

The Willows Flood Avoidance Project HESTIA V

PID 01/25

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Date:	3 Feb 25	**Date:**	11 Jan 25

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Amendment Record

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- An instruction page detailing the changes to be made and contact details for any questions arising from the amendment.
- A replacement contents page showing the amendment state of each section.
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Page Numbers or Sections Amended	Brief Description of Changes	Date of Change	Document Reference	Initials

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References

A	RAB 2863 Version 1.0 dated 6 January 2022 – The Willows, Manor Street, Wistow.
B	Environment Agency Publication: Improving the Flood Performance of New Buildings: Flood Resistant Construction, May 2007, ISBN 987 1 85946-287-4
C	Homeowners Guide to Property Flood Resistance, Ox-Cam Pathfinder Project (undated)
D	Planning Application 24/02084/LBC – Alterations at Porch House, Manor Street, Wistow dated 24 November 2024
E	The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 – Part 5, Regulation 18

Section 1 – Background, Justification and Outlined Solutions

Introduction

1. On Christmas Eve 2020, after several days of torrential rain, Bury Brook (designated as '*High Lode'* on the Environmental Agency Map), burst its banks. In so doing, the northwest corner of the village of Wistow in Cambridgeshire was flooded and at 0200 on Christmas Eve, the Willows (henceforth referred to as '*The Property*') was one of 3 houses in the village to suffer water ingress. The Property was not recovered fully until October 2021 and the combination of causal factors cannot be considered unique. Moreover, there has been no region-wide flood prevention measures put in place since and Bury Brook continues to burst its banks with increasing regulatory.

2. The aim of Project HESTIA V is to establish flood defences at the Property in the form of a surrounding flood wall constructed from Class A/B engineering bricks and a series of removable flood barriers. In combination, the wall and flood barriers would surround the Property and avoid a reoccurrence of severe flooding. Figure 1 shows the extent of flooding in the village; the crosshairs show the Property location:



Figure 1: Extent of Severe Flooding in Wistow, 24 December 2020

3. During flooding in 2020, the Property was surrounded by flood water to a height of 300mm. The highest internal water ingress was only a few millimetres, with the deepest level experienced in the northwest corner. The ventilation air bricks were considered the most likely water ingress point at this part of the Property; however, water ingress occurred on the south side of the Property via the door thresholds. The garage was also flooded to a height that allowed the flood water to breach the 15cm step between the garage and the utility room.

4. The purpose of this document is to define the solution for preventing future water ingress and to underpin planning applications. It shall also be used to baseline a formal invitation to tender to allow building contractors to bid for the work.

Outlined Solutions

5. **Flood Risk and Property Resilience Survey**. After consulting with the Cambridge County Council (CCC) Flood Risk Manager and the Environment Agency (EA) Flood Resilience Team, RAB Consultants Limited was engaged to conduct a Property Flood Resilience Survey and its findings are detailed at Reference A. The FRS comprised 4 topics:

a. Assessment of the Flood Risk to the Property.

b. Property Flood Resistance.

c. Property Resilience and Repairability.

d. Flood Avoidance.

6. **Flood Risk**. RAB Consultants examined EA modelled flood data and concluded that the Property is located in a medium flood risk category area. This presents the risk as between 1% (1:100-year event) and 3.3% (1 in 30-year event); however, the report includes a caveat that Bury Brook (High Lode) is unmodelled and there were no estimated watercourse depths available. Local records show that between the period 2005 – 2020, High Lode burst its banks 11 times with only one instance of properties being flooded during that time. Between 2020 – 2024 High Lode had burst its banks 9 times, which indicates that the likelihood of flooding incidents is trending upwards. This increase is likely to be linked to climate change, and evidence suggests that the upward trend is likely to continue. Leaving flood defence to chance is therefore not an option.

7. **Property Resistance Measures**. Reference B defines resistance as *'measures taken at building level to prevent floodwater entering the building and damaging its fabric'*[1]. RAB Consultants conducted a full survey of the likely water ingress points, which resulted in 22 areas being identified for corrective action. Much of this was straightforward and included auto-closing air bricks, repointing brickwork, and raising exit points for wastewater drainpipes. The front door and the utility room door could readily be replaced with flood-proof doors; however, the double patio-doors and the 5-door bi-fold doors linking the dining room to the garden could not be replaced with commercially available flood-proof doors and would either have to be removed or an external flood barrier fitted. Moreover, the garage door could not be made flood proof and there were two proposed solutions; first, a long flood fence could be fitted in front of the garage doors; second, the garage could be allowed to flood and a flood gate fitted to the doorway between the garage and the utility room – neither option was deemed satisfactory. The cost of implementing these measures was estimated as between £15,000 and £29,000 (VAT Ex); however, the report concluded that the possibility of water entering via the Property foundations could not be discounted.

[1] Reference B, Page 17

8. **Property Resilience and Repairability Measures**. Reference B defines resilience as *'sustainable measures that can be incorporated into the building fabric, fixtures and fittings to reduce the impact of floodwater on the property'*.[2] Repairability involves '*the design and construction of building elements, to ensure the ease of replacement and repair, should they suffer flood damage'*[3]. RAB Consultants suggested that if preventing ingress via the foundations proved impractical, there was a possible solution in allowing the house to flood and retrospectively promoting resilience. This would involve replacing flooring, skirting boards, electric plug sockets, kitchen unit plinths, etc, with materials that would be more resistant to water ingress and easily recoverable/repairable post a flooding incident. The estimated costs associated with retrospective property resilience measures was estimated between £64,000 and £105,000 (VAT Ex). This solution, however, was considered unaffordable and would do little to mitigate the inconvenience of a flooding incident, timely flood recovery notwithstanding.

9. **Flood Avoidance Measures**. Reference B defines avoidance as: *'measures that can be taken to prevent floodwater from reaching a property. For example, these can take the form of […] barriers surrounding a development or individual property'*[4]. A practical solution, therefore, to mitigate the uncertainty associated with foundation seepage would be to keep the flood water away from the Property. This would involve building a flood wall all the way around the Property with entrance and exit points adapted to allow the fitment of flood barriers when flooding occurs. The height of the flood wall must be twice the highest water level, which implies that the flood wall must be 600mm above ground level. Two construction methods were considered:

(i) **Option 1 – Hollow Core Stepoc Block**. Stepoc masonry retaining wall system are constructed using a formwork block that can be laid dry. The blocks are hollow, are designed to incorporate steel reinforcement bars and are filled with concrete. Though rapid to construct, Stepoc masonry is unesthetic and requires caping stones and masonry paint; moreover, the build requires a great deal of concrete and steel reinforcement. The estimated costs of providing a Stepoc solution is between £45,000 and £59,000 (VAT Ex) not including masonry paint and lifecycle maintenance costs.

(ii) **Option 2 – Class A/B Engineering Brick**. Blue Class A/B engineering bricks are slightly more expensive than their red brick counterparts; however, they are highly conducive to flood-wall application. Table 6.1 (See Annex F) shows that Class A/B Engineering Bricks top the table in terms of resilience to water penetration, drying ability, and retention of pre-flood dimension and material integrity. There is already a small engineering brick wall on the south side of the property that could be retained as a cost-savings measure and the aesthetics are more favourable. Thus, the wall would not require capping stones or painting, which would further reduce longer term maintenance costs. The estimated cost of a Class A/B engineering brick solution is between £26,000 and £37,000 (VAT Ex).

[2] Reference B, Page 17
[3] ibid
[4] ibid

10. **Flood Gates versus Barriers**. The ideal solution would be to fit flood gates to the entry and exit points at the front and rear of the property. This would allow the Property to be isolated from the flood waters in short order as soon as a flood warning was received simply by closing the gates. The main disadvantage is cost. Quotations received in February 2021 priced the fitment of flood gates between £16,000 and £20,000 (VAT Ex). These costings are only likely to have increased in the meantime. Flood barriers, on the other hand are a more cost-effective solution with estimated costs of between £3,000 and £8,000 (VAT Ex). The only problem is that the flood barriers require more protracted assembly and they would also have to be stored when not in use. On balance, given the low frequency of flooding incidents and the proven timeliness of flood warnings, flood barriers represent the most practical solution.

12. **Seepage Mitigation**. The flood wall of whatever construction would comprise approximately 100m of masonry/brickwork and approximately 8m of flood barriers. Maintaining this length of flood wall completely watertight might prove impracticable and, therefore, provision must be made to remove any seepage. The Property was reconfigured in 2011 and 2 soakaways were incorporated into the drainage system (See Drawing 01/25, Annex A). One of the soakaways was designed to clear surface water from the garage threshold, and the second soakaway was positioned in the northwest corner to drain surface water from the driveway. This soakaway is positioned under the lowest point on the driveway and, under normal circumstances, works incredibly well. It would make sense to position a drainage sump on top of this soakaway such that under normal circumstances, any water in the sump would drain normally, thus leaving it clear. During the flood condition, seepage water would drain into the sump where a scavenge pump could be inserted to pump the collected water to the other side of the flood wall.

13. **Rainwater Capture System**. The Property has a rainwater capture system, which was installed during the building work that took place in 2011. This system collects rainwater from the east and southern facing rooves via a system of pipes buried under the patio. The rainwater capture storage tank (4,800 litre capacity) is buried under the lawn (See Drawing 01/25, Annex A) and under the proposed plans (Drawing 02/25, Annex B) will remain outside the flood defences. The pipe that feeds into the storage tank would be a prime source of water ingress in a flood condition, which means that for flood avoidance this pipe must be shut off. Shutting off this pipe would mean that all the rainwater that would have drained into the storage tank would then gather on the wrong side of the flood wall. The solution would be to install a second sump with provision made to access a one-way/shut off valve. This would be configured such that under normal operation, rainwater drains into the storage tank as per design. Under flood conditions, the rainwater would gather in the sump ready to be pumped to the other side of the flood wall.

14. **Potential Further Water Ingress Points**. In addition to seepage through the flood wall and backflow through the rainwater capture pipe, there are 2 other potential sources of water ingress:

a. **Soakaways**. The soakaways buried under the main driveway could be a potential source of ingress. If the flood water penetrates beneath the surface, it follows that this might create a reverse flow that would allow flood water to

collect on the wrong side of the flood wall. During the flooding that damaged the Property in 2011, the soakaways were quickly overwhelmed as they were already saturated after days of persistent rainfall. The Property is, however, built on a heavy clay soil, which was confirmed during the 2011 building work. The working hypothesis is that a scavenge pump should be able to clear the water from the sump quicker than the flood water could penetrate the surrounding clay soil. This hypothesis could be proven only during a flood condition, and the rating of the scavenge pump optimised accordingly.

b. **Risk of Flooding from Sewers**. At Reference A, RAB Consultants considered the risk to the Property associated with heavy rainfall overwhelming the local sewers. There was no evidence of sewage ingress when the Property was damaged in 2020; however, the sewage pipe would run beyond the planned flood wall and presents a route for flood water/sewage to breach the flood wall. A potential solution would be to increase the size of the current inspection chamber, which is located in front of the garage, to allow fitment of and access to a sewage shut-off valve. Such a chamber would allow the fitment of a one-way valve; however, this might require a higher level of routine maintenance compared with a pure shut off valve.

15. **Additional Requirements**. There are several other factors impinging on the design such as the scope of site clearance required, foundations and the design features of the flood wall openings to accommodate the flood barriers. There would also be a requirement for further landscaping to recover the fabric of the driveways, pathways and patios. Further details are as follows:

a. **Site Clearance**. Drawing 01/25 (Annex A) shows the existing configuration of Property and the scope of site clearance required. Specific details are as follows:

(i) **Eastern Edge**. The eastern edge of the proposed flood wall is already clear (See Picture 1) and requires only the removal of turf and a few pathing slabs towards on northern edge of the proposed flood wall.



Picture 1: Location of eastern facing flood wall



Picture 2: North facing lapboard fence, and pathway that would have to be lifted during site clearance

(ii) **Northern Lapboard Fence**. Consultation with a potential contractor postulated that it might be possible to build the flood wall inside the fence (See Picture 2) such that the fence would not need to be removed; however, this would depend on the extent of the concrete post anchor points, which were fixed using rapid-setting concrete during installation in 2013. Ideally, the lapboard fence should remain in situ.



Picture 3: North facing lapboard fence, and west facing picket fence

(iii) **Western Picket Fence**. The picket fence on the western edge of the property (See Picture 3) and the two wooden gate assemblies would have to be removed (See Picture 4). There are four gate posts, which are buried to a depth of between 400 – 500mm and are set in rapid drying concrete. Their removal would require the surrounding block work to be lifted; however, removing the gate posts without damaging the tarmac sections that connect the driveway to the public road would be desirable.



Picture 4: Southern side of the west-facing picket fence showing the right-hand gate assembly.

(iv) **Southern Wall and Hedgerow**. The current engineer brick wall extends from the western boundary to level with the edge of the dining room (See Picture 5 & 6). The proposal would require this wall to be extended to meet up with the eastern edge of the flood wall; however, this would require the removal of approximately 4m of hedgerow, which belong to the neighbour and could not, therefore, be removed without permission (See Picture 6). The wall itself was built in 2011 to replace a red brick retaining wall, which was required because the neighbouring property is at a slightly higher level than the Willows. Part of this wall is constructed from block work with an engineering-brick facia and the type and depth of the foundations is not recorded. There is an aspiration to remove the flower bed on the western end of the wall, which was built to accommodate a small tree and some shrubs that no longer exist (See Picture 7). It might therefore make sense to remove the wall completely such that the construction and foundations are properly recorded. Prospective contractors might be asked to scope the potential for reclaiming the engineer bricks if the wall was demolished.



Picture 5: Retaining wall on southern boundary showing the redundant flower bed towards the western boundary, and the paving slabs that might require lifting.



Picture 6: South facing aspect showing the extent of the necessary hedgerow removal to extend the southern wall.



Picture 7: South facing retaining wall and redundant flower bed, which is planned for removal to straighten the border.

b. **Foundations**. The foundations must be 300mm high, 400mm wide and deep enough for 2 courses of engineer bricks to be buried underground. The foundations would be laid in a heavy clay soil, which makes the foundations vulnerable to clay heave[5]. The addition of A393 steel mesh would support the concrete and improve strength, durability and flexibility. According to the manufacturer's data, A393 reinforced concrete foundations resist cracking under pressure from external forces such as those induced by clay heave. Moreover, A393 reinforced concrete has a similar thermal expansion coefficient compared with concrete, which allows steel and concrete to expand in tandem during temperature fluctuations.

c. **Provisions for Flood Barriers**. Flood barrier seals are more effective if compressed against a smooth surface. Thus the gap between the foundation and driveway/pathway level in the flood wall openings must be built up to the same level and smoothed off. Moreover, the access points in the flood wall should be another brick-width wide across the opening to provide a more secure anchor for the flood barrier guide rails. This provision is shown in Drawing 02/25 (Annex B).

Design Solution Summary

16. **Flood Wall Construction**. The likelihood of future flooding is unacceptably high and trending upwards. Protecting the property from future flooding cannot, therefore, be left to chance. On balance, flood avoidance through the installation of a flood wall is considered the most practical means of protecting the Property. Two main construction methods were considered; Stepoc hollow masonry blocks and Class A/B engineering

[5] Clay heave is usually the result of clay soils expanding due to an increase in moisture levels. Clay is an 'expansive soil', which means that when it is wet it expands and when it becomes dry it shrinks.

bricks. The engineering brick solution was chosen because this was the most cost effect in terms of both installation, maintainability and aesthetics. Entry and exit points in the flood wall could be secured for flood avoidance either through bespoke flood gates or flood barriers, or a mixture of the two systems. Flood barriers were considered the most cost effective and practicable means of securing the exit points in the wall given the proven timeliness of flood warnings.

17. **Seepage and Rainfall Mitigation**. Ensuring that the flood wall is completely watertight might prove impractical or disproportionately expensive. Seepage mitigation would be affected through the addition of a sump on top of the existing soakaway in the northwest corner of the main driveway. Scavenge pumps would be procured to clear the sump water overboard. With the rainwater capture pipe sealed to prevent a backflow from the tank into the flood wall perimeter, a shut-off valve would be installed. This would, however, cause the rainwater draining from the rooves to back up inside the flood wall. An additional sump would be installed in the southeast corner at the rear of the Property to house the shut-off valve and collect the rainwater for a second scavenger pump to clear the rainwater overboard.

18. **Backflow Mitigation**. There is a high risk of backflow to the dry side of the flood wall resulting from the sewers being overwhelmed during a flood condition. To mitigate this, a larger sewage pipe inspection chamber would be fitted in place of the existing chamber in front of the garage at the Property and big enough to accommodate a shut-off valve. The other source of backflow to the dry side of the flood wall is the soakaway pits on the front drive. There is no empirical evidence of the potential reverse flow rate; however, the soil around the soakaways has been confirmed as heavy clay. Thus, a properly rated scavenge pump should be able to clear the seepage water faster than the flood water can permeate the clay surrounding the soakaways.

19. **Utilities**. The Property is supplied with gas, electricity and water through pipes and cables that run from the main road to the property either side of the main sewer. The exact location is unknown; however, during the extension and alteration work that took place in 2011, care was taken to ensure that the gate posts opposite the garage did not impinge on the utility supplies. Ergo, the gas, water and electricity pipes all enter the property between the existing gate posts. Since the flood wall opening would match the current opening, there should be no conflict with the utility supplies. A chosen contractor would, however, need to map these supplies before commencing work.

Section 2 – Environmental Factors

20. **Conservation Area Considerations**. The Huntingdonshire District Council Planning Portal defines a conservation area as *'an area of special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance'*[6]. The Map at Appendix 2 to Annex A shows that the Willows is within a designated conservation area; however, this did not preclude planning permission for the extension and alterations that took place in 2011 (See Appendix 4 to Annex A). The installation of the flood wall will not change the character of Manor Street; indeed,

[6] https://www.huntingdonshire.gov.uk/planning/conservation-areas/

arguably, the addition of the flood wall will enhance the front aspect because the shrubs between the wall and the public highway will, over time, cover the wall. At only 600mm high, the flood wall would be unobtrusive and more aesthetically pleasing than the old picket fence currently in place. There is already a Class A/B engineering brick wall on the right-hand side of the Property (See Pictures 5 and 7) and straightening this wall to align with the boundary will add to the aesthetic. The northern and southern parts of the flood wall will not be visible from main road. The flood barriers will be in place only during flooding conditions, and thus there will be no detriment to the character of Manor Street.

21. **Neighbouring Grade II Property**. As shown in the map at Appendix 3 to Annex A, the Willows is located next to Porch House in Manor Street, which is Grade II listed. Moreover, the Willows is opposite the Wistow Village Hall, which is also a Grade II listed building. In simple terms, the flood wall replaces the existing boundary fencing and does not, therefore, impinge on the curtilage of any of the Grade II listed buildings. The building immediately to the right of the flood wall looking from the main road is a wooden outbuilding that is not originally part of the main property, and the owner of Porch House has plans to replace this building in due course (See Reference D).

22. **Environmental Impact Assessment**. The Environmental Impact Assessment has been completed in accordance with Reference E. The description of the proposed development as prescribed in Section (3)(a) at Reference E is dealt with in the preceding paragraphs of this document. Additional requirements of the Regulation are detailed below:

a. **Likely Significant Effects**. Section 3(b) at Reference E requires a statement on the likely significant effects. The flood wall, if successfully constructed, should keep the flood waters away from the Property. It follows that the water that would have surrounded the Property would need to go elsewhere during a flood event. During the flooding in 2020, the water surrounding the Property reached a maximum depth of 300mm. The area within the flood wall as currently designed is approximately 576m^2 and the floor area of the Property is approximately 210m^2. In 2020, when the Property was compromised, the flood level at the walls of the Property was 0.3m, which implies that the flood wall as proposed would account for a volume of water in the region of (576 – 210) x 0.3 [m^3] = <u>110m^3</u>. This equates to 110,000 litres; and given the extent of the flood plain as shown in Figure 1, the water displaced by the flood wall will have no measurable effect on the level of the flood water elsewhere in the village.

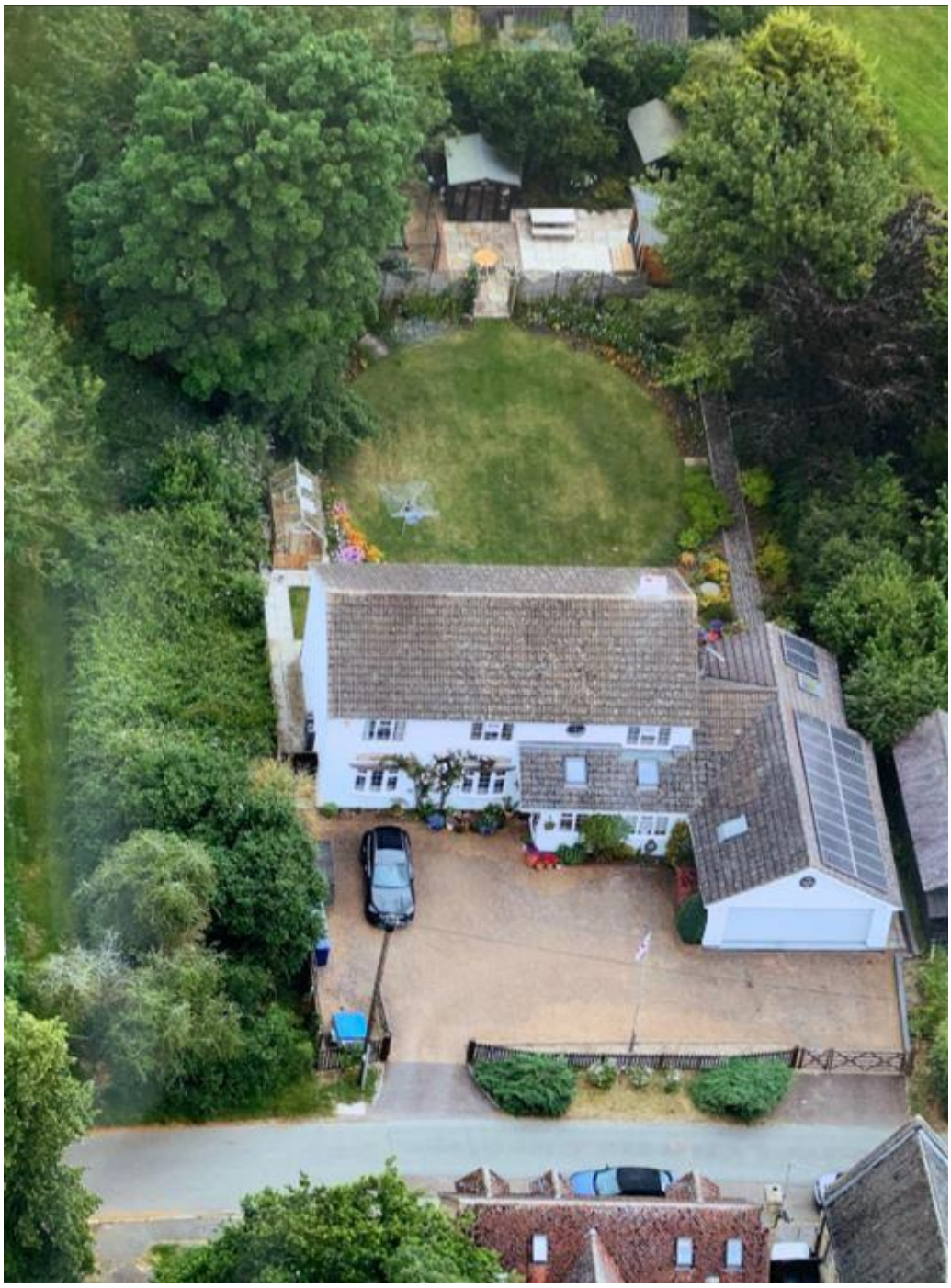
b. **Avoiding, Preventing, Reducing and Offsetting**. Section 3(c) at Reference E requires a statement on avoiding, preventing, reducing and/or offsetting environmental impact. As shown in Paragraph 22(a), the environmental impact in terms of exacerbating flood risk elsewhere in the village is negligible. There are other environmental factors associated with the production of building materials, especially the use of concrete. The Class A/B engineering brick chosen solution outperforms the Stepoc solution in terms of the volume of concrete required; however, the carbon footprint associated with producing the bricks is broadly comparable with that of the Stepoc blocks. A do-nothing option was considered untenable given the increasing risk of further

flooding; however, the environmental impact of the flood wall would quickly offset the impact of repairing the Property if no flood wall was present. As an example, in 2020 three 860W industrial dehumidifiers were running for 2-months to dry out the Property after the flood. There would also be an opportunity to offset the environmental impact of the build through upcycling the wooden gate assemblies, picket fence and, if necessary, the current Class A/B engineering bricks currently in situ on the southern boundary.

c. **Reasonable Alternatives**. Other options considered during the project investigation were deploying temporary flood barriers all the way around the Property and changing the topography using earthen bunds. The neighbouring property in Manor Street (Treyarnon) was badly flooded in 2020 and the owner has since procured a deployable polyurethane barrier at great expense. This barrier requires a team of 6 people and 3 hours to deploy, and there are no guarantees that 6 people will always be available, timely flood warnings notwithstanding. The reality is that this flood barrier must remain partially deployed around Treyarnon throughout the winter months to make sure it can be fully deployed during a flood event. Building an earth bund around the Willows was quickly discounted as being completely impracticable and wholly detrimental to the aesthetic associated the conservation area. In sum, there are no reasonable alternatives to a flood avoidance strategy other than the Class A/B engineering brick flood wall.

d. **Flora and Fauna Considerations**. The position of the Willows on the edge of the village, close to Bury Brook and backing on to meadows attracts a variety of wildlife. The proposed flood wall will have no impact on any wildlife pathways or habitats, with one exception. Extending the southern wall to complete the flood wall perimeter requires the removal of approximately 4m of hedgerow. Wood pigeons and blackbirds have been known to nest in these hedgerows, but there are plenty of alternative habitats within the Willows boundary and beyond. There is an aspiration to complete the hedgerow on the southern boundary towards the rear of the Property where there are gaps currently, which would more than offset the loss of hedgerow associated with the project. Moreover, in 2023, 4 cherry trees were planted in the garden, which are thriving and will continue to offset the loss of hedgerow as they mature.

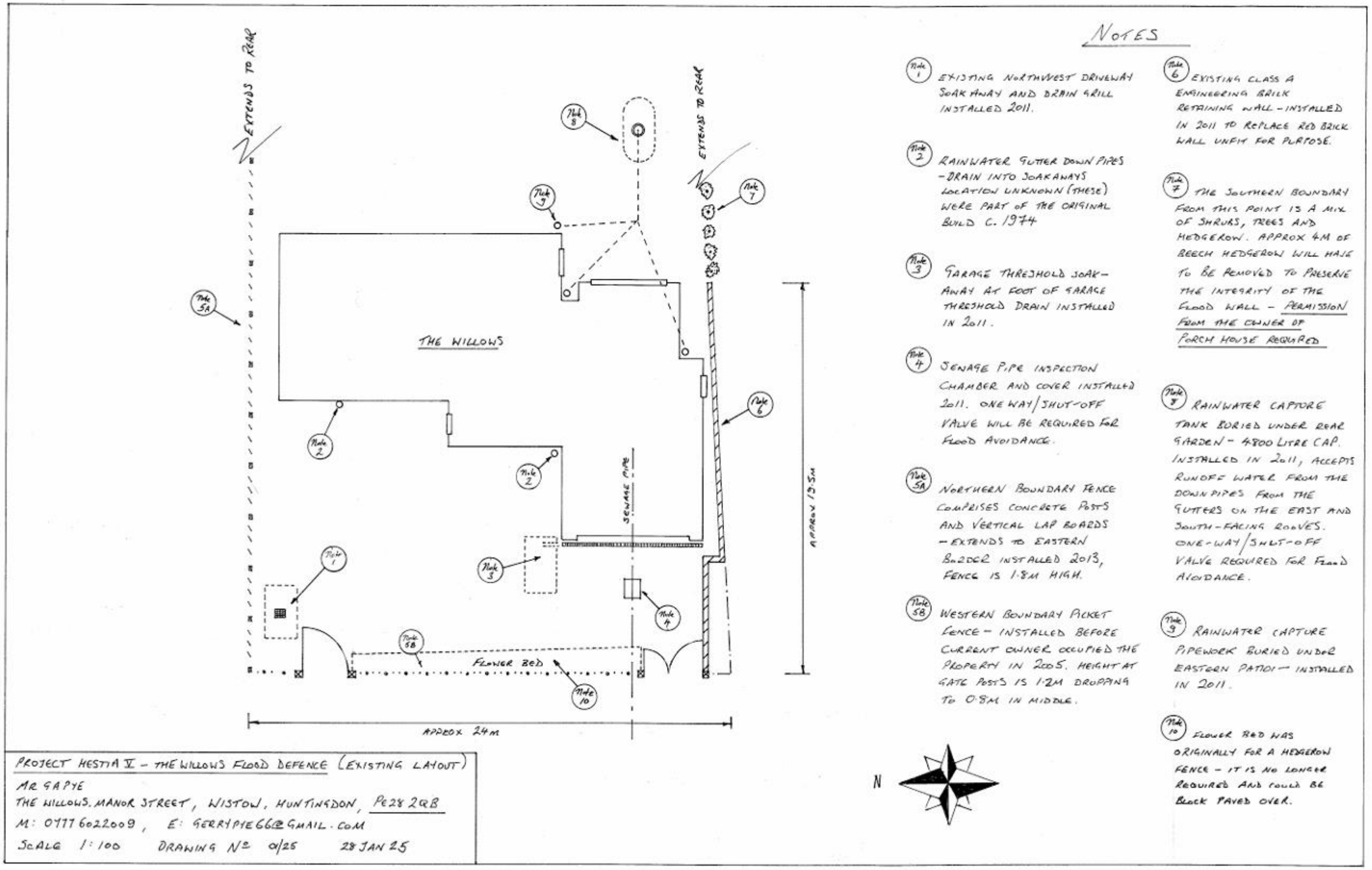
e. **Non-technical Summary**. There are environmental impacts associated with the materials manufacture; however, these compare favourably to the environmental impacts associated with repairing the Property after a flooding event. On balance, the environmental impact of installing a flood wall at the Property is considered insignificant.



Picture 8: Ariel view of the Willows, July 2024.

Section 2 – Annexes

Annex A: Project HESTIA V – The Willows Flood Defences (Existing Layout)



NOTES

Note 1 EXISTING NORTHWEST DRIVEWAY SOAK AWAY AND DRAIN GRILL INSTALLED 2011.

Note 2 RAINWATER GUTTER DOWN PIPES – DRAIN INTO SOAKAWAYS LOCATION UNKNOWN (THESE) WERE PART OF THE ORIGINAL BUILD C. 1974

Note 3 GARAGE THRESHOLD SOAK-AWAY AT FOOT OF GARAGE THRESHOLD DRAIN INSTALLED IN 2011.

Note 4 SEWAGE PIPE INSPECTION CHAMBER AND COVER INSTALLED 2011. ONE WAY/SHUT-OFF VALVE WILL BE REQUIRED FOR FLOOD AVOIDANCE.

Note 5A NORTHERN BOUNDARY FENCE COMPRISES CONCRETE POSTS AND VERTICAL LAP BOARDS – EXTENDS TO EASTERN BOUNDARY INSTALLED 2013, FENCE IS 1.8M HIGH.

Note 5B WESTERN BOUNDARY PICKET FENCE – INSTALLED BEFORE CURRENT OWNER OCCUPIED THE PROPERTY IN 2005. HEIGHT AT GATE POSTS IS 1.2M DROPPING TO 0.8M IN MIDDLE.

Note 6 EXISTING CLASS A ENGINEERING BRICK RETAINING WALL – INSTALLED IN 2011 TO REPLACE RED BRICK WALL UNFIT FOR PURPOSE.

Note 7 THE SOUTHERN BOUNDARY FROM THIS POINT IS A MIX OF SHRUBS, TREES AND HEDGEROW. APPROX 4M OF BEECH HEDGEROW WILL HAVE TO BE REMOVED TO PRESERVE THE INTEGRITY OF THE FLOOD WALL – PERMISSION FROM THE OWNER OF PORCH HOUSE REQUIRED

Note 8 RAINWATER CAPTURE TANK BURIED UNDER REAR GARDEN – 4800 LITRE CAP. INSTALLED IN 2011, ACCEPTS RUNOFF WATER FROM THE DOWN PIPES FROM THE GUTTERS ON THE EAST AND SOUTH-FACING ROOVES. ONE-WAY/SHUT-OFF VALVE REQUIRED FOR FLOOD AVOIDANCE.

Note 9 RAINWATER CAPTURE PIPEWORK BURIED UNDER EASTERN PATIO – INSTALLED IN 2011.

Note 10 FLOWER BED WAS ORIGINALLY FOR A HEDGEROW FENCE – IT IS NO LONGER REQUIRED AND COULD BE BLOCK PAVED OVER.

N

PROJECT HESTIA V – THE WILLOWS FLOOD DEFENCE (EXISTING LAYOUT)

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SCALE 1:100 DRAWING Nº 01/25 28 JAN 25

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The representation of features as lines is no evidence of a property boundary.

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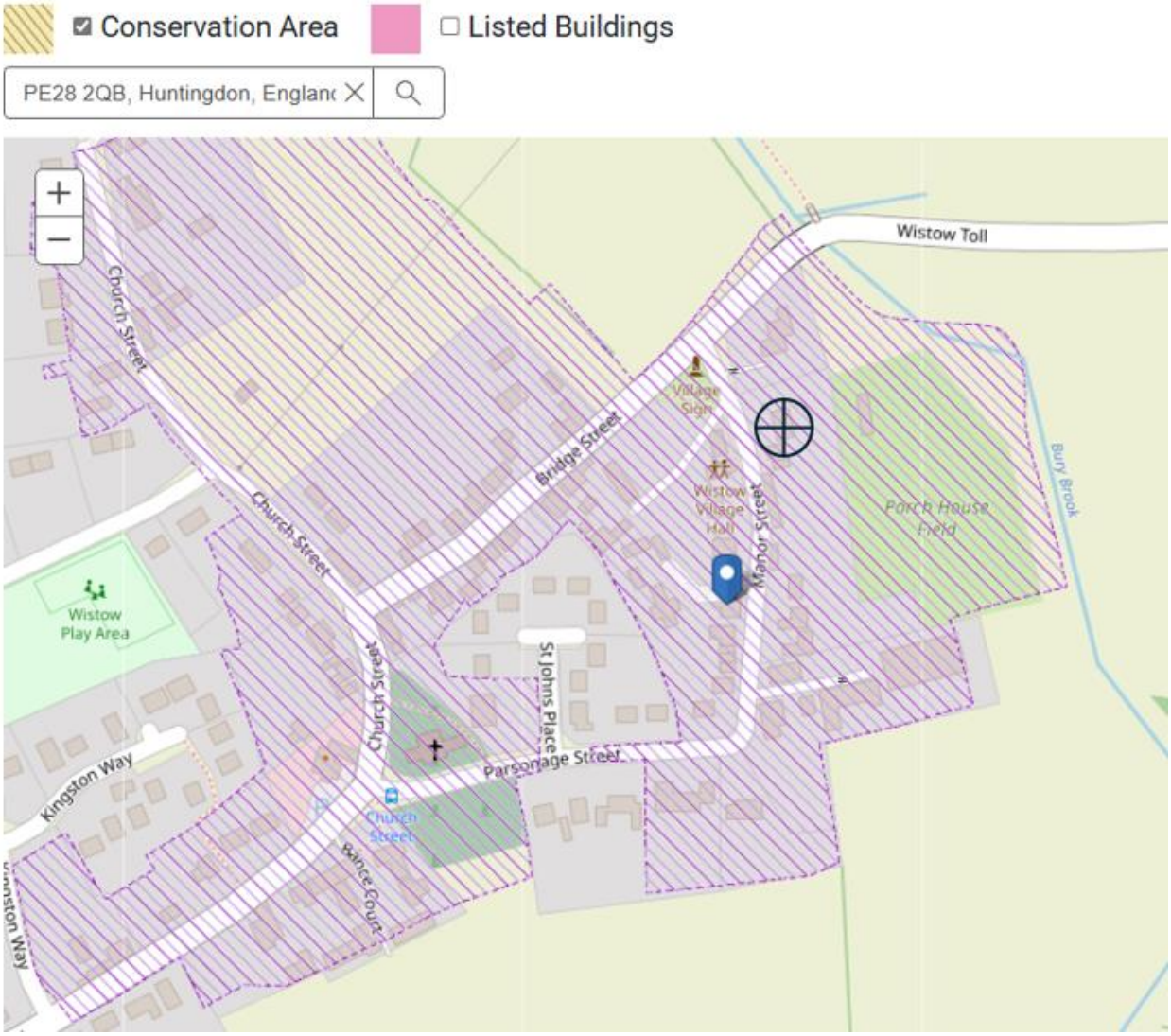
0 20 40
Scale 1:1250

Supplied by: **Blackwell M and D C**
Serial number: 00919000
Centre coordinates: 528071 281122

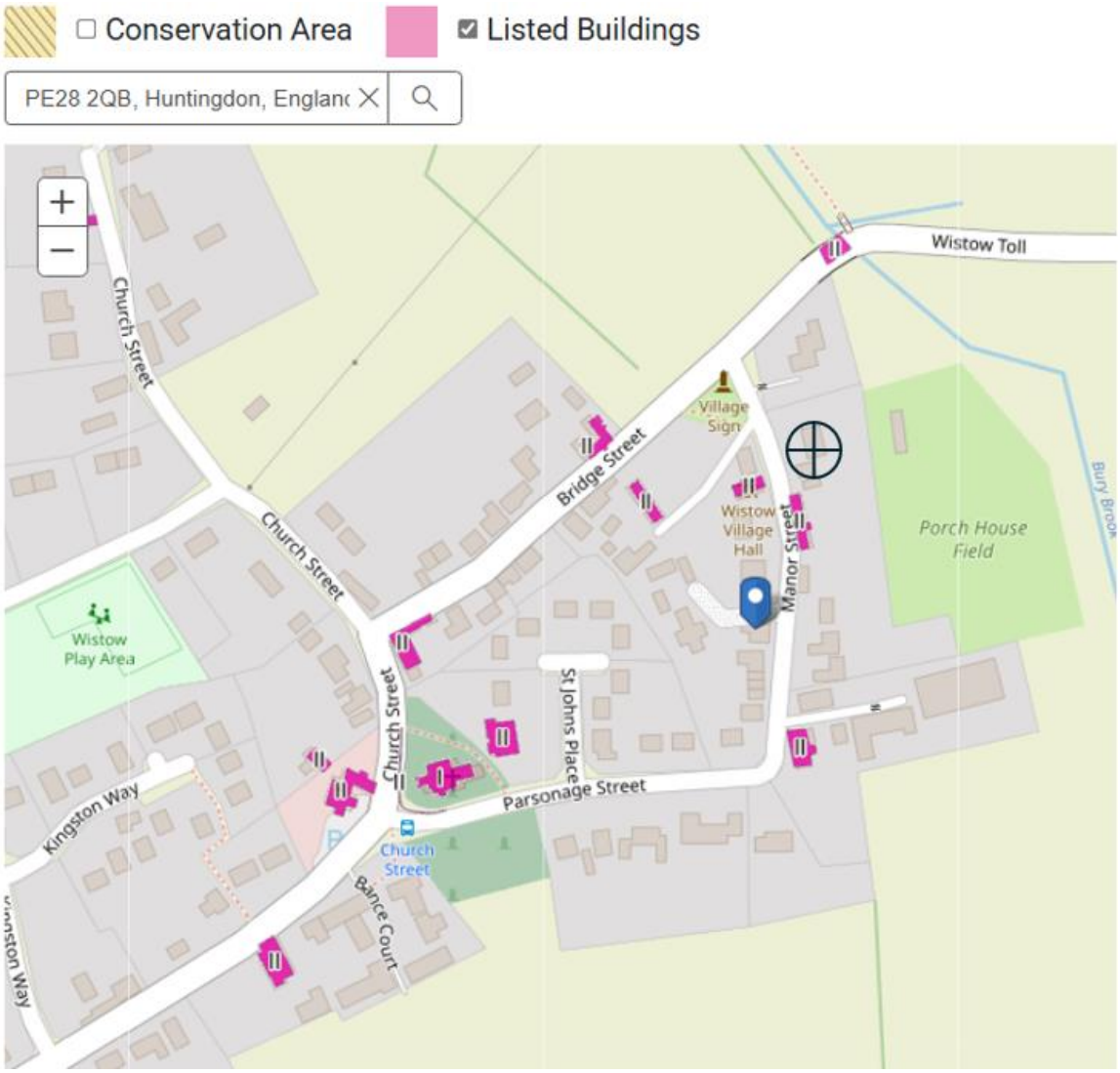
Further information can be found on the OS Sitemap Information leaflet or the Ordnance Survey web site: www.ordnancesurvey.co.uk

Map Showing the Willows Within Conservation Area



The crosshairs mark the position of the Willows

Map Showing the Willows Next to Grade II Listed Property



The crosshairs mark the position of the Willows

Full Approval Certificate for Works Carried out in 2011

Huntingdonshire DISTRICT COUNCIL

FULL APPROVAL

The Building Act 1984. The Building Regulations 2010

Details of Work

Application Number	**1001826DEXFP**
Proposal:	**Extension and alterations**
Address:	**The Willows Manor Street Wistow Huntingdon PE28 2QB**

Notice of Passing of Plans.

The plans and details submitted on 17th November 2010, have been examined and passed by the Authority as complying with the Building Regulations.

This approval is for the purposes of Building Regulations only. It is not an approval under the Town and Country Planning Acts or for any other statutory provisions.

If the work is not commenced within three years of submitting the plans the Authority will treat the application as void under the Building Act 1984, Section 32.(i.e. the consent expires)

Authority This Full Approval is authorised by

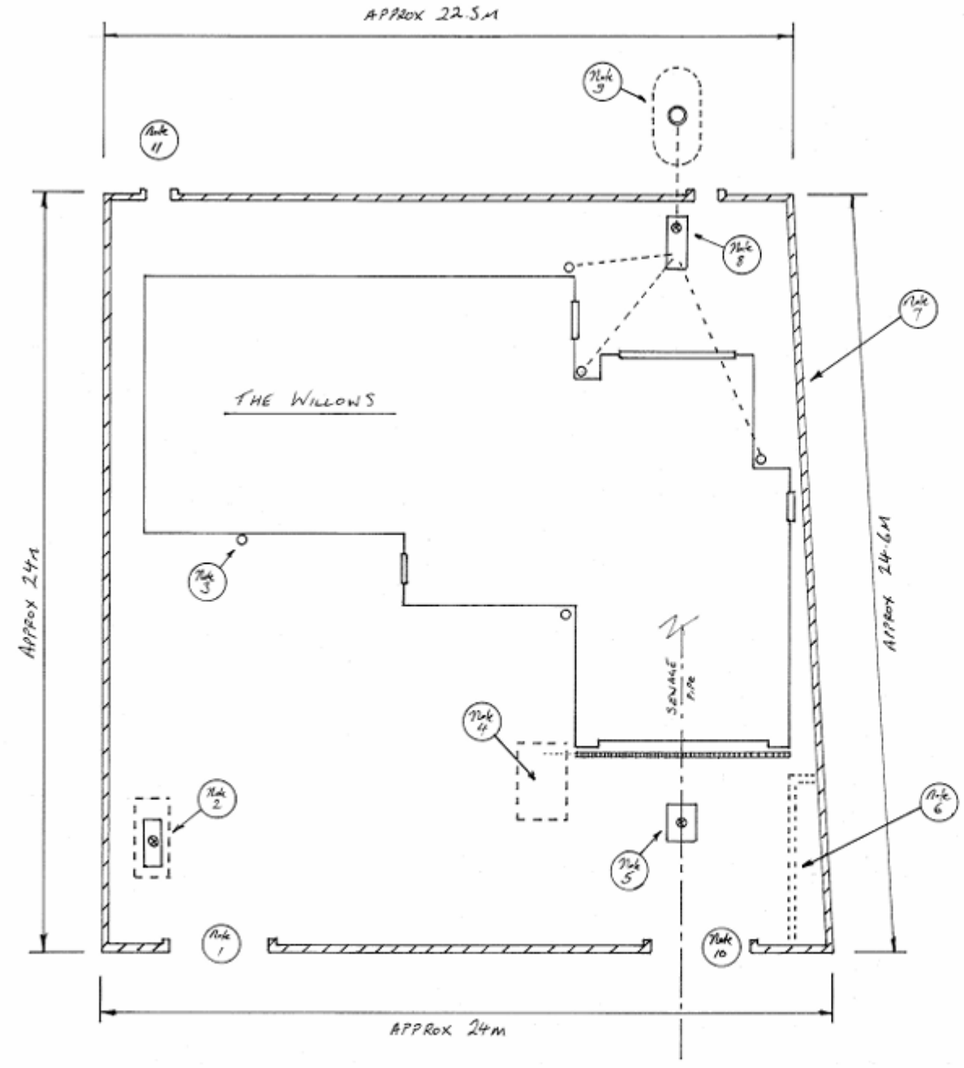
[redacted] **Director of Environmental and Community Services**

Signature [redacted] Date **30th November 2010**

winner LABC 2009 awards

Building Control Services Certificate No. FS 31414

Annex B: Project HESTIA V – The Willows Flood Defences (Proposed Layout)



NOTES

Note 1 THE GAP BETWEEN THE FLOOD WALL OPENINGS TO BE BUILT UP LEVEL WITH THE DRIVE WAY AND SMOOTHED TO PROMOTE THE SEAL WITH THE FLOOD BARRIERS WHEN FITTED.

Note 2 SUMP TO CATCH WALL SEEPAGE – TO BE FITTED ABOVE EXISTING SOAK AWAY SUCH THAT WATER DRAINS AWAY DURING NORMAL OPERATION. WHEN REQUIRED, SCAVENGE PUMP FITTED TO PUMP SEEPAGE WATER OVERBOARD

Note 3 RAINWATER GUTTER DOWN PIPES – NO CHANGE (SEE DWG 01/25)

Note 4 GARAGE THRESHOLD DRAIN – NO CHANGE (SEE BEFORE CONDITION ON DWG 01/25)

Note 5 SEWAGE PIPE INSPECTION CHAMBER TO BE ENLARGED TO FIT ONE-WAY/SHUT-OFF VALVE FOR FLOOD AVOIDANCE.

Note 6 EXISTING WALL SHOWN DOTTED TO BE DEMOLISHED SO NEW FLOOD WALL LINES UP WITH PROPERY BOUNDARY.

Note 7 FLOOD WALL CONSTRUCTED USING CLASS A/B ENGINEERING BRICKS WITH MORTAR MIX AS PRESCRIBED IN PROJECT DOCUMENT. THE WALL IS 600mm HIGH; 220 mm WIDE.

Note 8 SUMP CHAMBER FITTED WITH SHUT-OFF/ NON-RETURN VALVE SUCH THAT NORMAL OPERATION ALLOWS WATER TO DRAIN INTO UNDERGROUND TANK – VALVE CLOSED FOR FLOOD AVOIDANCE SUCH THAT SEEPAGE & GUTTER WATER COLLECTED FOR SCAVENGE PUMP TO DUMP OVERBOARD.

Note 9 UNDERGROUND RAINWATER CAPTURE TANK – NO CHANGE (SEE DWG 01/25)

Note 10 FRONT OPENINGS CLOSED USING FLOOD BARRIERS FOR FLOOD AVOIDANCE NOMINALLY 3.2M WIDE BESPOKE FLOOD BARRIERS PROCURED SEPARATELY.

Note 11 REAR FLOOD WALL OPENINGS CLOSED USING BESPOKE FLOOD BARRIERS PROCURED SEPARETELY NOMINALLY 0.8M WIDE.

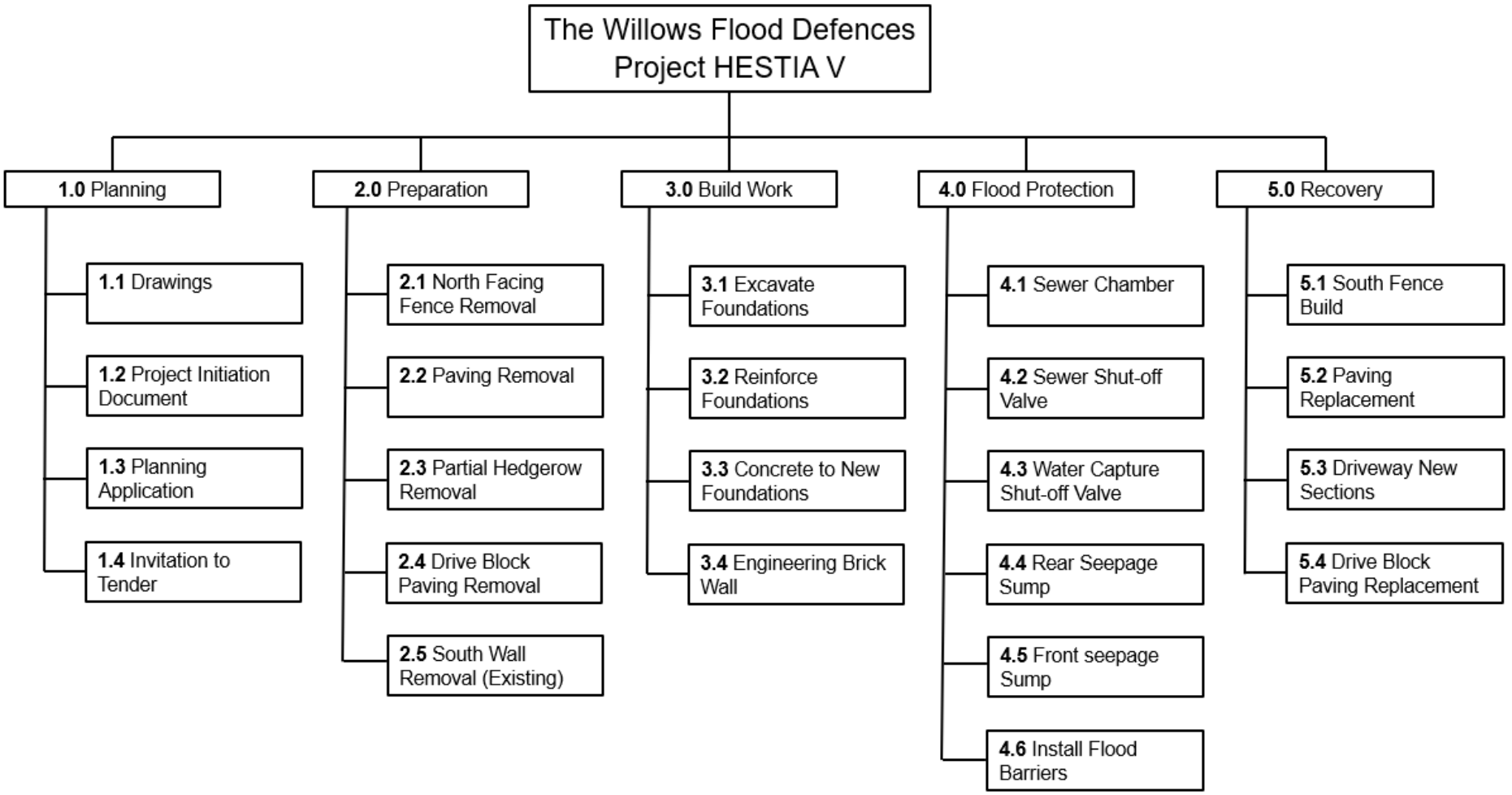
N

PROJECT HESTIA V – THE WILLOWS FLOOD DEFENCE (PROPOSED LAYOUT)

MR G A PYE
THE WILLOWS. MANOR STREET, WISTOW, HUNTINGDON, PE28 2QB
MOBILE: 07776022009 E: GERRYPYE66@GMAIL.COM

SCALE: 1:100 DRAWING Nº 02/25 27 JAN 25

Annex C: Project HESTIA V, Work Breakdown Structure



Statement of Work

WBS (a)	Description (b)	Work Required (c)	ITT (d)
1.0 Planning			
1.1	Drawings	In accordance with Huntingdonshire District Council (HDC) planning rules, drawings are required showing the current layout and the proposed layout (metric measurements of the positioning of the proposed development within the site and the distances from the neighbouring boundaries).	No
1.2	Project Initiation Document (PID 01/25)	Also, in accordance with HDC planning rules, a covering document describing the proposed development, including existing and proposed uses and outlining the functional need for such a proposed use.	No
1.3	Planning Application	Planning application is split into 2 phases: full use of the HDC pre-application process to test the art of the possible and to determine whether full planning approval is required or simply a Lawful Development Approval Notice. In the even that full planning permission is required, and additional planning application noting the caveats of the pre-planning judgement shall be initiated.	No
1.4	Invitation to Tender	In parallel with the planning application processes, an invitation to tender shall be issues to selected approved contractors to bid for the building work. No work shall commence until HDC approval, in whatever form, has been received.	No
2.0 Preparation			
2.1	North Facing Fence Removal	The aspiration is to retain the north-facing lapboard fence in situ; however, this is the most important part of the flood wall and if the integrity of the foundations cannot be guaranteed, then the fence and fence posts might have to be removed.	Yes
2.2	Paving Removal	There are paving slabs running on paths ways between the Property and the northern boundary and the Property and the southern boundary. Moreover, there is a patio to the rear of the dining room – all of which will need to be lifted in order to dig the foundations.	Yes
2.3	Hedgerow Partial Removal	In order to ensure the integrity of the flood wall in the southeast corner, approximately 4m of hedgerow will have to be removed, including root bowls, and disposed of.	No
2.4	Drive Block Paving Removal	The driveway comprises blockwork arranged in a herringbone pattern with kerbs at the northern edge and surrounding the flowerbed on the western edge – these will have to be removed in order to dig the foundations.	

2.5	South-facing Wall Removal (Existing)	There is a partial Class A/B Engineering Brick wall on the southern edge of the Property, which could be retained/altered to complete the flood wall; however, the nature of the foundations is unknown. Moreover, there is an option to demolish the raised flower bed, which is located towards the front of the southern wall. All options need to be costed as part of the ITT.	Yes
3.0 Build Work			
3.1	Excavate Foundations	Foundations need to be excavated to allow 300mm of concrete and two courses of Class A/B Engineering Bricks below the surface.	Yes
3.2	Reinforce Foundations	Foundations need to be reinforced with A393 Steel Mesh as mitigation against clay heave and other environmental variances.	Yes
3.3	Concrete to New Foundations	Concrete to 300mm deep, 400mm wide.	Yes
3.4	Engineering Brick Flood Wall	Class A/B Engineering Brick wall – buried courses 1:3 Cement: Sand; exposed course 1:6 Cement Sand	Yes
4.0 Flood Protection			
4.1	Sewer Chamber	Existing inspection chamber to be replaced with a larger inspection chamber with a sealed sewage pipe. Must include an easily removed access hatch.	Yes
4.2	Sewer Shut-off Valve	A sewer shut-off valve to be installed in the pipe work within the enlarged inspection chamber to prevent backflow from the local sewage system in the event of flood.	Yes
4.3	Water Capture Shut-off Valve	A water-capture shut off valve to be incorporated in the rear seepage sump such that flood water is unable to back flow into the flood wall perimeter in the event of a flood.	Yes
4.4	Rear Seepage Sump	Rear seepage sump to be large enough to capture the rainwater that would have drained into the rainwater capture tank, and to allow a scavenge pump to be inserted to clear the sump water overboard.	Yes
4.5	Front Seepage Sump	A front seepage sump to be installed above the existing soakaway in the northwest corner of the driveway. The sump must be large enough to allow an additional scavenge pump to be inserted to clear the seepage water overboard.	Yes
4.6	Install Flood Barriers	Flood Barriers to be installed in the entry and exit points to the flood wall to close the perimeter in the event of a flood. This requires provision under Section 3.4 for a smooth base between the ends of the flood wall and increased depth in the flood wall itself to accommodate the barrier guides.	No
5.0 Recovery			
5.1	Southern Fence Build	A fence will be required to ensure privacy in the area where the hedgerow was removed to accommodate the southern foundations of the flood wall. Negotiations will be required with the owner of Porch House to ensure that the fence is fit for purpose and meets both household requirements.	Optional

5.2	Paving Replacement	The paving lifted to dig the foundations for the flood wall shall be replaced, like for like where possible using the original paving slabs. Additional paving will be required to extend the rear pathway from the existing 1.2m wide to 2.4m wide.	Optional
5.3	Driveway New Sections	New sections of block paving will be required upon removal of the raised flower beds towards the front of the Property on the southern boundary, and where the ground level flowerbed was positioned on the western side of the Property.	Optional
5.4	Driveway Block Paving Replacement	All block paving removed in order to dig the foundations to be replaced. With the wall in place towards the front of the properties, there will be no requirement to replace the kerb stones.	Yes

Notes:

a. Work Breakdown Structure Number.
b. Description of Task allocated to the WBS number.
c. Self-explanatory.
d. Work required to be included in the Invitation to Tender.

Pre-application Compliance Table

Requirement (a)	Reference (b)
For written advice pre-application enquires Minimum document list	
A covering letter or similar document describing the proposed development, including the existing and proposed uses. Outlining the functional need for such a proposed use.	PID 01/25
A location plan identifying the site, its boundaries and neighbouring properties.	Appendix 1 to Annex A
Existing and proposed site plan (metric measurements of the positioning of the proposed development within the site and the distances from neighbouring boundaries).	Drawing 01/25 Annex A
Existing and proposed floor plans (Plans of each of the affected floors of the building where operational works are proposed).	N/A
Existing and proposed elevations (upper and lower limits for height, width and length, in metres, of each building within the site boundary).	N/A
Upload these with the online application if you have them available:	
An indicative layout plan showing any separate developments proposed within the site boundary.	N/A
An assessment of the site's surroundings and commentary on how the proposal has had regard to, and may impact, them.	Paragraphs 20 & 21
A completed commercially sensitive checklist	N/A
In addition, and only where the proposal involves works to, or within the curtilage of, a listed building:	
A description of the significance of the heritage assets affected and the contribution of their setting to that significance.	Paragraphs 20 & 21
Full details of the works proposed, including existing and proposed floor plans and elevations where they are affected by the proposal	Drawing 02/25 Annex B
An explanation of the rationale for the design, including details of its evolution through the design process.	Section 1
An assessment of the impact of the proposals upon the significance of the heritage assets and their setting.	Section 2

Flood Characteristics of Building Materials

Table 6.1 **Flood resilience characteristics of building materials (based on laboratory testing)**			
Material	Resilience characteristics*		
	Water penetration	Drying ability	Retention of pre-flood dimensions, integrity
Bricks			
Engineering bricks (Classes A and B)	Good	Good	Good
Facing bricks (pressed)	Medium	Medium	Good
Facing bricks (handmade)	Poor	Poor	Poor
Blocks			
Concrete (3.5N, 7N)	Poor	Medium	Good
Aircrete	Medium	Poor	Good
Timber board			
OSB2, 11mm thick	Medium	Poor	Poor
OSB3, 18mm thick	Medium	Poor	Poor
Gypsum plasterboard			
Gypsum Plasterboard, 9mm thick	Poor	Not assessed	Poor
Mortars			
Below d.p.c. 1:3(cement:sand)	Good	Good	Good
Above d.p.c. 1:6(cement:sand)	Good	Good	Good
* Resilience characteristics are related to the testing carried out and exclude aspects such as ability to withstand freeze/thaw cycles, cleanability and mould growth			