion and Hildenborough Embankment Scheme (LEHES), the Environment Agency has carried out flood modelling and surveys to understand the relationship between flooding at Rogues Hill, and the operation of the Leigh FSA. The outcome of this modelling is reported in the Flood Risk Assessment for the scheme dated July 2020, and submitted in support of the planning application.

Ground levels have been identified using Light Imaging, Detection and Ranging (LIDAR) data at the following locations:

- Lowest point on Rogues Hill road: 28.9m AOD.
- Average ground level on floodplain upstream and downstream of Rogues Hill road: 27.6 – 27.8m AOD.

The Environment Agency has carried out flood modelling at Rogues Hill for the following scenarios:

- Natural flooding – flooding that would be experienced if the Leigh FSA were not present and operating.
- Operation of the Leigh FSA to 28.05m AOD - flooding that occurs with the Leigh FSA in operation at the current legal maximum storage level.
- Operation of the Leigh FSA to 28.6m AOD –flooding that would occur with Leigh FSA in operation at the proposed legal maximum storage level.

The flood modelling undertaken has looked at a flood event with a 5% chance of occurring in one year and a much more severe 1% flood event which includes the

increased flow driven by climate change. Modelling of these scenarios ensures that a range of events has been considered.

The result of this modelling is shown below in Table 1. All levels shown are immediately downstream of Rogues Hill road surface.

<b>Flood event annual probability</b>	<b>Natural flood level</b>	<b>Leigh FSA operating at 28.05m AOD</b>	<b>Leigh FSA operating at 28.60m AOD</b>
<b>5%</b>	28.7m AOD	28.8m AOD	28.8m AOD
<b>1% + climate change</b>	29.4m AOD	29.5m AOD	29.5m AOD

*Table 1: Flood levels downstream of Rogues Hill for 5% and 1% + CC flood events.*

The information presented in Table 1 demonstrates the following:

- Rogues Hill floods due to natural flooding that is driven from high flows upstream.
- The raised causeway that Rogues Hill is built on keeps the road dry during a 5% flood event. (The LIDAR measurement shows the lowest point of Rogues Hill road is 28.9m AOD).
- During an extreme 1% flood event when the impounded water level measured at the control structure reaches its current maximum level (28.05m AOD), operation of the Leigh FSA increases the depth of floodwater over Rogues Hill.
- Increasing the maximum storage level of floodwater in the Leigh FSA from 28.05m AOD to 28.6m AOD will not increase the depth of flooding on Rogues Hill.

During an extreme 1% flood event, (an event more severe than any experienced to date at Rogues Hill) there is potential for the operation of the existing Leigh FSA to increase the depth of flooding over Rogues Hill by up to 0.1m. Due to the timing of the flooding the road would be flooded to at least 0.6m prior to the operation of the Leigh FSA and would therefore be impassable with or without the influence of the Leigh FSA.

## **Conclusion**

Penshurst Parish Council have expressed concern that future use of the Leigh FSA will exacerbate the flooding of the roads and cause this to occur on a more regular basis and for a longer period.

Whilst the existing FSA can increase water levels on Rogues Hill by up to 0.1m, Figure 4 shows that the proposed expansion will not increase the depth of flooding on Rogues Hill. As Long Bridge, Chafford Bridge and Colliers Land Bridge are further upstream, the expansion will not have any impact on the flooding on these roads either.

Furthermore, because the expansion will not increase the depth of flooding on the road, the duration of any flood will not be increased by the proposed change.



**2. Penshurst Parish Council is concerned that the Environment Agency is not reducing flood risk to the roads around Penshurst.**

The primary objective of the proposed expansion of the Leigh FSA is to provide improved flood protection to properties in Tonbridge and Hildenborough. The proposed expansion will not reduce the flood risk to roads around Penshurst, but it does not increase the flood risk either.

The Environment Agency recognise the risks that arise through flooding of the roads around Penshurst. We always warn the public against driving through flood water. Flooding of these and other roads makes them dangerous, with the potential for drivers to try to pass through the floodwater at Rogues Hill and for cars to become stuck with the obvious risk to life this presents and the ongoing blockage to passage after the floodwaters have receded.

There are a number of organisations involved in managing and responding to flood risk. The Environment Agency has powers to manage flood risk from main rivers and Kent County Council provide and manage highway drainage and roadside ditches. Other organisations and risk management authorities also have roles in managing and responding to flooding.

The risk of flooding in the natural floodplain cannot be eliminated. Warning and informing presents the only viable approach to the management of the risk to road users.

We would like to offer to fund the National Flood Forum to help the local community to set up a flood action group where the concerns of the community can be raised with all of the organisations involved in managing flood risk so that ways to mitigate the impact and improve the resilience of the community to flooding can be explored together.

**3. The Environment Agency does not measure the depth of floodwater at Rogues Hill. Penshurst Parish Council is concerned that the Environment Agency may not be aware of the current extent of the flooding on this road and has not taken accurate account of this in the modelling of the proposed impacts to highways of increasing the maximum stored water level in the Leigh FSA.**

The Environment Agency has flow gauges upstream of Rogues Hill at Chafford Bridge and Colliers Land Bridge on the River Medway, and Penshurst and Vexour Bridge on the River Eden. This represents a significant investment in flow monitoring. Information from these gauging stations has been used in the 2015 Medway flood model. Whilst it is always possible to further refine the calibration of any flood model by considering more baseline data, the Environment Agency is confident that the modelled flood data represents the best available means of understanding the flood risk at Rogues Hill and flow gauging at Rogues Hill will not materially alter the outputs of the 2015 Medway flood model.

In addition to the 2015 Medway flood model, the Environment Agency has photographs and data showing the extent of land flooded during previous events,

and staff observed the flooding at Rogues Hill in February 2020 to understand the extent of flooding at this location. None of the observations are any worse than predicted by the flood modelling. The timing of the flooding in February 2020 was as predicted by the model. The area around Penshurst was flooded prior to the operation of the Leigh FSA.

**4. Penshurst Parish Council would like the Environment Agency to monitor the depth of flood water at Rogues Hill.**

The Environment Agency would like to work with Penshurst Parish Council and Kent County Council to install gauge boards at Rogues Hill and appropriate signage to inform road users of the flood depths. The installation of this signage would be funded by the Environment Agency, and we would like to work with Penshurst Parish Council on the design to ensure it meets the needs of local road users.

In addition to providing gauge boards, the Environment Agency's free Flood Warning Service covers Rogues Hill and can provide residents with information about potential flooding at this location.

We understand that there is concern within the community in Penshurst that the effect of operation of the Leigh FSA on flood levels in Penshurst is not fully understood. We are investigating the feasibility of providing additional depth gauging in Penshurst, downstream of Rogues Hill. This will provide definitive data on this issue, and will hopefully provide the reassurance sought by the community.

## Jonathan Young

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**From:** Connell, Tim <Tim.CConnell@environment-agency.gov.uk>  
**Sent:** 04 August 2020 09:17  
**To:** sean.mitchell@sevenoaks.gov.uk  
**Subject:** RMREP 002: Environment Agency application to amend the Scheme within the River Medway (Flood Relief) Act 1976

Ref: RMREP 002

Dear Mr Mitchell

Further to our application to Defra to vary the maximum stored water level within the Leigh Flood Storage Area (FSA), Defra has passed us your letter responding to our proposal.

I understand that Sevenoaks District Council has no objection to our proposal to increase the maximum stored water level within the Leigh FSA, subject to the construction of the wave wall at Paul's Farm in Leigh. I can confirm that this will be constructed as part of the scheme and look forward to continuing to work with you on the project.

Kind regards,

Tim Connell

**Area Operations Manager (South London & West Kent)**

Environment Agency South East,  
Direct dial: 020847 46818  
Mobile: 07775 702130  
Orchard House, Endeavour Park, London Road, Addington, Kent, ME19 5SH

## **RM REP003 CLA objection to the Environment Agency's Application to vary the Scheme within the River Medway (Flood Relief) Act 1976**

### **Environment Agency technical response, September 2020**

Further to the CLA's representation to Defra, the Environment Agency believe the representation raises four specific issues. These four issues are addressed below.

#### **1. You are concerned that the proposed works have not been undertaken with adequate consultation and discussion with the landowners and farmers directly affected by the proposals.**

Alongside the usual engagement carried out as part of any flood risk management scheme, the Environment Agency has also carried out a specific consultation on the proposed change to the stored water level within the Leigh Flood Storage Area (FSA). This is in accordance with the River Medway (Flood Relief) Act 1976.

In May 2019, the Environment Agency's land agent, Dalcour Maclaren, wrote to 36 landowners and tenants within the existing FSA to advise them of the proposed application to increase the maximum stored water level, and to offer a meeting to explain the impact this would have on them and discuss any concerns they had. These letters were followed up with phone calls and 27 parties took up the offer of a meeting. There are no new landowners and/or occupiers that would be brought into the FSA as a result of the proposed expansion.

Alongside this process, the Environment Agency also contacted all of the organisations named within the Act as Specified Interests (plus additional organisations as directed by Defra) to make them aware of the application to expand the FSA, offer meetings to discuss the proposal and any concerns they had on behalf of their residents or members. These organisations have gone through their own processes to ensure that they understand the impact of the proposal on their residents or members.

Of the 52 landowners and organisations consulted (36 landowners and 16 organisations), 11 representations have been made in response to our formal consultation on the proposed changes. We are continuing to work with those individuals to answer their questions and try to resolve their concerns. However, it should be noted that, of the 11 representations made, according to our modelling only 1 will be affected by the proposal to increase the maximum stored water level.

#### **2. You state that "Any decisions on flood mitigation works that are likely to have a significant impact on the land or business of the landowner must be based on robust evidence and with all potential solutions fully explored. In this case it is clear that there are some outstanding questions around the technical analysis that must be resolved before a decision is made."**

The Environment Agency, and the wider hydrological industry, uses modelling software, mapping techniques and topographical and rainfall data to understand a



wide range of catchment processes, how river catchments respond to different rainfall events, and to identify the impacts of these events.

The Environment Agency has flow gauges upstream of Rogues Hill, at Chafford Bridge and Colliers Land Bridge on the River Medway and at Penshurst and Vexour Bridge on the River Eden. This represents a significant investment in flow monitoring and allows us to understand the water levels on both rivers. Information from these gauging stations was used to calibrate the 2015 Medway flood model and is used to inform the operation of the Leigh Flood Storage Area (FSA).

Our modelling indicates that the proposed change to increase the maximum impoundment level will not increase the depth of flooding above Rogues Hill. This is demonstrated in Figure 1 below. Figure 1 shows the increase in flooding depth from raising the Leigh FSA maximum impoundment level from 28.05m Above Ordnance Datum (AOD) to 28.6m AOD (measured at the main Leigh FSA embankment) during a 1.33% flood event. The map below has been taken from the Flood Risk Assessment for consistency. This map has been updated since the submission of the Application. Whilst it shows greater depth variation lower in the FSA, the point at which the effect of the expansion dissipates remains the same.

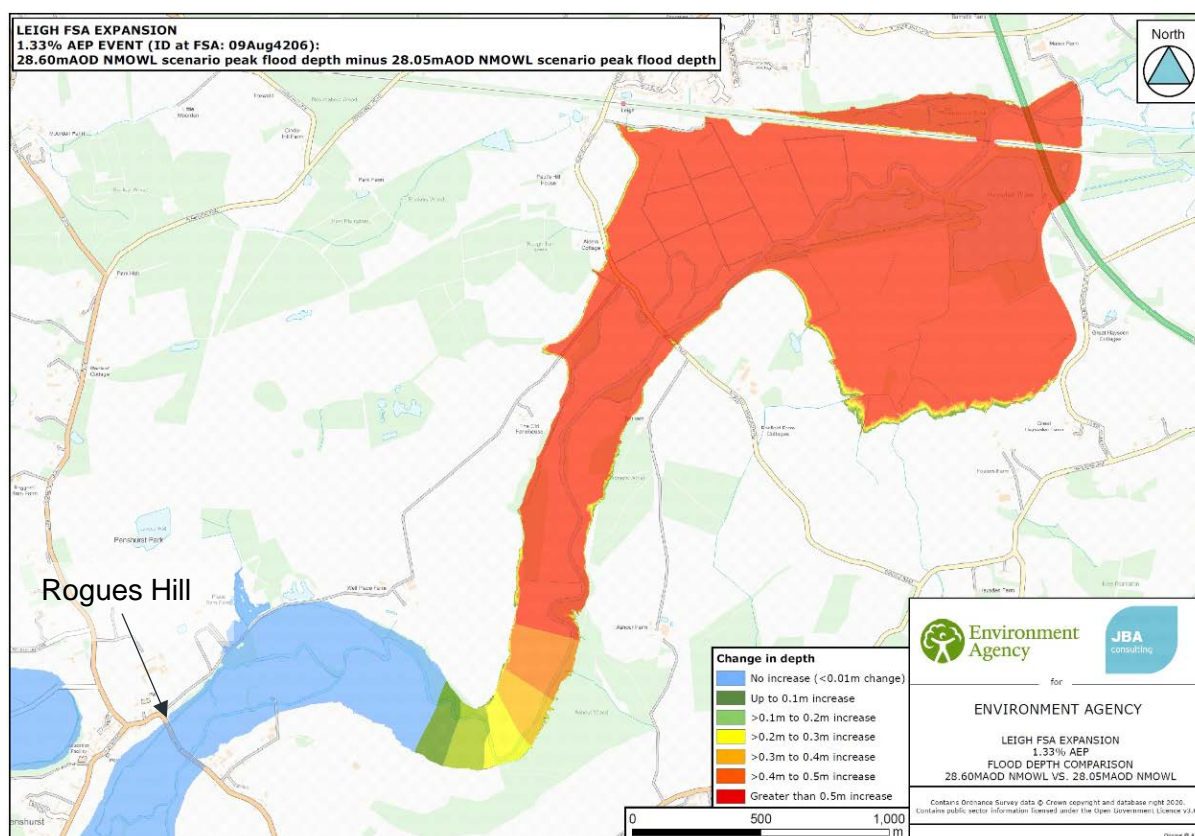


Figure 1: Increase in flood depth in a 1.33% flood event. 28.05m AOD vs 28.6m AOD

The Flood Risk Assessment was submitted with our planning application at the end of August 2020. The planning application reference number is 20/02463/FUL, and it is available for view at the Sevenoaks District Council planning portal:

<https://pa.sevenoaks.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=QFPV1WBK0LO00>

Every flood event is different, depending on a number of factors, including soil saturation and weather patterns. The modelled scenario in Figure 1 was chosen to demonstrate the impact of expanding the FSA because it shows the greatest change in flood depths.

Whilst it is always possible to further refine the calibration of any flood model by considering more baseline data, the Environment Agency is confident that the modelled flood data is sufficient to understand the flood risk upstream of the FSA.

In addition to the 2015 Medway flood model, the Environment Agency has photographs and data showing the extent of land flooded during previous events, and staff observed the flooding at Rogues Hill in February 2020 to understand the extent of flooding at this location. The timing and extent of the flooding in February 2020 was as predicted by the model.

You state that there are some outstanding questions around the technical analysis that must be resolved before a decision is made. Please can you clarify the questions that you'd like us to answer?

**3. You have concerns that in other locations landowners are flooded more frequently than was anticipated when agreements were made and have provided an invaluable service to the communities downstream, without adequate compensation for the damage to their land.**

The River Medway (Flood Relief) Act 1976 (the 1976 Act) accepts through section 17(4) that property may be affected by the operation of the Leigh FSA and gives landowners the right to be compensated for any damages caused.

Landowners are able to claim compensation after each flood event. As an alternative the previous operators, the Southern Water Authority, offered landowners within the FSA the opportunity to enter into agreements where full and final compensation would be been paid for any damage caused as a result of the operation of the existing FSA into the future.

The agreements made in the 1970s and 1980s allowed flooding to any depth and for any duration for the lifetime of the FSA. We must assume that they were correctly calculated with the best available data at the time.

As a result of the 2015 Medway flood model, we now know that more land is affected by the operation of the existing FSA than was covered by some of the agreements made in the 1970s and 1980s. On the occasions where operation of the FSA has caused damage to areas not covered by agreements, the Environment Agency has paid compensation for that damage. This is in accordance with Section 17(4) of the 1976 Act.

Whilst the 1976 Act provides a right for those who suffer damage as a result of operation of the existing FSA to claim compensation on a case by case basis, we are willing to consider entering into further agreements with affected landowners to fully and finally discharge this obligation.

**4. You are requesting that agreements and mitigation opportunities are entered into before this application is confirmed.**

As noted in our response to point 3, Section 17(4) of the 1976 Act obliges the Environment Agency to compensate landowners where damage is sustained as a result of operation of the existing FSA. If the level of that compensation is not agreed then the matter can be referred to a court for determination. The Environment Agency does not have to agree compensation before submitting the Revised Scheme to Defra.

Whilst we have started discussions with some landowners about the possibility of a supplemental agreement to fully and finally discharge this obligation to pay compensation under Section 17(4) for damage caused as a result of the existing FSA, these are separate discussions and should not prevent the Minister from determining the Revised Scheme.

**RM001 Mr and Mrs Massey's objection to the Environment Agency's Application to vary the Scheme within the River Medway (Flood Relief) Act 1976**

**Environment Agency technical response, September 2020**

**1. You are concerned that physical monitoring of the water levels at Penshurst has not been used and so the modelling is incorrect.**

Environment Agency response to your first concern:

The Environment Agency, and the wider hydrological industry, uses modelling software, mapping techniques and topographical and rainfall data to understand a wide range of catchment processes, how river catchments respond to different rainfall events, and to identify the impacts of these events.

The Environment Agency has flow gauges upstream of Rogues Hill, at Chafford Bridge and Colliers Land Bridge on the River Medway and at Penshurst and Vexour Bridge on the River Eden. This represents a significant investment in flow monitoring and allows us to understand the water levels on both rivers. Information from these gauging stations was used to calibrate the 2015 Medway flood model and is used to inform the operation of the Leigh Flood Storage Area (FSA).

Whilst it is always possible to further refine the calibration of any flood model by considering more baseline data, the Environment Agency is confident that the available modelled flood data is sufficient to understand the flood risk at Penshurst, and additional flow gauging data from closer to Penshurst would align with the outputs of the 2015 Medway flood model. However, in response to the concern within the community in Penshurst that the effect of operation of the FSA on flood levels is not reliably predicted through our modelling, we are looking to provide an additional depth gauge in Penshurst, downstream of Rogues Hill. This will provide definitive data on this issue, and will hopefully provide the reassurance sought by the community.

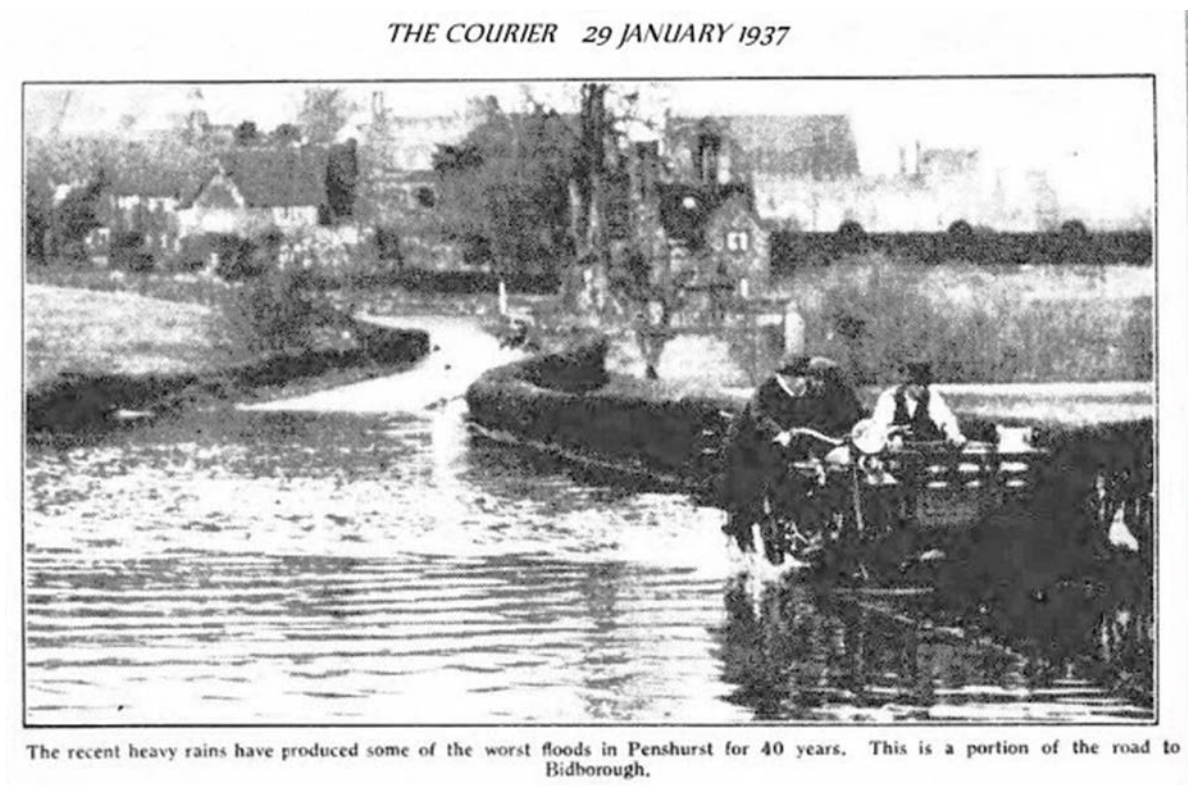
In addition to the 2015 Medway flood model, the Environment Agency has photographs and data showing the extent of land flooded during previous events, and staff observed the flooding at Penshurst in February 2020 to understand the extent of flooding at this location. The timing and extent of the flooding in February 2020 was as predicted by the model.



**2. You are concerned that incorrect information has been presented, particularly around the extent of natural flooding occurring in Penshurst village**

Environment Agency response to your second concern:

There are historical reports of flooding in Penshurst which occurred prior to the construction of the FSA, demonstrating that the area is affected by natural flooding. Indeed, the FSA itself was constructed in response to the 1968 flood when the flooding at Rogues Hill was so severe that the road bridge over the River Medway was damaged and a temporary bridge had to be installed. The photograph below from a newspaper article (Figure 1) shows flooding on Rogues Hill in 1937. These events demonstrate that Rogues Hill was vulnerable to flooding prior to the construction of the FSA.



*Figure 1: Flooding of Rogues Hill in 1937*

The depth and timing of flooding at Rogues Hill is principally dictated by upstream flows. The following photographs demonstrate this.

The first photograph, below, (Figure 2) was taken in the garden of Colquhouns Cottage (next door to your garden) at 14:12 on 20 December 2019. It shows the water level at approximately 29.0m AOD (metres above Ordnance Datum). Impoundment of the FSA didn't begin until 15:30 on the same day.



*Figure 2: Flooding of the garden of Colquhouns Cottage, 14:12 on 20 December 2019*

The next two photographs (Figures 3 and 4) were taken from Rogues Hill on 16 February 2020. Figure 3 shows the fields immediately upstream of Rogues Hill and was taken at 12:51. Figure 4 was taken from the bridge on Rogues Hill over the River Medway and shows Bridge House. It was taken at 13:13. Impoundment of the FSA didn't begin until 17:15 the same day.



*Figure 3: Flooding of the fields immediately upstream of Rogues Hill, 12:51 on 16 February 2020*





*Figure 4: River Medway and Bridge House, 13:13 on 16 February 2020*

The final photograph (Figure 5), below, was taken 14 minutes earlier than Figure 3 (at 12:37 on 16 February 2020). It shows the bridge on Ensfield Road over the River Medway, 3.9km downstream of Penshurst. It is clear that the river was within bank at this location whilst at the same time there was significant flooding in Penshurst driven by upstream flows. The FSA was not in operation and all the flooding at this time in Penshurst was driven by flows from upstream.



*Figure 5: The bridge on Ensfield Road over the River Medway, 12:37 on 16 February 2020*

These photographs clearly show that the land around Penshurst floods irrespective of operation of the FSA. The FSA only operates when there are high flows in the river. Therefore the same conditions that drive flooding in Penshurst also determine operation of the FSA.

**3. You are concerned that more of your land is flooding due to the existing FSA than is covered by the easement on your property.**

Environment Agency response to your third concern:

For clarity, we understand that the 'easement' that you refer to is the agreement dated 25 September 1978, between Southern Water Authority and you. We agree that more of your land is affected by flooding than is shaded blue on the plan in that agreement. However, the flooding you experience is both natural flooding, and caused by the operation of the FSA (up to 0.1m).

The plan does not limit the area of land that can be flooded. Instead it defines the area covered by the agreement, where full and final compensation has been paid for any damage caused as a result of the operation of the FSA. The consideration paid for the agreement also compensated you for the restrictions set out in the agreement, which restrict activities within that area that would interfere with the flow of flood water.

As a result of the 2015 Medway flood model, we know that more land is affected by the operation of the existing FSA than was covered by the 1978 agreement. On the occasions where operation of the FSA has caused damage to areas not covered by agreements, the Environment Agency has paid compensation for that damage. This is in accordance with Section 17(4) of the River Medway (Flood Relief) Act 1976 (the 1976 Act).

Whilst the 1976 Act provides a right for those who suffer damage as a result of operation of the FSA to claim compensation on a case by case basis, we are willing to consider entering into a further agreement with you to fully and finally discharge this obligation. Please let us know if this is something you would wish to discuss further.

**4. You are concerned that raising the flood barrier by 0.55m will flood your warehouse.**

Environment Agency response to your fourth concern:

As explained in Section 4.2 of the Application (pages 24 and 25), whilst the 2015 Medway flood model indicates that in certain circumstances operation of the FSA can add up to 0.1m to the depth of flood water in your garden, the flood model also indicates that the proposal to increase the maximum impoundment level will not further increase the depth of flooding in this location.



This is illustrated in Figure 6 below. Figure 6 shows the increase in flooding depth from raising the Leigh FSA maximum impoundment level from 28.05m AOD to 28.6m AOD (measured at the main Leigh FSA embankment) during a 1.33% flood event. The map below has been taken from the Flood Risk Assessment for consistency. This map has been updated since the submission of the Application. Whilst it shows greater depth variation lower in the FSA, the point at which the effect of the expansion dissipates remains the same.

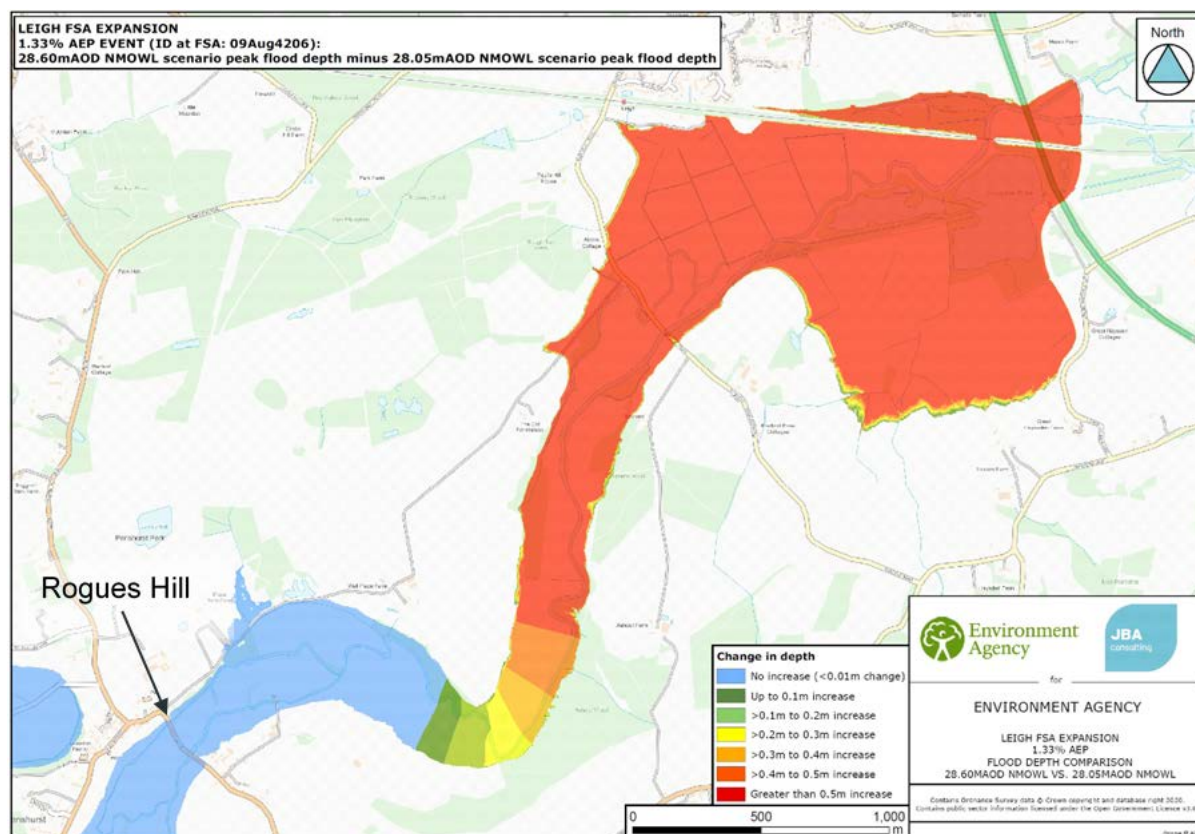


Figure 6: Increase in flood depth in a 1.33% flood event. 28.05m AOD vs 28.6m AOD

The Flood Risk Assessment was submitted with our planning application at the end of August 2020. The planning application reference number is 20/02463/FUL, and it is available for view at the Sevenoaks District Council planning portal:

<https://pa.sevenoaks.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=QFPV1WBK0LO00>

Every flood event is different, depending on a number of factors, including soil saturation and weather patterns. The modelled scenario in Figure 6 was chosen to demonstrate the impact of expanding the FSA because it shows the greatest change in flood depths.

**5. You are concerned that the Environment Agency is not offering to pay compensation for any increase in flood risk resulting from the increase in maximum stored water level.**

Environment Agency response to your fifth concern:

Section 17(4) of the 1976 Act obliges the Environment Agency to compensate you where damage is sustained as a result of operation of the FSA, and this obligation relates to both the existing arrangement and the proposed changes.

The Environment Agency accepts that in certain circumstances, operation of the existing FSA can increase the depth of flood water by up to 0.1m at your property and as set out in our response to your third concern, we are willing to consider entering into a further agreement with you to fully and finally discharge this obligation.

However, as set out in our response to your fourth concern, the Environment Agency does not agree that the proposal to increase the maximum stored water level will increase the flood risk at your property.

**6. You are concerned about the wider impact the flooding of Rogues Hill has upon users of the road network (including emergency services and parents of pupils at the nursery and primary schools) and the risk to life this causes, and you consider that the Environment Agency should be addressing this issue.**

Environment Agency response to your sixth concern:

As discussed in our response to your second concern, the land and roads around Penshurst flood irrespective of operation of the FSA. But we share your concerns over the impact of flooding in the village. There are a number of organisations involved in managing and responding to flood risk. The Environment Agency has powers to manage flood risk from main rivers and Kent County Council provide and manage highway drainage and roadside ditches. Other organisations and risk management authorities also have roles in managing and responding to flooding.

The risk of flooding in the natural floodplain cannot be eliminated. Warning and informing presents the only viable approach to the management of the risk to road users.

We have made an offer to Penshurst Parish Council to fund the National Flood Forum to help the local community to set up a flood action group where the concerns of the community can be raised with all of the organisations involved in managing flood risk so that ways to mitigate the impact and improve the resilience of the community to flooding can be explored together.

**RM002 Mr and Mrs Storey's objection to the Environment Agency's Application to vary the Scheme within the River Medway (Flood Relief) Act 1976**

**Environment Agency technical response, September 2020**

**1. Introduction**

**Bridge House is the closest home to the River Medway in Penshurst, at its closest point it is just nine metres from the river bank. It is within the Flood Storage Area (FSA).**

**We have lived at Bridge House for fifteen years. In 2010 the Environment Agency (EA) informed us that they had a proposal to raise the height of the water level stored in the FSA. This proposal did not proceed. But in 2015 we received Newsletter No1 informing us that the proposal was now being funded and would be proceeding.**

Environment Agency response to point 1:

Noted.

**2. Fundamental reasons for Objection**

**2.1 We strongly object to this application to vary the Scheme for the operation of the Leigh Flood Storage Area. The EA has consistently failed to properly understand the effect that the operation of the FSA has on both Bridge House and Penshurst. Because of this lack of understanding it has developed a theoretical model of flood events that is fundamentally flawed. This has a knock on effect through the whole project.**

Environment Agency response to point 2.1:

The Environment Agency, and the wider hydrological industry, uses modelling software, mapping techniques and topographical and rainfall data to understand a wide range of catchment processes, how river catchments respond to different rainfall events, and to identify the impacts of these events.

The Environment Agency has flow gauges upstream of Rogues Hill, at Chafford Bridge and Colliers Land Bridge on the River Medway and at Penshurst and Vexour Bridge on the River Eden. This represents a significant investment in flow monitoring and allows us to understand the water levels on both rivers. Information from these gauging stations was used to calibrate the 2015 Medway flood model and is used to inform the operation of the Leigh Flood Storage Area (FSA).

In addition to the 2015 Medway flood model, the Environment Agency has photographs and data showing the extent of land flooded during previous events, and staff observed the flooding at Rogues Hill in February 2020 to understand the

extent of flooding at this location. The timing and extent of the flooding in February 2020 was as predicted by the model.

**2.2 Despite having had at least ten years to measure the actual flood levels at Bridge House and Penshurst, the EA has taken an entrenched position on its theoretical modelling and simply denies that raising the level of the FSA will have an adverse effect on Bridge House and Penshurst.**

Environment Agency response to point 2.2:

Our modelling indicates that the proposed change to increase the maximum impoundment level will not increase the depth of flooding above Rogues Hill. This is demonstrated in Figure 1 below. Figure 1 shows the increase in flooding depth from raising the Leigh FSA maximum impoundment level from 28.05m Above Ordnance Datum (AOD) to 28.6m AOD (measured at the main Leigh FSA embankment) during a 1.33% flood event. The map below has been taken from the Flood Risk Assessment for consistency. This map has been updated since the submission of the Application. Whilst it shows greater depth variation lower in the FSA, the point at which the effect of the expansion dissipates remains the same.

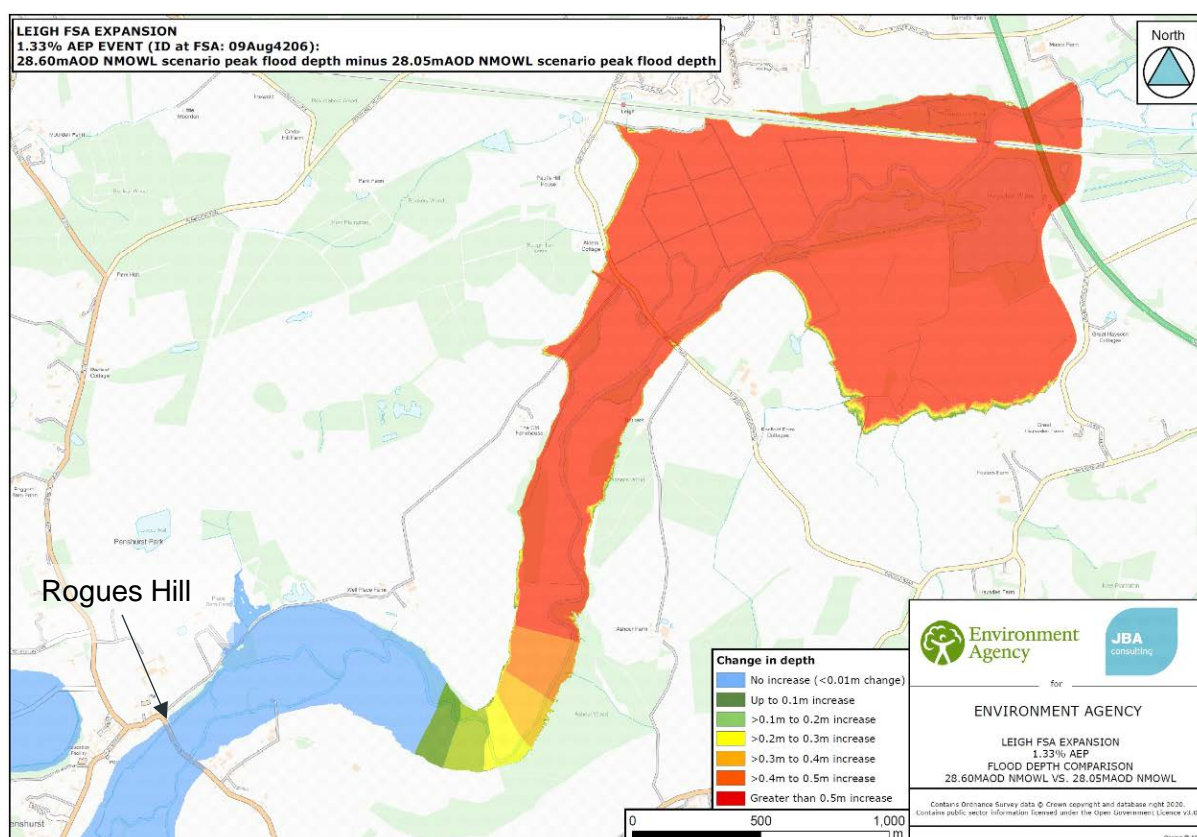


Figure 1: Increase in flood depth in a 1.33% flood event. 28.05m AOD vs 28.6m AOD



The Flood Risk Assessment was submitted with our planning application at the end of August 2020. The planning application reference number is 20/02463/FUL, and it is available for view at the Sevenoaks District Council planning portal:

<https://pa.sevenoaks.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=QFPV1WBK0LO00>

Every flood event is different, depending on a number of factors, including soil saturation and weather patterns. The modelled scenario in Figure 1 was chosen to demonstrate the impact of expanding the FSA because it shows the greatest change in flood depths.

We understand that there is concern within the community in Penshurst that the effect of operation of the Leigh FSA on flood levels in Penshurst is not reliably predicted through our modelling. We are looking to provide additional depth gauging in Penshurst, downstream of Rogues Hill. This will provide definitive data on this issue, and will hopefully provide the reassurance sought by the community.

**2.3 The River Eden joins the River Medway a few hundred metres upstream of Bridge House, and measurement of actual flood levels should have been taken after this confluence of two major Kent rivers to understand the effect that the operation of the FSA causes during times of flooding. Instead the EA relies on measuring actual flood levels at Colliers Land Bridge for the River Medway and Vexour Bridge for the River Eden and then estimating the effect after the confluence. This is a fundamental flaw. Modelling is only ever as good as the inputs into it, if the inputs are flawed, the outputs will also be flawed.**

Environment Agency response to point 2.3:

As stated in 2.1, the Environment Agency has flow gauges upstream of Rogues Hill at Chafford Bridge and Colliers Land Bridge on the River Medway, and Penshurst and Vexour Bridge on the River Eden. This allows us to understand the flow in both rivers, including after the confluence.

Whilst it is always possible to further refine the calibration of any flood model by considering more baseline data, the Environment Agency is confident that the modelled flood data is sufficient to understand the flood risk at Bridge House, and additional flow gauging data from points downstream of the confluence will align with the outputs of the 2015 Medway flood model.

**2.4 It is a disgrace that the EA have never measured actual flood levels after the confluence of the two rivers.**

Environment Agency response to point 2.4:

As explained in our response to 2.3, we do not consider this is necessary for operational purposes, as we already measure water levels on both rivers. We appreciate, however, that we need to address the concerns of the community in Penshurst on this issue, and are looking to provide additional depth gauging in Penshurst downstream of Rogues Hill.

**2.5 Bridge House has flooded 5 times since 2000. On every occasion, that flooding has been after the EA has commenced impounding of the FSA. We have submitted evidence of these five floods to the EA that shows the flooding took place after the EA started impounding of the FSA. These submissions are included in this document as Appendices A, B, C & D.**

Environment Agency response to point 2.5:

Bridge House is within flood zone 3. This is land that is assessed as having a 1% or greater annual probability of flooding.

Whilst Bridge House is within the natural floodplain of the River Medway, and would flood even if the Leigh FSA did not exist, we acknowledge that in certain circumstances this can be made worse by the operation of the existing Leigh FSA.

It is not correct to assert that flooding at Bridge House is solely due to the operation of the Leigh FSA. The Leigh FSA only operates during high flows, therefore the same conditions that drive flooding in Penshurst will also determine the operation of the Leigh FSA. This does not mean that the Leigh FSA causes the flooding in Penshurst.

**2.6 December 2013 was the first flood occasion for us and we struggled to get the EA to pay compensation for the losses incurred. In November 2019, five years and eleven months after the event, the EA finally admitted liability and paid us compensation. Yet in their application they still say that raising the level of the FSA will not have an adverse effect on us. There is a serious breakdown of communications within the EA.**

Environment Agency response to point 2.6:

The River Medway (Flood Relief) Act 1976 (the 1976 Act) accepts through section 17(4) that property may be affected by the operation of the Leigh FSA since it gives landowners the right to be compensated. Further, landowners may enter into easements with the Environment Agency to allow the Leigh FSA to flood their land under sections 24 and 25 of the 1976 Act.

The Environment Agency acknowledges that it has an obligation to compensate for damage caused due to the operation of the Leigh FSA in accordance with section 17(4) of the 1976 Act.

In 2019 you provided photographic evidence showing the peak of the flood at Bridge House in December 2013. Using the detailed topographic survey that had been carried out of Bridge House by J C White, the Environment Agency accepted that the living room of Bridge House was flooded to a depth of approximately 0.1m.

The 2015 Medway flood model shows that operation of the existing FSA can increase flood levels by up to 0.1m at Bridge House.

Therefore the Environment Agency agreed to pay compensation for the damage caused by the operation of the FSA in December 2013 that is not covered by the 1985 Deed.

As explained in 2.2, the 2015 Medway flood model shows that Bridge House will not be affected any further by the proposed expansion.

Compliance with the statutory obligation to pay compensation when damage is caused should not be regarded as evidence that the proposed expansion of the FSA will increase the impact of flooding at Bridge House.

**2.7 Page 7 states “There are no households within the additional area to be flooded.” This is simply untrue. Bridge House is within the existing FSA so must be within the enlarged FSA.**

Environment Agency response to point 2.7:

In the application dated June 2020 (the Application), the "additional area to be flooded" refers to the additional area to be flooded as a result of the proposed changes (emphasis added).

This area is in addition to the area that is already flooded as a result of operation of the existing FSA.

We say "there are no households within the additional area to be flooded" because, as explained in 2.2, the flood modelling shows that the proposed changes will not increase the depth and/or duration of flooding at Bridge House.

That said, for the avoidance of doubt, the house and garden at Bridge House is on occasion flooded by the River Medway, and we agree that in certain circumstances this flooding may be to a greater depth and/or for a longer duration as a result of operation of the FSA in accordance with the existing Scheme. We also acknowledge there are other properties at Penshurst whose gardens and outbuildings are similarly affected by the existing FSA.

### **3. Flawed Process**

#### **3.1 Natural Flooding**

**We challenge the EA’s assumption that “Natural Flooding” occurs rather than being the effect of impounding the FSA. In our experience as residents of the**

**house most affected, this is simply not true. We have provided evidence to the EA that all floods from 2000 to 2020 at Bridge House and the Village have occurred after the impounding of the FSA takes place. This flooding is greater than, and lasts for a longer duration than, any natural flooding.**

Environment Agency response to point 3.1:

We acknowledge that Bridge House and areas of Penshurst can be affected by the operation of the existing Leigh FSA, depending on the size of the flood event. However, the area is within the floodplain of the River Medway so can also be affected by naturally-occurring flooding.

Please see the photographs below showing that natural flooding occurred at Penshurst prior to the operation of the FSA. The first (Figure 2) was taken in the garden of Colquhouns Cottage at 14:12 on 20 December 2019. It shows the water level near the gym. The level here is approximately 29.0m AOD, similar to the internal floor level of the kitchen at Bridge House (which is 29.03m AOD). Impoundment didn't commence until 15:30 on the same day.



*Figure 2: Flooding of the garden of Colquhouns Cottage, 14:12 on 20 December 2019*



The next two photographs below (Figures 3 and 4), were taken from Rogues Hill on 16 February 2020. Figure 3 shows the fields immediately upstream of Bridge House and was taken at 12:51. Figure 4 was taken from the bridge on Rogues Hill over the River Medway and shows Bridge House. It was taken at 13:13. Impoundment didn't commence until 17:15 the same day.



*Figure 3: Flooding of the fields immediately upstream of Bridge House, 12:51 on 16 February 2020*



*Figure 4: River Medway and Bridge House, 13:13 on 16 February 2020*

The final photograph (Figure 5), below, was taken 14 minutes earlier than Figure 3 (at 12:37 on 16 February 2020). It shows the bridge on Ensfield Road over the River Medway, 3.9km downstream of Penshurst. It is clear that the river was within bank at this location whilst at the same time there was significant flooding in Penshurst driven by upstream flows. The Leigh FSA was not in operation and all the flooding at this time in Penshurst was driven by flows from upstream.



*Figure 5: The bridge on Ensfield Road over the River Medway, 12:37 on 16 February 2020*

### **3.2 Inconsistent standards**

**In the EA's Strategic Flood Policy it states that 1 in 100 years plus climate change is the scenario that should be defended against.**

**Throughout this project the EA have always quoted 1 in 100 years plus climate change as the scenario used.**

**In the application the EA have quoted a 1 in 75 years scenario. This conflicts with their own National Guidance.**

Environment Agency response to point 3.2:

Figure 1 in response 2.2 shows a plan of the additional depth of water during a modelled 1.33% (1 in 75 year) flood event as a result of changing the maximum stored water level from 28.05m AOD to 28.6m AOD.



We chose this scenario to demonstrate the impact of expanding the FSA because it shows the greatest change in flood depths as a result of the proposed change. The depth increase for the majority of the storage area will be greatest for the 1.33% event.

During more extreme flood events, such as a 1% (1 in 100 year) plus climate change event, the increase in depth as a result of the proposed change reduces. This is because the natural flood level, which is greater, dominates.

Please see Section 5.1 (pages 24 to 26) and Appendices A and B of the Flood Risk Assessment for further details. For clarity and to address your concern, figures B1, B2 and B3 in Appendix B of the flood risk assessment show the change in flood depth for the following flood events: 1.33%AEP, 1%AEP and 1%+20%flow AEP.

### **3.3 Failure to gather evidence of actual flood levels**

**The EA have failed to measure the actual flood levels at Bridge House specifically and Penshurst generally. Instead they have relied on theoretical modelling, which simply does not stand scrutiny when compared to the actual flood levels during impoundment of the FSA. The EA first raised the proposal to increase the FSA in 2010. Had they measured the flood levels then they would have actual data for the floods of 2013, 2019 & 2020. They failed to do this, instead they have relied on calculated flood levels and theoretical modelling. We have sent the EA the actual flood levels at Bridge House but they have chosen to disregard these. Their arrogance as an organisation is unacceptable in today's UK culture of openness and accountability**

Environment Agency response to point 3.3:

Please see to our answers to 2.1 and 2.3

### **3.4 Misleading statements**

**On Page 12 the EA state that they use "Better and more reliable gauging technology which provides more accurate information about actual river levels." Whilst this may be true, it is certainly not true in Penshurst. They have no gauging at all between the Leigh Barrier itself and Colliers Land Bridge for the River Medway and Vexour Bridge for the River Eden, a distance of 8km and 5 km respectively. And there is no gauging at all after the confluence of these two rivers.**

Environment Agency response to point 3.4:

Please see to our answer to 2.3

### 3.5 Flow Rates

**The current Scheme allows the FSA to be used when the rate of flow in the River Medway exceeds 35 cubic metres per second. Since 2011 the EA have only used the FSA when the flow exceeds 75 cubic metres per second, as to “go too early” would leave them with no spare capacity. Yet they ask to retain the lower figure. This places a great risk on Penshurst. With an increased capacity they could start impounding of the FSA too early and this would increase flood levels at Bridge House, (and Penshurst generally).**

Environment Agency response to point 3.5:

The flow rate at which impounding begins needs to be flexible to enable optimum use of the storage volume in the FSA. This will vary for every flood event. It is important not store flood water too soon to ensure we have capacity to store the peak and the most damaging flood flows for any given event.

For the majority of floods impounding starts around 75 cubic metres per second. However that is not always the case and it may be necessary to impound water at different flows, both higher and lower, to provide the maximum flood risk reduction in Tonbridge.

Altering the Scheme’s minimum operating flow rate in law would fundamentally diminish the ability to operate the FSA, as designed, to reduce flood risk to downstream communities.

### 3.6 Biased letters of support

**In the application the EA has submitted letters of support from many bodies. Not one person or organisation representing upstream communities have been invited to submit letters giving opposing views. For a Public Body this is unacceptable bias.**

Environment Agency response to point 3.6:

In May 2019, the Environment Agency's land agent, Dalcour Maclaren, wrote to 36 landowners and tenants within the existing FSA to advise them of the proposed application to increase the maximum stored water level, and to offer a meeting to explain the impact this would have on them and discuss any concerns they had. These letters were followed up with phone calls and 27 parties took up the offer of a meeting. There are no new landowners and/or occupiers that would be brought into the FSA as a result of the proposed expansion.

Alongside this process, the Environment Agency also contacted all of the organisations named within the Act as Specified Interests (plus additional organisations as directed by Defra) to make them aware of the application to expand the FSA, offer meetings to discuss the proposal and any concerns they had on behalf of their residents or members, and to understand what process they would need to go through in order to consider the proposal. These parties are listed in

Section 8.1 of the Application. All of these parties, with the exception of Maidstone Borough Council represent members of upstream communities, to a greater or lesser extent.

The organisations have gone through their own processes to ensure that they understand the impact of the proposal on their residents or members.

It was hoped that by carrying out this pre-consultation, the Environment Agency could understand and resolve or mitigate any concerns prior to submitting the Application to the Minister.

The one month long formal consultation for the Application began on submission of the Application to the Minister. Any Specified Interest could make a representation (either of support or objection) during this period, therefore we do not agree that the consultation has been biased.

### **3.7 Failure to meet statutory obligation 1**

**The Environment Agency (EA) have not met the requirements of Section 17, Part II (e) of the River Medway (Flood Relief) Act 1976. The Act requires the EA to supply a copy of the revised scheme to “The Specified Interests” BEFORE submitting the scheme to the Minister for approval. The EA failed to do this. The scheme was submitted on the 10th June, but we did not receive the copy until after this, denying us the opportunity to (a) discuss the revised scheme with the EA and (b) to come to an agreement with them.**

Environment Agency response to point 3.7:

Section 17(3)(e) of the 1976 Act requires the Environment Agency to submit the Revised Scheme to Specified Interests before submission to the Minister. We posted the Revised Scheme to the Specified Interests on 8 June 2020 and then submitted the Application to the Minister on 10 June 2020. You received your copy on 11 June 2020 which means that your copy of the Scheme reached you after the Minister. We agree that this is a technical breach of Section 17(3)(e), for which we apologise. However, as your representation has been accepted by Defra, the delay in you receiving the notification of our intention to vary the Scheme has not denied you the opportunity to be heard by the Minister. You have not suffered any detriment or prejudice from this delay.

We have not denied you the opportunity to come to an agreement with us as we have been in discussions with you for some months. We do not have to agree compensation nor agree an easement to flood before submitting the Revised Scheme to the Minister.

We understand that you would like compensation to enable you to carry out works that will make Bridge House resilient to future flood events. We have started discussing with you the possibility of a supplemental agreement to fully and finally

discharge the obligation to pay compensation when damage is sustained as a result of operation of the FSA.

These are separate discussions which we do not believe should affect the determination of the Revised Scheme.

### **3.8 Failure to meet statutory obligation 2**

**The Environment Agency (EA) have not met the requirements Section 17, Part II (e) of the River Medway (Flood Relief) Act 1976. The Act required the EA to supply a COPY of the revised scheme to “The Specified Interests.” The EA failed to do this. The copy supplied is not the same as that which has been submitted to the Minister. The revised scheme on the reverse of the letter dated 8th June contains 5 paragraphs, whereas the revised scheme submitted contains 4 paragraphs. Again as the scheme had already been submitted, we were denied an opportunity to (a) discuss the revised scheme with the EA and (b) to come to an agreement with them.**

Environment Agency response to point 3.8:

The Environment Agency sent you the Revised Scheme on 8 June 2020. With the covering letter we also sent you a full copy of the Environment Agency’s Application dated June 2020. This Application included a copy of the Revised Scheme in Appendix B. The copy set out in Appendix B of the Application differed from that in the covering letter since it did not include paragraph 2 as it appears in the covering letter. We apologise for this error and any confusion caused. However, we believe no prejudice has been suffered. Paragraph 2 of the covering letter is merely informative in that it states we will apply for planning permission and that we shall operate the FSA according to the Revised Scheme after planning permission is granted in accordance with the succeeding paragraphs of the Scheme.

This version of the Scheme does not differ substantively from the version in the application. There is no difference between the two versions on how the Scheme will be operated. For the sake of certainty, we confirm the Scheme as enclosed in the Application is the version of the Scheme which the Environment Agency intends to operate. Apart from some confusion, which we have now clarified, you have not suffered any prejudice.

For the reasons set out in our response to 3.7, we do not agree that this has denied you an opportunity to come to an agreement with us and our discussions are ongoing.

### **3.9 Communication Failure 1**

**The EA have consistently failed to listen to us, even when we have provided actual evidence of the flood levels at Bridge House when they have impounded the FSA. We eventually persuaded the EA to erect a Gauge Board on the river**

**bank next to Bridge House. When they erected it we told them it was too short and would not be visible during a flood, they did nothing. In both the 2019 and 2020 floods the Gauge Board was under water. It is now July 2020 and the EA have still done nothing.**

Environment Agency response to point 3.9:

Staff and representatives of the Environment Agency have met with you and spoken to you on the phone on numerous occasions. They listened to what you have said but, as is clear from your representations, there is a disagreement between us over the impact that the proposed change to the operation of the FSA has on Bridge House.

We acknowledge that the gauge board can be improved for higher flows and we are investigating replacing this.

### **3.10 Communication Failure 2**

**There has been no meaningful discussion with residents nor the Parish Council. What communication there has been, has simply been the EA telling us that their Theoretical Model shows that they are not responsible.**

**The EA have failed to monitor, assess safety and accessibility within the Village and to identify solutions.**

Environment Agency response to point 3.10:

The primary objective of the proposed expansion of the Leigh FSA is to provide improved flood protection to properties in Tonbridge and Hildenborough.

The proposed expansion will not reduce the flood risk to Penshurst, however (for the reasons set out in 2.2 above) our modelling shows that the expansion will not increase flood risk in Penshurst either.

Our engagement with the community through this scheme has raised awareness of the FSA and opened a conversation about the wider flooding experienced in Penshurst and the problems this causes. We now recognise the depth of concern in the community about local flooding.

As a result, we are offering to fund the National Flood Forum to help the local community to set up a flood action group where the concerns of the community can be raised with all of the organisations involved in managing flood risk so that ways to mitigate the impact and improve the resilience of the community to flooding can be explored together.

The Environment Agency is always here to discuss any aspect of our work, including flood risk, and we have had numerous discussions with you about the impact of the existing FSA and the possibility of extending your existing flood deed to compensate you for future flooding compensation claims.



### **3.11 Disregard for local MP**

**Tom Tugendhat MP has been supportive of our vulnerable position within this proposal. He has raised our position with the EA but has always been told that they were discussing it with us, whilst this was not untrue, it implied that a solution was being agreed, when it was not.**

Environment Agency response to point 3.11:

We have kept Tom Tugendhat MP updated on the progress of the project in general.

All landowners within the FSA are protected from loss by the River Medway (Flood Relief) Act 1976.

The proposed change will not increase the impact of the FSA on Bridge House. However, we have been discussing the potential for an agreement to pay a sum in lieu of compensation for future losses as a result of the operation of the existing FSA and this discussion is ongoing.

### **3.12 Risk of Judicial Review**

**All of the above flaws in the process mean that any decision made on the EA's Application could be challenged by means of a Judicial Review. The residents of Penshurst have twice raised funds to pay a QC to challenge two national decisions via Judicial Review, one planning decision and one aviation decision. Both decisions were quashed due to failure in process.**

Environment Agency response to point 3.11:

Noted.

## **4. Bridge House**

### **4.1 Right to flood**

**There is a legal agreement (1985 Deed) that allows the EA to flood part of our property but not all of it, effectively they can flood the garden but not the house.**

**We raised the validity of the 1985 Deed with the EA, and in 2018 they confirmed in writing that there was a discrepancy within it but that they still considered it to be valid. In 2019 we asked the EA to raise this discrepancy with their legal counsel. In May 2020 we received a summary of that legal opinion but were told that it was privileged information and they would not allow us to see it. The EA is a public sector organisation and the project is a public one, we are taxpayers and it is wrong for the EA to withhold this legal opinion. They should operate with transparency.**

Environment Agency response to point 4.1:

The Environment Agency has taken the unusual step of summarising Counsel's advice which we took at your request, questioning the validity of the easement relating to your land. Usually, such advice is privileged and, as such, the Environment Agency will not release the document. We have summarised the advice accurately. If you do not accept our position and believe the 1985 Deed is not enforceable then you should seek your own legal advice on the action you may take.

#### **4.2 Liability accepted and partial compensation paid**

**In 2013 the EA flooded Bridge House by 0.5 metre when they impounded the FSA. When we contacted them to receive compensation, we were told that they did not have a procedure to pay compensation, despite it being a legal requirement of The River Medway (Flood Relief) Act 1976 for them to do so. We continued to press our case over a period of years, they were then told by their own advisors that they had to pay compensation, and finally in November 2019 the EA accepted liability and paid us compensation. The amount claimed was the sum of individual elements, for two elements the EA only paid us 50%. This was unlawful as The River Medway (Flood Relief) Act 1976 specifically states that full compensation shall be paid.**

Environment Agency response to point 4.2:

As noted in 2.6, the Environment Agency recognise that they have an obligation to compensate for damage caused by the operation of the Leigh FSA in accordance with section 17(4) of the 1976 Act.

The photographic evidence you provided showing the peak of the flood at Bridge House in December 2013, and the detailed topographic survey of Bridge House that was carried out by J C White, show that the living room of Bridge House was flooded to a depth of approximately 0.1m during that event.

The 2015 Medway flood model shows that operation of the existing FSA can increase flood levels by up to 0.1m at Bridge House.

Therefore the Environment Agency agreed to pay compensation for the damage caused by the operation of the Leigh FSA because the flooding extended beyond that agreed in the 1985 easement.

As explained in 2.2 above, the 2015 Medway Flood model shows that Bridge House will not be affected by the expansion.

For the two elements where the Environment Agency paid 50% of the sum claimed, you agreed that this was a fair sum for the losses you incurred. You were therefore paid full compensation on the merits of your claim.

Had you not agreed, there is a mechanism within the River Medway (Flood Relief) Act 1976 for the compensation claim to be determined by a court.

#### **4.3 EA to purchase Bridge House**

**The EA produced a Technical Note that showed the forecast flood levels at Bridge House. This was so serious that we offered to sell Bridge House to the EA. The EA commissioned two Estate Agents/Surveyors to provide full Red Book Valuations of the Open Market Value (OMV) of Bridge House. After we were given copies of the valuations the EA ceased communicating with us. After a year and a formal complaint we were told that they would not be proceeding with the purchase of Bridge House. The Technical Note is at Appendix E**

Environment Agency response to point 4.3:

You bought Bridge House in 2004. The conveyancing process should have made you aware of the FSA and the fact that the property (including the house) had previously flooded.

The Environment Agency carried out valuations of the property in order to properly consider your offer to sell the house. As the modelling shows that the increase in storage level does not increase the flood risk at Bridge House, the Environment Agency is unable to economically justify the purchase of the property.

#### **4.4 Flooding of Household**

**Page 24 of the application states that there are no households within the additional area to be flooded. This conflicts with the Technical Note that the EA produced and gave to us. It states that their forecast is that Bridge House will flood to a depth of 1.4 metres. The Technical Note is at Appendix E**

Environment Agency response to point 4.4:

Please refer to our response to 2.7 which explains our statement that there are no households within the additional area to be flooded as a result of the expansion.

The technical note that you refer to does show that your house may be affected by flooding of up to 1.4m. However, the technical note also shows that this water level is not further increased by the proposal to raise the maximum stored water level in the FSA. Bridge House is constructed in the floodplain of the River Medway and has always been susceptible to flooding. The Leigh FSA was constructed in 1982. The floodplain in this location was flooded on a number of occasions prior to the construction and operation of the Leigh FSA.

#### **4.5 Flood Duration**

**On page 25 of the application the EA state that the enlarged FSA will only take one day longer to return to normal. This conflicts with the Technical Note the EA produced and sent to us, that states that it would be up to 8 days. The Technical note is at Appendix E**

Environment Agency response to point 4.5:

Section 5.1.3 (page 25) of the Flood Risk Assessment submitted with the planning application gives greater detail on the change in duration of impoundment. In summary, out of approximately 3,000 scenarios modelled and analysed, the maximum additional duration of impoundment is predicted to be between 50-60 hours. However, the majority of events are for a shorter duration and the average is 19 additional hours.

Please note that these periods of time are for immediately upstream of the flow control structure. The duration at Penshurst will be less.

#### **4.6 Solution for Bridge House**

**We decided that we had to find a solution to the future flooding. We employed an architect who submitted a planning application to demolish the lowest part of Bridge House and to abandon the ground floor, re-providing the same space lost with a raised extension to the rear, as well as raising the garage and driveway. This innovative and permanent solution would give Bridge House resilience to the worst case flood level that the EA had calculated. The EA supported this planning application and it was granted in April 2019.**

Environment Agency response to point 4.6:

Noted.

#### **4.7 Funding of Bridge House Solution**

**On 16th June 2020 the EA invited us to submit a proposal for them to make a contribution to the cost of implementing the above solution. The EA should have reached agreement with us before they submitted this application.**

Environment Agency response to point 4.7:

You wish the Environment Agency to contribute to the cost of works that will make Bridge House resilient to future flood events.

Section 17(4) of the 1976 Act obliges the Environment Agency to compensate you where damage is sustained as a result of operation of the FSA. If the level of that compensation is not agreed then the matter can be referred to a court for

determination. The Environment Agency does not have to agree compensation before submitting the Revised Scheme to Defra.

Whilst we have started discussing with you the possibility of a supplemental agreement to fully and finally discharge this obligation to pay compensation under Section 17(4), these are separate discussions and will not prevent the Minister from determining the Revised Scheme.

## **5. Penshurst Village**

### **5.1 Risk of Death**

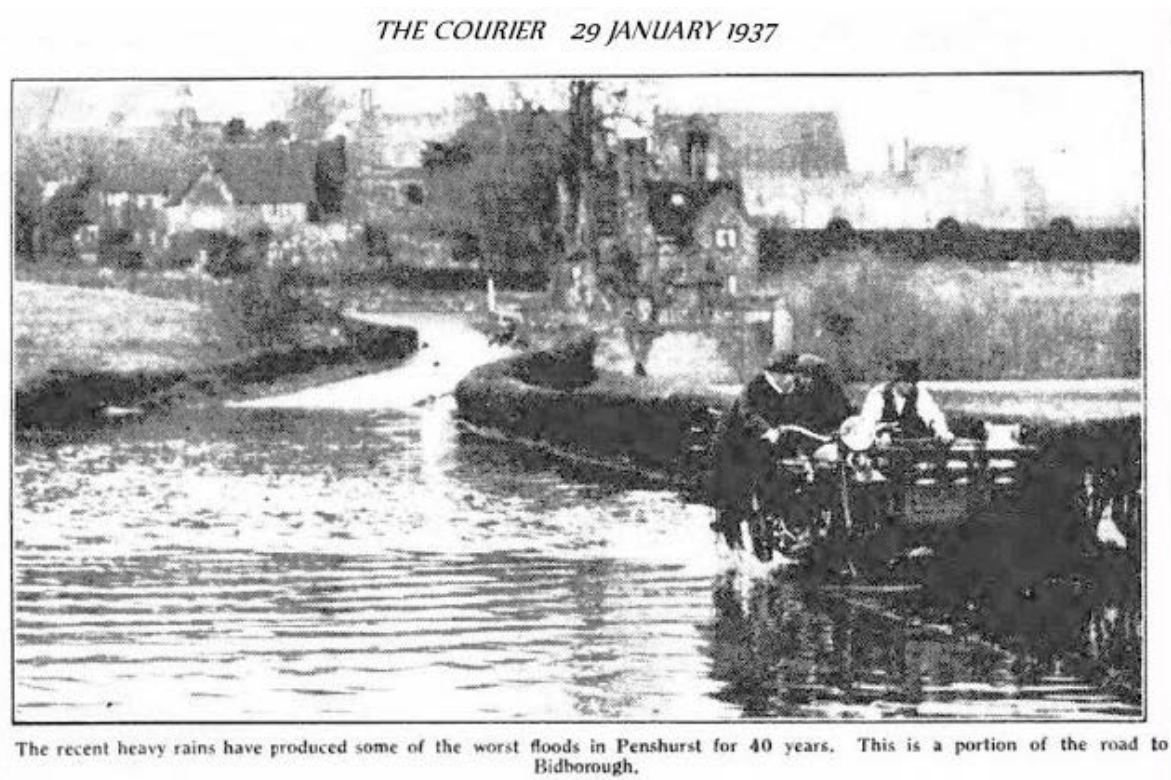
**Rogues Hill is a major route into and through the Village. It is the route used by the Fire Brigade, Police and Ambulance Service responding to emergency calls. It is also used by school buses and village traffic. When the EA impound the FSA this road floods to a depth of up to 1 metre, making it impassable, yet vehicles still attempt to pass. Raising the level of the FSA can only increase this flooding. This would create a Moral Hazard, with the potential for death. The water flow is known to be in excess of 70 cubic metres per second and should a school bus attempt to go through the flood, it could easily be carried away downstream. This risk of multiple death is high. The EA have merely said that it is the responsibility of the Highways Agency. The Grenfell disaster has taught us that Moral Hazards can prove fatal years later for many innocent members of the public.**

Environment Agency response to point 5.1:

As you state, Rogues Hill is a major route into and through the village. It is built on a causeway across the flat valley 200m downstream of the confluence of the Rivers Eden and Medway. Rogues Hill passes over the River Medway by Bridge House. The lowest part of Rogues Hill is particularly vulnerable to flooding.



The photograph below from a 1937 newspaper article (Figure 6) shows flooding on Rogues Hill. In 1968 the flooding at this location was so severe that the Rogues Hill road bridge over the River Medway was damaged to such an extent a temporary bridge had to be installed. These events show that Rogues Hill has historically experienced flooding and that it is not the operation of the Leigh FSA that causes flooding.



*Figure 6: Flooding of Rogues Hill in 1937*

In your representation you suggest that Rogues Hill floods to up to 1m deep as a result of the operation of the FSA. Whilst in certain circumstances the FSA can, when operating, add up to 0.1m to the depth of water at Rogues Hill, the depth and timing of the flooding of Rogues Hill is dictated by upstream flows.

This is shown by the photographs provided in response to 3.1. To further illustrate this, the peak of the most recent flood at Penshurst Gauging Station was at 01:30 on 17 February 2020 (see Figure 7 below) and the water level was falling before the water levels at the Leigh FSA were rising as water was stored (see Figure 8). Penshurst Gauging Station is situated on the River Eden about 2.8 km upstream of Rogues Hill, and so the peak of this flood will occur earlier at Penshurst Gauging Station than at Rogues Hill but it clearly demonstrates that the water level in the river is independent of the operation of the FSA.



Figure 7: Water levels at Penshurst gauging station 12 to 18 February 2020. Image from Shoothill Gauge map using data from Environment Agency gauging station

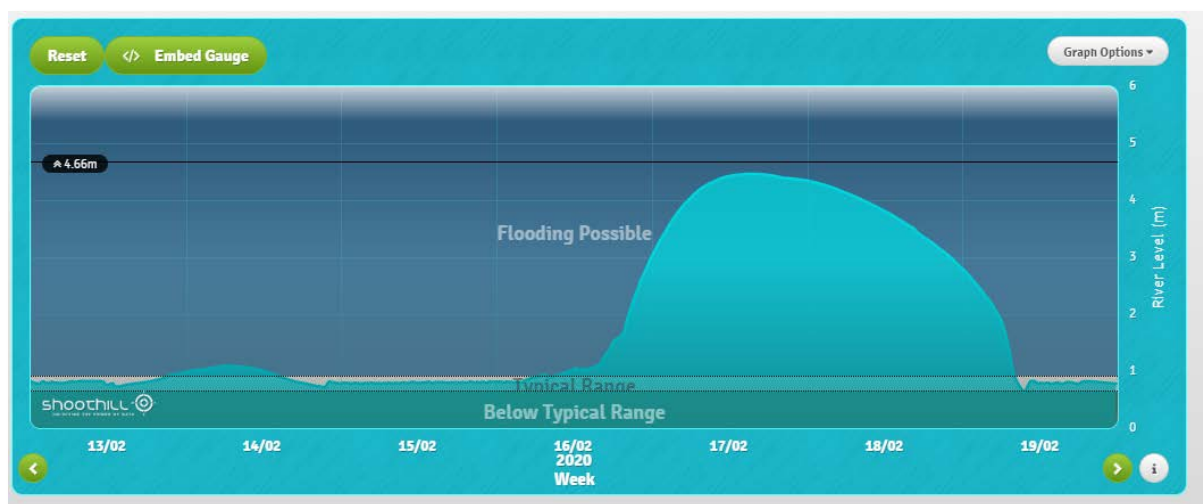


Figure 8: Water levels at Leigh Barrier upstream gauging station 13 to 19 February 2020. Image from Shoothill Gauge map using data from Environment Agency gauging station

For the reasons set out in 2.2 above, the proposed expansion does not increase the flood risk at Rogues Hill. Therefore, the proposed expansion does not exacerbate the present situation.

Whilst the expansion of the Leigh FSA will not increase the level of flooding experienced at Rogues Hill, we recognise the risks that arise through flooding of the roads around Penshurst. We always warn the public against driving through flood water. Flooding of these and other roads makes them dangerous, with the potential for drivers to try to pass through the floodwater at Rogues Hill and for cars to become stuck with the obvious risk to life this presents and the ongoing blockage to passage after the floodwaters have receded.

There are a number of organisations involved in managing and responding to flood risk. The Environment Agency has powers to manage flood risk from main rivers and Kent County Council provide and manage highway drainage and roadside ditches.

Other organisations and risk management authorities also have roles in managing and responding to flooding.

The risk of flooding in the natural floodplain cannot be eliminated. Warning and informing presents the only viable approach to the management of the risk to road users.

As noted in 3.10, we are offering to fund the National Flood Forum to help the local community to set up a flood action group where the concerns of the community can be raised with all of the organisations involved in managing flood risk so that ways to mitigate the impact and improve the resilience of the community to flooding can be explored together.

## **5.2 Disregard for Penshurst Estate Residents**

**When the Leigh FSA was built in 1982 the EA's predecessor identified the risk of access to properties on the Penshurst Estate, and paid for the construction of a concrete road to ensure safe access. The EA's proposal to raise the height of the FSA now places access via that same concrete road at risk. On Page 21 the EA deny this problem, but say there may be scope to help. This is typical of the condescending attitude throughout both communications and the application. They have failed to provide a solution to a problem of their creation. A problem that affects not just six residential properties and farm buildings but also a nursery school with many children in its care.**

Environment Agency response to point 5.2:

This is a matter that has been raised by the Penshurst Place Estate and we are working to address it with them.

## **5.3 Disregard for High Street Properties**

**Flooding will affect properties on High Street. There are buildings used for warehousing, hobbies and garages to the rear of these properties. Increased flooding will cause damage to property and access problems. One of these properties also claimed compensation for flooding caused by the EA's impounding of the FSA in December 2013. Early in 2020 the EA admitted liability and paid compensation to the owner of the property.**

Environment Agency response to point 5.3:

Section 4.2 (page 24 and 25) of the Application and our response to 2.2 explains the impact the proposed change to the flood water levels. This is also explained in greater detail in section 5.1 (pages 24 to 26) of the Flood Risk Assessment submitted with the planning application.

You will see that no change is expected to the extent of flooding or depth of water at the properties on the High Street, which like Bridge House are upstream of Rogues Hill, as a result of the proposal to increase the maximum stored water level.

**RM004 Mr and Mrs Hill's objection to the Environment Agency's Application to vary the Scheme within the River Medway (Flood Relief) Act 1976**

**Environment Agency technical response, September 2020**

**1. Introduction**

**Elliotts House is at the bottom of Rogues Hill close to the River Medway in Penshurst.**

**We have lived at Elliotts House since 1993. We have seen for ourselves, over 27 years, the flood levels at Penshurst produced by the operation of the Leigh Barrier.**

Environment Agency response to point 1:

Noted.

**2. Fundamental reasons for Objection**

**2.1 We strongly object to this application to vary the Scheme for the operation of the Leigh Flood Storage Area. The EA has consistently failed to properly understand the effect that the operation of the FSA has on Penshurst. Because of this lack of understanding it has developed a theoretical model of flood events that is fundamentally flawed. This has a knock on effect through the whole project.**

Environment Agency response to point 2.1:

The Environment Agency, and the wider hydrological industry, uses modelling software, mapping techniques and topographical and rainfall data to understand a wide range of catchment processes, how river catchments respond to different rainfall events, and to identify the impacts of these events.

The Environment Agency has flow gauges upstream of Rogues Hill, at Chafford Bridge and Colliers Land Bridge on the River Medway and at Penshurst and Vexour Bridge on the River Eden. This represents a significant investment in flow monitoring and allows us to understand the water levels on both rivers. Information from these gauging stations was used to calibrate the 2015 Medway flood model and is used to inform the operation of the Leigh Flood Storage Area (FSA).

In addition to the 2015 Medway flood model, the Environment Agency has photographs and data showing the extent of land flooded during previous events, and staff observed the flooding at Rogues Hill in February 2020 to understand the extent of flooding at this location. The timing and extent of the flooding in February 2020 was as predicted by the model.



**2.2 Despite having had at least ten years to measure the actual flood levels at Penshurst, the EA has taken an entrenched position on its theoretical modelling and simply denies that raising the level of the FSA will have an adverse effect on Penshurst. This is not based on actual evidence.**

Environment Agency response to point 2.2:

Our modelling indicates that the proposed change to increase the maximum impoundment level will not increase the depth of flooding above Rogues Hill. This is demonstrated in Figure 1 below. Figure 1 shows the increase in flooding depth from raising the Leigh FSA maximum impoundment level from 28.05m Above Ordnance Datum (AOD) to 28.6m AOD (measured at the main Leigh FSA embankment) during a 1.33% flood event. The map below has been taken from the Flood Risk Assessment for consistency. This map has been updated since the submission of the Application. Whilst it shows greater depth variation lower in the FSA, the point at which the effect of the expansion dissipates remains the same.

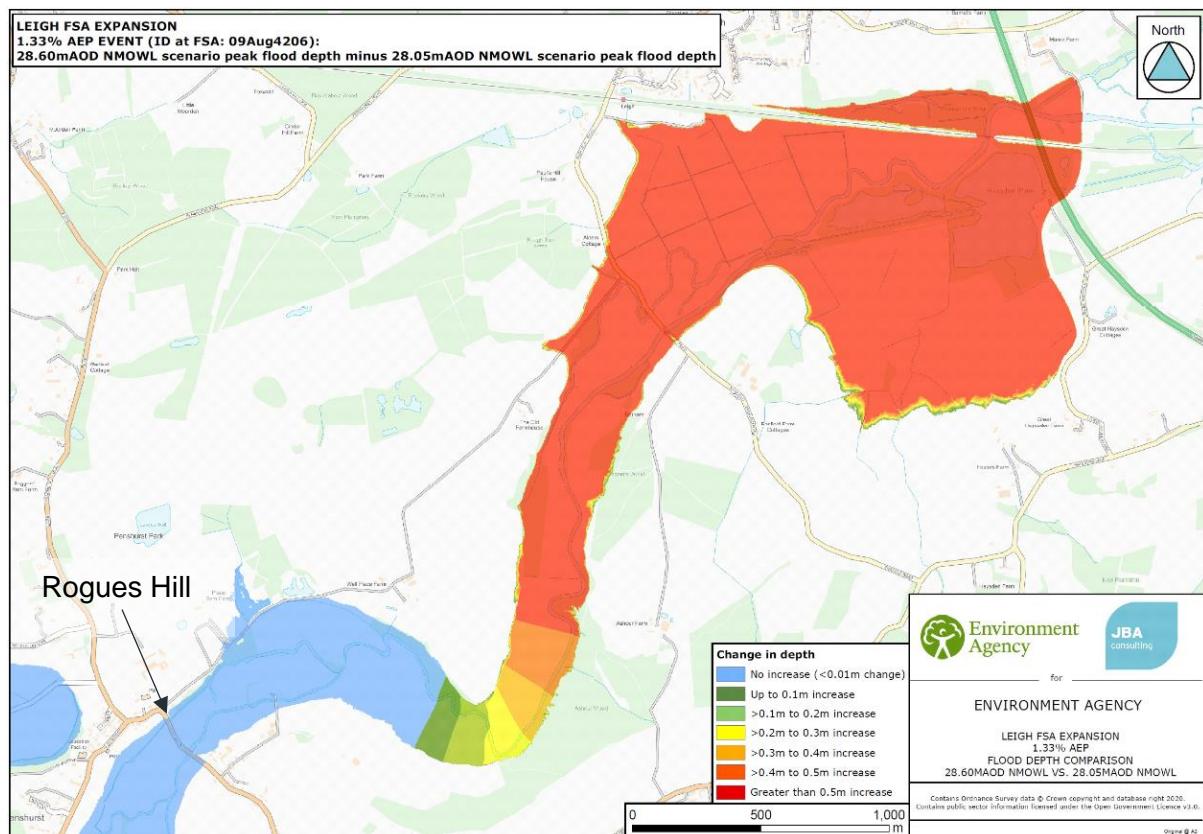


Figure 1: Increase in flood depth in a 1.33% flood event. 28.05m AOD vs 28.6m AOD

The Flood Risk Assessment was submitted with our planning application at the end of August 2020. The planning application reference number is 20/02463/FUL, and it is available for view at the Sevenoaks District Council planning portal:

<https://pa.sevenoaks.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=QFPV1WBK0LO00>

Every flood event is different, depending on a number of factors, including soil saturation and weather patterns. The modelled scenario in Figure 1 was chosen to demonstrate the impact of expanding the FSA because it shows the greatest change in flood depths.

We understand that there is concern within the community in Penshurst that the effect of operation of the Leigh FSA on flood levels in Penshurst is not reliably predicted through our modelling. We are looking to provide additional depth gauging in Penshurst, downstream of Rogues Hill. This will provide definitive data on this issue, and will hopefully provide the reassurance sought by the community.

**2.3 The River Eden joins the River Medway a few hundred metres upstream of Rogues Hill, and measurement of actual flood levels should have been taken after this confluence of two major Kent rivers, to understand the effect that the operation of the FSA causes during times of flooding. Instead the EA relies on measuring actual flood levels at Colliers Land Bridge for the River Medway and Vexour Bridge for the River Eden and then estimating the effect after the confluence. This is a fundamental flaw. Modelling is only ever as good as the inputs into it, if the inputs are flawed, the outputs will also be flawed.**

Environment Agency response to point 2.3:

As stated in 2.1, the Environment Agency has flow gauges upstream of Rogues Hill at Chafford Bridge and Colliers Land Bridge on the River Medway, and Penshurst and Vexour Bridge on the River Eden. This allows us to understand the flow in both rivers, including after the confluence.

Whilst it is always possible to further refine the calibration of any flood model by considering more baseline data, the Environment Agency is confident that the modelled flood data is sufficient to understand the flood risk at Rogues Hill, and additional flow gauging data from points downstream of the confluence will align with the outputs of the 2015 Medway flood model.

**2.4 The EA have never measured actual flood levels after the confluence of the two rivers.**

Environment Agency response to point 2.4:

As explained in our response to 2.3, we do not consider this is necessary for operational purposes, as we already measure water levels on both rivers. We appreciate, however, that we need to address the concerns of the community in Penshurst on this issue, and are looking to provide additional depth gauging in Penshurst downstream of Rogues Hill.

**2.5 Page 7 states “There are no households within the additional area to be flooded.” This is simply untrue. Bridge House is within the existing FSA so must be within the enlarged FSA.**

Environment Agency response to point 2.5:

In the application dated June 2020 (the Application), the "additional area to be flooded" refers to the additional area to be flooded as a result of the proposed changes (emphasis added).

This area is in addition to the area that is already flooded as a result of operation of the existing FSA.

We say "there are no households within the additional area to be flooded" because, as explained in 2.2, the flood modelling shows that the proposed changes will not increase the depth and/or duration of flooding at Bridge House.

That said, for the avoidance of doubt, the house and garden at Bridge House is on occasion flooded by the River Medway, and we agree that in certain circumstances this flooding may be to a greater depth and/or for a longer duration as a result of operation of the FSA in accordance with the existing Scheme. We also acknowledge there are other properties at Penshurst whose gardens and outbuildings are similarly affected by the existing FSA.

**2.6 Bridge House has flooded 5 times since 2000. On every occasion, that flooding has been after the EA has commenced impounding of the FSA. Kevin and Jenny Storey, the owners, have submitted evidence of these five floods to the EA that shows the flooding took place after the EA started impounding of the FSA. In 2019 the EA accepted liability and paid them compensation for damage caused by the 2013 flood, yet they still maintain that Penshurst will not be affected by this application to raise the level of the FSA. It simply does not make sense.**

Environment Agency response to point 2.6:

Bridge House is within flood zone 3. This is land that is assessed as having a 1% or greater annual probability of flooding.

Whilst Bridge House is within the natural floodplain of the River Medway, and would flood even if the Leigh FSA did not exist, we acknowledge that in certain circumstances this can be made worse by the operation of the existing Leigh FSA.

It is not correct to assert that flooding at Bridge House is solely due to the operation of the Leigh FSA. The Leigh FSA only operates during high flows, therefore the same conditions that drive flooding in Penshurst will also determine the operation of

the Leigh FSA. This does not mean that the Leigh FSA causes the flooding in Penshurst.

The Environment Agency acknowledges that it has an obligation to compensate for damage caused due to the operation of the Leigh FSA in accordance with section 17(4) of the 1976 Act.

In 2019 Mr Storey provided photographic evidence showing the peak of the flood at Bridge House in December 2013. Using the detailed topographic survey that had been carried out of Bridge House by J C White, the Environment Agency accepted that the living room of Bridge House was flooded to a depth of approximately 0.1m.

The 2015 Medway flood model shows that operation of the existing FSA can increase flood levels by up to 0.1m at Bridge House.

Therefore the Environment Agency agreed to pay compensation for the damage caused by the operation of the FSA in December 2013 that is not covered by the 1985 Deed.

As explained in 2.2, the 2015 Medway flood model shows that Bridge House will not be affected any further by the proposed expansion.

Compliance with the statutory obligation to pay compensation when damage is caused should not be regarded as evidence that the proposed expansion of the FSA will increase the impact of flooding at Bridge House.

**2.7 The Technical Note (Appendix A) produced by the EA, shows for a 1 in 100 plus Climate Change scenario, a forecast flood level at Bridge House of 30.4 metres AOD. This is high enough to affect more houses on Rogues Hill than just Bridge House.**

Environment Agency response to point 2.7:

As explained in our response to 2.2 above, we do not consider the flood risk is made any greater at Rogues Hill by the proposed change.

### **3. Flawed Process**

#### **3.1 Natural Flooding**

**We refute the EA's assumption that "Natural Flooding" occurs rather than being the effect of impounding the FSA. In our experience as residents, this is simply not true. Evidence has been provided to the EA that all floods from 2000 to 2020 at Bridge House and the Village have occurred after the impounding of the FSA takes place. This flooding is greater than, and lasts for a longer duration than, any natural flooding.**

### Environment Agency response to point 3.1:

We acknowledge that Bridge House and areas of Penshurst can be affected by the operation of the existing Leigh FSA, depending on the size of the flood event. However, the area is within the floodplain of the River Medway so can also be affected by naturally-occurring flooding.

Please see the photographs below showing that natural flooding occurred at Penshurst prior to the operation of the FSA. The first (Figure 2) was taken in the garden of Colquhouns Cottage at 14:12 on 20 December 2019. It shows the water level near the gym. The level here is approximately 29.0m AOD, similar to the internal floor level of the kitchen at Bridge House (which is 29.03m AOD). Impoundment didn't commence until 15:30 on the same day.



*Figure 2: Flooding of the garden of Colquhouns Cottage, 14:12 on 20 December 2019*

The next two photographs below (Figures 3 and 4), were taken from Rogues Hill on 16 February 2020. Figure 3 shows the fields immediately upstream of Bridge House and was taken at 12:51. Figure 4 was taken from the bridge on Rogues Hill over the River Medway and shows Bridge House. It was taken at 13:13. Impoundment didn't commence until 17:15 the same day.





*Figure 3: Flooding of the fields immediately upstream of Bridge House, 12:51 on 16 February 2020*



*Figure 4: River Medway and Bridge House, 13:13 on 16 February 2020*

The final photograph (Figure 5), below, was taken 14 minutes earlier than Figure 3 (at 12:37 on 16 February 2020). It shows the bridge on Ensfield Road over the River Medway, 3.9km downstream of Penshurst. It is clear that the river was within bank at this location whilst at the same time there was significant flooding in Penshurst



driven by upstream flows. The Leigh FSA was not in operation and all the flooding at this time in Penshurst was driven by flows from upstream.



*Figure 5: The bridge on Ensfield Road over the River Medway, 12:37 on 16 February 2020*

### **3.2 Inconsistent standards**

**In the EA's Strategic Flood Policy it states that 1 in 100 years plus Climate Change is the scenario that should be defended against.**

**Throughout this project the EA have always quoted 1 in 100 years plus Climate Change as the scenario used.**

**In the application the EA have changed to a 1 in 75 years scenario. This conflicts with their own National Guidance.**

Environment Agency response to point 3.2:

Figure 1 in response 2.2 shows a plan of the additional depth of water during a modelled 1.33% (1 in 75 year) flood event as a result of changing the maximum stored water level from 28.05m AOD to 28.6m AOD.

We chose this scenario to demonstrate the impact of expanding the FSA because it shows the greatest change in flood depths as a result of the proposed change. The depth increase for the majority of the storage area will be greatest for the 1.33% event.

During more extreme flood events, such as a 1% (1 in 100 year) plus climate change event, the increase in depth as a result of the proposed change reduces. This is because the natural flood level, which is greater, dominates.

Please see Section 5.1 (pages 24 to 26) and Appendices A and B of the Flood Risk Assessment for further details. For clarity and to address your concern, figures B1, B2 and B3 in Appendix B of the flood risk assessment show the change in flood depth for the following flood events: 1.33%AEP, 1%AEP and 1%+20%flow AEP.

### **3.3 Failure to gather evidence of actual flood levels**

**The EA have failed to measure the actual flood levels in Penshurst. Instead they have relied on theoretical modelling, which simply does not stand scrutiny when compared to the actual flood levels during impoundment of the FSA. The EA first raised the proposal to increase the FSA in 2010. Had they measured the flood levels then they would have actual data for the floods of 2013, 2019 & 2020. They failed to do this, instead they have relied on calculated flood levels and theoretical modelling. The EA have been sent the actual flood levels at Bridge House but they have chosen to disregard these. This is unacceptable.**

Environment Agency response to point 3.3:

Please see to our answers to 2.1 and 2.3

### **3.4 Misleading statements**

**On Page 12 the EA state that they use “Better and more reliable gauging technology which provides more accurate information about actual river levels.” Whilst this may be true, it is certainly not true in Penshurst. They have no gauging at all between the Leigh Barrier itself and Colliers Land Bridge for the River Medway and Vexour Bridge for the River Eden, a distance of 8km and 5 km respectively. And there is no gauging at all after the confluence of these two rivers.**

Environment Agency response to point 3.4:

Please see to our answer to 2.3

### **3.5 Flow Rates**

**The current Scheme allows the FSA to be used when the rate of flow in the River Medway exceeds 35 cubic metres per second. Since 2011 the EA have only used the FSA when the flow exceeds 75 cubic metres per second, as to**

**“go too early” would leave them with no spare capacity. Yet they ask to retain the lower figure. This places a great risk on Penshurst. With an increased capacity they could start impounding of the FSA too early and this would increase flood levels at Penshurst.**

Environment Agency response to point 3.5:

The flow rate at which impounding begins needs to be flexible to enable optimum use of the storage volume in the FSA. This will vary for every flood event. It is important not to store flood water too soon to ensure we have capacity to store the peak and the most damaging flood flows for any given event.

For the majority of floods impounding starts around 75 cubic metres per second. However that is not always the case and it may be necessary to impound water at different flows, both higher and lower, to provide the maximum flood risk reduction in Tonbridge.

Altering the Scheme’s minimum operating flow rate in law would fundamentally diminish the ability to operate the FSA, as designed, to reduce flood risk to downstream communities.

### **3.6 Biased letters of support**

**In the application the EA has submitted letters of support from many bodies. Not one person or organisation representing upstream communities have been invited to submit letters giving opposing views. For a Public Body this is unacceptable bias.**

Environment Agency response to point 3.6:

In May 2019, the Environment Agency's land agent, Dalcour Maclaren, wrote to 36 landowners and tenants within the existing FSA to advise them of the proposed application to increase the maximum stored water level, and to offer a meeting to explain the impact this would have on them and discuss any concerns they had. These letters were followed up with phone calls and 27 parties took up the offer of a meeting. There are no new landowners and/or occupiers that would be brought into the FSA as a result of the proposed expansion.

Alongside this process, the Environment Agency also contacted all of the organisations named within the Act as Specified Interests (plus additional organisations as directed by Defra) to make them aware of the application to expand the FSA, offer meetings to discuss the proposal and any concerns they had on behalf of their residents or members, and to understand what process they would need to go through in order to consider the proposal. These parties are listed in Section 8.1 of the Application. All of these parties, with the exception of Maidstone

Borough Council represent members of upstream communities, to a greater or lesser extent.

The organisations have gone through their own processes to ensure that they understand the impact of the proposal on their residents or members.

It was hoped that by carrying out this pre-consultation, the Environment Agency could understand and resolve or mitigate any concerns prior to submitting the Application to the Minister.

The one month long formal consultation for the Application began on submission of the Application to the Minister. Any Specified Interest could make a representation (either of support or objection) during this period, therefore we do not agree that the consultation has been biased.

### **3.7 Failure to meet statutory obligation 1**

**The Environment Agency (EA) have not met the requirements of Section 17, Part II (e) of the River Medway (Flood Relief) Act 1976. The Act requires the EA to supply a copy of the revised scheme to “The Specified Interests” BEFORE submitting the scheme to the Minister for approval. The EA failed to do this. The scheme was submitted on the 10th June, but some Penshurst residents did not receive their copy until after this, denying us all the opportunity to (a) discuss the revised scheme with the EA and (b) to come to an agreement with them.**

Environment Agency response to point 3.7:

Section 17(3)(e) of the 1976 Act requires the Environment Agency to submit the Revised Scheme to Specified Interests before submission to the Minister. We posted the Revised Scheme to the Specified Interests on 8 June 2020 and then submitted the Application to the Minister on 10 June 2020. Some people did not receive their copy until 11 June 2020 which means they received it after the Minister. We agree that this is a technical breach of Section 17(3)(e), for which we apologise. However, we do not believe that the delay in them receiving the notification of our intention to vary the Scheme has denied them the opportunity to be heard by the Minister. They have not suffered any detriment or prejudice from this delay.

We have not denied anybody the opportunity to come to an agreement with us. We do not have to agree compensation nor agree an easement to flood before submitting the Revised Scheme to the Minister.

### **3.8 Failure to meet statutory obligation 2**

**The Environment Agency (EA) have not met the requirements of Section 17, Part II (e) of the River Medway (Flood Relief) Act 1976. The Act required the EA**

**to supply a COPY of the revised scheme to “The Specified Interests.” The EA failed to do this. The copy supplied is not the same as that which has been submitted to the Minister. The revised scheme on the reverse of the letter dated 8th June contains 5 paragraphs, whereas the revised scheme submitted contains 4 paragraphs. Again as the scheme had already been submitted, we were denied an opportunity to discuss the revised scheme with the EA.**

Environment Agency response to point 3.8:

The Environment Agency posted the Revised Scheme to the Specified Interests on 8 June 2020. With the covering letter we also sent a full copy of the Environment Agency's Application dated June 2020. This Application included a copy of the Revised Scheme in Appendix B. The copy set out in Appendix B of the Application differed from that in the covering letter since it did not include paragraph 2 as it appears in the covering letter. We apologise for this error and any confusion caused. However, we believe no prejudice has been suffered. Paragraph 2 of the covering letter is merely informative in that it states we will apply for planning permission and that we shall operate the FSA according to the Revised Scheme after planning permission is granted in accordance with the succeeding paragraphs of the Scheme.

This version of the Scheme does not differ substantively from the version in the application. There is no difference between the two versions on how the Scheme will be operated. For the sake of certainty, we confirm the Scheme as enclosed in the Application is the version of the Scheme which the Environment Agency intends to operate. Apart from some confusion, which we have now clarified, you have not suffered any prejudice.

### **3.9 Communication Failure**

**There has been no meaningful discussion with residents nor the Parish Council. What communication there has been, has simply been the EA telling us that their Theoretical Model shows that they are not responsible.**

**The EA have failed to monitor, assess safety and accessibility within the Village and to identify solutions.**

Environment Agency response to point 3.9:

The primary objective of the proposed expansion of the Leigh FSA is to provide improved flood protection to properties in Tonbridge and Hildenborough.

The proposed expansion will not reduce the flood risk to Penshurst, however (for the reasons set out in 2.2 above) our modelling shows that the expansion will not increase flood risk in Penshurst either.

Our engagement with the community through this scheme has raised awareness of the FSA and opened a conversation about the wider flooding experienced in Penshurst and the problems this causes. We now recognise the depth of concern in the community about local flooding.

As a result, we are offering to fund the National Flood Forum to help the local community to set up a flood action group where the concerns of the community can be raised with all of the organisations involved in managing flood risk so that ways to mitigate the impact and improve the resilience of the community to flooding can be explored together.

The Environment Agency is always here to discuss any aspect of our work, including flood risk, and we have had numerous discussions with you about the impact of the existing FSA and the possibility of extending your existing flood deed to compensate you for future flooding compensation claims.

### **3.10 Disregard for local MP**

**Tom Tugendhat MP has been supportive of our village's position within this proposal. He recognises the benefit to the homes downstream that will benefit from this proposal, but he also recognises the problems caused upstream in Penshurst. He has consistently raised this downside with the EA but has always been told that they were consulting with Penshurst. This has not been the case.**

Environment Agency response to point 3.10:

We have kept Tom Tugendhat MP updated on the progress of the project in general.

All landowners within the FSA are protected from loss by the River Medway (Flood Relief) Act 1976.

The proposed change will not increase the impact of the FSA on Bridge House. However, we have been discussing the potential for an agreement to pay a sum in lieu of compensation for future losses as a result of the operation of the existing FSA and this discussion is ongoing.

### **3.11 Risk of Judicial Review**

**All of the above flaws in the process mean that any decision made on the EA's Application could be challenged by means of a Judicial Review. The residents of Penshurst have twice raised funds to pay a QC to challenge two national decisions via Judicial Review, one planning decision and one aviation decision. Both decisions were quashed due to failure in process.**



Environment Agency response to point 3.11:

Noted.

#### **4. Penshurst Village**

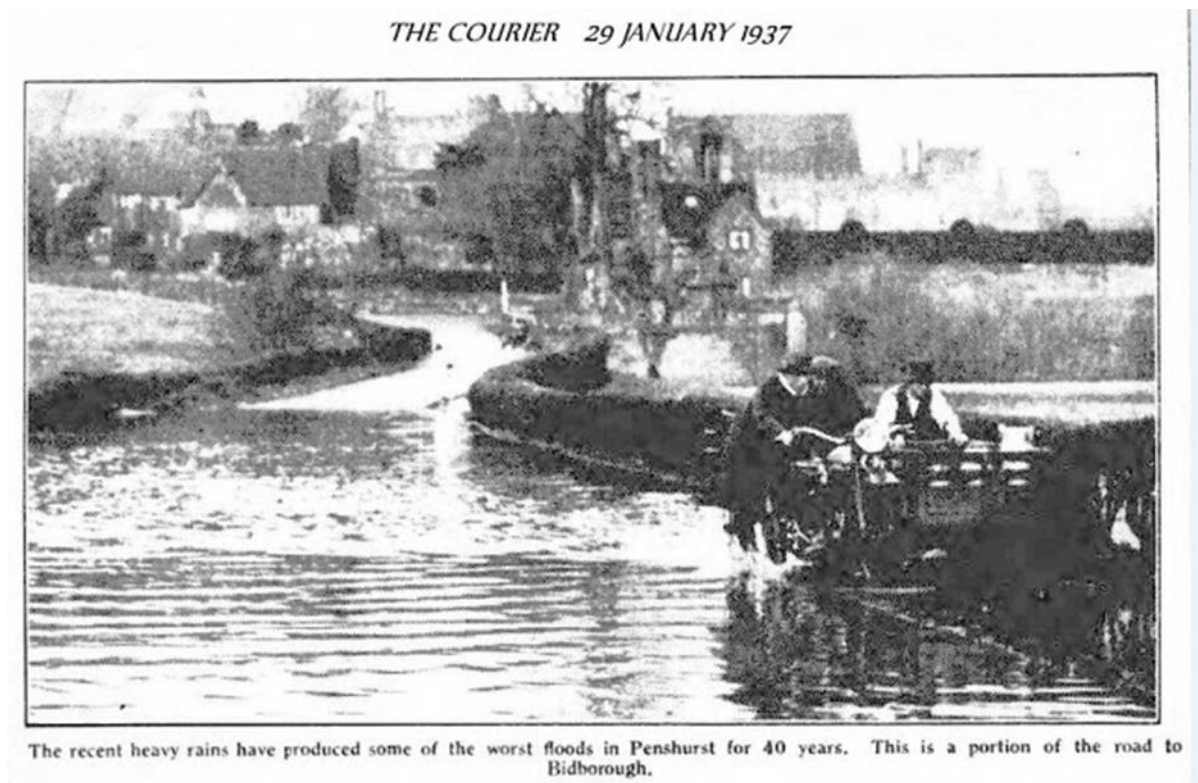
##### **4.1 Risk of Death**

**Rogues Hill is a major route into and through the Village. It is the route used by the Fire Brigade, Police and Ambulance Service responding to emergency calls. It is also used by school buses and village traffic. When the EA impound the FSA this road floods to a depth of up to 1 metre, making it impassable, yet vehicles still attempt to pass. Raising the level of the FSA can only increase this flooding. This would create a Moral Hazard, with the potential for death. The water flow is known to be in excess of 70 cubic metres per second and should a school bus attempt to go through the flood, it could easily be carried away downstream. This risk of multiple death is high. The EA have merely said that it is the responsibility of the Highways Agency. The Grenfell disaster has taught us that Moral Hazards can prove fatal, years later for many innocent members of the public.**

Environment Agency response to point 4.1:

As you state, Rogues Hill is a major route into and through the village. It is built on a causeway across the flat valley 200m downstream of the confluence of the Rivers Eden and Medway. Rogues Hill passes over the River Medway by Bridge House. The lowest part of Rogues Hill is particularly vulnerable to flooding.

The photograph below from a 1937 newspaper article (Figure 6) shows flooding on Rogues Hill. In 1968 the flooding at this location was so severe that the Rogues Hill road bridge over the River Medway was damaged to such an extent a temporary bridge had to be installed. These events show that Rogues Hill has historically experienced flooding and that it is not the operation of the Leigh FSA that causes flooding.



*Figure 6: Flooding of Rogues Hill in 1937*

In your representation you suggest that Rogues Hill floods to up to 1m deep as a result of the operation of the FSA. Whilst in certain circumstances the FSA can, when operating, add up to 0.1m to the depth of water at Rogues Hill, the depth and timing of the flooding of Rogues Hill is dictated by upstream flows.

This is shown by the photographs provided in response to 3.1. To further illustrate this, the peak of the most recent flood at Penshurst Gauging Station was at 01:30 on 17 February 2020 (see Figure 7 below) and the water level was falling before the water levels at the Leigh FSA were rising as water was stored (see Figure 8). Penshurst Gauging Station is situated on the River Eden about 2.8 km upstream of Rogues Hill, and so the peak of this flood will occur earlier at Penshurst Gauging Station than at Rogues Hill but it clearly demonstrates that the water level in the river is independent of the operation of the FSA.

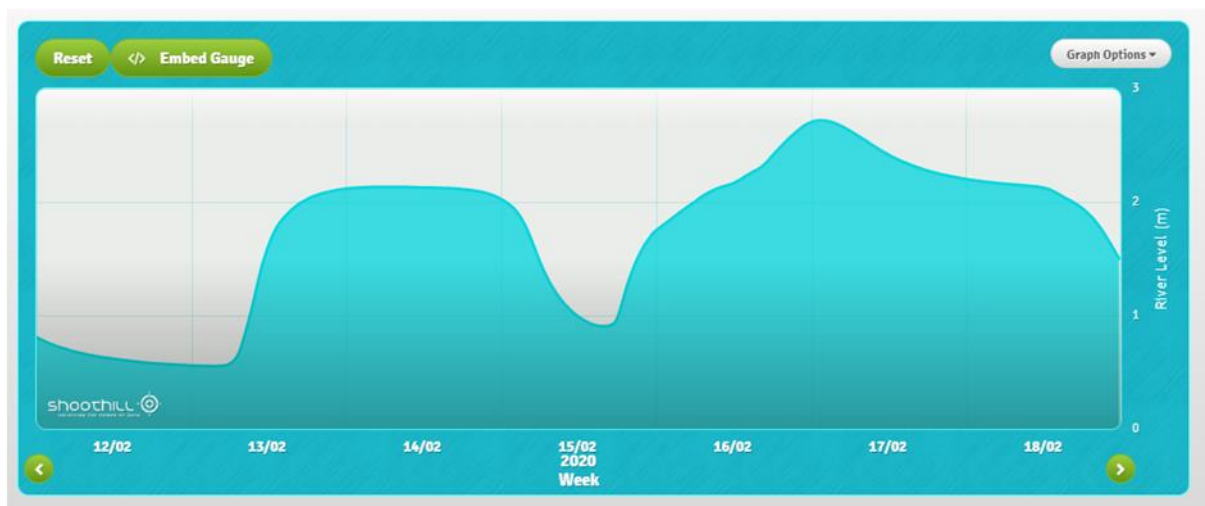


Figure 7: Water levels at Penshurst gauging station 12 to 18 February 2020. Image from Shoothill Gauge map using data from Environment Agency gauging station

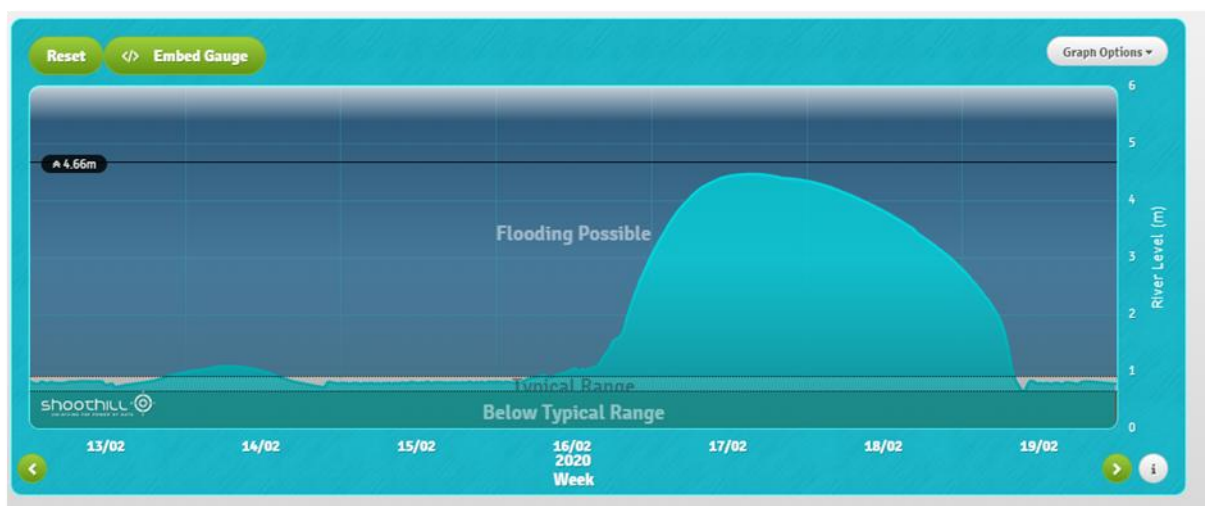


Figure 8: Water levels at Leigh Barrier upstream gauging station 13 to 19 February 2020. Image from Shoothill Gauge map using data from Environment Agency gauging station

For the reasons set out in 2.2 above, the proposed expansion does not increase the flood risk at Rogues Hill. Therefore, the proposed expansion does not exacerbate the present situation.

Whilst the expansion of the Leigh FSA will not increase the level of flooding experienced at Rogues Hill, we recognise the risks that arise through flooding of the roads around Penshurst. We always warn the public against driving through flood water. Flooding of these and other roads makes them dangerous, with the potential for drivers to try to pass through the floodwater at Rogues Hill and for cars to become stuck with the obvious risk to life this presents and the ongoing blockage to passage after the floodwaters have receded.

There are a number of organisations involved in managing and responding to flood risk. The Environment Agency has powers to manage flood risk from main rivers and Kent County Council provide and manage highway drainage and roadside ditches.

Other organisations and risk management authorities also have roles in managing and responding to flooding.

The risk of flooding in the natural floodplain cannot be eliminated. Warning and informing presents the only viable approach to the management of the risk to road users.

As noted in 3.9, we are offering to fund the National Flood Forum to help the local community to set up a flood action group where the concerns of the community can be raised with all of the organisations involved in managing flood risk so that ways to mitigate the impact and improve the resilience of the community to flooding can be explored together.

#### **4.2 Disregard for Penshurst Estate Residents**

**When the Leigh FSA was built in 1982 the EA's predecessor identified the risk of access to properties on the Penshurst Estate, and paid for the construction of a concrete road to ensure safe access. The EA's proposal to raise the height of the FSA now places access via that same concrete road at risk. On Page 21 the EA deny this problem, but say there may be scope to help . This is typical of the condescending attitude throughout both communications and the application. They have failed to provide a solution to a problem of their creation. A problem that affects not just six residential properties and farm buildings but also a nursery school with many children in its care.**

Environment Agency response to point 5.2:

This is a matter that has been raised by the Penshurst Place Estate and we are working to address it with them.

#### **4.3 Disregard for High Street Properties**

**Flooding will affect properties on High Street. There are buildings used for warehousing, hobbies and garages to the rear of these properties. Increased flooding will cause damage to property and access problems. One of these properties also claimed compensation for flooding caused by the EA's impounding of the FSA in December 2013. Early in 2020 the EA admitted liability and paid compensation to the owner of the property.**

Environment Agency response to point 5.3:

Section 4.2 (page 24 and 25) of the Application and our response to 2.2 explains the impact the proposed change to the flood water levels. This is also explained in greater detail in section 5.1 (pages 24 to 26) of the Flood Risk Assessment submitted with the planning application.

You will see that no change is expected to the extent of flooding or depth of water at the properties on the High Street, which like Bridge House are upstream of Rogues Hill, as a result of the proposal to increase the maximum stored water level.

**RM005 Ms Pallen & Mr Burraston's objection to the Environment Agency's Application to vary the Scheme within the River Medway (Flood Relief) Act 1976**

**Environment Agency technical response, updated 6 October 2020**

**1. Introduction**

**We moved into Colquhouns Cottage early in 2013.**

**In order to provide a suitable environment for home working, music production and exercise, in the summer of 2013, we converted two adjoining outbuildings in our garden to be fit for these purposes. In addition, we erected a small garden shed to provide storage for a lawn mower and gardening tools. All of these structures lie outside the area marked in blue on our deeds which the EA is not entitled to use for floodwater storage.**

**In December 2013, following operation of the Leigh Barrier both the adjoined studio/gym and the small shed were flooded.**

**In December 2019 we submitted a claim for compensation for which the EA admitted liability and settled.**

Environment Agency response to point 1:

We acknowledge that your garden and the outbuildings you have converted can be affected by the operation of the existing Leigh FSA, depending on the size of the flood event, because upstream of Rogues Hill the flood water can be up to an extra 0.1m deeper as a result. However, the area is within the floodplain of the River Medway so it can also be affected by naturally occurring flooding.

Please see the photographs below showing that natural flooding occurred at Penshurst prior to the operation of the FSA. You took the first photograph (Figure 1) at 14:12 on 20 December 2019. It shows the water level near your gym. Impoundment didn't commence until 15:30 on the same day.





*Figure 1: Flooding of the garden of Colquhouns Cottage, 14:12 on 20 December 2019*

The next two photographs below (Figures 2 and 3), were taken from Rogues Hill on 16 February 2020. Figure 2 shows the fields immediately upstream of Rogues Hill and was taken at 12:51. Figure 3 was taken from the bridge on Rogues Hill over the River Medway. It was taken at 13:13. Impoundment didn't commence until 17:15 the same day.



*Figure 2: Flooding of the fields immediately upstream of Rogues Hill, 12:51 on 16 February 2020*



*Figure 3: River Medway and Bridge House, 13:13 on 16 February 2020*

The final photograph (Figure 4), below, was taken 14 minutes earlier than Figure 2 (at 12:37 on 16 February 2020). It shows the bridge on Ensfield Road over the River Medway, 3.9km downstream of Penshurst. It is clear that the river was within bank at this location whilst at the same time there was significant flooding in Penshurst driven by upstream flows. The Leigh FSA was not in operation and all the flooding at this time in Penshurst was driven by flows from upstream.



*Figure 4: The bridge on Ensfield Road over the River Medway, 12:37 on 16 February 2020*

The above photographs demonstrate that the land around Penshurst (including your garden) floods irrespective of operation of the FSA, and the level of that flooding can reach the outbuildings you have converted. The FSA only operates during high flows, and so therefore the same conditions that drive flooding in Penshurst will also determine the operation of the FSA. This does not mean that the FSA causes the flooding in Penshurst.

The 'deed' that you refer to is the agreement dated 01 February 1982, between (i) Michael Donald Holmes and Imogen Margaret Holmes, (ii) Alliance Building Society and (iii) Southern Water Authority. We agree that your outbuildings and the garden shed are not situated within the area shaded blue on the plan in that agreement. But that plan does not define the area that can be flooded. Instead it defines the area upon which you are not allowed to do anything that will interfere with the flow of flood water or raise or lower the level of the ground.

## **2. Reasons for Objection**

**Whilst we fully understand the need for enhancements to the Leigh FSA we strongly object to this application. Our primary reasons for this are as follows:**

**2.1 It would appear that the EA is relying solely on computer modelling to predict the impact of changes to the flood storage area. We do not accept that this can provide an accurate picture of the effect on Penshurst given the vast number of variables present during an actual flood event.**

Environment Agency response to point 2.1:

The Environment Agency, and the wider hydrological industry, uses modelling software, mapping techniques and topographical and rainfall data to understand a wide range of catchment processes, how river catchments respond to different rainfall events, and to identify the impacts of these events.

The Environment Agency has flow gauges upstream of Rogues Hill, at Chafford Bridge and Colliers Land Bridge on the River Medway and at Penshurst and Vexour Bridge on the River Eden. This represents a significant investment in flow monitoring and allows us to understand the water levels on both rivers. Information from these gauging stations was used to calibrate the 2015 Medway flood model and is used to inform the operation of the Leigh Flood Storage Area (FSA).

In addition to the 2015 Medway flood model, the Environment Agency has photographs and data showing the extent of land flooded during previous events, and staff observed the flooding at Rogues Hill in February 2020 to understand the extent of flooding at this location. The timing and extent of the flooding in February 2020 was as predicted by the model.



**2.2 Despite past flood events, no monitoring has been put in place to understand the actual effect of operating the flood barrier on flood levels in Penshurst, below the confluence of the rivers Medway and Eden area. The EA relies on measurements from upstream at Colliers Land Bridge for the River Medway and Vexour Bridge for the River Eden. These measurements are not a substitute for proper local monitoring.**

Environment Agency response to point 2.2:

As stated in our response to point 2.1, the Environment Agency has flow gauges upstream of Rogues Hill at Chafford Bridge and Colliers Land Bridge on the River Medway, and Penshurst and Vexour Bridge on the River Eden. This allows us to understand the flow in both rivers, including after the confluence.

Whilst it is always possible to further refine the calibration of any flood model by considering more baseline data, the Environment Agency is confident that the modelled flood data is sufficient to understand the flood risk at Penshurst, and additional flow gauging data from points downstream of the confluence will align with the outputs of the 2015 Medway flood model.

We appreciate, however, that we need to address the concerns of the community in Penshurst on this issue, and are looking to provide additional depth gauging in Penshurst downstream of Rogues Hill. This will provide definitive data on this issue, and will hopefully provide the reassurance sought by the community.

**2.3. The EA's application concludes that the proposed changes to the height of the flood barrier will have no impact on Penshurst in terms of depth or duration of flooding. Given the lack of empirical data we do not accept this assertion.**

**2.4. In our experience as residents, flooding is most definitely exacerbated by the operation of the Leigh barrier. An increase in the height of the barrier must represent an increased risk to our outbuildings and to Penshurst in general.**

Environment Agency response to points 2.3 and 2.4:

Whilst, as explained in our response to point 1, operation of the existing FSA can in certain circumstances make the flood water up to an extra 0.1m deeper at Penshurst, our modelling indicates that the proposed change to increase the maximum impoundment level will not increase the depth of flooding above Rogues Hill any further. This is demonstrated in Figure 5 below. Figure 5 shows the increase in flooding depth from raising the Leigh FSA maximum impoundment level from 28.05m Above Ordnance Datum (AOD) to 28.6m AOD (measured at the main Leigh FSA embankment) during a 1.33% flood event. The map below has been taken from the Flood Risk Assessment for consistency. This map has been updated since the

submission of the Application. Whilst it shows greater depth variation lower in the FSA, the point at which the effect of the expansion dissipates remains the same.

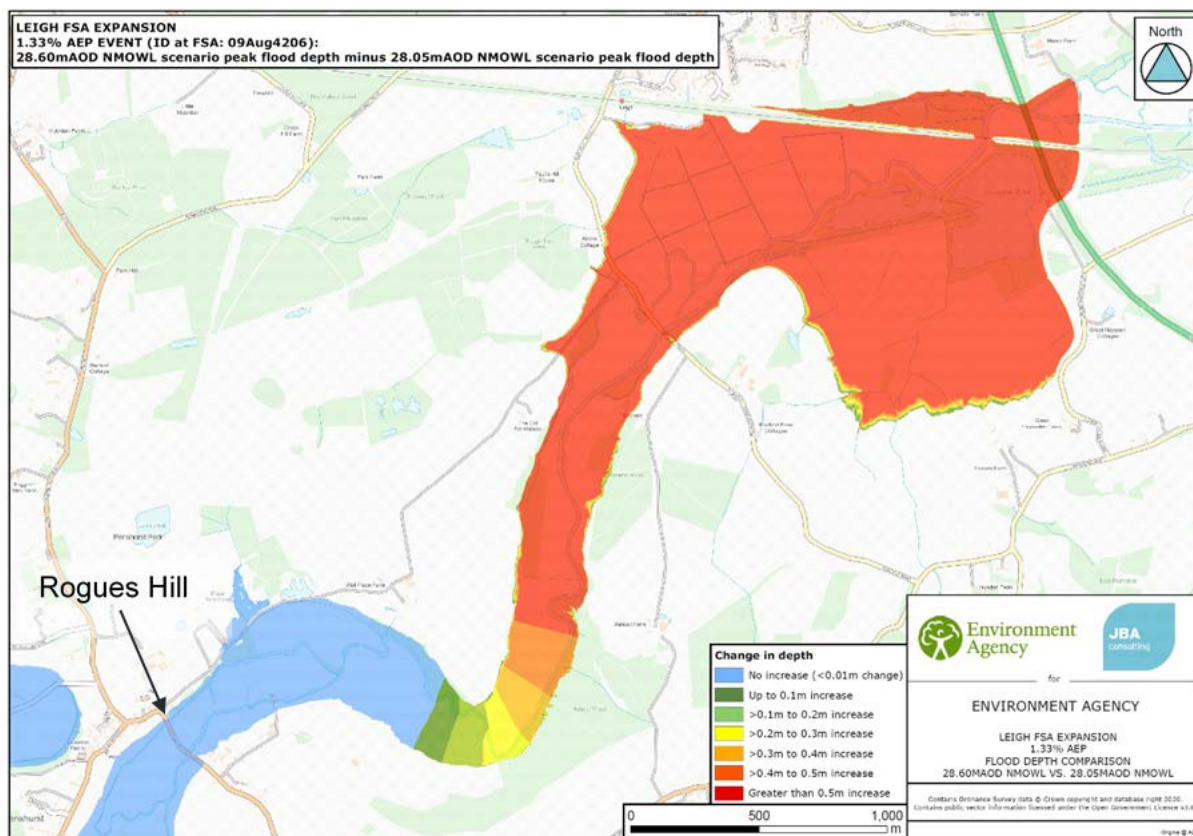


Figure 5: Increase in flood depth in a 1.33% flood event. 28.05m AOD vs 28.6m AOD

The Flood Risk Assessment was submitted with our planning application at the end of August 2020. The planning application reference number is 20/02463/FUL, and it is available for view at the Sevenoaks District Council planning portal:

<https://pa.sevenoaks.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=QFPV1WBK0LO00>

Every flood event is different, depending on a number of factors, including soil saturation and weather patterns. The modelled scenario in Figure 5 was chosen to demonstrate the impact of expanding the FSA because it shows the greatest change in flood depths.

**2.5 In the EA's Strategic Flood Policy it states that 1 in 100 years plus climate change is the scenario that should be defended against. Throughout this project the EA have always quoted 1 in 100 years plus climate change as the scenario used. In the application the EA have quoted a 1 in 75 years scenario. This conflicts with their own National Guidance.**

Environment Agency response to point 2.5:

Figure 5 in our response to points 2.3 and 2.4 shows a plan of the additional depth of water during a modelled 1.33% (1 in 75 year) flood event as a result of changing the maximum stored water level from 28.05m AOD to 28.6m AOD.

We chose this scenario to demonstrate the impact of expanding the FSA because it shows the greatest change in flood depths as a result of the proposed change. The depth increase for the majority of the storage area will be greatest for the 1.33% event.

During more extreme flood events, such as a 1% (1 in 100 year) plus climate change event, the increase in depth as a result of the proposed change reduces. This is because the natural flood level, which is greater, dominates.

Please see Section 5.1 (pages 24 to 26) and Appendices A and B of the Flood Risk Assessment for further details. For clarity and to address your concern, figures B1, B2 and B3 in Appendix B of the flood risk assessment show the change in flood depth for the following flood events: 1.33% AEP, 1% AEP and 1%+20% flow AEP.

**2.6. The application states that since 2011 the EA have only used the FSA when the flow in the River Medway exceeds 75 cubic metres per second. The current Scheme allows the FSA to be used when the rate of flow exceeds 35 cubic metres per second and this figure has been explicitly retained in the revised Scheme. This represents a significant risk to Penshurst in the event the EA reverted to using the lower flow rate in combination with an increase to the height of the Leigh barrier.**

Environment Agency response to point 2.6:

The flow rate at which impounding begins needs to be flexible to enable optimum use of the storage volume in the FSA. This will vary for every flood event. It is important not store flood water too soon to ensure we have capacity to store the peak and the most damaging flood flows for any given event.

For the majority of floods impounding starts around 75 cubic metres per second. However that is not always the case and it may be necessary to impound water at different flows, both higher and lower, to provide the maximum flood risk reduction in Tonbridge.

Altering the Scheme's minimum operating flow rate in law would fundamentally diminish the ability to operate the FSA, as designed, to reduce flood risk to downstream communities.

**2.7. Throughout the consultation period, communications have been very erratic and inconsistent. We do not believe that we have been party to all available information throughout the process. For example, we did not receive**



**the results of GPS altitude measurements conducted on our property in the Summer of 2019 until June this year.**

Environment Agency response to point 2.7:

We are sorry that you feel communications have been very erratic and inconsistent. You now have a copy of our Application and the documents that have been prepared to support the planning application are all available on Sevenoaks District Council's website with our planning application.

**2.8. Despite the consultation process, we have not been given any insight into the EA's intentions with respect to any actions that could be taken to mitigate future damage to our property.**

Environment Agency response to point 2.8:

As explained in our response to points 2.3 & 2.4, the 2015 Medway flood model shows that your property will not be affected any further by the proposed expansion.

The River Medway (Flood Relief) Act 1976 (the 1976 Act) accepts through section 17(4) that property may be affected by the operation of the Leigh FSA since it gives landowners the right to be compensated. Further, landowners may enter into easements with the Environment Agency to allow the Leigh FSA to flood their land under sections 24 and 25 of the 1976 Act.

We appreciate that you would like the Environment Agency to contribute to the cost of works that will make your outbuildings resilient to future flood events. This is something we will consider, and discuss with you as an option to fully and finally discharge the obligation to pay compensation when damage is sustained as a result of operation of the FSA. However, the Environment Agency does not have to agree compensation before submitting the Revised Scheme to Defra as they are separate discussions that will not prevent the Minister from determining the Revised Scheme.

**2.9. The application contains various letters of support. However, no-one from any of the affected upstream communities has been asked to comment. This is biased and unacceptable.**

Environment Agency response to point 2.9:

In May 2019, the Environment Agency's land agent, Dalcour Maclaren, wrote to 36 landowners and tenants within the existing FSA to advise them of the proposed application to increase the maximum stored water level, and to offer a meeting to explain the impact this would have on them and discuss any concerns they had.

These letters were followed up with phone calls and 27 parties took up the offer of a meeting. There are no new landowners and/or occupiers that would be brought into the FSA as a result of the proposed expansion.

Alongside this process, the Environment Agency also contacted all of the organisations named within the Act as Specified Interests (plus additional organisations as directed by Defra) to make them aware of the application to expand the FSA, offer meetings to discuss the proposal and any concerns they had on behalf of their residents or members, and to understand what process they would need to go through in order to consider the proposal. These parties are listed in Section 8.1 of the Application. All of these parties, with the exception of Maidstone Borough Council represent members of upstream communities, to a greater or lesser extent.

The organisations have gone through their own processes to ensure that they understand the impact of the proposal on their residents or members.

It was hoped that by carrying out this pre-consultation, the Environment Agency could understand and resolve or mitigate any concerns prior to submitting the Application to the Minister.

The one month long formal consultation for the Application began on submission of the Application to the Minister. Any Specified Interest could make a representation (either of support or objection) during this period, therefore we do not agree that the consultation has been biased.

**2.10. The EA have not met the requirements of Section 17, Part II (e) of the River Medway (Flood Relief) Act 1976. The Act requires the EA to supply a copy of the revised scheme to “The Specified Interests” BEFORE submitting the scheme to the Minister for approval. The EA failed to do this.**

**The scheme was submitted on the 10th June, but we did not receive the copy until after this, denying us the opportunity to (a) discuss the revised scheme with the EA and (b) to come to an agreement with them.**

**Furthermore, the copy supplied is not the same as that which has been submitted to the Minister. The revised scheme on the reverse of the letter dated 8th June contains 5 paragraphs, whereas the revised scheme submitted contains 4 paragraphs. Again, as the scheme had already been submitted, we were denied an opportunity to (a) discuss the revised scheme with the EA and (b) to come to an agreement with them.**

Environment Agency response to point 2.10:

Section 17(3)(e) of the 1976 Act requires the Environment Agency to submit the Revised Scheme to Specified Interests before submission to the Minister. We posted the Revised Scheme to the Specified Interests on 8 June 2020 and then submitted the Application to the Minister on 10 June 2020. We understand that some of the

Specified Interests did not receive their copy of the Scheme until after the Minister. We agree that this is a technical breach of Section 17(3)(e), for which we apologise. However, as your representation has been accepted by Defra, the delay in you receiving the notification of our intention to vary the Scheme has not denied you the opportunity to be heard by the Minister. You have not suffered any detriment or prejudice from this delay.

We have not denied you the opportunity to come to an agreement with us as we have been in discussions with you for some months. We do not have to agree compensation nor agree an easement to flood before submitting the Revised Scheme to the Minister.

We understand that you would like compensation to enable you to carry out works that will make your outbuildings resilient to future flood events. We have started discussing with you the possibility of a supplemental agreement to fully and finally discharge the obligation to pay compensation when damage is sustained as a result of operation of the FSA.

These are separate discussions which we do not believe should affect the determination of the Revised Scheme.

With the covering letter that the Environment Agency sent you on 8 June 2020, we also sent you a full copy of the Environment Agency's Application dated June 2020. This Application included a copy of the Revised Scheme in Appendix B. The copy set out in Appendix B of the Application differed from that in the covering letter since it did not include paragraph 2 as it appears in the covering letter. We apologise for this error and any confusion caused. However, we believe no prejudice has been suffered. Paragraph 2 of the covering letter is merely informative in that it states we will apply for planning permission and that we shall operate the FSA according to the Revised Scheme after planning permission is granted in accordance with the succeeding paragraphs of the Scheme.

This version of the Scheme does not differ substantively from the version in the application. There is no difference between the two versions on how the Scheme will be operated. For the sake of certainty, we confirm the Scheme as enclosed in the Application is the version of the Scheme which the Environment Agency intends to operate. Apart from some confusion, which we have now clarified, you have not suffered any prejudice.

### **3. Summary**

**3.1 We believe the EA have not acted in good faith in terms of addressing the additional risk posed to our property by this application and they have not taken on board the legitimate concerns and interests of the residents of Penshurst.**

Environment Agency response to point 3.1:

The primary objective of the proposed expansion of the Leigh FSA is to provide improved flood protection to properties in Tonbridge and Hildenborough.

For the reasons set out in our response to points 2.3 & 2.4, our modelling shows that the expansion will not increase flood risk in Penshurst.

Our engagement with the community through this scheme has raised awareness of the FSA and opened a conversation about the wider flooding experienced in Penshurst and the problems this causes. We now recognise the depth of concern in the community about local flooding.

As a result, we are offering to fund the National Flood Forum to help the local community to set up a flood action group where the concerns of the community can be raised with all of the organisations involved in managing flood risk so that ways to mitigate the impact and improve the resilience of the community to flooding can be explored together.

The Environment Agency is always here to discuss any aspect of our work, including flood risk, and we have had numerous discussions with you about the impact of the existing FSA and the possibility of extending your existing flood deed to compensate you for future flooding compensation claims.

**3.2 The process they have followed has clearly been flawed in several areas versus the requirements of the River Medway (Flood Relief) Act 1976.**

Environment Agency response to point 3.2:

Please see our response to point 2.10.

**3.3 There is an unacceptable level of reliance on computer modelling versus real world evidence and measurement.**

Environment Agency response to point 3.3:

Please see our response to point 2.1.

**3.4 During the consultation period there were occasional indications that the EA might be considering mitigating action to prevent the cyclic recurrence of damage to and compensation for our property but nothing material has come of this.**

**3.5 The solution to our flooding problems would be to simply raise our adjoined main outbuilding (studio + gym) by approximately 1 metre.**

**3.6 We would have been prepared to negotiate a revised easement in exchange for funding to enable this work to be carried out and given the requisite planning permission by Sevenoaks District Council, rather than face the misery and disruption caused by flooding due to future operation of the Leigh barrier.**

Environment Agency response to points 3.4, 3.5 & 3.6:

Please see our response to point 2.8.

#### **4. Penshurst Village**

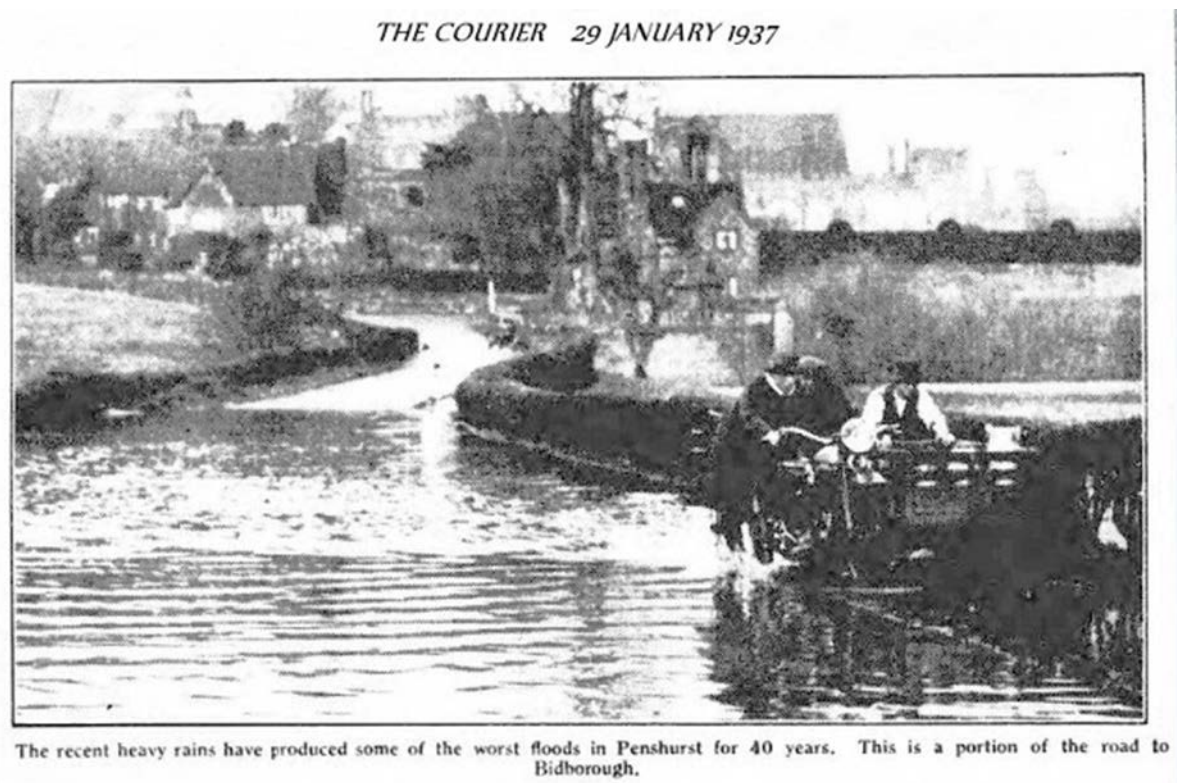
##### **4.1. Risk of Death**

**Rogues Hill is a major route into and through the Village. It is the route used by the Fire Brigade, Police and Ambulance Service responding to emergency calls. It is also used by school buses and village traffic. When the EA impound the FSA this road floods to a depth of up to 1 metre, making it impassable, yet vehicles still attempt to pass. Raising the level of the FSA can only increase this flooding. This would create a Moral Hazard, with the potential for death. The water flow is known to be in excess of 70 cubic metres per second and should a school bus attempt to go through the flood, it could easily be carried away downstream. This risk of multiple death is high. The EA have merely said that it is the responsibility of the Highways Agency. The Grenfell disaster has taught us that Moral Hazards can prove fatal years later for many innocent members of the public.**

Environment Agency response to point 4.1:

As you state, Rogues Hill is a major route into and through the village. It is built on a causeway across the flat valley 200m downstream of the confluence of the Rivers Eden and Medway. Rogues Hill passes over the River Medway by Bridge House. The lowest part of Rogues Hill is particularly vulnerable to flooding.

The photograph below from a 1937 newspaper article (Figure 6) shows flooding on Rogues Hill. In 1968 the flooding at this location was so severe that the Rogues Hill road bridge over the River Medway was damaged to such an extent a temporary bridge had to be installed. These events show that Rogues Hill has historically experienced flooding and that it is not the operation of the Leigh FSA that causes flooding.



*Figure 6: Flooding of Rogues Hill in 1937*

In your representation you suggest that Rogues Hill floods to up to 1m deep as a result of the operation of the FSA. Whilst in certain circumstances the FSA can, when operating, add up to 0.1m to the depth of water at Rogues Hill, the depth and timing of the flooding of Rogues Hill is dictated by upstream flows. This is shown by the photographs provided in response to point 1.

To further illustrate this, the peak of the most recent flood at Penshurst Gauging Station was at 01:30 on 17 February 2020 (see Figure 7 below) and the water level was falling as the water levels in the Leigh FSA were rising (see Figure 8). Penshurst Gauging Station is situated on the River Eden about 2.8 km upstream of Rogues Hill, and so the peak of this flood will occur earlier at Penshurst Gauging Station than at Rogues Hill but it clearly demonstrates that the water level in the river is not influenced by the operation of the FSA.



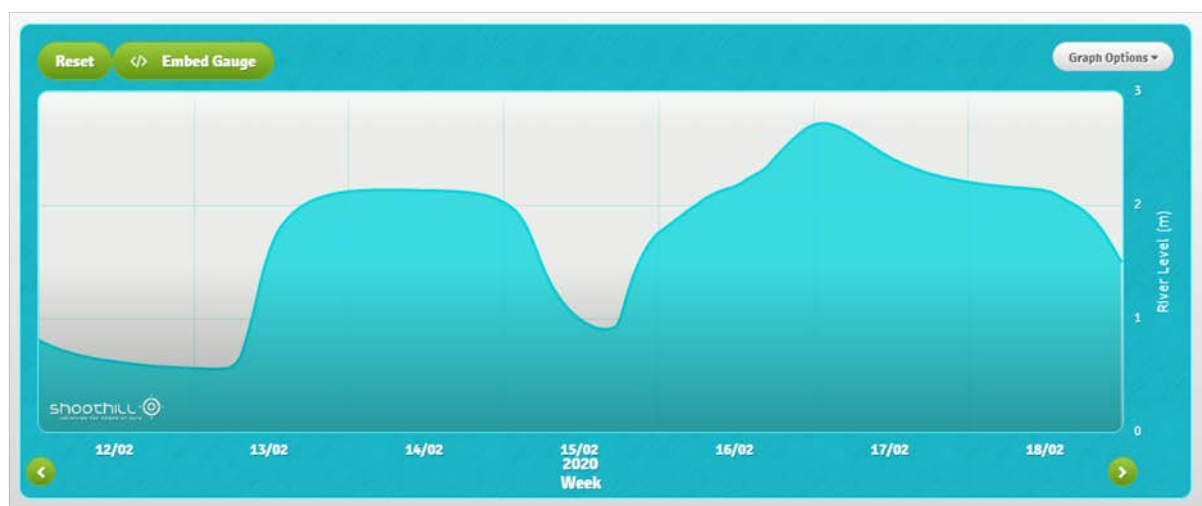


Figure 7: Water levels at Penshurst gauging station 12 to 18 February 2020. Image from Shoothill Gauge map using data from Environment Agency gauging station

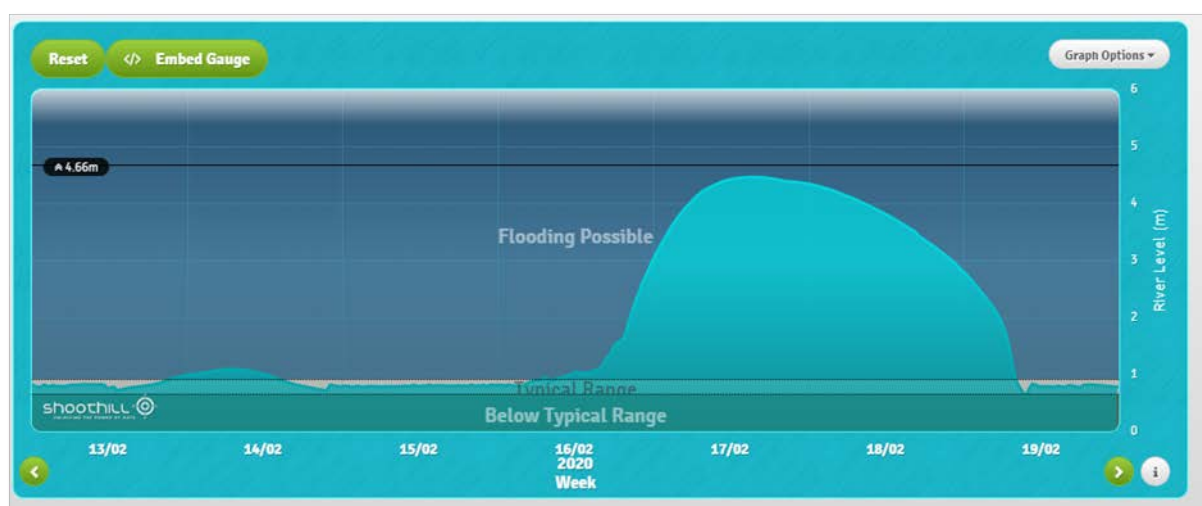


Figure 8: Water levels at Leigh Barrier upstream gauging station 13 to 19 February 2020. Image from Shoothill Gauge map using data from Environment Agency gauging station

For the reasons set out in our response to points 2.3 & 2.4 above, the proposed expansion does not increase the flood risk at Rogues Hill. Therefore, the proposed expansion does not exacerbate the present situation.

Whilst the expansion of the Leigh FSA will not increase the level of flooding experienced at Rogues Hill, we recognise the risks that arise through flooding of the roads around Penshurst. We always warn the public against driving through flood water. Flooding of these and other roads makes them dangerous, with the potential for drivers to try to pass through the floodwater at Rogues Hill and for cars to become stuck with the obvious risk to life this presents and the ongoing blockage to passage after the floodwaters have receded.

There are a number of organisations involved in managing and responding to flood risk. The Environment Agency has powers to manage flood risk from main rivers and Kent County Council provide and manage highway drainage and roadside ditches.

Other organisations and risk management authorities also have roles in managing and responding to flooding.

The risk of flooding in the natural floodplain cannot be eliminated. Warning and informing presents the only viable approach to the management of the risk to road users.

Our engagement with the community through this scheme has raised awareness of the FSA and opened a conversation about the wider flooding experienced in Penshurst and the problems this causes. We now recognise the depth of concern in the community about local flooding.

As a result, we are offering to fund the National Flood Forum to help the local community to set up a flood action group where the concerns of the community can be raised with all of the organisations involved in managing flood risk so that ways to mitigate the impact and improve the resilience of the community to flooding can be explored together.

#### **4.2. Disregard for Penshurst Estate Residents**

**When the Leigh FSA was built in 1982 the EA's predecessor identified the risk of access to properties on the Penshurst Estate, and paid for the construction of a concrete road to ensure safe access. The EA's proposal to raise the height of the FSA now places access via that same concrete road at risk. On Page 21 the EA deny this problem, but say there may be scope to help . This is typical of the condescending attitude throughout both communications and the application. They have failed to provide a solution to a problem of their creation. A problem that affects not just six residential properties and farm buildings but also a nursery school with many children in its care.**

Environment Agency response to point 4.2:

This is a matter that has been raised by the Penshurst Place Estate and we are working to address it with them.

#### **4.3. Disregard for High Street Properties**

**Flooding will affect properties on High Street. There are buildings used for warehousing, hobbies and garages to the rear of these properties. Increased flooding will cause damage to property and access problems.**

Environment Agency response to point 4.3:

Section 4.2 (page 24 and 25) of the Application and our response to points 2.3 & 2.4 explains the impact the proposed change to the flood water levels. This is also

explained in greater detail in section 5.1 (pages 24 to 26) of the Flood Risk Assessment submitted with the planning application.

You will see that no change is expected to the extent of flooding or depth of water at the properties on the High Street, which are upstream of Rogues Hill, as a result of the proposal to increase the maximum stored water level.

**RM006 Mr and Mrs Calvocoressi's objection to the Environment Agency's Application to vary the Scheme within the River Medway (Flood Relief) Act 1976**

**Environment Agency technical response, September 2020**

**1. Whilst it is recognised that there is a need for adjustment to the flood storage area in order to protect properties downstream we are very concerned that not enough consideration or communication has taken place with communities upstream. Most importantly, no monitoring has taken place, the safety aspects, accessibility of the village or potential effect on the community and property in Penshurst have not been properly assessed and no solutions have been proposed. Highways have not been consulted and the application is made based entirely on theoretical reports rather than real life evidence with no attempt made to verify the theory which has itself changed over time.**

Environment Agency response to point 1:

We are sorry you feel that the proposed expansion of the Leigh Flood Storage Area (FSA) has not properly considered or addressed the key areas of consideration or and communication with the upstream communities; monitoring of the rivers; and the safety, accessibility and potential effect on the Penshurst community and solutions for local flooding. We have responded to these areas in turn below and more detail on each can be found in our responses to the specific points you raised in your objection letter.

**Consideration and communication with upstream communities**

Whilst the primary objective of the proposed expansion is to reduce flood risk to properties in Tonbridge and the scheme will not increase the flood risk to Penshurst, our engagement has raised awareness of the FSA and opened a conversation about the wider flooding experienced in Penshurst and the problems this causes. We now recognise the depth of concern in the community about local flooding.

As a result, we are offering to fund the National Flood Forum to help the local community set up a flood action group where the concerns of the community can be raised with all of the organisations involved in managing flood risk so that ways to mitigate the impact and improve the resilience of the community to flooding can be explored together.

**Monitoring**

The Environment Agency, and the wider hydrological industry, uses modelling software, mapping techniques and topographical and rainfall data to understand a wide range of catchment processes, how river catchments respond to different rainfall events, and to identify the impacts of these events.

The Environment Agency has flow gauges upstream of Rogues Hill, at Chafford Bridge and Colliers Land Bridge on the River Medway and at Penshurst and Vexour Bridge on the River Eden. This represents a significant investment in flow monitoring and allows us to understand the water levels on both rivers. Information from these gauging stations was used to calibrate the 2015 Medway flood model and is used to inform the operation of the FSA.

In addition to the 2015 Medway flood model, the Environment Agency has photographs and data showing the extent of land flooded during previous events, and staff observed the flooding at Penshurst in February 2020 to understand the extent of flooding at this location. The timing and extent of the flooding in February 2020 was as predicted by the model.

The Environment Agency is confident that the available modelled flood data is sufficient to understand the flood risk at Penshurst, and additional flow gauging data from closer to Penshurst would align with the outputs of the 2015 Medway flood model. However, in response to the concern within the community in Penshurst that the effect of operation of the FSA on flood levels is not reliably predicted through our modelling, we are looking to provide an additional depth gauge in Penshurst, downstream of Rogues Hill. This will provide definitive data on this issue, and will hopefully provide the reassurance sought by the community.

### **Safety, accessibility and potential effect on the Penshurst community and solutions for local flooding**

Safety is always of paramount importance to us and a key consideration for all of our work.

Our modelling indicates that the proposal to increase the maximum impoundment level will not increase the depth of flooding above Rogues Hill. This is demonstrated in Figure 1 below. Figure 1 shows the increase in flooding depth from raising the Leigh FSA maximum impoundment level from 28.05m Above Ordnance Datum (AOD) to 28.6m AOD (measured at the main Leigh FSA embankment) during a 1.33% flood event. For consistency, the map below has been taken from the Flood Risk Assessment which accompanies the planning application. This map has been updated since the submission of the Application. Whilst it shows greater depth variation lower in the FSA, the point at which the effect of the expansion dissipates remains the same.

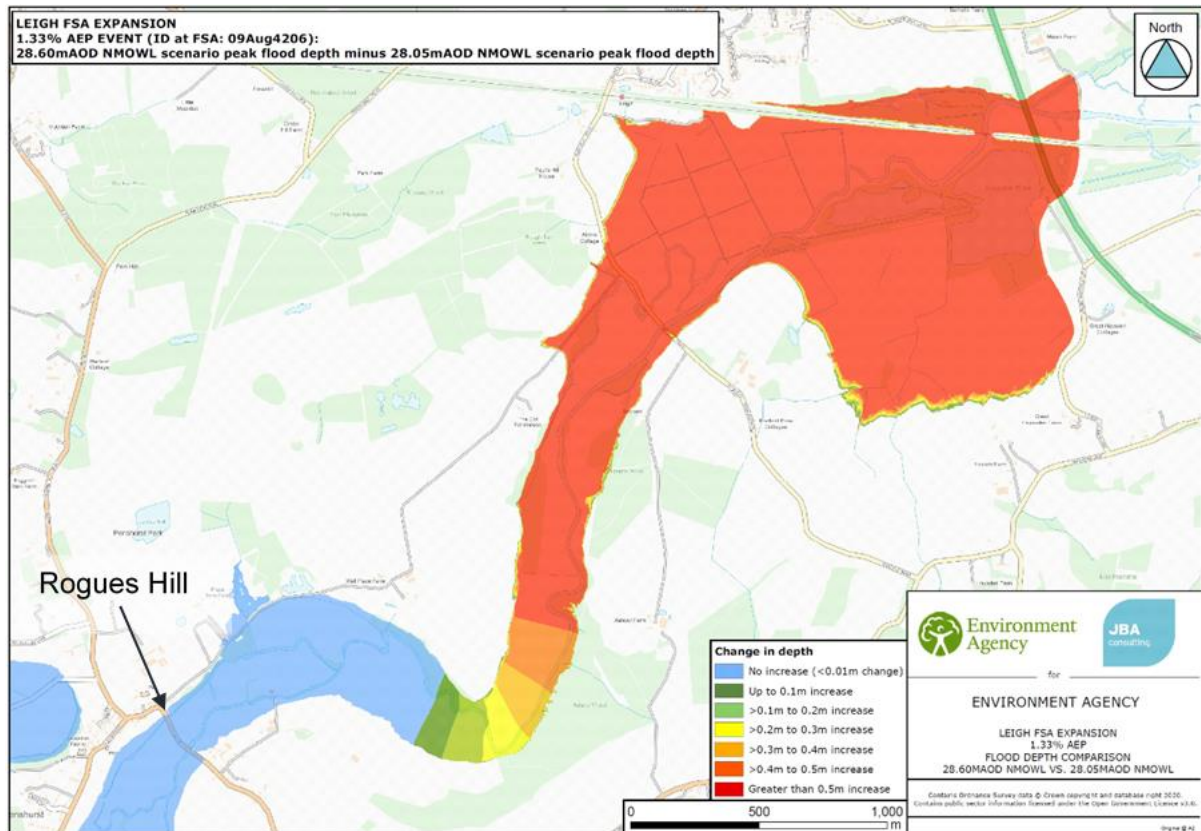


Figure 1: Increase in flood depth in a 1.33% flood event. 28.05m AOD vs 28.6m AOD

The Flood Risk Assessment was submitted with our planning application at the end of August 2020. The planning application reference number is 20/02463/FUL, and it is available for view at the Sevenoaks District Council planning portal:

<https://pa.sevenoaks.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=QFPV1WBK0LO00>

Every flood event is different, depending on a number of factors, including soil saturation and weather patterns. The modelled scenario in Figure 1 was chosen to demonstrate the impact of expanding the FSA because it shows the greatest change in flood depths.

We provide further comment on accessibility and safety in our response to your fourth point below.

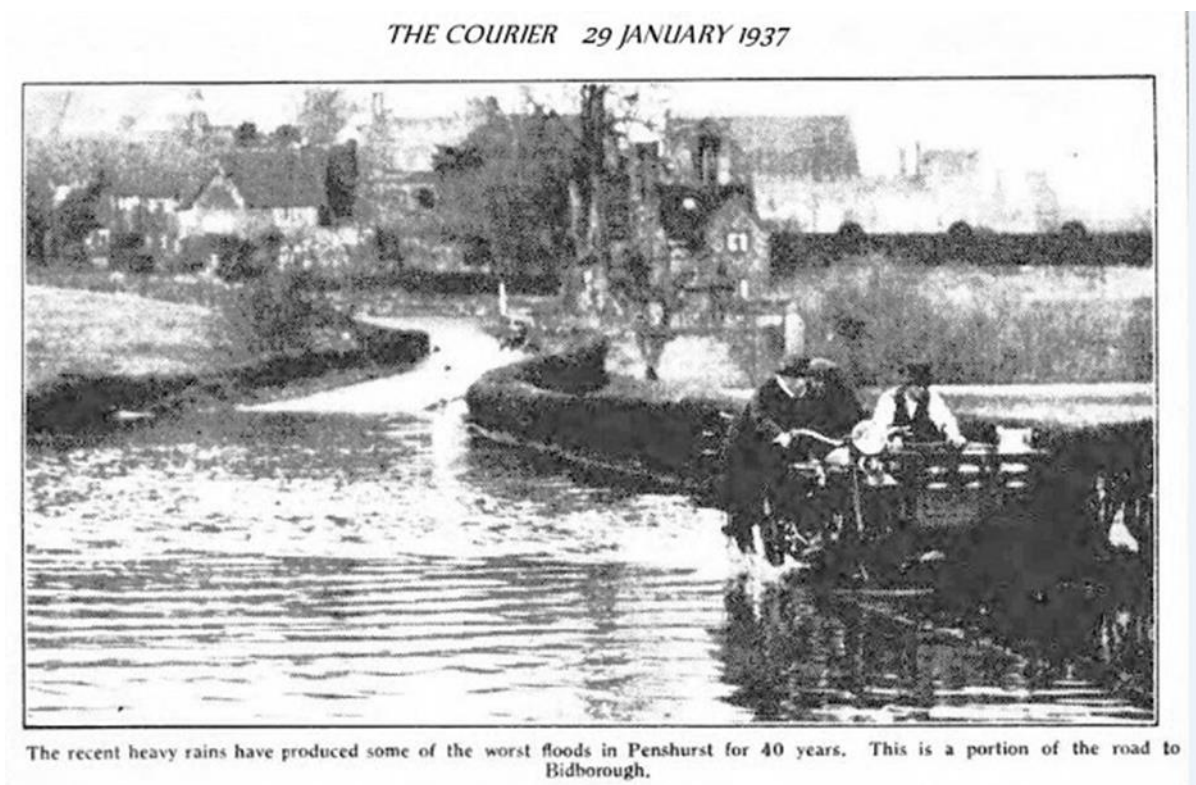
**2. We challenge the EA's assumptions on 'natural flooding'. We do not believe their parameters and assumptions.- In our experience as residents of the village, flooding is greater and lasts for longer when the barrier is shut, so to claim the barrier doesn't affect the village or our property is simply incorrect.**

Environment Agency response to point 2:



We acknowledge that areas of Penshurst can be affected by the operation of the existing Leigh FSA, depending on the size of the flood event.

However, there are historical reports of flooding in Penshurst which occurred prior to the construction of the FSA, demonstrating that the area is affected by natural flooding. Indeed, the FSA itself was constructed in response to the 1968 flood when the flooding at Rogues Hill was so severe that the road bridge over the River Medway was damaged and a temporary bridge had to be installed. The photograph below from a newspaper article (Figure 2) shows flooding on Rogues Hill in 1937. These events demonstrate that Rogues Hill was vulnerable to flooding prior to the construction of the FSA.



*Figure 2: Flooding of Rogues Hill in 1937*

The depth and timing of flooding at Rogues Hill is principally dictated by upstream flows. The following photographs demonstrate this.

The first photograph, below, (Figure 3) was taken in the garden of Colquhouns Cottage (next door to your garden) at 14:12 on 20 December 2019. It shows the water level at approximately 29.0m AOD. Impoundment of the FSA didn't begin until 15:30 on the same day.



*Figure 3: Flooding of the garden of Colquhouns Cottage, 14:12 on 20 December 2019*

The next two photographs (Figures 4 and 5) were taken from Rogues Hill on 16 February 2020. Figure 4 shows the fields immediately upstream of Rogues Hill and was taken at 12:51. Figure 5 was taken from the bridge on Rogues Hill over the River Medway and shows Bridge House. It was taken at 13:13. Impoundment of the FSA didn't begin until 17:15 the same day.



*Figure 4: Flooding of the fields immediately upstream of Rogues Hill, 12:51 on 16 February 2020*





*Figure 5: River Medway and Bridge House, 13:13 on 16 February 2020*

The final photograph (Figure 6), below, was taken 14 minutes earlier than Figure 4 (at 12:37 on 16 February 2020). It shows the bridge on Ensfield Road over the River Medway, 3.9km downstream of Penshurst. It is clear that the river was within bank at this location whilst at the same time there was significant flooding in Penshurst driven by upstream flows. The FSA was not in operation and all the flooding at this time in Penshurst was driven by flows from upstream.



*Figure 6: The bridge on Ensfield Road over the River Medway, 12:37 on 16 February 2020*

These photographs show that the land around Penshurst floods irrespective of operation of the FSA. The FSA only operates when there are high flows in the river. Therefore the same conditions that drive natural flooding in Penshurst also determine operation of the FSA.

**3. We do not understand why no local monitoring has taken place? There has been ample opportunity to monitor and create real reporting on the flood levels in the village, yet it has not been done. Penshurst is the point at which the rivers Eden and Medway meet, it is incredible that this has not been done. No accountability for the excess flooding we see in the village when the barrier is used has been taken, the Environmental Agency have wholly relied on theoretical reporting that does not tally with reality.**

Environment Agency response to point 3:

As stated in our response to your first point, the Environment Agency has flow gauges upstream of Rogues Hill, at Chafford Bridge and Colliers Land Bridge on the River Medway and at Penshurst and Vexour Bridge on the River Eden.

Further monitoring of the rivers is not necessary for our operational purposes. However as mentioned above, in response to the concern within the Penshurst community that the effect of operation of the FSA on flood levels is not reliably predicted through our modelling, we are looking to provide an additional depth gauge in Penshurst, downstream of Rogues Hill.

**4. The Highways agency haven't been consulted despite the fact that damage and therefore adjustment to the road will be inevitable in order to maintain the safety of residents and provide access to the village. This is especially important in regards to the road between the bridges at Rogues Hill which poses a 'Moral Hazard' when flooded as it is impassable, this road flooded recently within an hour of the barrier being closed. This is a main route for school buses and ambulances. Both bridges/roads at either end of the village flood, it is very dangerous to attempt driving through them as demonstrated earlier this year with an overturned lorry.**

Environment Agency response to point 4:

We recognise that Rogues Hill is a major route into and through the village. It is built on a causeway across the flat valley and passes over the River Medway by Bridge House.

For the reasons set out in our response to your first point, the proposed expansion would not increase the flood risk at Rogues Hill. Whilst in certain circumstances when operating the existing FSA can add up to 0.1m to the depth of water at Rogues Hill, the depth and timing of the flooding of Rogues Hill is dictated by upstream flows.

Whilst the expansion of the FSA will not increase the level of flooding experienced at Rogues Hill, we recognise the risks that arise through flooding of the roads around Penshurst. We always warn the public against driving through flood water. Flooding of these and other roads makes them dangerous, with the potential for drivers to try to pass through the floodwater at Rogues Hill and for cars to become stuck with the obvious risk to life this presents and the ongoing blockage to passage after the floodwaters have receded.

There are a number of organisations involved in managing and responding to flood risk. The Environment Agency has powers to manage flood risk from main rivers and Kent County Council provide and manage highway drainage and roadside ditches. Other organisations and risk management authorities also have roles in managing and responding to flooding.

The risk of flooding in the natural floodplain cannot be eliminated. Warning and informing presents the only viable approach to the management of the risk to road users.

As noted in our response to your first point, we are offering to fund the National Flood Forum to help the local community to set up a flood action group where the concerns of the community can be raised with all of the organisations involved in managing flood risk so that ways to mitigate the impact and improve the resilience of the community to flooding can be explored together.

**5. We know that with the proposed rise flooding will be higher and will last longer, what are the Environment Agency planning to do to mitigate the damage this will cause?**

Environment Agency response to point 5:

As explained above our modelling shows that the proposed expansion will not increase the flood risk in Penshurst.

As noted in Figure 1, depending on the size of the event, the proposed changes will increase the depth of flooding at the Leigh end of the FSA, but this effect dissipates toward the upper end of the FSA (downstream of Rogues Hill).

The Environment Agency has carried out detailed assessments of the impact of increasing the depth of water throughout the FSA area, including on the railway embankment, the A21 structure and for property owners who are affected such as at Paul's Farm and the Sailing Club.

We have used these assessments to plan the works which will be needed to mitigate any impacts. These are described in Section 3.2 in the Application.

Section 5.1.3 (page 25) of the Flood Risk Assessment submitted with the planning application gives greater detail on the change in duration of impoundment. In summary, out of approximately 3,000 scenarios modelled and analysed, the maximum additional duration of impoundment is predicted to be between 50-60

hours. However, the majority of events are for a shorter duration and the average is 19 additional hours.

Please note that these periods of time are for immediately upstream of the flow control structure. The duration at Penshurst will be less.

**6. Bridge House has flooded on 3 occasions when the barrier was in play- Dec 13, Dec 19 and Feb 20.**

Environment Agency response to point 6:

Bridge House has been built within the natural floodplain of the River Medway and so unfortunately has flooded numerous times, including prior to the construction of the FSA. It sits within flood zone 3, which is assessed as having a 1% or greater annual probability of flooding.

Whilst Bridge House is within the natural floodplain of the River Medway, and would flood even if the FSA did not exist, we acknowledge that in certain circumstances this can be made worse by the operation of the existing FSA. It is acknowledged within the River Medway (Flood Relief) Act 1976 (the 1976 Act) that properties within the FSA may be affected and the Act provides protections for affected land owners and the right to claim compensation for any damage sustained as a result of operation of the FSA.

It would not be correct to suggest that flooding at Bridge House is solely due to the operation of the FSA. The Environment Agency only operate the FSA during high flows. Therefore, the same conditions that drive natural flooding at Bridge House (and in Penshurst generally) will also determine the operation of the FSA. This does not mean that the FSA causes Bridge House to flood.

**7. There is real concern that the proposed increase will flood the concrete road at Penshurst Place potentially completely cutting off 6 residential properties, farm buildings and worryingly Well Place Nursery School.**

Environment Agency response to point 7:

For the reasons explained in our response to point 1, the proposed change will not increase the depth of flooding at Penshurst. However, this is a matter that has been raised by the Penshurst Place Estate and we are working to address it with them.

**8. Communication from the EA has been sporadic and inconsistent.**

Environment Agency response to point 8:

Your comment is noted.



**9. For example in the proposed scheme the environmental agency states that this scheme has a design life of 40 years, however they go on to say the flooding is 1/75 yrs, why the differential? Then on the recent planning for Bridge House they state flooding as a 1/100 year occurrence +climate change at 25% and that the new extension should be built with a 600mm freeboard, this is inconsistent. In reality though, serious flooding in the village and to Bridge House seems to be been more frequent than this with 3 significant floods in the last 10 years alone.**

Environment Agency response to point 9:

Figure 1 in our response to your first point shows a plan of the additional depth of water during a modelled 1.33% (1 in 75 year) flood event as a result of changing the maximum stored water level from 28.05m AOD to 28.6m AOD.

We chose this scenario to demonstrate the impact of expanding the FSA because it shows the greatest change in flood depths as a result of the proposed change. The depth increase for the majority of the storage area will be greatest for the 1.33% event.

During more extreme flood events, such as a 1% (1 in 100 year) plus climate change event, the increase in depth as a result of the proposed change reduces. This is because the natural flood level, which is greater, dominates.

Please see Section 5.1 (pages 24 to 26) and Appendices A and B of the Flood Risk Assessment for further details. For clarity and to address your concern, figures B1, B2 and B3 in Appendix B of the flood risk assessment show the change in flood depth for the following flood events: 1.33% AEP, 1% AEP and 1%+20% flow AEP.

**10. The model used we understand concentrates on information gathered from immediately behind the barrier not at Penshurst, it has also used flow rates from the 2017 flooding rather than from the peak flooding that was seen in 2013/14.**

Environment Agency response to point 10:

The Medway flood model was completed in 2015 and uses a range of data to capture the complex Medway catchment. The model uses recorded and simulated rainfall data to ensure that a range of events are considered. The flood model does not use a single event. The rainfall and flow data used in the model has been compared to the observed conditions in the 2013 flood event and the model predicts the flow to a good standard.

There is a level gauge close to the control structure at Leigh that records the level inside the storage area, it is not a flow gauge and is not used in the modelling as it

does not record flow. The flow data used to assess the accuracy of the model is collected from the flow gauges on the Medway and Eden upstream of Penshurst.

**11. The modelling is based on a level of 28.395m whilst the proposal is at 28.6m – why? On P21 it is stated that the flood levels will ‘not’ increase near Penshurst Place as a result of the proposed scheme and then they say on P23 that the flood levels in Penshurst will rise by 0.1m, then the map on P24 shows no increase!**

Environment Agency response to point 11:

The model information used in the Environment Agency’s Application to amend the Scheme is based on a storage level of 28.6m AOD, not 28.395m AOD.

The statement on page 24 of the Application is referring to the impact of the existing flood storage area at 28.05m AOD, which can be up to 0.1m for a large flood event if the storage area is used to near capacity. There is no additional increase in flood depth at Penshurst if the maximum storage level is increased to 28.6m AOD.

**12. We are also very concerned to note that in the proposed scheme the flood storage area can be used when the flow rate reaches 35 cubic meters per second when currently the barrier is only impounded when the flow rate is at 70 cubic m/sec. Why is this? If this is to be put in to practice from 35 c.m/s + it will certainly have a detrimental effect to the communities up stream in terms of unnecessary excess water building up. This should be changed to 70c/m/s to reflect what is done in practice.**

Environment Agency response to point 12:

The flow rate at which impounding begins needs to be flexible to enable optimum use of the storage volume in the FSA. This will vary for every flood event. It is important not store flood water too soon to ensure we have capacity to store the peak and the most damaging flood flows for any given event.

For the majority of floods impounding starts around 75 cubic metres per second. However that is not always the case and it may be necessary to impound water at different flows, both higher and lower, to provide the maximum flood risk reduction in Tonbridge.

Altering the Scheme’s minimum operating flow rate in law would fundamentally diminish the ability to operate the FSA, as designed, to reduce flood risk to downstream communities.

**13. We understand that at Pauls Hill the EA have just added that a new embankment is needed to prevent water finding its way around - by only just**

**adding this they demonstrate lack of thoroughness and quite how un-joined up their approach is.**

Environment Agency response to point 13:

The proposed works which are briefly described in section 3.2 of the Application are the culmination of work that began in 2017. It was identified during the outline design phase of the project that it would be necessary to raise the crest of the embankments just south of the railway line and east of Ensfield Road that were constructed as part of the original works in order to protect Leigh.

**14. There is the potential loss of access to Penshurst Place and Gardens affecting local businesses in the village and surrounding areas. Penshurst is in the greenbelt, in an AONB, a large proportion of the properties and their outbuildings are listed, it is a heritage site that should always be protected, on this basis monitoring should have taken place in the village.**

Environment Agency response to point 14:

As explained above, our modelling shows that the proposed expansion will not increase the flood risk in Penshurst, and Rogues Hill becomes flooded irrespective of operation of the FSA. Therefore, the proposed changes will not affect access and egress to Penshurst Place.

Access to Penshurst Place from the M25, Sevenoaks and Tonbridge (via Hildenborough) directions is not affected by any flooding on Rogues Hill. Traffic coming to Penshurst Place from the south might use Rogues Hill, and when the road is flooded it would be necessary to divert around Rogues Hill. The FSA has been operated on ten occasions, for a total duration of about 19 days during the months of September to February, in the last ten years. We consider the operation of the FSA has minimal effect on local businesses.

**15. With the current proposed scheme, flooding will be deeper and take longer to clear, this is going to adversely affect our property, vehicular access to the rear of our property could easily be cut off, our proposed garage, contents and garden flooded and damaged to a far greater degree. It is unacceptable that this has not been considered an issue of any concern to the EA.**

Environment Agency response to point 15:

As explained above, our modelling shows that the proposed expansion will not increase the flood risk in Penshurst, and so your property will not be affected any further than it is already.

Your garden is affected by natural flooding. The photo in Figure 3 shows your neighbour's garden flooded on 20 December 2019, before impoundment of the FSA began. Your garden is a similar level and so would have been similarly affected.

However, the Environment Agency acknowledge that in certain circumstances the existing FSA can increase the depth of flooding at your property by up to 0.1m. There is an agreement in place which covers part of your property where full and final compensation has been paid for any damage caused as a result of the operation of the existing FSA.

As a result of the 2015 Medway flood model, we now know that more land is affected by the operation of the existing FSA than was covered by the agreement. On the occasions where operation of the FSA has caused damage to areas not covered by agreements, the Environment Agency has paid compensation for that damage. This is in accordance with Section 17(4) of the 1976 Act.

Whilst the 1976 Act provides a right for those who suffer damage as a result of operation of the FSA to claim compensation on a case by case basis, we are willing to consider entering into a further agreement with you to fully and finally discharge this obligation. Please let us know if this is something you would wish to discuss further.

**16. To further manipulate the result of the application the EA appear to have cherry picked letters of support from parties who will not have researched, fully understood or have had any reason to question their reporting, so on this basis will not have given any thought to the upstream communities.**

Environment Agency response to point 16:

In May 2019, the Environment Agency's land agent, Dalcour Maclaren, wrote to 36 landowners and tenants within the existing FSA to advise them of the proposed application to increase the maximum stored water level, and to offer a meeting to explain the impact this would have on them and discuss any concerns they had. These letters were followed up with phone calls and 27 parties took up the offer of a meeting. There are no new landowners and/or occupiers that would be brought into the FSA as a result of the proposed expansion.

Alongside this process, the Environment Agency also contacted all of the organisations named within the Act as Specified Interests (plus additional organisations as directed by Defra) to make them aware of the application to expand the FSA, offer meetings to discuss the proposal and any concerns they had on behalf of their residents or members, and to understand what process they would need to go through in order to consider the proposal. These parties are listed in Section 8.1 of the Application. All of these parties, with the exception of Maidstone Borough Council represent members of upstream communities, to a greater or lesser extent.

The organisations have gone through their own processes to ensure that they understand the impact of the proposal on their residents or members.

It was hoped that by carrying out this pre-consultation, the Environment Agency could understand and resolve or mitigate any concerns prior to submitting the Application to the Minister.

The one month long formal consultation for the Application began on submission of the Application to the Minister. Any Specified Interest could make a representation (either of support or objection) during this period, therefore we do not agree that the consultation has been biased.

**RM007 Mr and Mrs Thompson's objection to the Environment Agency's Application to vary the Scheme within the River Medway (Flood Relief) Act 1976**

**Environment Agency technical response, September 2020**

**1. Introduction**

**The Yews is positioned at the bottom of Rogues Hill with the garden extending down to the river Medway some 20m from the house. The flood storage area (FSA) occupies a small part of our garden (as defined in the 1976 act ). The house is Grade II listed, sits in an Area of Outstanding Natural Beauty and is in a Conservation Area.**

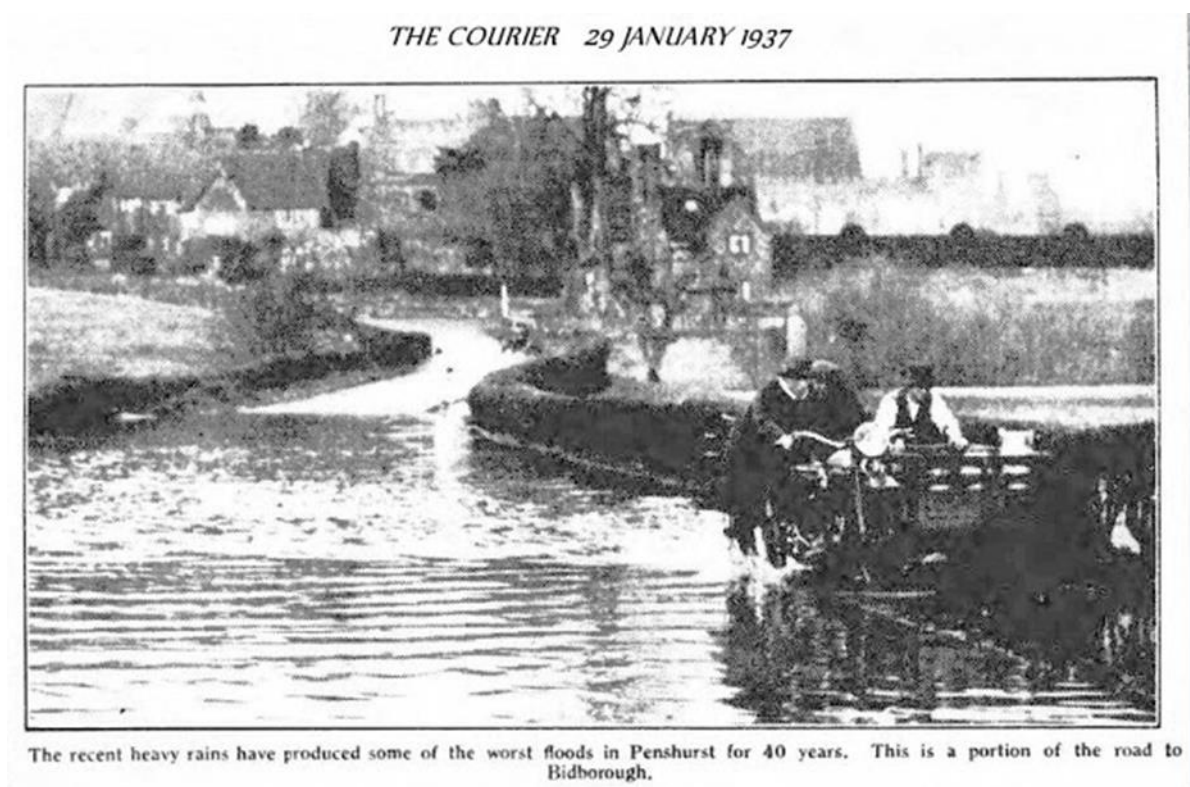
**We have lived at The Yews for over 25 years. In this time, we have kept a watchful eye on the evolving plans from the Environment agency (EA) to expand the flood barrier. I have attended meetings from before 2010 when I believe a proposal was originally announced to raise the height of the water level stored in the FSA.**

**Subsequently to that date, particularly from 2015 onwards, I have met with the EA and their representatives. At every meeting, I have made clear my concerns over the impact of their inappropriate modelling and misguided approach to this project expansion. The project team at EA gives little or no consideration to the significant impact on the village of Penshurst overall or the property and land owners specifically affected.**

Environment Agency response to point 1:

The land adjacent to the Rogues Hill causeway is particularly vulnerable to flooding. The photograph below from a 1937 newspaper article (Figure 1) shows flooding on Rogues Hill. In 1968 the flooding at this location was so severe that the road bridge over the River Medway was damaged and a temporary bridge had to be installed. These events demonstrate that Rogues Hill was vulnerable to flooding prior to the construction of the Leigh Flood Storage Area (FSA).





*Figure 1: Flooding of Rogues Hill in 1937*

In the development of the Leigh FSA expansion scheme, the Environment Agency has used the 2015 Medway flood model to understand how operation of the Leigh FSA currently affects flood water levels upstream of the main embankment, and to understand how the proposal to increase the maximum impoundment level by 0.55m at the control structure will further change these water levels. The hydrological industry uses modelling software, mapping techniques and topographical and rainfall data to understand a wide range of catchment processes, how river catchments respond to different rainfall events, and to identify the impacts of these events.

The Environment Agency has flow gauges upstream of Rogues Hill, at Chafford Bridge and Colliers Land Bridge on the River Medway and at Penshurst and Vexour Bridge on the River Eden. This represents a significant investment in flow monitoring and allows us to understand the water levels on both rivers. Information from these gauging stations was used to calibrate the 2015 Medway flood model and is used to inform the operation of the Leigh FSA.

In addition to the 2015 Medway flood model, the Environment Agency has photographs and data showing the extent of land flooded during previous events, and staff observed the flooding at Rogues Hill in February 2020 to understand the extent of flooding at this location. The timing and extent of the flooding in February 2020 was as predicted by the model, and the model outputs for the peak of the December 2013 flood are consistent with the observed flooding.

The 2015 Medway flood model indicates that in certain circumstances, operation of the FSA can add up to 0.1m to the depth of flood water at The Yews (situated on the downstream side of Rogues Hill).

However, the depth and timing of flooding at Rogues Hill is principally dictated by upstream flows. The following photographs demonstrate this.

The first photograph (Figure 2) was taken in the garden of Colquhouns Cottage (in the High Street, upstream of Rogues Hill) at 14:12 on 20 December 2019. It shows the water level at approximately 29.0 mAOD (metres above Ordnance Datum). Impoundment didn't commence until 15:30 on the same day.



*Figure 2: Flooding of the garden of Colquhouns Cottage, 14:12 on 20 December 2019*

The next two photographs (Figures 3 and 4) were taken from Rogues Hill on 16 February 2020. Figure 3 shows the fields immediately upstream of Rogues Hill and was taken at 12:51. Figure 4 was taken from the bridge on Rogues Hill over the River Medway and shows Bridge House. It was taken at 13:13. Impoundment didn't commence until 17:15 the same day.



*Figure 3: Flooding of the fields immediately upstream of Rogues Hill, 12:51 on 16 February 2020*



*Figure 4: River Medway and Bridge House, 13:13 on 16 February 2020*

The final photograph (Figure 5), below, was taken 14 minutes earlier than Figure 3 (at 12:37 on 16 February 2020). It shows the bridge on Ensfield Road over the River Medway, 3.9km downstream of Penshurst. It is clear that the river was within bank at this location whilst at the same time there was significant flooding in Penshurst



driven by upstream flows. The Leigh FSA was not in operation and all the flooding at this time in Penshurst was driven by flows from upstream.



*Figure 5: The bridge on Ensfield Road over the River Medway, 12:37 on 16 February 2020*

The Leigh FSA only operates when there are high flows in the river. Therefore the same conditions that drive flooding in Penshurst also determine operation of the FSA.

Whilst the 2015 Medway flood model indicates that in certain circumstances, operation of the FSA can add up to 0.1m to the depth of flood water at The Yews, the flood model also indicates that the proposed change to increase the maximum impoundment level will not further increase the depth of flooding at The Yews.

This is illustrated in Figure 6 below. Figure 6 shows the increase in flooding depth from raising the Leigh FSA maximum impoundment level from 28.05 mAOD to 28.6 mAOD (measured at the main Leigh FSA embankment) during a 1.33% flood event. The map below has been taken from the Flood Risk Assessment for consistency. This map has been updated since the submission of the Application. Whilst it shows greater depth variation lower in the FSA, the point at which the effect of the expansion dissipates remains the same.

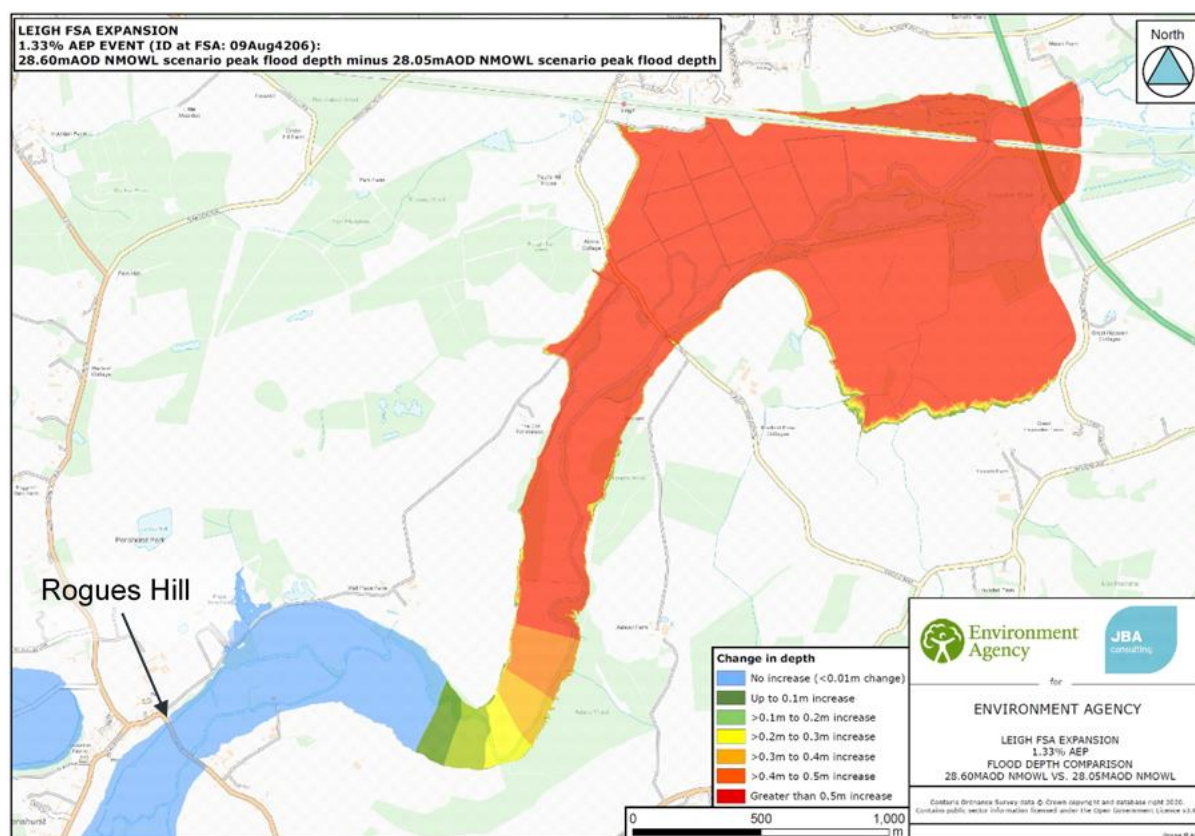


Figure 6: Increase in flood depth in a 1.33% flood event. 28.05m AOD vs 28.6m AOD

The Flood Risk Assessment was submitted with our planning application at the end of August 2020. The planning application reference number is 20/02463/FUL, and it is available for view at the Sevenoaks District Council planning portal:

<https://pa.sevenoaks.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=QFPV1WBK0LO00>

Every flood event is different, depending on a number of factors, including soil saturation and weather patterns. The modelled scenario in Figure 6 was chosen to demonstrate the impact of expanding the FSA because it shows the greatest change in flood depths.

The primary objective of the proposed expansion of the Leigh FSA is to provide improved flood protection to properties in Tonbridge and Hildenborough. The proposed expansion will not reduce the flood risk to Penshurst, however (as explained above) our modelling shows that the expansion will not increase flood risk in Penshurst either.

Our engagement with the community through this scheme has opened a conversation about the wider flooding experienced in Penshurst and the problems this causes. We now recognise the depth of concern in the community about local flooding.

## **2. Reasons for Objection**

**2.1 We remain very concerned about the application to amend the scheme for the operation of the FSA. We fundamentally believe that the EA has not sort to fully understand the impact of the FSA and any changes to the barrier on the village of Penshurst and on our property.**

Environment Agency response to point 2.1:

The steps we have taken to understand the impact of the FSA as currently operated and the impact of the proposed changes is set out in our response to 1 above.

**2.2 At meetings we have had with the EA, I have stressed the need for more accurate measurements of the topographical land levels and resultant water ingress. As a result, they did produce much more accurate land measurements in July 2018, which showed the likely water ingress to my property quite clearly. See appendix H in the application, showing the dark blue natural flood outline. This line appears to have expanded beyond the “limit of land to be acquired” as a result of the 1976 Act, visible in appendix J of the November 1975 River Medway Flood Relief Plan. It is also worth noting in the map, demonstrating an enlarged section of my property. Appendix H excludes the Eastern extent of my property which is where the lowest land levels are and the areas which are most likely to flood.**

Environment Agency response to point 2.2:

The ‘limit of land to be acquired’ shown on the Deposited Plans at Appendix J of our Application relates to the acquisition of easements to flood. It is not the maximum extent of land authorised to be flooded by operation of the FSA.

**2.3 At meetings with the EA and their representatives, I have raised concerns that they do not understand the flows of water at Penshurst when the flood barrier is in operation. I believe this is fundamental in determining the impact of flooding on Penshurst and its residents. Indeed on at least two occasions, employees of the EA have told me they have never visited Penshurst when the barrier is raised. They said their focus was on the operation of the barrier and the flooding downstream, not on Penshurst. This flawed position together with inadequate consultation and communication with all the connected parties cannot be consistent with finding an appropriate even-handed outcome for this planned expansion. In any situation like this, a majority of land and property owners are set to gain but a minority inevitably lose out. A concerted effort needs to go in to control the negative impact and compensate property and landowners for it appropriately.**



Environment Agency response to point 2.3:

The steps taken to understand the flows of water within the FSA, including at Penshurst, are set out in our response to point 1. We are not aware of any evidence that materially changes the predictions of the 2015 Medway flood model.

In response to the concern within the community in Penshurst that the effect of operation of the FSA on flood levels is not reliably predicted through our modelling, we are looking to provide an additional depth gauge in Penshurst, downstream of Rogues Hill. This will provide definitive data on this issue, and will hopefully provide the reassurance sought by the community.

As explained in section 5 of the Application, the River Medway (Flood Relief) Act 1976 (the 1976 Act) recognises that owners of property upstream of the control structure affected by the operation of the FSA may suffer a loss and so provided the right to be compensated for damage due to that operation. The Environment Agency acknowledges this obligation.

### **3. Issues for Penshurst**

**3.1 The valley in which Penshurst sits is a natural flood plain with a pinch point between the village church to the North and Bridge House and The Yews to the South. In between are two bridges and about 80 metres of road which is raised as a causeway in an attempt to allow traffic to pass despite flooding.**

**This is a critical area for the whole village as it is the main road B2176 to Tonbridge and Tunbridge Wells to the South and Hildenborough and Sevenoaks to the North. Its closure causes huge disruption to the area, unlike Ensfield Road to the Northwest which is broader, quieter and designed to close with enough turning space.**

**At Penshurst Place, the concrete road going East from the entrance arch to Ensfield Road floods quickly after the barrier is raised, causing difficult access to their car park, facilities and is the only route to the Nursery School at Wells Farm. That road was built and raised to avoid this issue and is clearly failing in its purpose when the barrier is at its current highest position.**

**In addition, for us at The Yews and Bridge House the effect is just as quick as water comes up through the ground level effect in the fields by the causeway before the Eden and Medway have broken their banks. When this happens, the causeway is quickly underwater and as seen in 1999/2000, 2013/2014 and 2019/2020, soon after the road is impassable to all traffic.**

**Descending Rogues Hill is very tight with very limited visibility. You reach the bridge very quickly where there is no turning space. From the opposite direction coming through the village you turn sharply right and are immediately at the other bridge again with very little turning space.**

**Unsurprisingly, when the flood water is running high, the causeway becomes a dangerous traffic nightmare.**

**Southern Water back in 1976 partially recognised these issues by paying compensation, including modest amounts to the residents on the South Side of Penshurst High Street. The EA appears to have rewritten history and geography here by ignoring the whole issue.**

Environment Agency response to point 3.1:

We share your concerns over the impact of flooding in the village. There are a number of organisations involved in managing and responding to flood risk. The Environment Agency has powers to manage flood risk from main rivers and Kent County Council provide and manage highway drainage and roadside ditches. Other organisations and risk management authorities also have roles in managing and responding to flooding.

The risk of flooding in the natural floodplain cannot be eliminated. Warning and informing presents the only viable approach to the management of the risk to road users.

We have made an offer to Penshurst Parish Council to fund the National Flood Forum to help the local community to set up a flood action group where the concerns of the community can be raised with all of the organisations involved in managing flood risk so that ways to mitigate the impact and improve the resilience of the community to flooding can be explored together. We hope we can rely upon your support with this offer.

We are working with Penshurst Place Estate to address the flood risk to their Concrete Road.

As explained in the response to point 2.3, the Environment Agency acknowledge the obligation to pay compensation where a loss is suffered due to operation of the FSA, and this obligation relates to both the existing arrangement and the proposed changes. Our land agent would be happy to discuss this further with you. However, the Environment Agency does not have to agree compensation before submitting the Revised Scheme to Defra as they are separate discussions that will not prevent the Minister from determining the Revised Scheme.

**3.2 I have said at many meetings with the EA over the last 5 years that they need to do a very detailed traffic survey of the village, both under normal conditions and when the flood barrier is fully utilised. Back in 1976, Penshurst was a sleepy village but now that is far from the case. The B2176 is a very well used local road, including traffic from all emergency services. There are several timetabled bus routes through the village plus many school pick up/drop off buses. Commuters are very active at the beginning and end of the day with many main line stations and business parks within reach. Not to**

**mention the vast increase in `white van traffic` for both work and delivery services plus heavy farm and building traffic. It is obvious that a detailed study is needed by Sevenoaks Council Highways Agency to fully understand the traffic implications of any expansion to the FSA. To the best of my knowledge, nothing of this kind has happened to date. In fact, it would appear that Sevenoaks council has naively believed the EA`s view that the changes will have no impact on their constituents at Penshurst.**

**When the road through Penshurst is closed, chaos ensues as detouring West via Fordcombe is very tight and can easily take an extra 15 minutes. Going East via Tonbridge is much longer and with heavy traffic and flood detours can easily take 30 minutes. As the EA tell us “Because of climate change” and the increased level of the barrier proposed (28.05m to 28.65m) we must expect to see roads closed for twice as long, for a 8 day period, as the water takes longer to clear. This is an extremely serious level of disruption for the 800 residents of Penshurst and residents of the local area. The EA should be pushed hard to investigate and properly measure this meaningful level of inconvenience for all.**

Environment Agency response to point 3.2:

Whilst the proposed expansion will not exacerbate the present situation, we recognise the risks that arise through flooding of the roads around Penshurst. We always warn the public against driving through flood water. Flooding of these and other roads makes them dangerous, with the potential for drivers to try to pass through the floodwater at Rogues Hill and for cars to become stuck with the obvious risk to life this presents and the ongoing blockage to passage after the floodwaters have receded.

As noted above, we are offering to fund the National Flood Forum to help the local community to set up a flood action group where the concerns of the community can be raised with all of the organisations involved in managing flood risk so that ways to mitigate the impact and improve the resilience of the community to flooding can be explored together.

#### **4. Geology**

**4.1 Geology is another significant local feature that the EA find easier to ignore. The bulk of Eastern Penshurst sits on a natural outcrop of very porous Wealden sandstone. This has been used extensively in building Penshurst Place and many local houses. I would argue, and have done so with the EA, that understanding this is essential in trying to calculate the flows of water during flooding, exacerbated when the barrier is in use.**

**With this in mind, viewing the valley at Penshurst when it starts to flood would show how quickly water flows through the underground water table. You can**

**clearly see in many fields and our garden water bubbling up through the ground to start the flooding process well before the rivers break their banks.**

Environment Agency response to point 4.1:

The impact of groundwater flooding due to local geology on the storage capacity of the FSA is considered in section 3.4.1 (page 16) of the Flood Risk Assessment submitted with our recent planning application.

**4.2 I believe a detailed geological survey is essential and it would quickly prove that some of the EA's modelling assumptions are seriously flawed. It explains why the water flows quickly upstream through Penshurst when the barrier is raised. Indeed the EA's projection at an increase of 0.5 m to the height of the barrier would only result in an increase of 0.1m of water passing through the village is seen as laughable by the residents. It would also appear to run contrary to the assumptions Southern Water made as part of the 1976 Act.**

Environment Agency response to point 4.2:

Please see our responses to points 1 and 4.1 above.

## **5. River Levels**

**5.1 It is clear that with living very close to the rivers Medway and Eden confluence, understanding the FSA is a regular topic of conversation for myself and other residents, such as Kevin Storey. In the last 25 years, there have been some 5 major flooding issues where the top water levels at the barrier were 27m above sea level or higher. These were December 1999, the last two months of 2000, December 2013 (the highest at over 28m above sea level), December 2019 and February 2020.**

Environment Agency response to point 5.1:

As explained in the response to point 1, the depth and timing of flooding at Rogues Hill is principally dictated by upstream flows, and those same flows trigger operation of the FSA. The largest flood events at Penshurst are also likely to result in the largest volumes being stored in the FSA. Therefore, whilst it is acknowledged that operation of the FSA can, in certain circumstances, raise the flood water levels by up to 0.1m at Penshurst, this does not mean that operation of the Leigh FSA causes the flooding in Penshurst.

**5.2 On all occasions, the background was the same, significantly they all occurred at the beginning or end of the year i.e deep mid-winter. The tendency was to be after an extended period of very heavy rainfall. This was coming from persistent frontal weather systems travelling from the Atlantic, moving from the South West in an Easterly direction. Persistent rain filled up the water table to saturation point here in Kent which is normally a county which enjoys much drier weather than most of the United Kingdom.**

Environment Agency response to point 5.2:

Noted.

**5.3 The ground is constantly awash and water rushes down to the valleys to the point below Well Farm where the Eden and Medway rivers meet. Thereafter, the water speeds rapidly Eastwards to the sea. The EA's explanation that raising the barrier increases the water in the valley from the bottom may suit their argument but makes no sense. The valley is already saturated so raising the barrier traps more water in the flood plain and therefore increases the height of the water effectively filling it from the top.**

Environment Agency response to point 5.3:

Your comment on this is noted.

**5.4 I am sure proper measurement of the flood water will show this higher water level, quickly moving back upstream to Penshurst and beyond. Meanwhile, as well as heavy rain there are usually extreme winds driving the water down the valley to the pinch point at the causeway. One can see this with marked wave patterns moving in an Easterly direction often over 1m in height. I would imagine this is a result of the flood water being driven down the valley meeting with the water backed up by the raised barrier. This is no doubt exaggerated by the valley's variable topography to which the EA refer. Thereby significantly increasing its depth, spread and therefore flooding impact at this crucial Penshurst pinch point.**

Environment Agency response to point 5.4:

Your comment on this is also noted.

**5.5 To claim that the increased barrier height would make little difference to water levels in Penshurst clearly runs contrary to historic data. I can only**

**imagine this is a result of some very optimistic assumptions buried deep within the model. The predicted work carried out in the mid 1970s would have appeared to have been more realistic only to have been overtaken by significant changes in weather patterns and rainfall levels. I conclude that the modelling carried out must be deeply flawed, not in terms of its approach or mathematics but it assumes wildly optimistic, self-serving assumptions. Similarly, the land level measurements that took place in Penshurst some years ago were very inaccurate. These were corrected by a very detailed survey undertaken by JC White in July 2018. This survey clearly reflects where the water goes and shows that it is quickly beyond the area of land acquired under the “Right to Flood” facility in the 1976 act. Following the same precedent, the flood modelling should all be redone using transparent and more realistic assumptions. This is the only way that the swift and overwhelming flood water effect on Penshurst can be understood. Logically, it is then that appropriate measures and compensation can be given to residents and land-owners who will suffer the consequences with the significant impact on their livelihoods and devaluation of their property.**

Environment Agency response to point 5.5:

The Environment Agency remains confident that the 2015 Medway flood model and the results produced by it are sufficiently accurate to understand the flood risk at The Yews.

Those who designed the FSA in the 1970s did not have the benefit of these resources. We now find that the maximum extent of a flood at The Yews may affect more land than is shaded blue on the plan in the 1985 agreement. But that plan does not define the area that can be flooded. Instead it defines the area to be protected from activities that interfere with the flow of flood water.

We recognise that your garden and the outbuildings within it are at risk from flooding, but there is a possibility that property level flood protection measures could be used to protect your stables and cottage that might be affected by a larger flood. We understand from our representatives that you do not wish to explore this option however if you wish to explore this together then we are willing to commission a report from a specialist in property level protection for us to consider together.

Alternatively, whilst the 1976 Act provides the right for those who suffer damage as a result of operation of the Scheme to claim compensation, we are willing to consider an option to fully and finally discharge this obligation.

## **6. Flooding; Frequency, Depth & Flow Rates**

**6.1 We believe the flooding in 2013/2014 & 2019/2020 showed a significant expansion of the Natural Flood Outline. The barrier was in full operation during these periods and this clearly demonstrates that the flooding is greater, deeper and lasts longer than any natural flooding.**



Environment Agency response to point 6.1:

For the reasons explained in our response to point 1 above, we consider that operation of the FSA currently adds minimal depth and extent to flooding at Penshurst.

**6.2 Prior to the last year, the EA have constantly referred to the 1 in 100 years plus climate change as the scenario to be defended against. It was also frequently stated that this was the scenario used in their plans. In the current application, the EA have suddenly changed this to a 1 in 75 year scenario.**

**Why the change? Particularly as it is contrary to the national guidance. With at least 3 major floods in the last decade, the EA have clearly got a much more frequent issue to attend to.**

Environment Agency response to point 6.2:

Figure 6 in our response to point 1 shows a plan of the additional depth of water during a modelled 1.33% (1 in 75 year) flood event as a result of changing the maximum stored water level from 28.05m AOD to 28.6m AOD.

We chose this scenario to demonstrate the impact of expanding the FSA because it shows the greatest change in flood depths as a result of the proposed change. The depth increase for the majority of the storage area will be greatest for the 1.33% event.

During more extreme flood events, such as a 1% (1 in 100 year) plus climate change event, the increase in depth as a result of the proposed change reduces. This is because the natural flood level, which is greater, dominates.

Please see Section 5.1 (pages 24 to 26) and Appendices A and B of the Flood Risk Assessment for further details. For clarity and to address your concern, figures B1, B2 and B3 in Appendix B of the flood risk assessment show the change in flood depth for the following flood events: 1.33% AEP, 1% AEP and 1%+20% flow AEP.

**6.3 Many people in Penshurst have requested measuring water depths at the causeway with Kevin and I particularly outspoken on this matter. After 2013/2014 the EA did install a measuring post on the river bank opposite the Bridge House. For those of us who monitor water depths the top of this post is about 1.5m below the maximum levels reached in those two flood incidents. The measuring post is wholly inadequate, is this deliberate or incompetence?**

Environment Agency response to point 6.3:

We acknowledge that the gauge board can be improved for higher flows and we are investigating replacing this.

**6.4 Flow rates are also an issue subject to recent change by the EA. The current scheme allows for the FSA to be used when the rate of flow in the river Medway exceeds 35 cubic metres / second. Since 2011 the EA have only used the FSA when flow rates exceed 75 cubic metres/ second. They say that “going too early” would leave less storage capacity and indeed there is some evidence building that letting water flow through Penshurst more quickly could manage flooding more effectively. However, retaining the right to raise the barrier triggered by the lower flow rate could start impounding too soon. With a higher maximum height of the barrier, this could significantly increase the flood levels around Bridge House, The Yews and Eastern Penshurst.**

Environment Agency response to point 6.4:

The flow rate at which impounding begins needs to be flexible to enable optimum use of the storage volume in the FSA. This will vary for every flood event. It is important not store flood water too soon to ensure we have capacity to store the peak and the most damaging flood flows for any given event.

For the majority of floods impounding starts around 75 cubic metres per second. However that is not always the case and it may be necessary to impound water at different flows, both higher and lower, to provide the maximum flood risk reduction in Tonbridge.

Altering the Scheme’s minimum operating flow rate in law would fundamentally diminish the ability to operate the FSA, as designed, to reduce flood risk to downstream communities.

**6.5 The EA’s intention to spend money on new embankments may well help shield additional properties in Hildenborough, for example, from flooding when the barrier is fully raised. However, we would be very concerned that this could alter the balance of water in the FSA thereby increasing the amount of water held upstream at Penshurst.**

Environment Agency response to point 6.5:

Our proposal to increase the capacity of the FSA will result in flood water being stored to a greater depth, greater extent and longer duration when used. However, for the reasons explained in our response to point 1, the impact of the proposed change ends some distance downstream of Rogues Hill.

## **7. Other Issues**

**7.1 We have reached out to Tom Tugendhat, our MP and have had a number of conversations with Matt at his office. Tom has a conflict of interest with this proposal in that he represents more constituents in Tonbridge and areas to the East who would benefit from the scheme than West of the barrier who are likely to suffer.**

**He indeed spoke in the house in support of the EA plans however he has made it clear to us that this support is predicated on the residents of Penshurst being looked after and the appropriate compensation paid for the increased flood risk to land and properties.**

Environment Agency response to point 7.1:

We note your comments about Tom Tugendhat MP's involvement.

As explained in Section 5 of the Application, the 1976 Act provides the right for those who suffer damage as a result of operation of the Scheme to claim compensation. If any claim is not agreed then the 1976 Act also provides a mechanism for the compensation claim to be determined by a court.

**7.2 The detailed mapping and measuring of our property 'The Yews' shows a small area to the East of my land (the attached map shows this ) that used to belong to the estate but for the last 40 years or more has been part of the curtilage of The Yews.**

**Land marked in green on the map indicates part of The Yews curtilage at the Eastern end of the property**

**I have spoken to Ben Thomas at Penshurst Place and he is quite happy that this is the case. He recognises that we have improved this parcel of land and indeed added brick walls creating better security for the adjacent Enterprise Centre. We will follow this up and make this formal with the Land Registry.**

**We have told the EA and their representatives about this on many occasions as it is the lowest lying area of our property and does flood by over 1 ft when the barrier is fully raised. The photo attached shows this area of the garden and the adjacent field, owned by the Estate, underwater in 2019. The same thing happened in 2013/2014, also flooding the old barn and a shed in the same piece of land. On both occasions I did not make a claim against the EA on either occasion as I did not want to trigger an insurance claim for flooding on this property. We have never made an insurance claim for flooding on this property, and neither did the previous residents.**

Environment Agency response to point 7.2:

Noted.

**7.3 In the June 2020 submission to DEFRA to amend the Leigh Flood Storage Area maximum stored water level are a number of supportive letters. These come from a variety of MPs, Councillors and interested parties all of whom represent areas to the East of the FSA. Unsurprisingly, they are all in favour of the scheme and by contrast there is no representation from anyone whose interest lies to the upstream of the flood barrier who might understandably have significant objections.**

Environment Agency response to point 7.3:

In May 2019, the Environment Agency's land agent, Dalcour Maclaren, wrote to 36 landowners and tenants within the existing FSA to advise them of the proposed application to increase the maximum stored water level, and to offer a meeting to explain the impact this would have on them and discuss any concerns they had. These letters were followed up with phone calls and 27 parties took up the offer of a meeting. There are no new landowners and/or occupiers that would be brought into the FSA as a result of the proposed expansion.

Alongside this process, the Environment Agency also contacted all of the organisations named within the Act as Specified Interests (plus additional organisations as directed by Defra) to make them aware of the application to expand the FSA, offer meetings to discuss the proposal and any concerns they had on behalf of their residents or members, and to understand what process they would need to go through in order to consider the proposal. These parties are listed in Section 8.1 of the Application. All of these parties, with the exception of Maidstone Borough Council represent members of upstream communities, to a greater or lesser extent.

The organisations have gone through their own processes to ensure that they understand the impact of the proposal on their residents or members.

**7.4 There was a presentation last year by the EA to the Penshurst Parish Council that was open to the public. I attended and there were over 50 villagers present who made serious and strongly worded complaints about the proposal. The EA representatives promised to take note of the comments and have correspondence with the Parish council to make sure our views were properly reflected. I can see no mention of these views in the detailed document of submission which again clearly reflects how little consideration the EA gives to Penshurst and its residents' views. We think this is an unacceptable bias from a public body in a significant and sensitive application.**

#### Environment Agency response to point 7.4:

We are sorry that you feel we have disregarded the concerns of the Penshurst residents that attended the meeting in 2019. We hope that (i) the additional information supplied in this response, (ii) the proposal to replace the gauge board near Bridge House, (iii) the proposal to install additional depth gauging downstream of Rogues Hill, and (iv) the offer to fund the National Flood Forum to help the local community to set up a flood action group where the concerns of the community can be raised with all of the organisations involved in managing flood risk, addresses these concerns.

### **8. Conclusion: A Call for a full, independent inquiry**

**8.1 Some 4 years ago when the first serious meetings with the EA representatives took place, they stated there was a strong desire to gain information from us, share background with us and keep us informed with their progress. Since that meeting, they have been consistently unhelpful, we have not been provided with the information promised and they have adopted the attitude that their proposal does not affect Penhurst and therefore our views carry no weight. I had to resort to a request under “The Freedom of Information Act” to extract some information which was still very slow to arrive and given grudgingly. Information about compensation paid after completion in 1982 was never provided. This is important to me as it took until 1985 for a sum of £10,000 to be paid to the then owners of the The Yews. Was that the total sum paid and was there a protracted dispute ? Some of us contacted Southern Water, who at that stage were responsible for the project and they said all papers were handed over to the EA in good order. Dalcour Maclaren have been representing the EA in recent years and they have been far from impressive and just appear to have the role of an unhelpful buffer between us and the EA.**

#### Environment Agency response to point 8.1:

We are sorry that you feel that we have given insufficient attention to the views of the residents of Penshurst. Whilst we maintain that the proposal to increase the maximum impoundment level from 28.05 mAOD to 28.6 mAOD has no affect at Penshurst, our engagement through this scheme has raised awareness of the concerns of the community over the wider flooding issues in the area.

We have no records of how the sum of £10,000 was agreed to be consideration for the 1985 agreement.

**8.2 As you can see from the issues explored herein, the proposal to increase the flood storage area would have a significant and potentially life changing impact on the livelihood and safety of Penshurst residents and local traffic**

**attempting to pass through the causeway. It has been frustrating to have been promised consultation throughout the process, and then to see such a lack of transparency. For example, four years ago the EA said they would pay for reasonable legal and advisory fees for us relating to understanding and challenging their proposal. This offer was subsequently withdrawn in totality without explanation.**

Environment Agency response to point 8.2:

For the reasons set out in our response to point 1 above, we do not agree that the proposal to increase the maximum level to which water can be stored in the FSA will have a significant impact on the livelihood and safety of Penshurst residents and local traffic. Instead, the proposal will have no additional impact, and whilst we acknowledge that in certain circumstances, operation of the FSA can add up to 0.1m to the depth of water at The Yews (and Penshurst), the risks that exist arise primarily from high river flows.

**8.3 For the sake of clarity, however I would like to state that my intention is not to stop an expansion of the FSA by way of raising the water retention height at the barrier. I realise that thousands of properties in Tonbridge and further downstream of the Medway will benefit significantly from this. One could however consider how wise the planning authorities have been in granting permission for so many properties to have been built in a well-known flood plain. My argument is that a full impartial, detailed inquiry of the impact of the increased flood risk on Penshurst should take place as soon as possible and be made public. My view on the short coming of what has happened, the absence of actual measuring of water depths at the causeway pinch point in Penshurst being the most important. Following on from that should have been appropriate adjustments and mitigation measures but more realistically significant compensation. The value of our property has already been significantly undermined and the expansion has not yet taken place. This is why we are going on record with a formal objection to expand the size and depth of the Leigh Flood Storage Area, based on the deeply flawed analysis provided by the EA in their application.**

Environment Agency response to point 8.3:

We hope that the additional information provided in this response goes some way to addressing your concerns.



# **RM008 Mrs Menard's objection to the Environment Agency's Application to vary the Scheme within the River Medway (Flood Relief) Act 1976**

## **Environment Agency technical response, September 2020**

1. I have lived at Longford since June 2007 and have seen how my neighbours' properties have been affected by the flooding and understand that there is now a risk that my garage could be flooded. My household usually has at least two cars parked at the bottom of our garden next to our garage. If we were away from our house for a number of days (perhaps on holiday or visiting family members) and there was a flood there could be damage to cars left on our driveway.

Environment Agency response to point 1:

Longford is on the very edge of the land that might be flooded. The plan below (Figure 1) shows the extent of your property shaded. In the southern part of your property is a small area shaded blue. This is the land that might currently be flooded by a 1% AEP + 20% flood event. You will note that your garage, which is situated on raised land, is not affected.

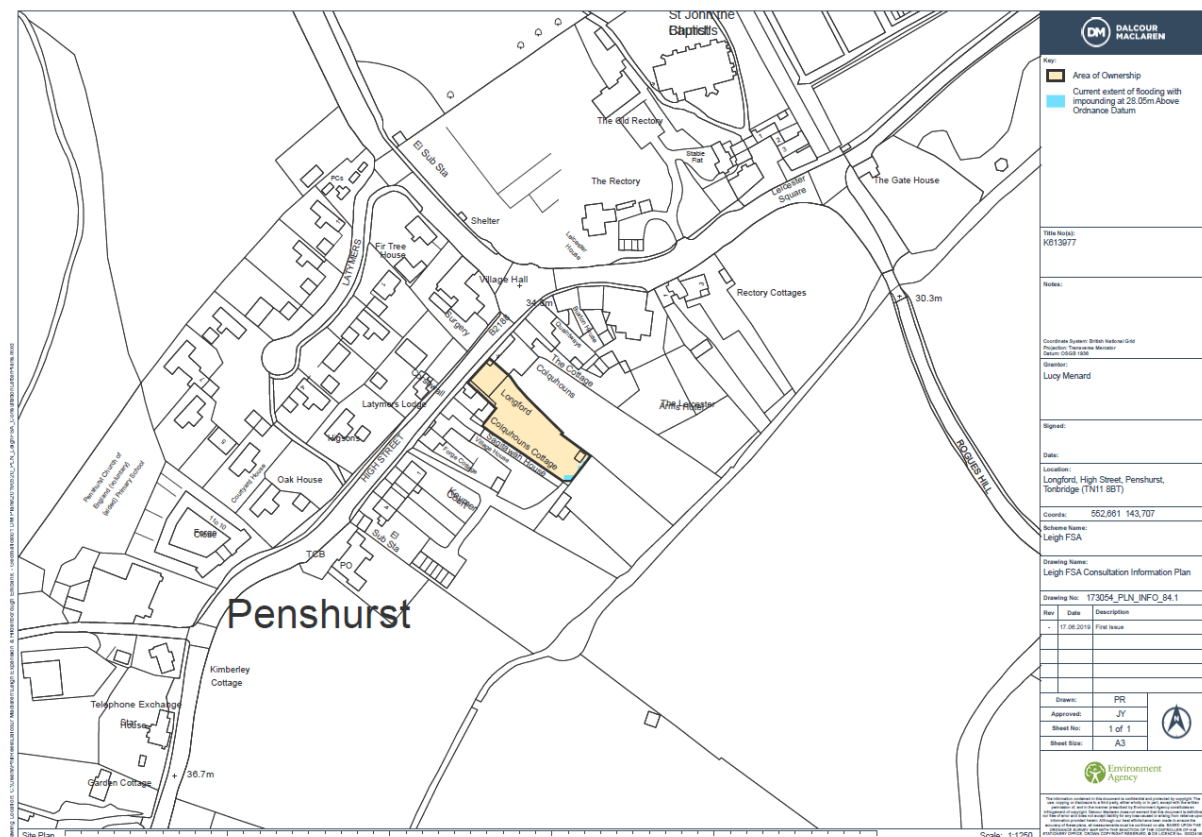


Figure 1: Extent of your property (Longford) that might be affected in a 1% AEP + 20% flood event.

Our modelling indicates that the proposed change to increase the maximum impoundment level will not increase the depth of flooding in the gardens of the properties on the High Street in Penshurst. This is demonstrated in Figure 2 below. Figure 2 shows the increase in flooding depth from raising the Leigh FSA maximum impoundment level from 28.05m Above Ordnance Datum (AOD) to 28.6m AOD (measured at the main Leigh FSA embankment) during a 1.33% flood event. The map below has been taken from the Flood Risk Assessment for consistency. This map has been updated since the submission of the Application. Whilst it shows greater depth variation lower in the FSA, the point at which the effect of the expansion dissipates remains the same.

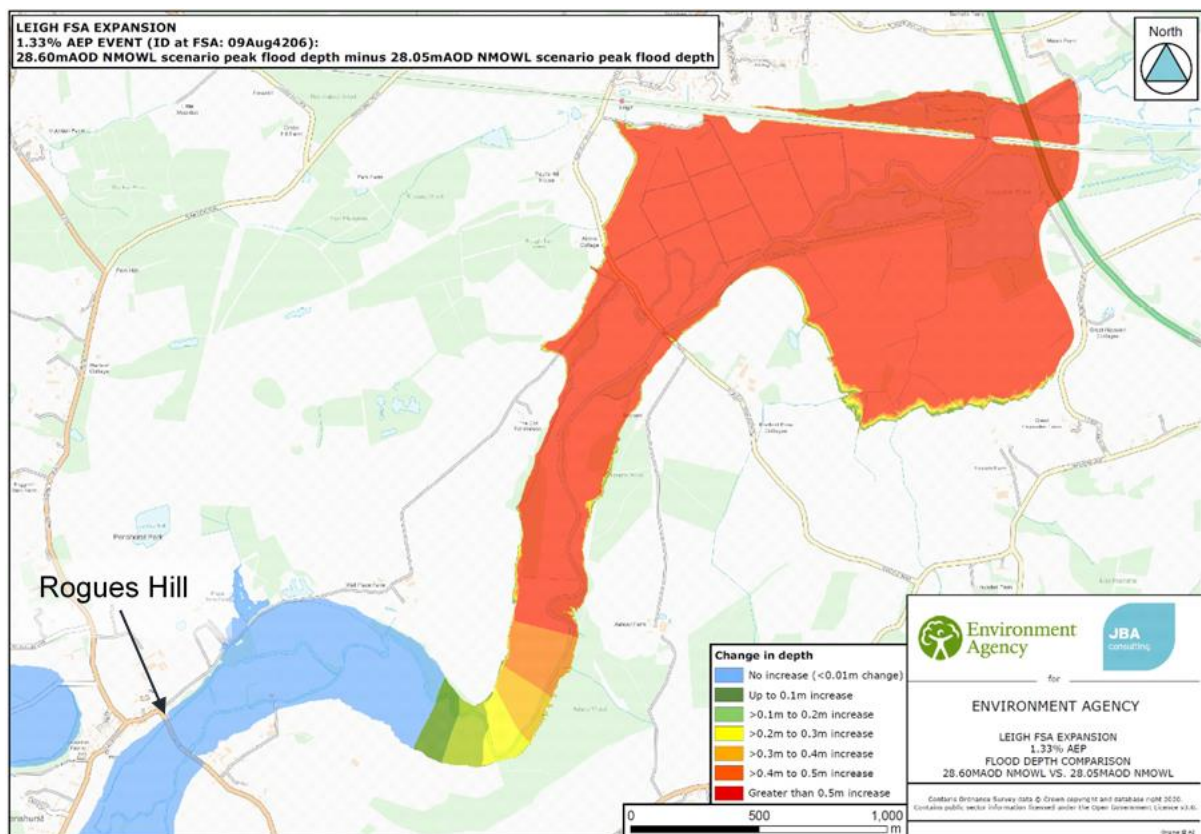


Figure 2: Increase in flood depth in a 1.33% flood event. 28.05m AOD vs 28.6m AOD

The Flood Risk Assessment was submitted with our planning application at the end of August 2020. The planning application reference number is 20/02463/FUL, and it is available for view at the Sevenoaks District Council planning portal:

<https://pa.sevenoaks.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=QFPV1WBK0LO00>

Every flood event is different, depending on a number of factors, including soil saturation and weather patterns. The modelled scenario in Figure 2 was chosen to demonstrate the impact of expanding the FSA because it shows the greatest change in flood depths.

**2. I object to this application to vary the Scheme for the operation of the Leigh Flood Storage Area. The Environment Agency (EA) has failed to properly understand the effect that the operation of the Flood Storage Area (FSA) has on Penshurst. Because of this lack of understanding it has developed a theoretical model of flood events that is fundamentally flawed. This has a knock on effect through the whole project.**

Environment Agency response to point 2:

The Environment Agency, and the wider hydrological industry, uses modelling software, mapping techniques and topographical and rainfall data to understand a wide range of catchment processes, how river catchments respond to different rainfall events, and to identify the impacts of these events.

The Environment Agency has flow gauges upstream of Rogues Hill, at Chafford Bridge and Colliers Land Bridge on the River Medway and at Penshurst and Vexour Bridge on the River Eden. This represents a significant investment in flow monitoring and allows us to understand the water levels on both rivers. Information from these gauging stations was used to calibrate the 2015 Medway flood model and is used to inform the operation of the Leigh Flood Storage Area (FSA).

In addition to the 2015 Medway flood model, the Environment Agency has photographs and data showing the extent of land flooded during previous events, and staff observed the flooding at Rogues Hill in February 2020 to understand the extent of flooding at this location. The timing and extent of the flooding in February 2020 was as predicted by the model.

**3. The main issue seems to be that there is no measuring of water levels at the confluence of the River Eden and the River Medway a few hundred metres upstream of Bridge House and so the EA rely on theoretical modelling.**

**4. Measurement of actual flood levels should have been taken at the confluence of two major Kent rivers to understand the effect that the operation of the FSA causes during times of flooding. Instead the EA relies on measuring actual flood levels at Colliers Land Bridge for the River Medway and Vexour Bridge for the River Eden and then estimating the effect after the confluence. This is a fundamental flaw. Modelling is only ever as good as the inputs into it, if the inputs are flawed, the outputs will also be flawed.**

Environment Agency response to points 3 & 4:

As stated above, the Environment Agency has flow gauges upstream of Rogues Hill at Chafford Bridge and Colliers Land Bridge on the River Medway, and Penshurst and Vexour Bridge on the River Eden. This allows us to understand the flow in both rivers, including after the confluence.

Whilst it is always possible to further refine the calibration of any flood model by considering more baseline data, the Environment Agency is confident that the modelled flood data is sufficient to understand the flood risk at Penshurst, and additional flow gauging data from points downstream of the confluence will align with the outputs of the 2015 Medway flood model.

We appreciate, however, that we need to address the concerns of the community in Penshurst on this issue, and are looking to provide additional depth gauging in Penshurst downstream of Rogues Hill. This will provide definitive data on this issue, and will hopefully provide the reassurance sought by the community.

**5. The EA assumes that “Natural Flooding” occurs rather than being the effect of impounding the FSA. In my experience of living in Penshurst (in Longford since 2007 and previously at The Village House, High Street, Penshurst 1999-2007) this is not true. There is evidence from neighbours that all floods from 2000 to 2020 in the Village have occurred after the impounding of the FSA takes place. This flooding is greater than, and lasts for a longer duration than, any natural flooding.**

Environment Agency response to point 5:

We acknowledge that areas of Penshurst can be affected by the operation of the existing Leigh FSA, depending on the size of the flood event. However, the area is within the floodplain of the River Medway so can also be affected by naturally-occurring flooding.

Please see the photographs below showing that natural flooding occurred at Penshurst prior to the operation of the FSA. The first (Figure 3) was taken in the garden of Colquhouns Cottage at 14:12 on 20 December 2019. Impoundment didn't commence until 15:30 on the same day.





*Figure 3: Flooding of the garden of Colquhouns Cottage, 14:12 on 20 December 2019*

The next two photographs below (Figures 4 and 5), were taken from Rogues Hill on 16 February 2020. Figure 4 shows the fields immediately upstream of Rogues Hill and was taken at 12:51. Figure 5 was taken from the bridge on Rogues Hill over the River Medway and shows Bridge House. It was taken at 13:13. Impoundment didn't commence until 17:15 the same day.



*Figure 4: Flooding of the fields immediately upstream of Rogues Hill, 12:51 on 16 February 2020*



*Figure 5: River Medway and Bridge House, 13:13 on 16 February 2020*

The final photograph (Figure 6), below, was taken 14 minutes earlier than Figure 4 (at 12:37 on 16 February 2020). It shows the bridge on Ensfield Road over the River Medway, 3.9km downstream of Penshurst. It is clear that the river was within bank at this location whilst at the same time there was significant flooding in Penshurst driven by upstream flows. The Leigh FSA was not in operation and all the flooding at this time in Penshurst was driven by flows from upstream.



*Figure 6: The bridge on Ensfield Road over the River Medway, 12:37 on 16 February 2020*



The above photographs confirm that the land around Penshurst floods before operation of the FSA. The FSA only operates during high flows, and so therefore the same conditions that drive flooding in Penshurst will also determine the operation of the FSA. This does not mean that the FSA causes the flooding in Penshurst.

**6. In the EA's Strategic Flood Policy it states that 1 in 100 years plus climate change is the scenario that should be defended against. Throughout this project the EA have always quoted 1 in 100 years plus climate change as the scenario used. In the application the EA have quoted a 1 in 75 years scenario. This conflicts with their own National Guidance.**

Environment Agency response to point 6:

Figure 2 in response 1 above shows a plan of the additional depth of water during a modelled 1.33% (1 in 75 year) flood event as a result of changing the maximum stored water level from 28.05m AOD to 28.6m AOD.

We chose this scenario to demonstrate the impact of expanding the FSA because it shows the greatest change in flood depths as a result of the proposed change. The depth increase for the majority of the storage area will be greatest for the 1.33% event.

During more extreme flood events, such as a 1% (1 in 100 year) plus climate change event, the increase in depth as a result of the proposed change reduces. This is because the natural flood level, which is greater, dominates.

Please see Section 5.1 (pages 24 to 26) and Appendices A and B of the Flood Risk Assessment for further details. For clarity and to address your concern, figures B1, B2 and B3 in Appendix B of the flood risk assessment show the change in flood depth for the following flood events: 1.33% AEP, 1% AEP and 1%+20% flow AEP.

**7. The current Scheme allows the FSA to be used when the rate of flow in the River Medway exceeds 35 cubic metres per second. Since 2011 the EA have only used the FSA when the flow exceeds 75 cubic metres per second, as to "go too early" would leave them with no spare capacity. Yet they ask to retain the lower figure. This places a great risk on Penshurst. With an increased capacity they could start impounding of the FSA too early and this would increase flood levels.**

Environment Agency response to point 7:

The flow rate at which impounding begins needs to be flexible to enable optimum use of the storage volume in the FSA. This will vary for every flood event. It is important not store flood water too soon to ensure we have capacity to store the peak and the most damaging flood flows for any given event.

For the majority of floods impounding starts around 75 cubic metres per second. However that is not always the case and it may be necessary to impound water at different flows, both higher and lower, to provide the maximum flood risk reduction in Tonbridge.

Altering the Scheme's minimum operating flow rate in law would fundamentally diminish the ability to operate the FSA, as designed, to reduce flood risk to downstream communities.

**8. Tom Tugendhat MP has been supportive of our vulnerable position within this proposal.**

Environment Agency response to point 8:

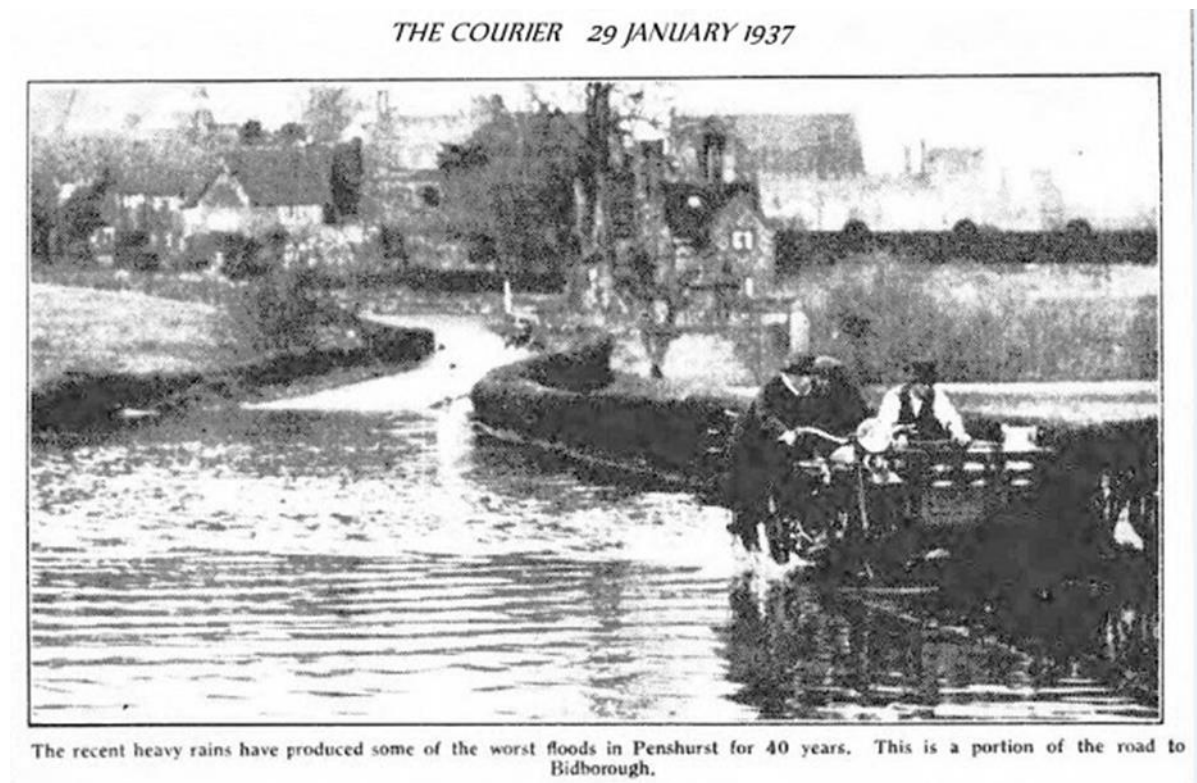
Noted.

**9. Rogues Hill is a major route into and through the Village. It is the route used by the Fire Brigade, Police and Ambulance Service responding to emergency calls. It is also used by school buses and village traffic. When the EA impound the FSA this road floods to a depth of up to 1 metre, making it impassable, yet vehicles still attempt to pass. Raising the level of the FSA can only increase this flooding. This would create a Moral Hazard, with the potential for death. The water flow is known to be in excess of 70 cubic metres per second and should a school bus attempt to go through the flood, it could easily be carried away downstream. This risk of multiple death is high. The EA have merely said that it is the responsibility of the Highways Agency.**

Environment Agency response to point 9:

As you state, Rogues Hill is a major route into and through the village. It is built on a causeway across the flat valley 200m downstream of the confluence of the Rivers Eden and Medway. Rogues Hill passes over the River Medway by Bridge House. The lowest part of Rogues Hill is particularly vulnerable to flooding.

The photograph below from a 1937 newspaper article (Figure 7) shows flooding on Rogues Hill. In 1968 the flooding at this location was so severe that the Rogues Hill road bridge over the River Medway was damaged to such an extent a temporary bridge had to be installed. These events show that Rogues Hill has historically experienced flooding and that it is not the operation of the Leigh FSA that causes flooding.



*Figure 7: Flooding of Rogues Hill in 1937*

In your representation you suggest that Rogues Hill floods to up to 1m deep as a result of the operation of the FSA. Whilst in certain circumstances the FSA can, when operating, add up to 0.1m to the depth of water at Rogues Hill, the depth and timing of the flooding of Rogues Hill is dictated by upstream flows. This is shown by the photographs provided in response to 5.

To further illustrate this, the peak of the most recent flood at Penshurst Gauging Station was at 01:30 on 17 February 2020 (see Figure 8 below) and the water level was falling as the water levels in the Leigh FSA were rising (see Figure 9). Penshurst Gauging Station is situated on the River Eden about 2.8 km upstream of Rogues Hill, and so the peak of this flood will occur earlier at Penshurst Gauging Station than at Rogues Hill but it clearly demonstrates that the water level in the river is not influenced by the operation of the FSA.

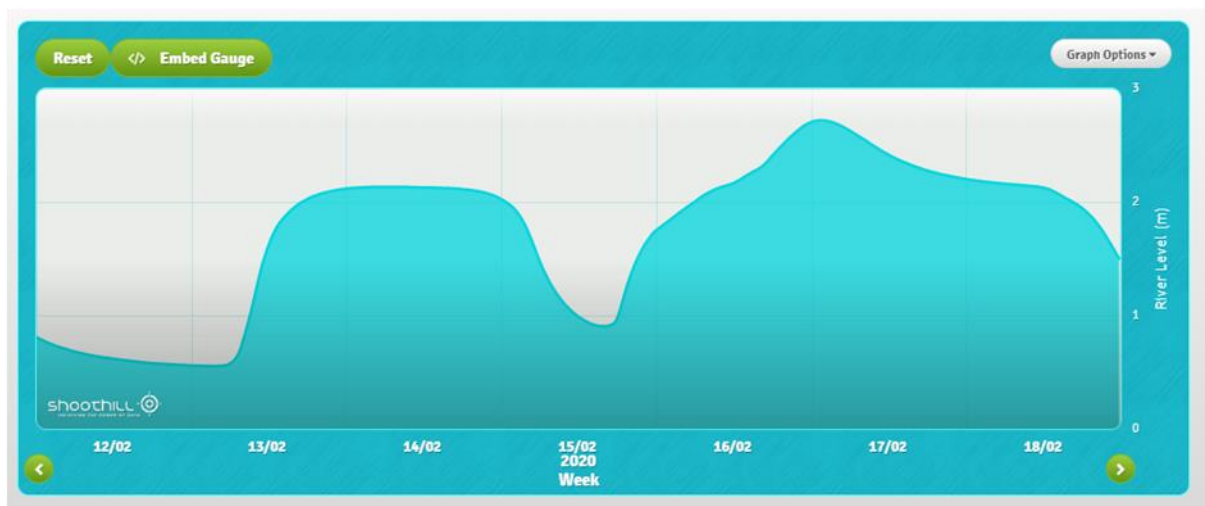


Figure 8: Water levels at Penshurst gauging station 12 to 18 February 2020. Image from Shoothill Gauge map using data from Environment Agency gauging station

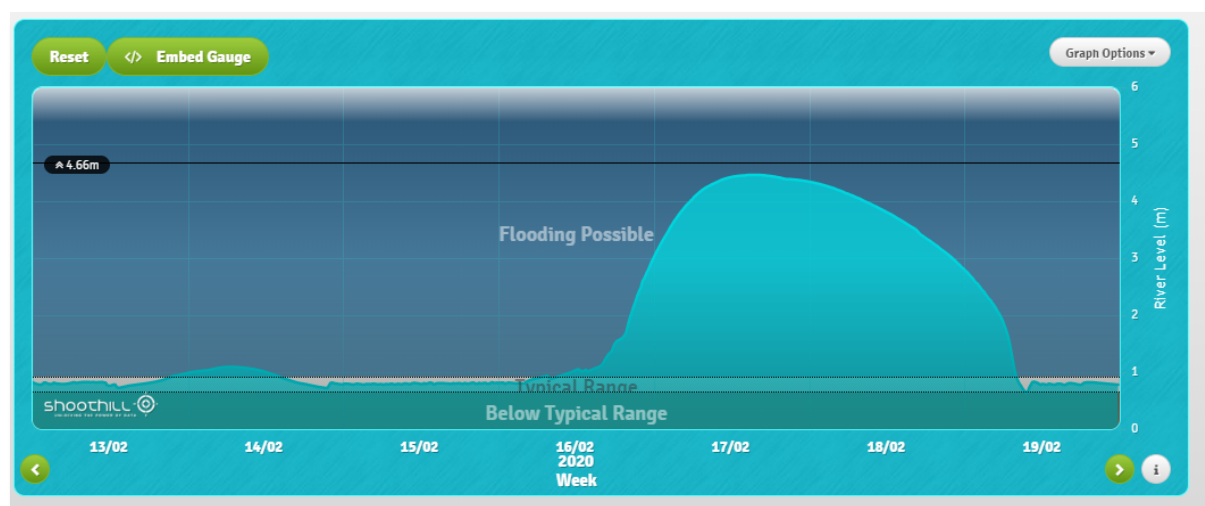


Figure 9: Water levels at Leigh Barrier upstream gauging station 13 to 19 February 2020. Image from Shoothill Gauge map using data from Environment Agency gauging station

For the reasons set out in 1 above, the proposed expansion does not increase the flood risk at Rogues Hill. Therefore, the proposed expansion does not exacerbate the present situation.

Whilst the expansion of the Leigh FSA will not increase the level of flooding experienced at Rogues Hill, we recognise the risks that arise through flooding of the roads around Penshurst. We always warn the public against driving through flood water. Flooding of these and other roads makes them dangerous, with the potential for drivers to try to pass through the floodwater at Rogues Hill and for cars to become stuck with the obvious risk to life this presents and the ongoing blockage to passage after the floodwaters have receded.

There are a number of organisations involved in managing and responding to flood risk. The Environment Agency has powers to manage flood risk from main rivers and Kent County Council provide and manage highway drainage and roadside ditches.

Other organisations and risk management authorities also have roles in managing and responding to flooding.

The risk of flooding in the natural floodplain cannot be eliminated. Warning and informing presents the only viable approach to the management of the risk to road users.

As a result, we are offering to fund the National Flood Forum to help the local community to set up a flood action group where the concerns of the community can be raised with all of the organisations involved in managing flood risk so that ways to mitigate the impact and improve the resilience of the community to flooding can be explored together.

**10. When the Leigh FSA was built in 1982 the EA's predecessor identified the risk of access to properties on the Penshurst Estate, and paid for the construction of a concrete road to ensure safe access. The EA's proposal to raise the height of the FSA now places access via that same concrete road at risk. There are six residential properties and farm buildings but also a nursery school with many children in its care who could face being cut off during a flood.**

Environment Agency response to point 10:

This is a matter that has been raised by the Penshurst Place Estate and we are working to address it with them.

**11. Flooding will affect a number of properties on the High Street, not just Longford. There are buildings used for warehousing, hobbies and garages to the rear of these properties. Increased flooding will cause damage to property and access problems. One of these properties also claimed compensation for flooding caused by the EA's impounding of the FSA in December 2013. Early in 2020 the EA admitted liability and paid compensation to the owner of the property.**

Environment Agency response to point 11:

Section 4.2 (page 24 and 25) of the Application and our response to 1 above explains the impact the proposed change to the flood water levels. This is also explained in greater detail in section 5.1 (pages 24 to 26) of the Flood Risk Assessment submitted with the planning application.

You will see that no change is expected to the extent of flooding or depth of water at the properties on the High Street, which are upstream of Rogues Hill, as a result of the proposal to increase the maximum stored water level.