

**RM003 Penshurst Place Estate's objection to the Environment Agency's  
Application to vary the Scheme within the River Medway (Flood Relief) Act 1976**

**Environment Agency technical response, February 2021**

**Introduction**

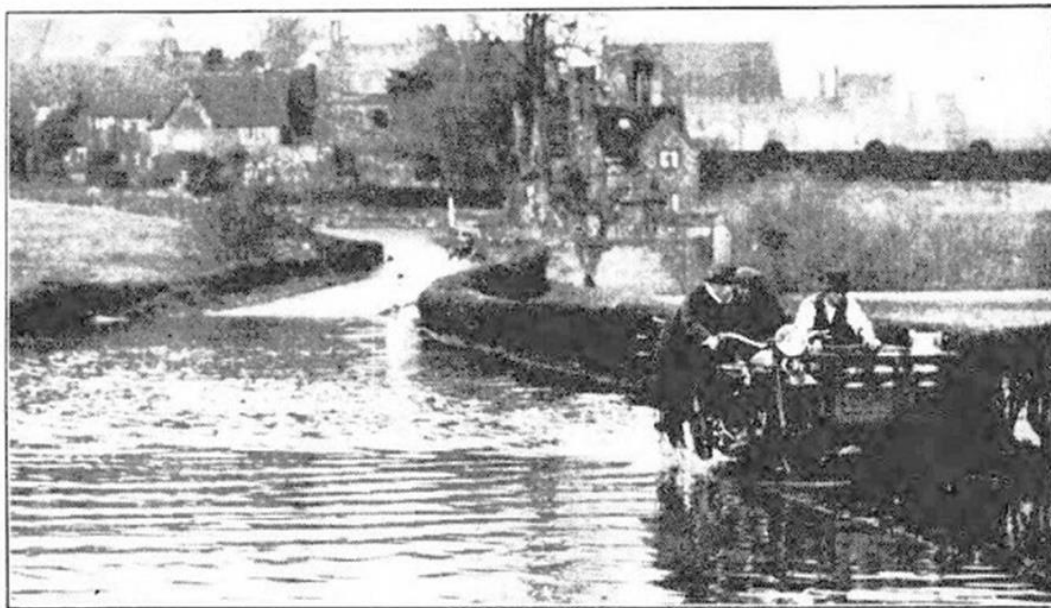
The Environment Agency acknowledge that a significant proportion of the existing Leigh Flood Storage Area (FSA) falls within the Penshurst Place Estate, and so the Penshurst Place Estate is a Specified Interest as defined in Section 17 of the River Medway (Flood Relief) Act 1976 (the 1976 Act).

A significant proportion of the existing FSA is within the natural flood plain of the River Medway and as such floods naturally. However, operation of the FSA increases the depth of this natural flooding, and therefore the extent, particularly at the downstream end of the FSA. The modelled additional extent of flooding during a 1% AEP + climate change flood event, with the water level at the control structure at 28.05m Above Ordnance Datum (AOD) is shown coloured light blue in Appendix I of the Application.

**The effect of natural flooding**

Penshurst is within the natural floodplain of the River Medway and so has always been subject to flooding. The photograph below from a 1937 newspaper article (Figure 1) shows flooding on the B2176 Rogues Hill, where it leads into Penshurst. 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 the low-lying land around Penshurst flooded prior to the construction of the Leigh FSA.

*THE COURIER 29 JANUARY 1937*

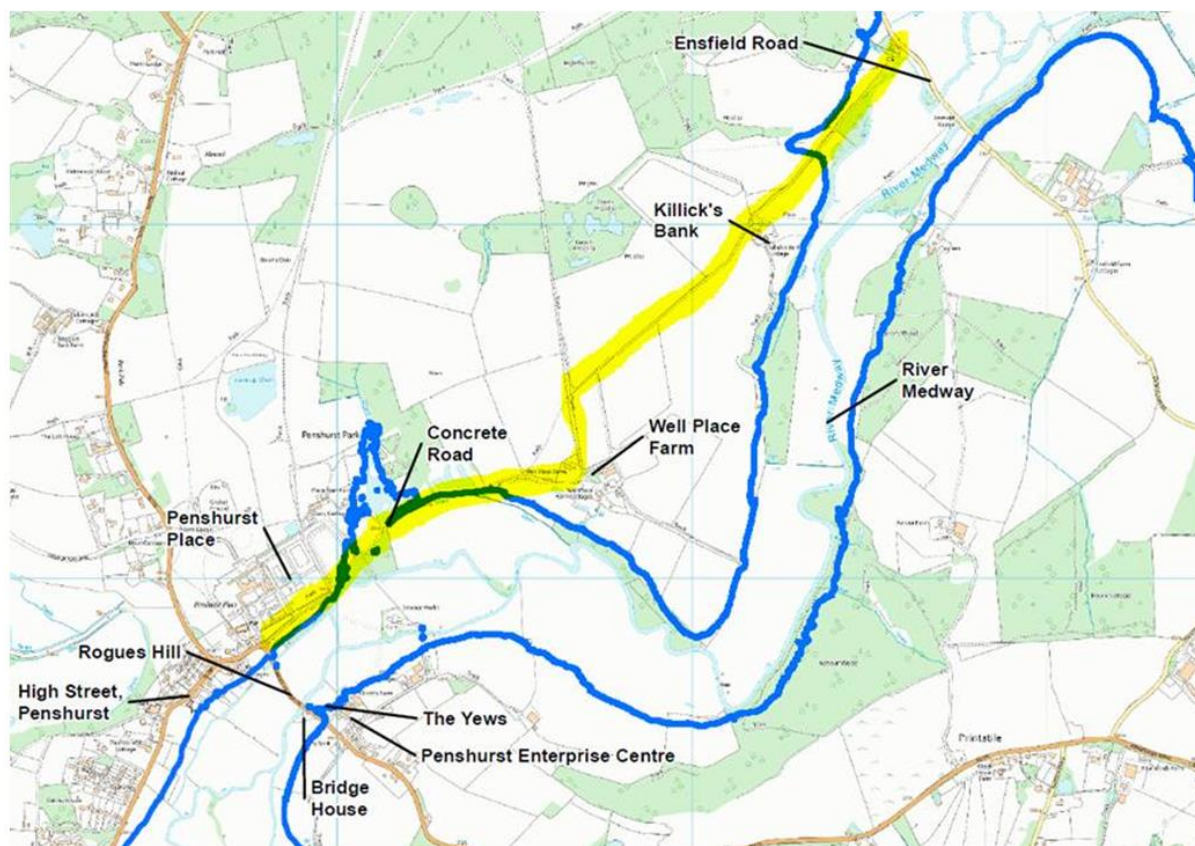


The recent heavy rains have produced some of the worst floods in Penshurst for 40 years. This is a portion of the road to Bidborough.

*Figure 1: Flooding of Rogues Hill in 1937*

### **The Concrete Road**

The Concrete Road is a private road within the Penshurst Place Estate, which runs from the B2176 Rogues Hill, by The Gatehouse on Leicester Square, to Ensfield Road. There are two low points on the Concrete Road, both of which sit within the natural floodplain. The section most affected by flooding is the final stretch of road, where the Concrete Road joins Ensfield Road. The other section that can be affected is near Place Barn Farm.



*Figure 2: The location of the Concrete Road, highlighted in yellow*

### **The use of flood modelling**

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 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 (measured at the control structure) will further affect these water levels.

### **The effect of the existing FSA**

The 2015 Medway flood model indicates that in certain circumstances, operation of the FSA can currently add up to 0.1m to the depth of flood water on the downstream side of Rogues Hill in the location of the Concrete Road by Place Barn Farm. However, the depth and timing of flooding at Rogues Hill is principally dictated by upstream flows. The following photographs demonstrate this.

These four photographs (Figures 3, 4, 5 and 6) were taken from the Concrete Road and Rogues Hill on 16 February 2020 and show extensive flooding of farmland downstream of Rogues Hill and in the vicinity of the Concrete Road. They were taken between 12:54 and 12:59 and at 16:58. Impoundment didn't commence until 17:15 the same day.



*Figure 3: Flooding of fields downstream of Rogues Hill, taken from the Concrete Road at 12:54 on 16 February 2020*



*Figure 4: Water ponding in paddock in front of Dairy Cottage at Place Barn Farm, taken from the Concrete Road at 12:58 on 16 February 2020*



*Figure 5: Flooding of fields alongside the Concrete Road near Place Barn Farm, taken from the Concrete Road at 12:59 on 16 February 2020*



*Figure 6: Flooding of fields downstream of Rogues Hill, taken from Rogues Hill at 16:58 on 16 February 2020*

The final two photographs (Figures 7 and 8), below, were taken 19 and 17 minutes, respectively, earlier than Figure 3 (at 12:35 and 12:37 on 16 February 2020). They were taken by 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 7: The River Medway looking upstream from Ensfield Road, taken at 12:35 on 16 February 2020*



*Figure 8: The downstream face of the bridge on Ensfield Road over the River Medway, taken at 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.

### **The effect of the proposed expanded FSA**

Whilst the 2015 Medway flood model indicates that in certain circumstances, operation of the existing FSA can add up to 0.1m to the depth of flood water on the downstream side of Rogues Hill and the Concrete Road near Place Barn Farm, the flood model also indicates that the proposed change to increase the maximum impoundment level will not further increase the depth of flooding in these locations.

This is illustrated in Figure 9 below. Figure 9 shows the increase in flooding depth that would be caused by 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.

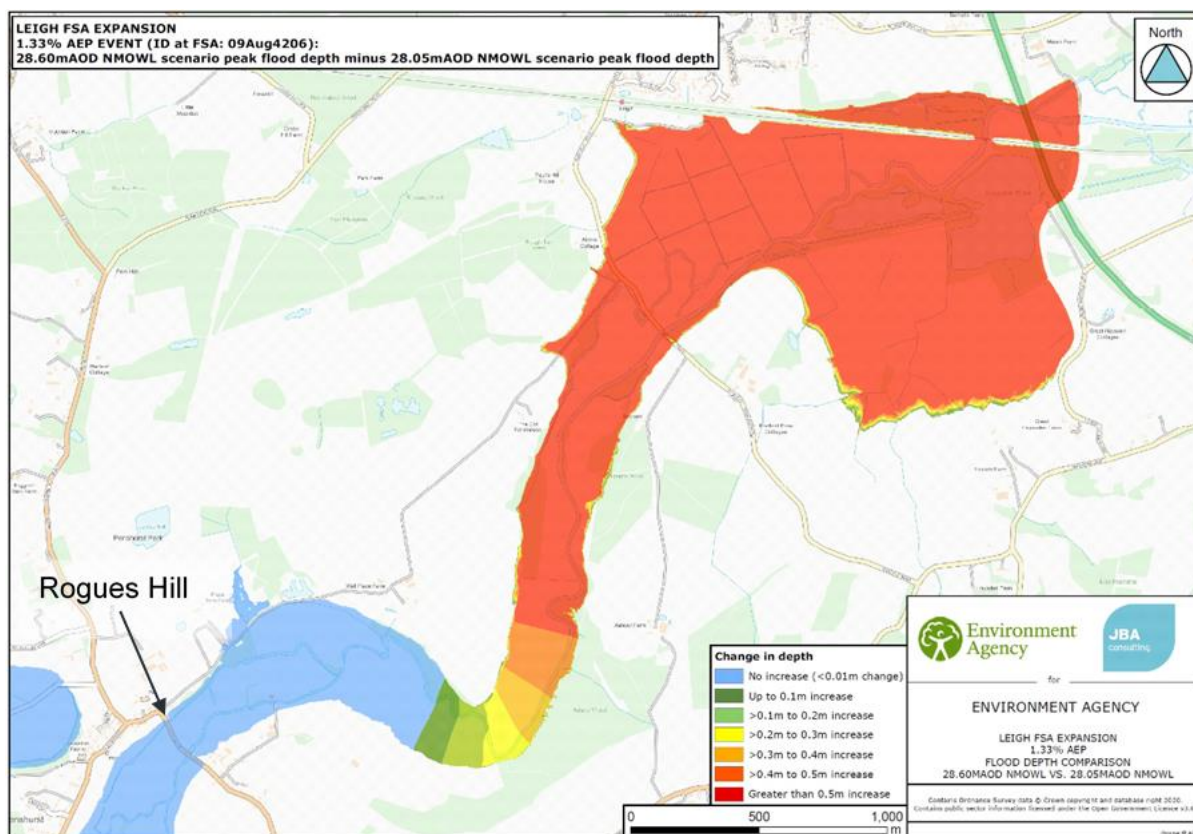


Figure 9: Increase in flood depth in a 1.33% flood event. 28.05m AOD vs 28.6m AOD

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>

This application was approved by Sevenoaks District Council on 8 January 2021.

Every flood event is different, depending on a number of factors, including soil saturation and weather patterns. The modelled scenario in Figure 9 was chosen to demonstrate the impact of expanding the FSA because it shows the greatest change in flood depths.

Figures 10 and 11 below show the increase in flooding depth that would be caused by 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% (Figure 10) and 1% + climate change (Figure 11) flood events. More information can be found in section 5.1.2 and Appendices B2 and B3 of the Flood Risk Assessment.

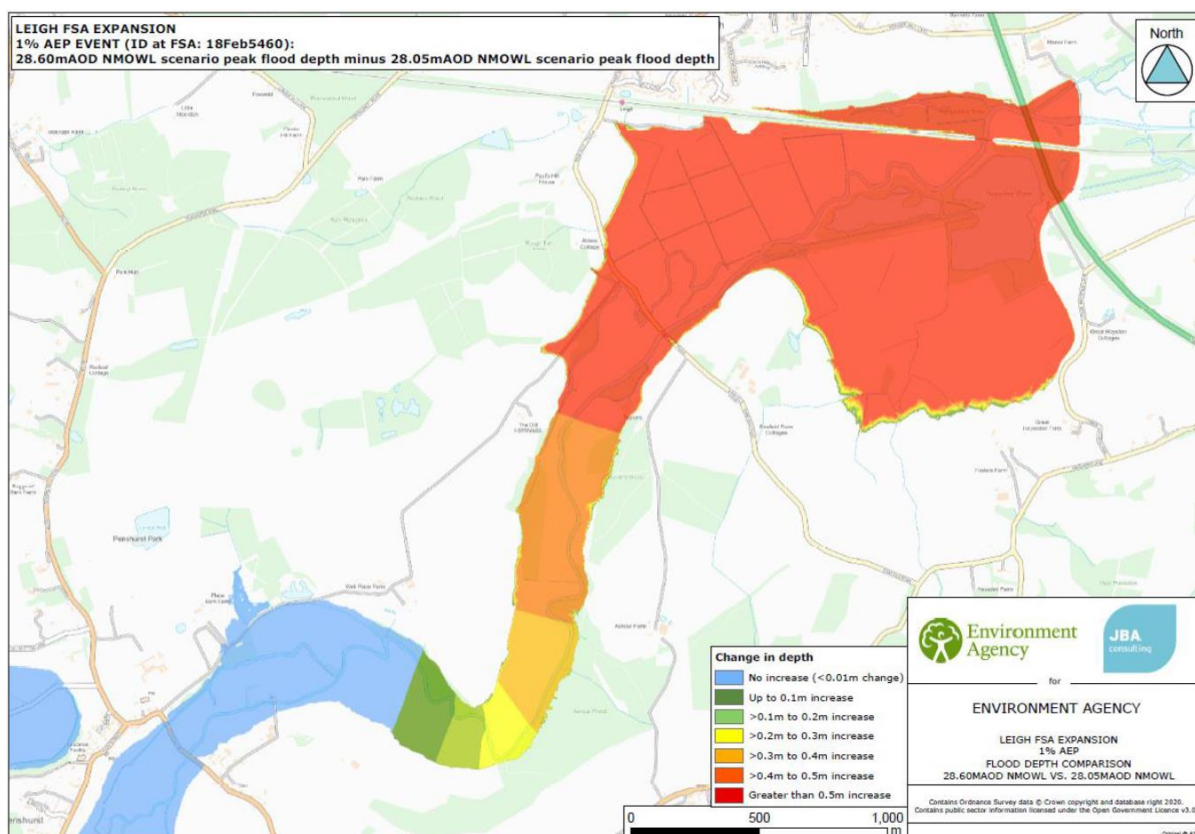


Figure 10: Increase in flood depth in a 1% flood event. 28.05m AOD vs 28.6m AOD

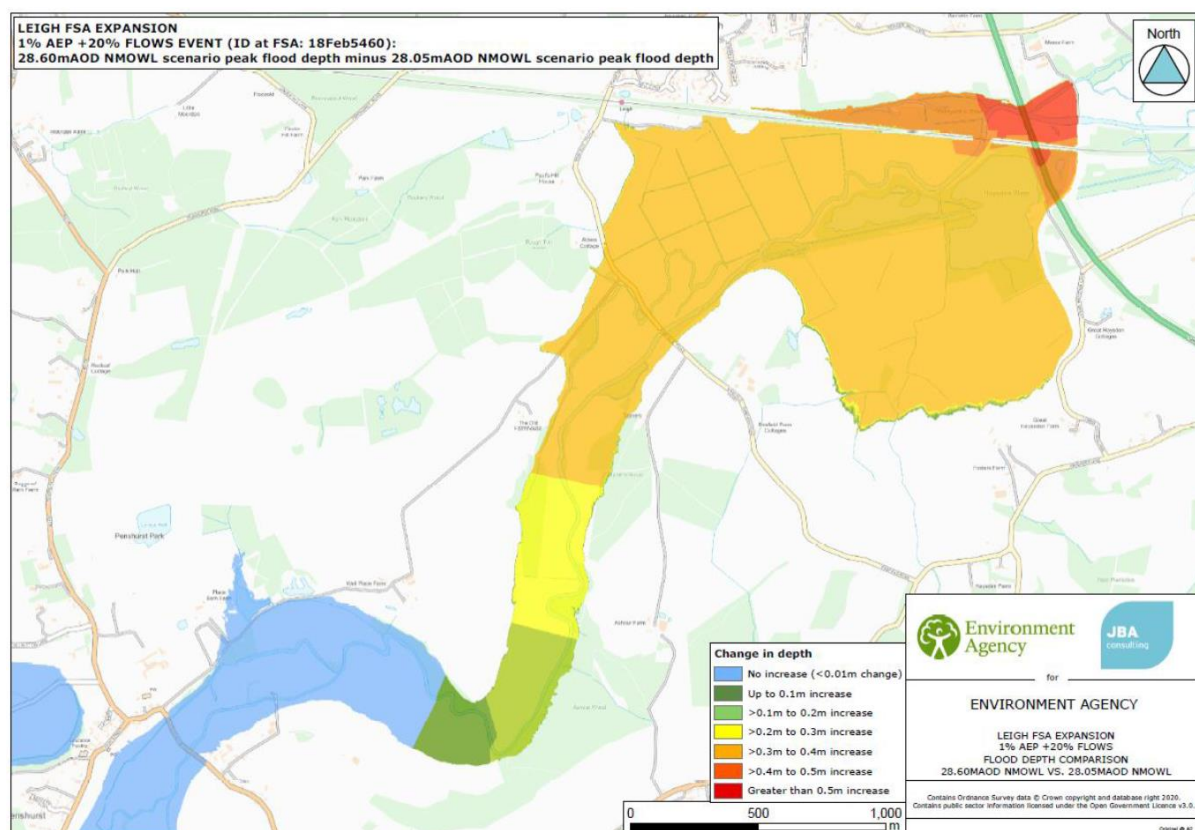


Figure 11: Increase in flood depth in a 1% plus climate change flood event. 28.05m AOD vs 28.6m AOD

## Response

You raise a number of points through your representation which we have quoted (marked by boxes and italics) and responded to below.

*At page 21 of the Application, the EA asserts that “the anticipated maximum flood water levels will not increase near Penshurst Place as a result of the Revised Scheme”.*

*However, this conclusion is inconsistent with Section 4.1 at page 23 of the Application which states that: “Modelling shows that the FSA adds approximately 0.1m in depth to the natural floodwater level to land around Penshurst.”*

*This inconsistency undermines the confidence that can be placed on the EA’s overall conclusions.*

### Environment Agency response:

The statement “Modelling shows that the FSA adds approximately 0.1m in depth to the natural floodwater level to land around Penshurst” on page 23 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.

As explained above and demonstrated in Figures 9, 10 and 11 above, there is no additional increase in flood depth at Penshurst if the maximum storage level is increased to 28.6m AOD.

It is acknowledged that since the effect of the FSA increases closer to the control structure, the FSA currently can result in water levels in excess of that which would occur naturally downstream of Penshurst, and in particular downstream of Ensfield Road. As demonstrated in Figures 9, 10 and 11 above, the proposal to increase the maximum impounded water level may result in deeper water levels within the FSA on parts of the Estate which are further downstream.

In recognition that property may be affected by the operation of the existing Leigh FSA, the 1976 Act through section 17(4) gives landowners the right to be compensated. Further, landowners have entered into easements with the Environment Agency to allow the Leigh FSA to flood their land under sections 24 and 25 of the 1976 Act. Under the terms of the easements already acquired for the land within the FSA, the Environment Agency is entitled to flood the land acquired to any depth and for any duration of time in exercise of powers conferred by Section 17 of the Act of 1976.

*Second, prior to the submission of the Application, the Estate instructed WSP to engage with the EA and its consultants to enable it to properly understand the impact of the amended Scheme on the Estate.*

*Following their instruction, WSP reviewed the proposals and sought to engage with the EA and its advisors from September 2019 in order to properly assess the impact on the Estate.*

*WSP raised a number of issues and sought clarification on a number of points from the EA regarding the proposed modelling the EA had undertaken. As a result of these discussions it became apparent that:*

- i. The original model was focused on flood storage immediately behind the barrier rather than at Penshurst;*

Environment Agency response:

The Medway flood model was completed in 2015 and uses a range of data to capture the complex Medway catchment. It has been used to analyse water levels at various locations throughout the FSA, not only immediately behind the control structure. The model considers the impact of flooding upstream of the embankment and includes the land at Penshurst.

- ii. The EA had used flow rates from 2017 rather than the recorded peak flood event in 2013, which would have been more appropriate in order to assess a worst-case scenario, the analysis shows significant differences in the inflow characteristics of the models used and much lower peak inflows to the model than earlier recorded events;*

Environment Agency response:

The Medway flood model was completed in 2015 and uses recorded and simulated rainfall data to ensure that a range of events are considered. The flood model does not use a single event. Penshurst Estate engaged WSP to carry out a review of the Environment Agency's modelling. To the best of our knowledge this review was concluded and WSP agreed with the Environment Agency's modelled flood data. If this is not the case please can WSP work with us and our consultants JBA to determine which aspects of the modelling require further explanation and/or review? We would welcome further direct engagement between WSP and JBA to expedite this matter.

*iii. The model had been run assuming a water storage level of 28.395m rather than the proposed maximum permitted impoundment of 28.6m;*

Environment Agency response:

During the engagement between WSP and JBA a review of the modelled events was summarised and discussed. The fact that the modelling for a single simulation does not store water to a peak of 28.60mAOD is not to say that the FSA would not necessarily be operated to store to this level during a flood event. Rather, the modelling indicates that the maximum permissible level of 28.60mAOD was due to be exceeded in each of the outflow scenarios tested (within the confines of the methods documented in the reporting), and so a lower level reflects the fact that the gates needed to be opened to safely manage water levels in the FSA. As in 2013 the gate operation is designed to maximise the available storage within the operating procedures but to never exceed the legal limit. The result of this approach is that in certain scenarios the optimum operation may not reach the maximum storage level. It is not normal procedure to store to the legal maximum irrespective of conditions, the operators take a variety of factors into account. This is reflected in the modelled gate opening procedures.

WSP carried out their own analysis of the flooding on the concrete road. On 10th January 2020 they informed the Environment Agency that the additional modelling and analysis they had undertaken concluded that there was no increase in the flooding at the concrete road as a result of the proposed increase in storage level.

*iv. The EA had assumed a design life of the Scheme of only 40 years and limited the assessment to a 1 in 75 year design event.*

Environment Agency response to the above point:

FCERM Project Appraisal Guidance sets out the criteria for the design life of the scheme. The Leigh FSA structure was constructed in 1982 and uses a mechanical gates to control the flow of water. The design life of 40 years is a realistic maximum lifespan for the main structure.

As shown in Figures 9, 10 and 11, the flood risk assessment demonstrates that we have assessed the expansion proposal against a number of different design events, including a 1 in 75 year event (1.33%), 1 in 100 year event (1%) and 1 in 100 year plus climate change event (1% plus climate change).

*Throughout this dialogue the EA's responses to the issues raised were often inconsistent and contradictory.*

*WSP has concluded that there is considerable uncertainty in the results of the modelling on which the Application is based particularly at the location of the Estate. This is due to many factors that have not been resolved such as: inflow*

*rates which now appear to be significantly lower than in previous modelling work; model parameters that are linked to the improvement works design life and an operational level based on the cost benefit analysis carried out by the EA rather than the potential risk that occurs at any one location.*

*The EA has not, to date, satisfactorily demonstrated to WSP that the impact on the Estate has been properly modelled and understood. In turn, WSP's concerns have not been addressed in the Application.*

Environment Agency response:

We are sorry that you feel we have not satisfactorily demonstrated that the impact on the Estate has been properly modelled and understood.

We do not understand why WSP have advised you that the impact upon the Estate has not been properly modelled because, whilst they had questions, on 10 January 2020 Bruno Venturini confirmed that he was satisfied the Environment Agency's statement that the proposed increase is the maximum stored water level to 28.6m AOD at the control structure would not increase water levels at the Concrete Road (by Place Barn Farm). Furthermore, it appears from their design for alterations to the Concrete Road that WSP agree that a 1% + climate change flood event will result in a water level of 29.4m AOD at the Concrete Road.

*The EA's modelling that underpins its conclusion that the revised Scheme will not result in increased flooding at the Estate is based on an assessment of a 1 in 75 year event. This approach is inadequate and contrary to current flood risk assessment guidance and accepted best practice. WSP's view is that the Application should have properly assessed the 1 in 100 year plus 25% for climate change scenario. This is a requirement of the EA in respect of many planning applications where it is a statutory consultee. No explanation as been provided as to why this modelling has not been presented as part of the Application.*

Environment Agency response:

The Environment Agency has considered a wide range of flood events when considering the impact of expanding the FSA, including a 1% plus climate change scenario. These scenarios are included in the Flood Risk Assessment supporting our planning application, also see Figures 9, 10 and 11 above.

In our Application to vary the Scheme for the operation of the Leigh FSA, the Environment Agency chose the scenario in Figure 9 to demonstrate the impact of expanding the FSA because it shows the greatest change in flood depths as a result of the proposed change. Figure 9 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.

With regard to climate change allowances the following approach has been adopted:

Whilst simulations for Models 2, 3 and 4 focused on a +25% flows event when considering climate change (as well as +35% flows), the +20% flows design event was simulated for Model 1. Justification for this is as follows: The 2016 climate change guidance has a central estimate of +25% flows. However, given the up-to-date baseline of the flood risk mapping study hydrology (1995 – 2015), the hydrology is assumed to already include approximately 6% increase in flows. Therefore, the +20% flow testing already conducted was considered to be very close to the +25% allowance required.

The +25% and +35% allowances are the same Central and Higher central estimates for the 2080s epoch for both the following sets of guidance:

- Adapting to Climate Change: Advice for Flood and Coastal Erosion Risk Management Authorities, updated April 2016 (available: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/571572/LIT\\_5707.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/571572/LIT_5707.pdf))
- Flood risk assessments: climate change allowances, February 2016 (available: <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>)

*As part of the discussions prior to the submission of Application, the EA's consultants did provide an assessment of the 1 in 100 year plus 25% for climate change scenario. A copy of this modelling is attached as Appendix B.*

*This assessment indicated that in this scenario there is likely to be an increase of 100mm in flood levels within the Estate, including at the Concrete Road. It also indicates that the Flood Storage Area will extend beyond its current boundaries within the Estate – i.e. more land within the Estate will be flooded as a result of the amended Scheme. Neither of these impacts has been properly acknowledged within the Application material.*

#### Environment Agency response:

The plan in Appendix B of your representation was given to the Estate on 2 May 2019 but was superseded by plan reference 173054\_PLN\_INFO\_37\_C which was sent to the Estate on 13 August 2019.

As explained above, the 2015 Medway flood model indicates that in certain circumstances, operation of the existing FSA can currently add up to 0.1m to the depth of flood water in the location of the Concrete Road by Place Barn Farm.

Also as explained above, when the FSA is operating, the proposal to increase the maximum stored water level from 28.05m AOD to 28.6m AOD may increase the maximum depth of flooding on land downstream of Ensfield Road by up to 0.55m. As shown on the plans in Figures 9, 10 and 11, the change to flood water levels diminishes as you move upstream from the control structure.

These plans and the results set out in Table 1 below (see page 18), show that the proposal to increase the maximum stored water level from 28.05m AOD to 28.6m

AOD will not increase the depth of flooding on the Concrete Road for any of the flood scenarios analysed.

As explained in section 5 of the Application, 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.

The Estate entered into an agreement with the Environment Agency's predecessor, Southern Water Authority, which compensated the Estate for the right to flood the land subject to the agreement and for any resultant damage or loss caused.

The Environment Agency agree that more of your land may be affected by flooding than is shaded on the plan in that agreement. This flooding may be as a result of natural flooding only, or that natural flooding may be increased due to operation of the FSA. 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, as you were informed by Dalcour Maclaren in May 2019, we are willing to consider entering into a further agreement with the Estate to fully and finally discharge this obligation. Please let us know if this is something you would wish to discuss further.

*Fundamentally, the EA's approach is based on a 40 year design life of the Scheme. WSP consider that this is an inappropriate position to take and that the Scheme should be assessed based on a 100 year plus duration with appropriate climate change allowances.*

*The Estate's position is therefore that the EA's assertion in the Application that the revised Scheme will not increase water levels at Penshurst has not been substantiated.*

#### Environment Agency response:

As noted above, FCERM Project Appraisal Guidance sets out the criteria for the design life of the scheme. The Leigh FSA structure was constructed in 1982 and uses a mechanical gates to control the flow of water. The design life of 40 years is a realistic maximum lifespan for the main structure. Should the main structure require investment in the future, the economic appraisal will consider the climate change guidance current to the time of implementation and modelling and consultation will be appropriate to the time of the study.

As noted above, the Environment Agency has considered a wide range of flood events when considering the impact of expanding the FSA, including a 1% plus climate change scenario. These scenarios are included in the Flood Risk Assessment supporting our planning application, also see Figures 9, 10 and 11 above. All of these scenarios show that the proposal to increase the maximum stored water level in the FSA will not increase water levels at Penshurst.

*Furthermore, the information provided prior to the submission of the Application demonstrates that there is likely to be an increase in the level of flooding at the Estate and in particular at the Concrete Road.*

Environment Agency response:

The information that was shared with the Estate prior to submission of the Application is as set out above. This demonstrates that the proposal to increase the maximum stored water level from 28.05m AOD to 28.6m AOD will not increase the depth of flooding on the Concrete Road at Place Barn Farm (or upstream closer to Penshurst) for any of the flood scenarios analysed.

4. Impact on the Estate and the Concrete Road

*The Concrete Road is the crucial vehicular access to many of the component parts of the Estate – including the visitor entrance to the Gardens, Gift Shop, nursery and several residential properties. During flood events this access becomes even more important as the EA closes the other access into the Estate from Ensfield Road.*

*There is a risk that the Concrete Road will be flooded during the 1 in 100 year plus climate change scenario by up to 100mm. The Concrete Road itself is already raised from the surrounding land. WSP consider there is a risk that water levels on the land immediately adjacent to the Concrete Road would increase by up to 600mm due to the relative difference in ground levels. The EA/Defra guidance on Flooding and Risk (FD2320/TR2) categorises flooding of 600mm as being a 'danger for most'.*

*There is a defined edge and drop between the Concrete Road and these areas which in circumstances where the Concrete Road is under water (and in particular where the edge of the road is under water) creates a considerable safety risk for drivers.*

*In practice the road may become impassable and large parts of the Estate, including the main visitor access, gift shop, nursery and several residential properties would become inaccessible.*

*The Application indicates that under the revised Scheme water could be held in the Flood Storage Area for up to 2 days (an increase from current practice).*

*A situation where access is restricted to these properties for such a length of time would have a profound and unacceptable impact upon the operation of the Estate and for the occupiers of the individual premises.*

*National Planning Policy Guidance advises that*

*“Access and egress must be designed to be functional for changing circumstances over the lifetime of the development.....*

*Access routes should allow occupants to safely access and exit their dwellings in design flood conditions. Vehicular access to allow the emergency services to*

*safely reach the development during design flood conditions will also normally be required.....*

*Even low levels of flooding can pose a risk to people in situ (because of, for example, the presence of unseen hazards and contaminants in floodwater.....)*

*Whilst this guidance applies to planning applications the same principles should be applied to the Application.*

*The Estate considers that the EA has not adequately demonstrated that safe vehicular access can be provided to all parts of the Estate during the operation of the revised Scheme. There is a very real risk that access to large parts of the Estate (including several residential premises and a nursery school) will be impossible for a protracted period of time, resulting in an unacceptable impact upon the Estate and its occupiers and giving rise to a direct safety risk.*

Environment Agency response:

The Environment Agency acknowledge that the Concrete Road is crucial for vehicular access to many parts of the Estate.

As mentioned above, there are two low points on the Concrete Road, both of which sit within the natural floodplain. The section most affected by flooding is the final stretch of road, where the Concrete Road joins Ensfield Road. When the FSA is being used Ensfield Road is closed and the access into the Estate from this end becomes unavailable.

The other section that can be affected is near Place Barn Farm. The entrance into the visitors' car park (which provides access to the Gardens, Gift Shop, Café and Dairy Cottage), is approximately 29.5m AOD and the exit from that carpark is approximately 29.0m AOD. The low point along this section is approximately 28.8m AOD and is just beyond the exit from the carpark. The locations of these are shown in Figure 12, below.

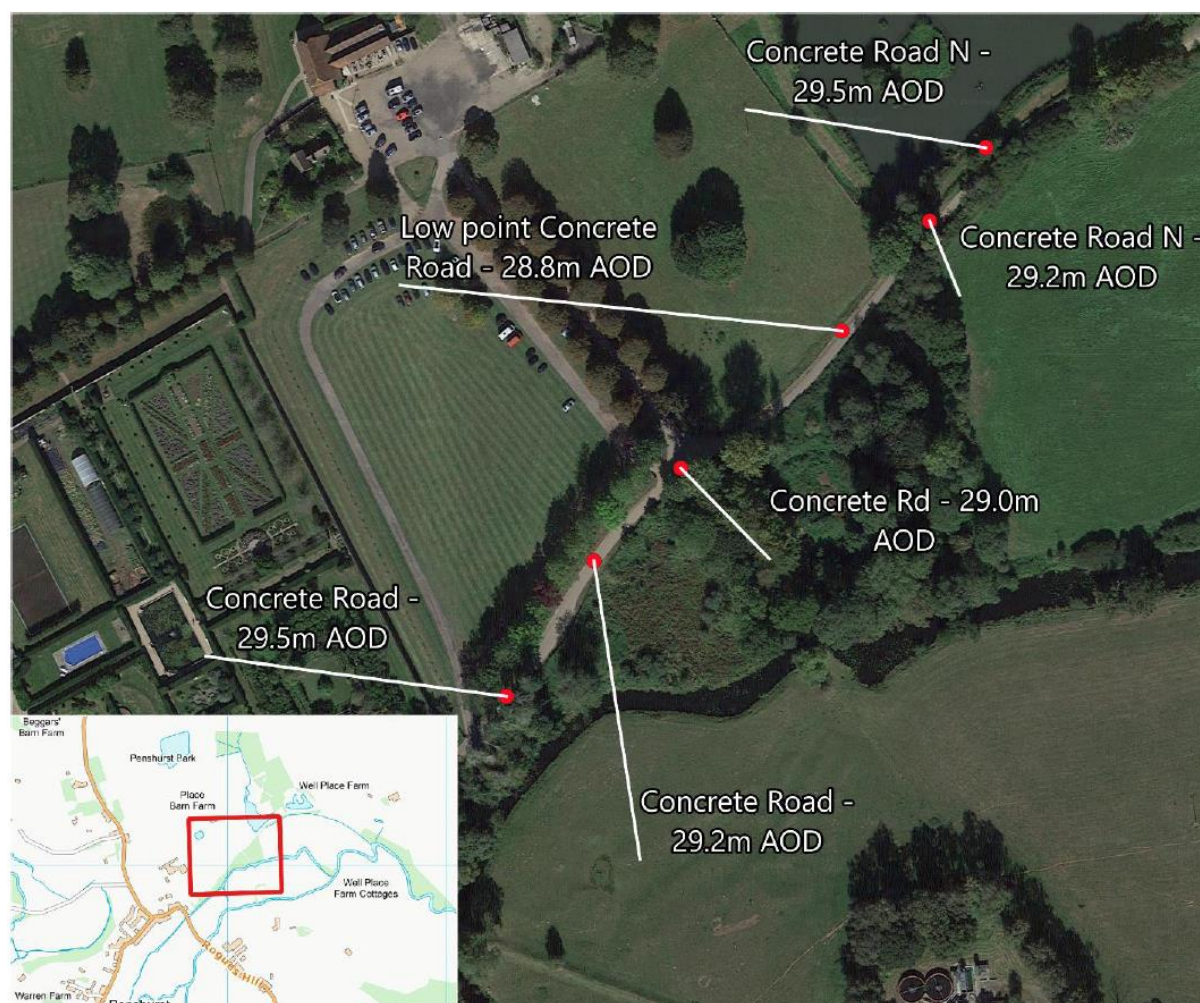


Figure 12: Locations of key ground elevations against which modelled flood levels are compared

As part of the development of this project, the Environment Agency carried out flood modelling and surveys for the following scenarios in order to understand the flood risk at the Concrete Road.

- 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 considered a range of flood events from one with a 20% chance of occurring in any one year through to one with a much more severe 0.4% chance of occurring in any one year. It also considered the effects of climate change for a flood event with 1% chance of occurring in any one year. The result of this modelling is shown below in Table 1.

<b>Flood event annual probability</b>	<b>Natural flood level</b>	<b>Leigh FSA operating at 28.05m AOD (current operation)</b>	<b>Leigh FSA operating at 28.60m AOD (proposed change)</b>
<b>20%</b>		28.3m AOD	28.3m AOD
<b>5%</b>	28.5m AOD	28.6m AOD	28.6m AOD
<b>2%</b>		28.9m AOD	28.9m AOD
<b>1.3%</b>		29.1m AOD	29.1m AOD
<b>1% + climate change</b>	29.3m AOD	29.4m AOD	29.4m AOD
<b>0.4%</b>		29.5m AOD	29.5m AOD

*Table 1: Predicted flood water levels at the Concrete Road by Place Barn Farm*

With the lowest point of the Concrete Road near Place Barn Farm being at 28.8m AOD, the information presented in Table 1 identifies the following:

- The Concrete Road will flood as a result of natural flooding that is driven from high flows upstream during more severe flood events (events with approximately 2% or less chance of occurring in any one year).
- During an extreme 1% + climate change flood event (an event more severe than any experienced in living memory at the Concrete Road), there is potential for the operation of the FSA at 28.05m AOD (i.e. the existing maximum impounded water level) to increase the depth of flooding over the Concrete Road by up to 0.1m on top of the natural flood level (to 29.4m AOD). At this point in time the road would already be impassable because it would be flooded to a depth of approximately 0.5m (to 29.3m AOD) as a result of natural flooding from downstream flows.
- 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 the Concrete Road.
- Whilst the low point of the Concrete Road and the exit of the visitors' car park may be impassable due to flooding, the entrance to the visitors' car park (which is approximately 29.5m AOD) is unlikely to be flooded and therefore in these unusual circumstances could be used for egress and well as access. This would provide access to the Gardens, Gift Shop, café and Dairy Cottage all situated at Place Barn Farm. This is why in the Application (in 3.2 on page 22) we said that flooding of the Concrete Road only affects access to the residential and commercial households at Well Place Farm and Killick's Bank.

In section 4.2 (page 25) of the Application we explained that in December 2013 it took approximately 33 hours for the water level in the FSA to return from 28.05m AOD to its normal level, and that we anticipate it will take approximately one day

longer for the water level to return to its normal level from 28.6m AOD. These periods of time are for immediately upstream of the flow control structure. The duration at Penshurst will be less.

There is greater detail on the change in duration of impoundment in section 5.1.3 (page 25) of the Flood Risk Assessment submitted with the planning application. 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.

#### 5. Proposed mitigation and discussions with the EA

*As set out above the Estate is not, in principle, opposed to the EA's desire to improve the flood defences for settlements downstream.*

*The Estate has sought to engage in dialogue with the EA to seek to understand the impact of the revised Scheme with a view to agreeing works to the Concrete Road in order to properly mitigate the risk set out above.*

*Again, National Planning Practice Guidance provides that:*

*"Proposals that are likely to increase the number of people living or working in areas of flood risk require particularly careful consideration, as they could increase the scale of any evacuation required. To mitigate this impact, it is especially important to look at ways in which the development could help to reduce the overall consequences of flooding in the locality, either through its design...or through off-site works that benefit the area more generally".*

*In summary the Estate's position is that in order to properly mitigate the risks of the revised Scheme on the Estate and provide surety of access, the Concrete Road needs to be raised by a maximum of 0.9m and appropriately widened. We enclose at Appendix C a drawing showing the works which the Estate considers to be necessary to the Concrete Road.*

*Whilst a scheme of works to the Concrete Road has been discussed between the Estate and the EA, the EA's position immediately prior to the submission of the Application was that such works were not necessary.*

*The discussions between the parties were suspended due to the COVID--19 lockdown.*

*The Estate was surprised and disappointed that the EA subsequently submitted the application without further notification to the Estate in circumstances where the discussions had not been concluded.*

*In the Application itself at Paragraph 21, the EA state:*

*"the Environment Agency acknowledges that there may be scope to improve access arrangements during a flood irrespective of the source of the flooding. They are working with the landowners to assess options to modify the private road (the Concrete Road) to the residential and commercial households at Well Place*

*Farm and Killick's Bank. These cannot be accessed from the alternative route off Ensfield Road when the FSA is in operation."*

*In this paragraph the EA appears to be acknowledging the need for works to the Concrete Road to be undertaken but no precise scheme of mitigation has been confirmed within the Application documentation.*

*The Estate hopes to work with the EA to agree a mutually acceptable scheme of works to adequately mitigate the risk of the revised Scheme.*

*Unless such a scheme of mitigation can be agreed and secured, the Estate will maintain its objection to the Application.*

#### Environment Agency response:

As discussed at the start of this response, the Penshurst Place Estate is currently affected by both natural flooding and the effect of the existing FSA.

As noted above, some areas of Penshurst Place Estate land are covered by existing deeds which allow flooding from the FSA to any depth and for any duration. Penshurst Place has received compensation for this through the existing deed. Much of the land that will be affected by flooding as a result of the proposal to increase the maximum stored water level from 28.05m AOD to 28.6m AOD is covered by this agreement.

The proposal to expand the FSA would bring some additional areas of Penshurst Estate land into the expanded FSA. If the proposal is approved, where losses are suffered or damage is caused due to operation of the FSA on land that is not covered by an agreement, the Environment Agency has an obligation to pay compensation in accordance with section 17(4) of the 1976 Act.

As noted above, we are willing to consider entering into a further agreement with the Estate to fully and finally discharge this obligation. Please let us know if this is something you would wish to discuss further.

As explained above, the modelling shows that the proposed increase to the maximum stored water level will not increase the maximum flood water level on the Concrete Road near Place Barn Farm.

However, we agree that climate change will increase the flood risk to the Concrete Road. The Environment Agency was engaging with WSP before the Covid 19 lockdown. During these engagements WSP presented a proposed road raising scheme as discussed above. The Environment Agency has proposed an alternative scheme that could be implemented that would confer a high level of flood resilience for a much lower cost and level of disruption.

As the proposed expansion will not affect the Concrete Road, the Environment Agency is not able to justify spending public money on any works to a private road. The Environment Agency is funded by central government Grant in Aid funding and the primary objective of the funding is the reduction of risk to households. There are mechanisms within the funding arrangements to reduce the risk to infrastructure.

However, no mechanism exists for the funding of flood resilience measures on private roads. The concrete road is a private road and an easement has been agreed for the existing levels of flooding. As the scheme does not increase the level of flooding at this location the existing easement for which a payment has already been made is appropriate.

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