

A Draft Parish Council Plan

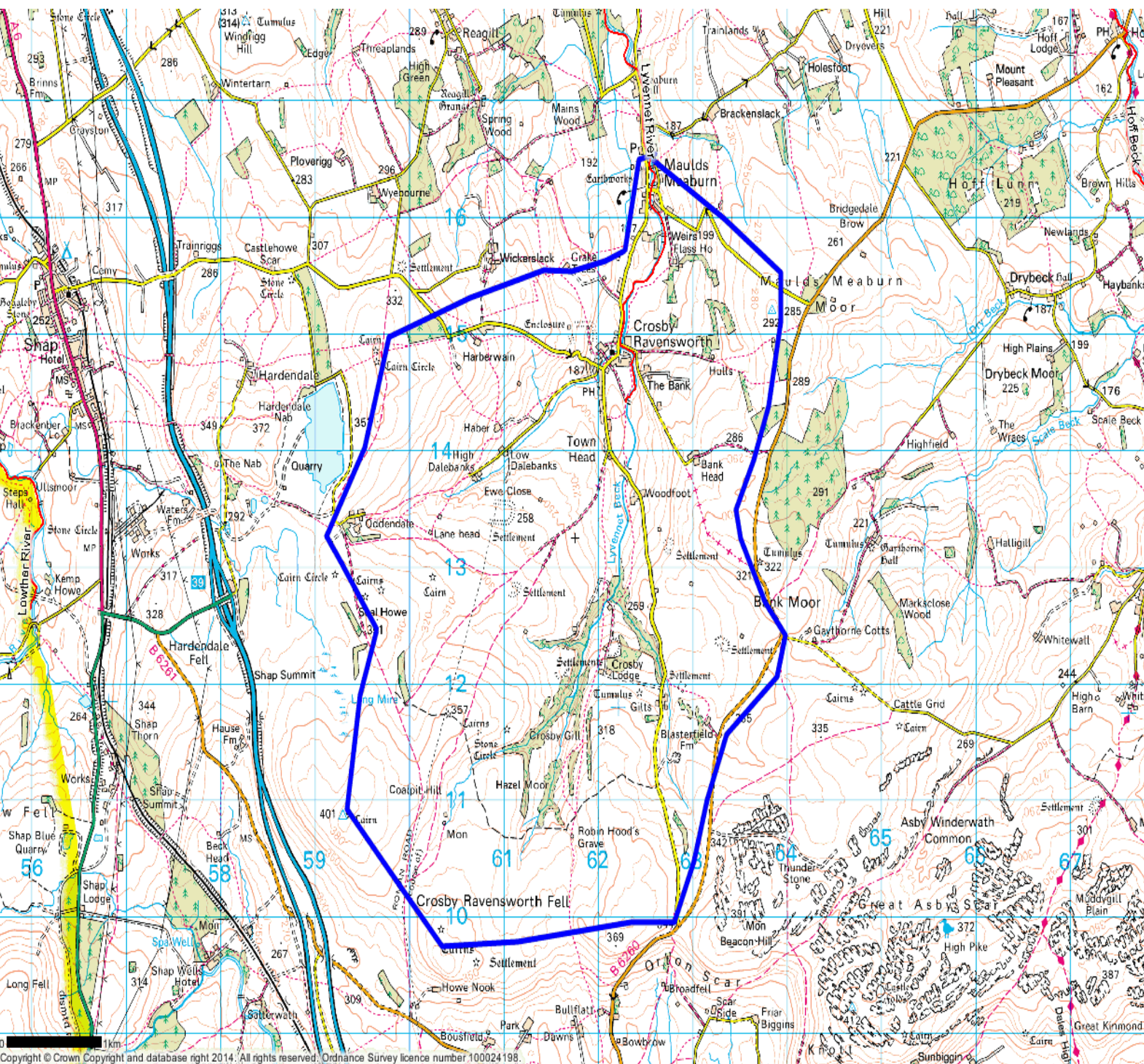
Flood Risk Strategy Plan

Prepared & Presented by:

Mike Archer of Eden Architecture
Council recognised Flood Resilience Consultant

Iwan Lawton of the Environmental Agency: PSO team
Present also is Tony Metcalfe of EDC Flood Resilience Grants Team





Catchment Map

- Flooding in Maulds Meaburn & Crosby Ravensworth
- Main River - Lyvennet
- Confluence with Dalebanks Beck in Crosby Ravensworth
- Total area in blue outline is 25 Km²
- Characteristics of the tributaries are determined by catchment geology which is Limestone – very unpredictable!





“How would my community survive the first 48 hours of a serious emergency?”

BE PREPARED!

**COMMUNITY
EMERGENCY
PLANNING**

**SMALL COMMUNITIES &
PARISH MEETINGS**



Community Emergency Planning

As part of the Sustain Eden programme, ACT is working with communities in Eden to raise awareness of, and support, Community Emergency Planning.

Cumbria Community
Messaging – pls contact
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[Rebecca.arkley@environme
nt-agency.gov.uk](mailto:Rebecca.arkley@environment-agency.gov.uk)

Those who are responsible for emergency planning,

	Responsibility	Responsibility Detail
Environment Agency	<ul style="list-style-type: none"> • Flood warning. • Emergency response. 	<ul style="list-style-type: none"> • Carry out flood forecasting • Issue flood warnings • Provide assistance in flood emergencies • Monitor and repair flood defences • Clear blockages • Collect data on flood events
Met Office	<ul style="list-style-type: none"> • Weather forecasting. 	<ul style="list-style-type: none"> • Forecast extreme weather and tidal surges.
Police	<ul style="list-style-type: none"> • Law and order. 	<ul style="list-style-type: none"> • Flood emergency planning. • Co-ordinate emergency response. • Interpretation of EA flood warnings • Public safety. • Evacuation.
Local Authorities (County Councils, District Councils and Unitary Authorities)	<ul style="list-style-type: none"> • Emergency planning • Emergency response 	<ul style="list-style-type: none"> • Carry out flood emergency planning • Interpretation of EA flood warnings • Provide a flood emergency response including road diversions, rest centres and clearing watercourses. • Provide welfare assistance for flood victims • Co-ordinate voluntary organisations. • Clear up and recovery.
Fire Service	<ul style="list-style-type: none"> • Emergency response particularly fires, road accidents, etc. 	<ul style="list-style-type: none"> • Carry out flood emergency planning • Provide emergency response including rescue • Provide pumping out • Deal with pollution clean up
Health Service	<ul style="list-style-type: none"> • Public health. 	<ul style="list-style-type: none"> • Provide health support to those affected by floods. • Carry out R&D into health impacts of flooding

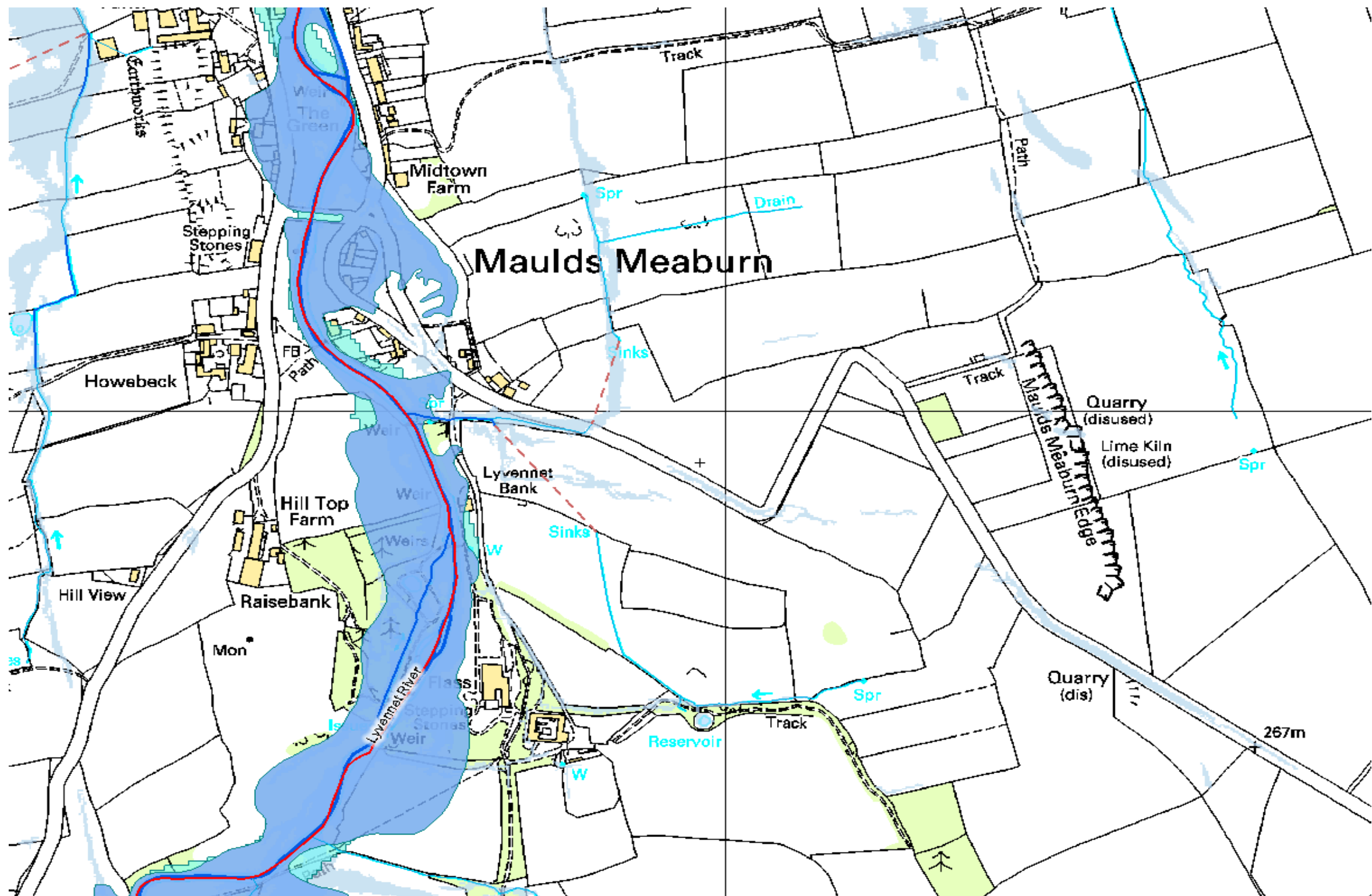
Parish Council

Flood Risk Strategy Plan

1. Historic actions and consequences
2. Properties at risk (On map shown further on)
3. Means of egress (Considered in full on all planning submissions. UU)
4. Large tractors and trailers (who will provide them/Drivers)?
5. First aiders: (For Example: First Responders; resident local doctors including mental health)
6. Wardens (Trained in their responsibilities: Active flood defences?)
7. Wardens to patrol roads for vehicles in distress
 1. Means Of communication
8. Deliverers: (Local volunteers ?)
9. The Parish Council would like to thank all those who helped recently during the flooding.
10. Place of refuge & organisation:
 1. (MMVI; Crosby Village Hall; Butchers Arms?)
 2. Food and drink

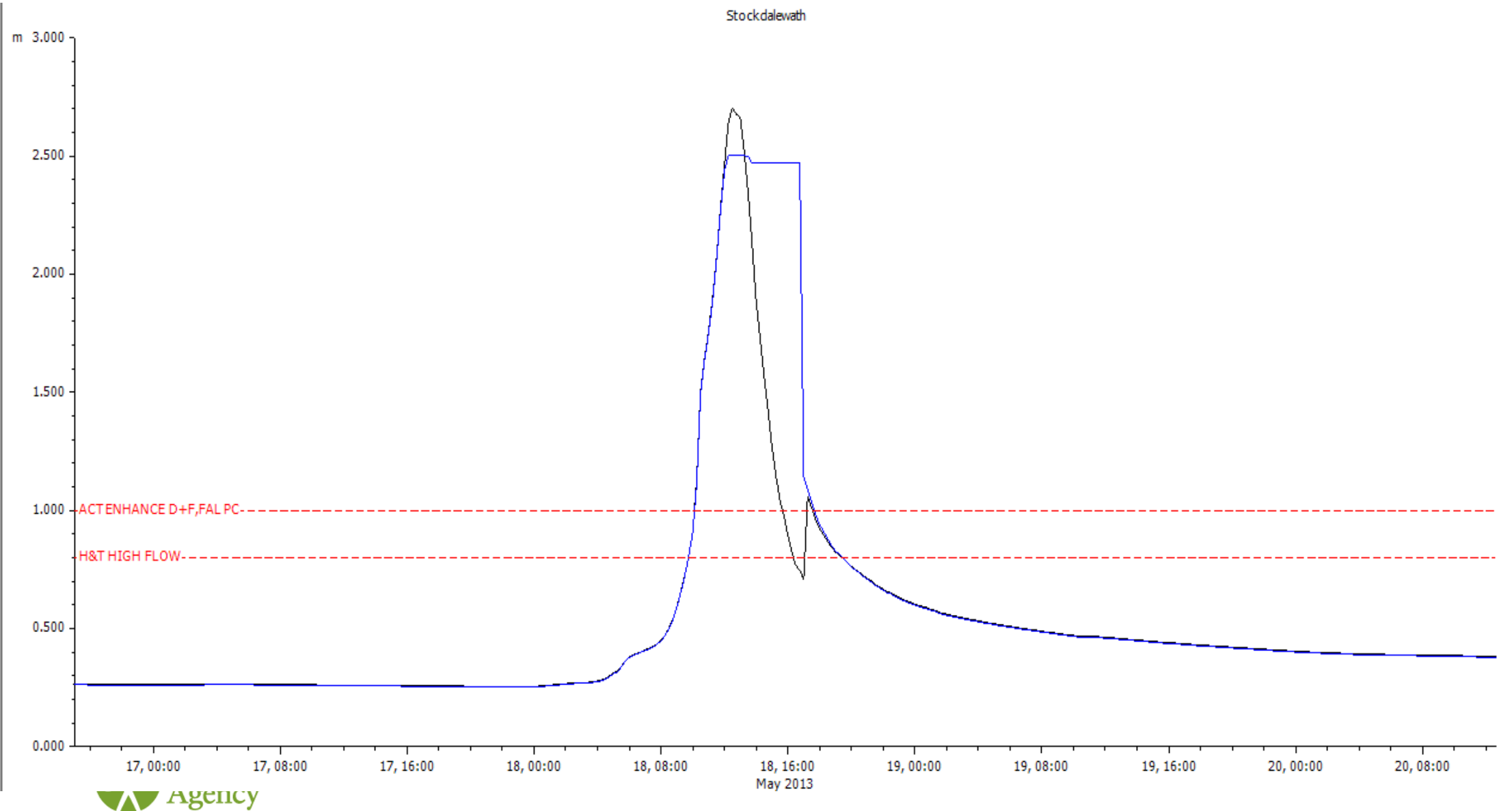
Parish Council Strategic Responsibilities

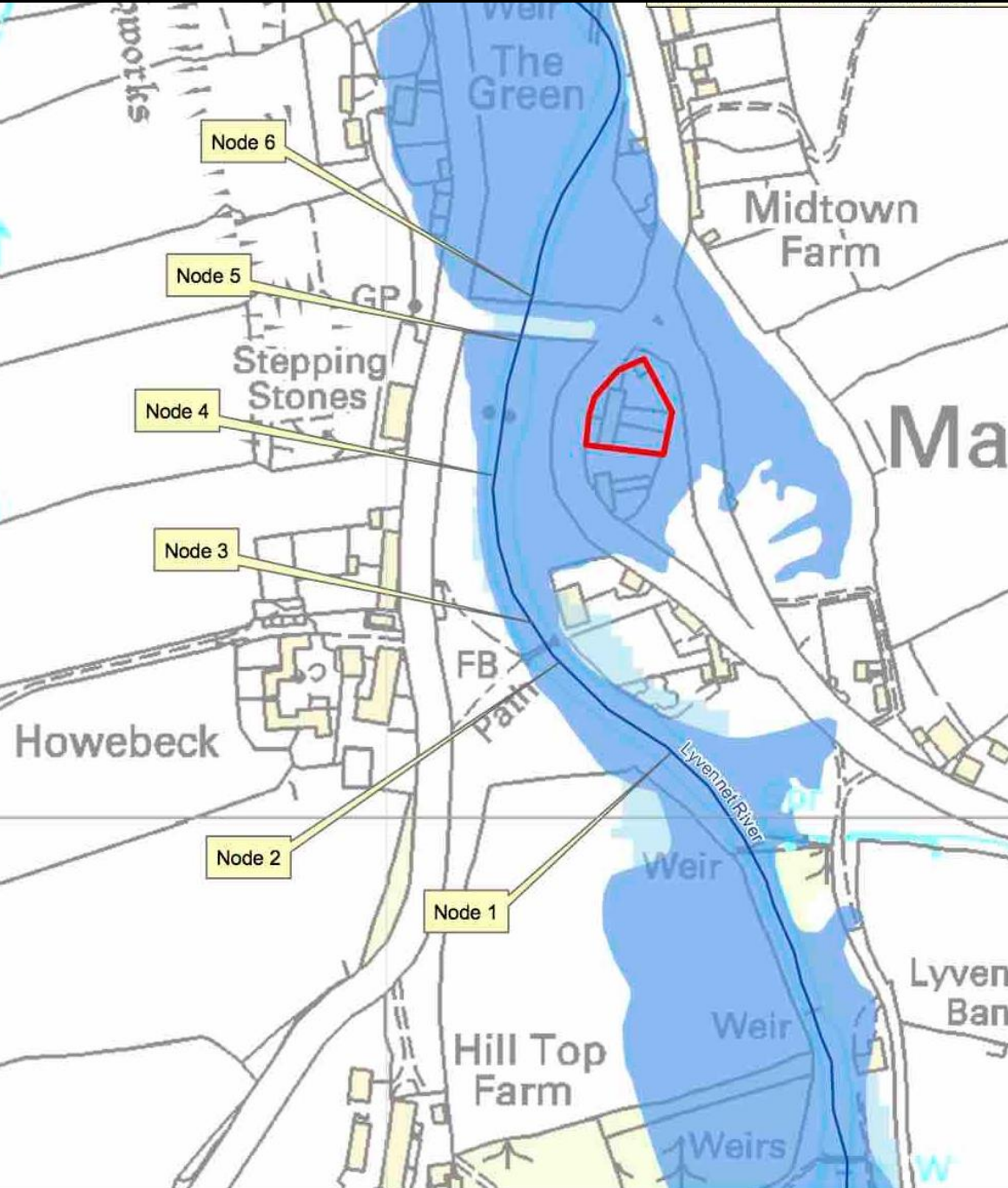
- 1.Flood resilience in new build and renovations in all flood zones
- 2.Sustainable Urban Drainage (SUD's) for all increases in hard standing areas:
 - 1.River edges allowed to become naturalised;
 - 2.planted with trees and shrubs;
 - 3.willow planting to stabilise river banks
 - 4.Bridge locations to be reviewed to allow the river to flow normally.
- 3.Identify safe routes in and out of villages and the parish.
- 4.Ensure safe routes are maintained
- 5.Ensure all drainage is well maintained on priority roads in liaison with the Highways Agency
- 6.Ensure flood storage is maintained and leaky walls are in good condition.
- 7.Annual review of the flood Wardens Team are filled and wardens are trained (Funding needs to be found & insurance)
- 8.Annual Flood strategy plan review of Flood levels & methodologies



Examples of Environment Agency flood risk mapping

Gauging Stations – key info





**Environment
Agency**

Fluvial Flood Level Map: Lyvennet River at Maulds Meaburn

Produced: 29 September 2015

Our Ref: CL4834HR

NGR: NY 62618 16200

Key



Main River



Historic Flooding



Flood Zone 3



Flood Zone 2



Areas Benefitting from Defences

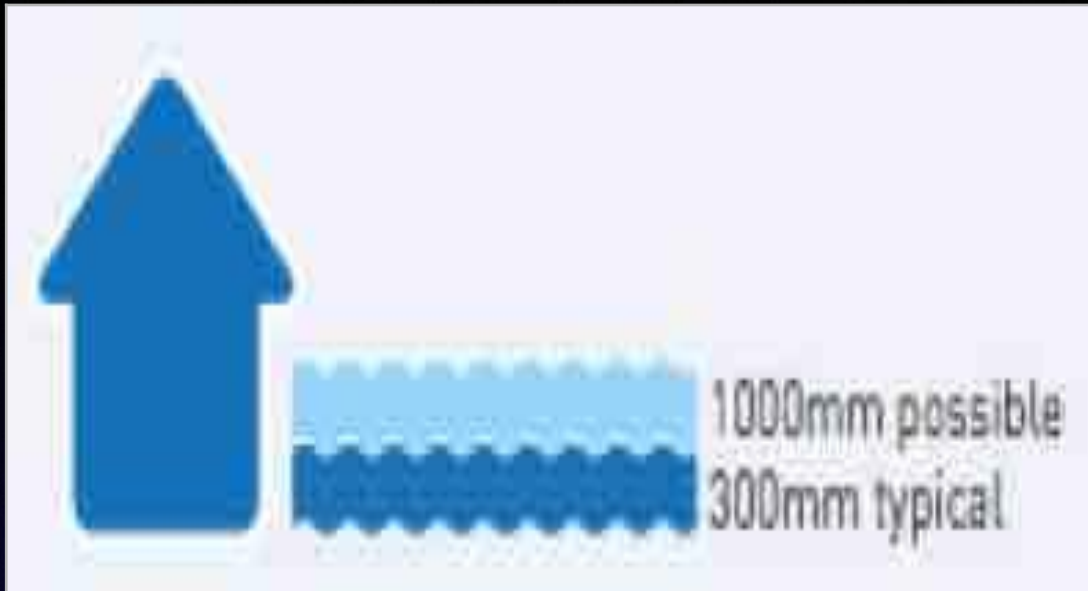
Fluvial Flood Node data at return period:

Node Point	1:2		1:5		1:10		1:25		1:50		1:75		1:100	
	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level
Node 1	9.20	169.68	12.40	169.80	14.67	169.88	17.86	169.99	20.60	170.08	22.34	170.13	23.64	170.17
Node 2	9.20	169.46	12.40	169.58	14.66	169.65	17.87	169.76	20.59	169.83	22.35	169.88	23.64	169.92
Node 3	9.20	169.44	12.40	169.54	14.66	169.61	17.87	169.70	20.59	169.76	22.35	169.80	23.64	169.83
Node 4	9.20	168.85	12.41	168.95	14.67	169.02	17.87	169.11	20.60	169.18	22.35	169.22	23.65	169.24
Node 5	9.21	168.33	12.41	168.45	14.67	168.54	17.88	168.66	20.60	168.77	22.36	168.84	23.66	168.88
Node 6	9.21	168.32	12.41	168.44	14.67	168.51	17.88	168.62	20.60	168.70	22.36	168.74	23.66	168.78

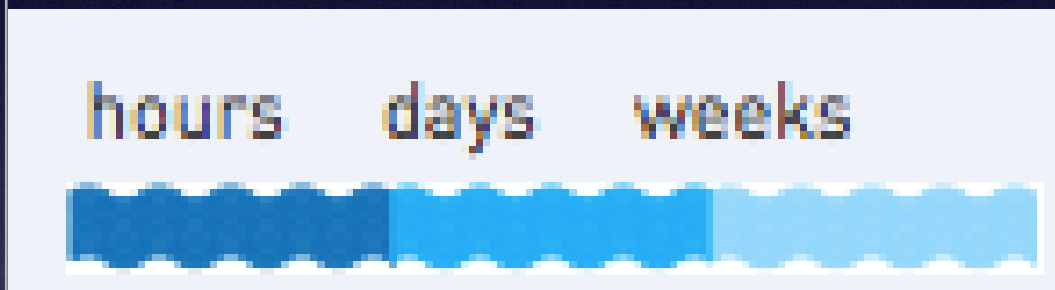
Flows are given in m³/s and Levels are given in m AOD

Data taken from River Eden Tributaries SFRM 2006

Facts about the flood risk FD2320/T2



Flood depths expected at your house. Low depths, for example 100mm, are unlikely to put people at risk but water damage to buildings and contents may be significant without any flood protection. High water depths, for example 1m, may severely threaten the safety of people and may cause extensive damage to buildings. It may be dangerous to keep deep floods out of a building because of the large weight of water pressing against the walls.



Flood duration is the time that flood water is expected to stay at your house. Temporary flood defences may successfully keep water out if flooding is expected to last for just a couple of hours, whereas, long flood durations may give time for water to penetrate into the building. It may be safe to take refuge and stay in a building for short duration floods but this will depend on the other factors.



Flood onset is the time for flood water to reach your house from its source. Short onset flooding (flash floods) are particularly dangerous as there is little time available to get people to safety or to protect buildings.

Flood Flood Node data in return period														
Node Name	1:2		1:5		1:10		1:25		1:50		1:75		1:100	
	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level
Node 1	0.20	100.00	0.40	100.00	0.60	100.00	0.80	100.00	1.00	100.00	1.20	100.00	1.40	100.00
Node 2	0.20	100.40	0.40	100.40	0.60	100.40	0.80	100.40	1.00	100.40	1.20	100.40	1.40	100.40
Node 3	0.20	100.40	0.40	100.40	0.60	100.40	0.80	100.40	1.00	100.40	1.20	100.40	1.40	100.40
Node 4	0.20	100.90	0.40	100.90	0.60	100.90	0.80	100.90	1.00	100.90	1.20	100.90	1.40	100.90
Node 5	0.20	100.30	0.40	100.30	0.60	100.30	0.80	100.30	1.00	100.30	1.20	100.30	1.40	100.30
Node 6	0.20	100.30	0.40	100.30	0.60	100.30	0.80	100.30	1.00	100.30	1.20	100.30	1.40	100.30
Node 7	0.20	100.30	0.40	100.30	0.60	100.30	0.80	100.30	1.00	100.30	1.20	100.30	1.40	100.30

Flood algorithm is in 1D and 1D only given in 1D AC30

Data taken from Flood Data Template ZFAM 2008

Flood annual probability is a measure of the chance of flooding to your Flood house over the course of 1 year. Different approaches to flood protection may be needed depending upon how likely flooding is expected.









Runoff Attenuation Features

1. Large Woody Debris

- Increases hydraulic roughness of channels
- Potential for upstream storage
- Used in series



2. Overland Flow Interceptor

- Creating a bund across a flow path to create temporary storage



3. Online Ditch Barrier

- Barriers across small channels to restrict high flows
- Allows low level flow to pass freely
- Used in series

4. Offline Ponds

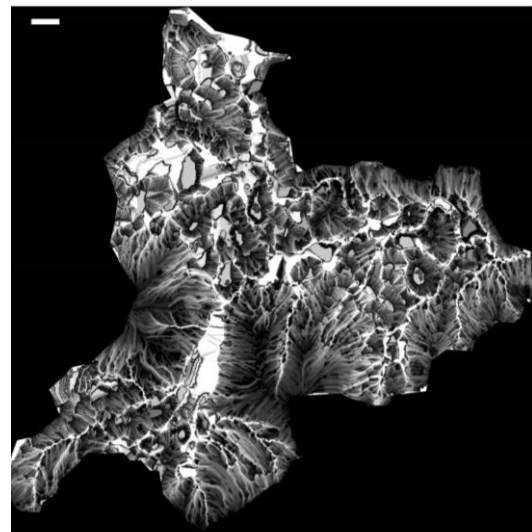
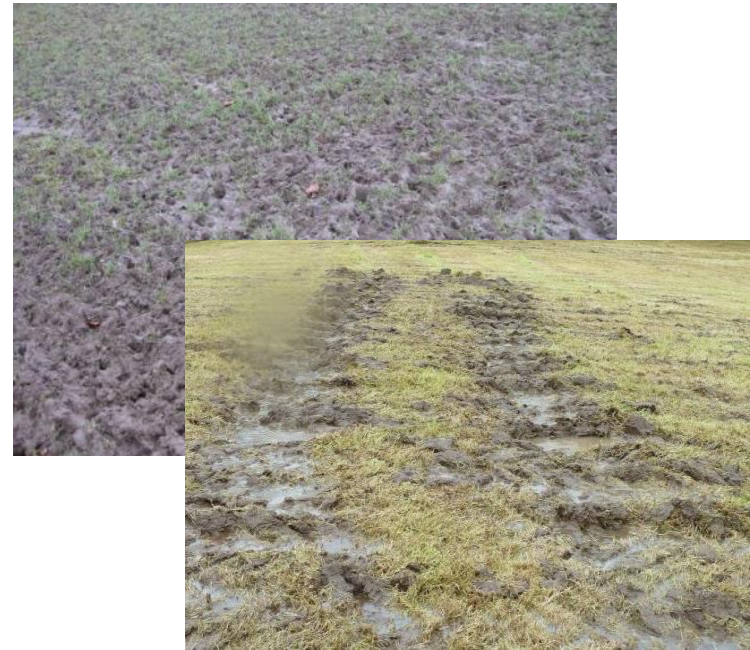
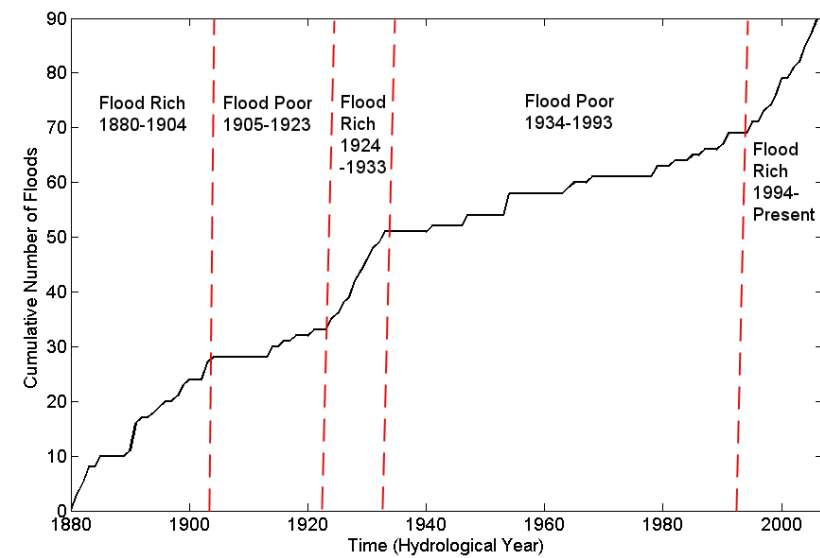
- Located on low-lying ground away from watercourse



5. Riparian Woodland

- Creation of woodland or adaptation of agricultural methods in riparian zone
- Aims to reduce soil erosion and surface run off





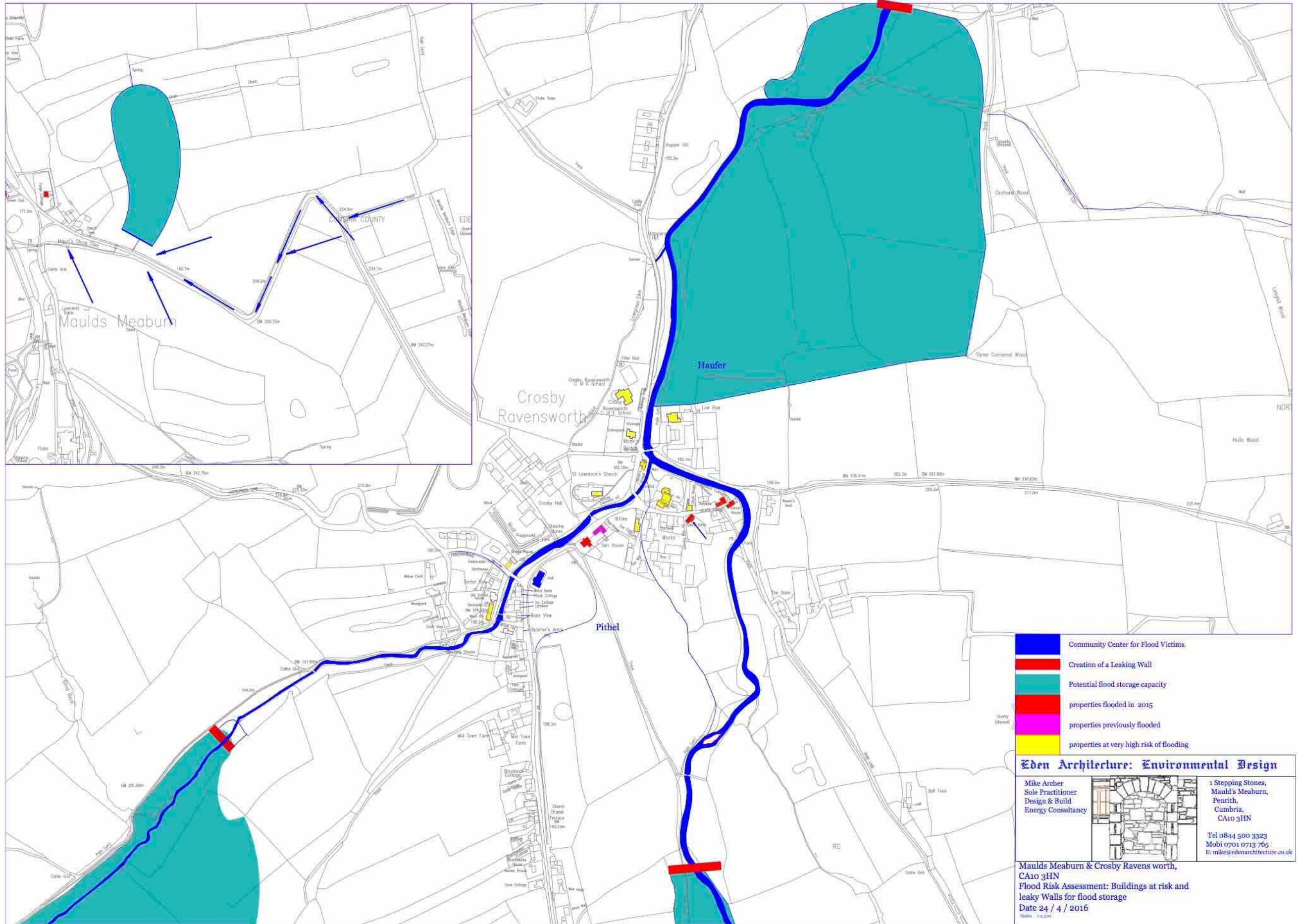
Working with researchers at Durham University to investigate:

“to what extent upstream land management could be used in a river management capacity to increase low flows and decrease peak flows in the Eden catchment”



Taking a catchment based approach trialling projects in the Dacre Beck looking at delivering multiple benefits for water quality, habitat and wildlife, farm business and flood risk management.

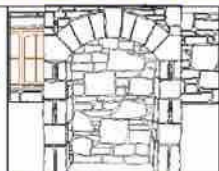




- Community Center for Flood Victims
- Creation of a Leaking Wall
- Potential flood storage capacity
- properties flooded in 2015
- properties previously flooded
- properties at very high risk of flooding

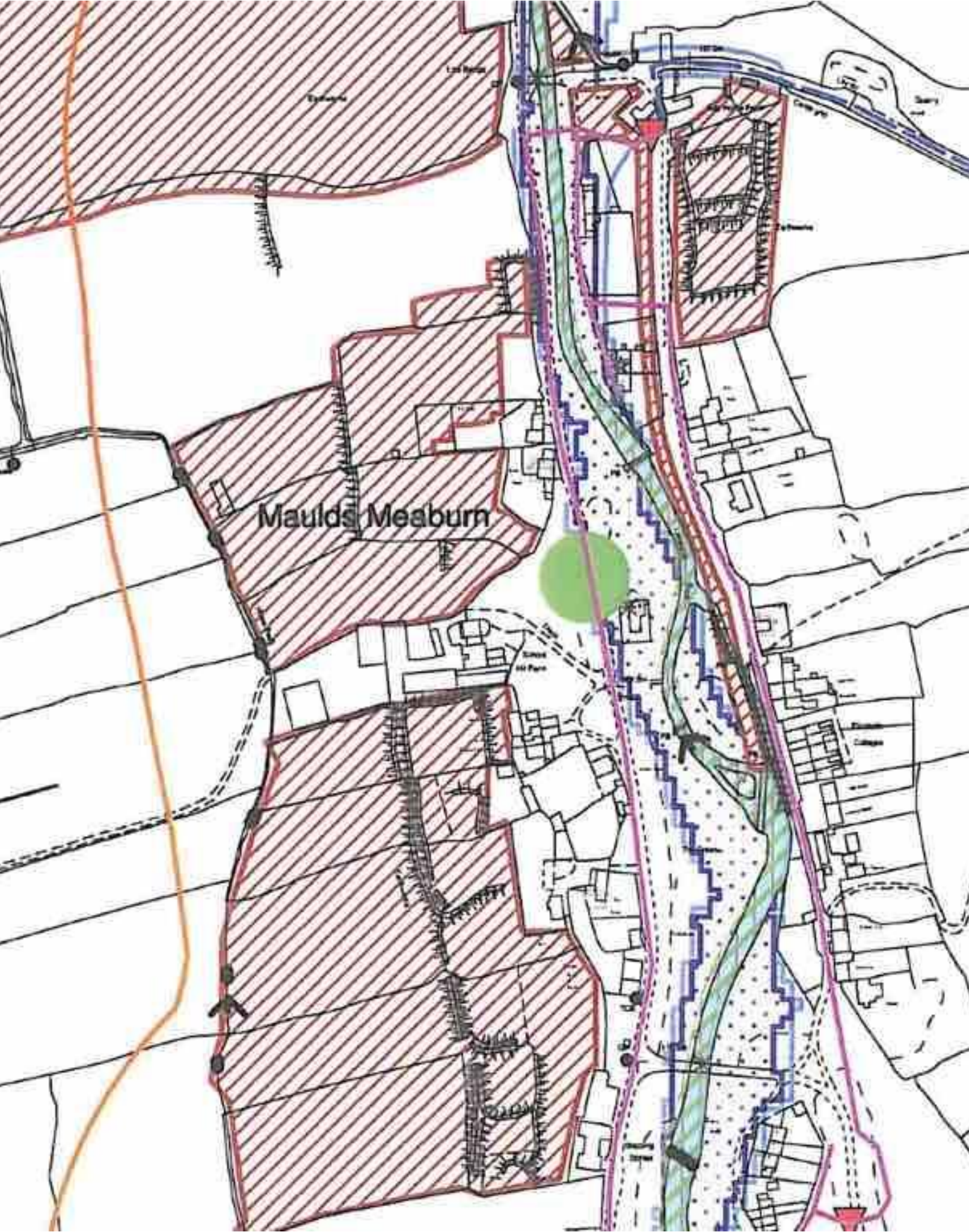
Eden Architecture: Environmental Design

Mike Archer
Sole Practitioner
Design & Build
Energy Consultancy



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Maulds Meaburn & Crosby Ravensworth,
CA10 3HN
Flood Risk Assessment: Buildings at risk and
leaky Walls for flood storage
Date 24 / 4 / 2016
Scale 1:10,000



1 in 100 Year Flood Zone



1 in 1000 Year Flood Zone



SBI



Scheduled Ancient Monume

Flood Risks to People Phase 2 FD2320_3364_TRP

Table 13.1 Danger to people for different combinations of depth and velocity

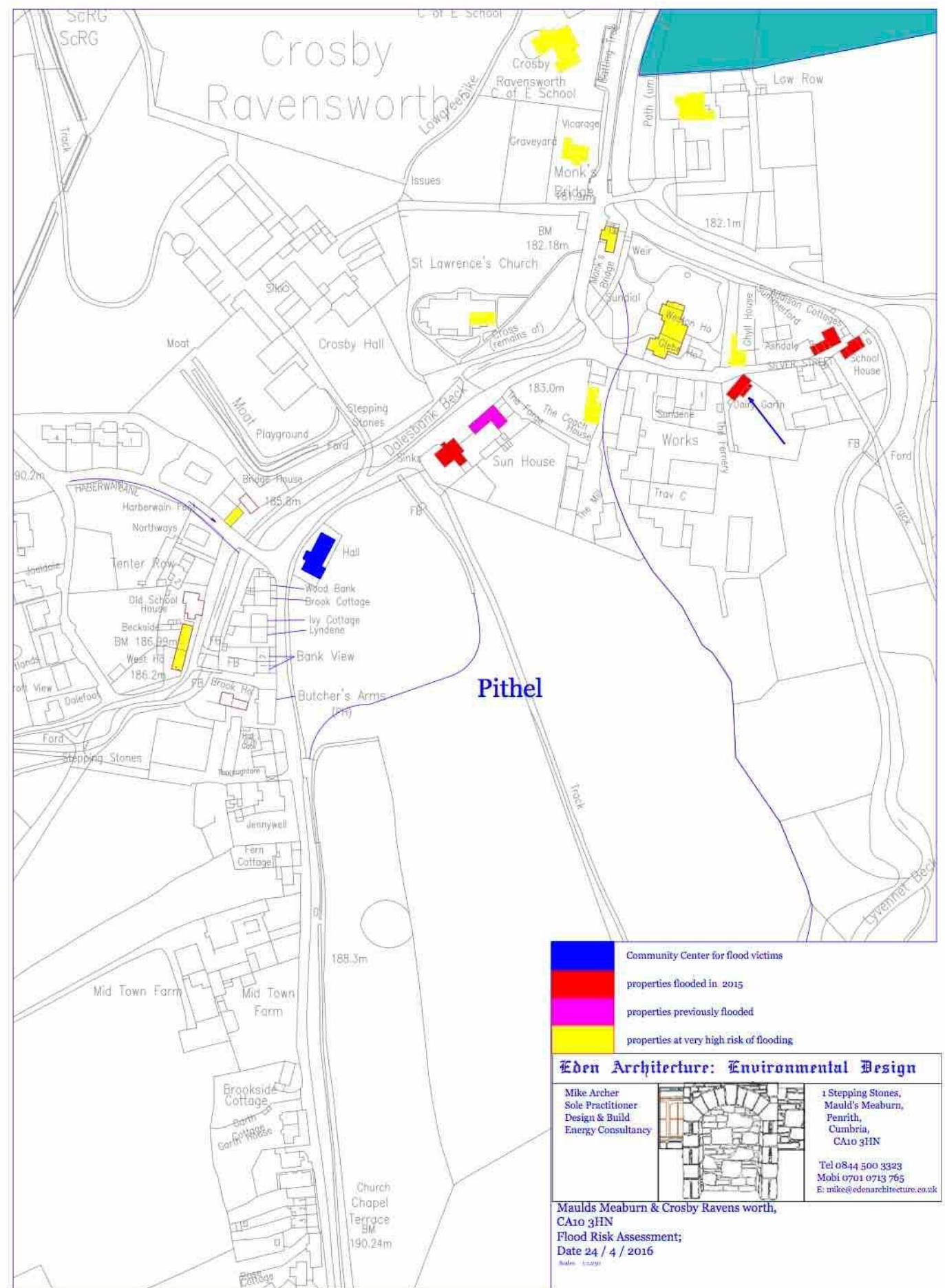
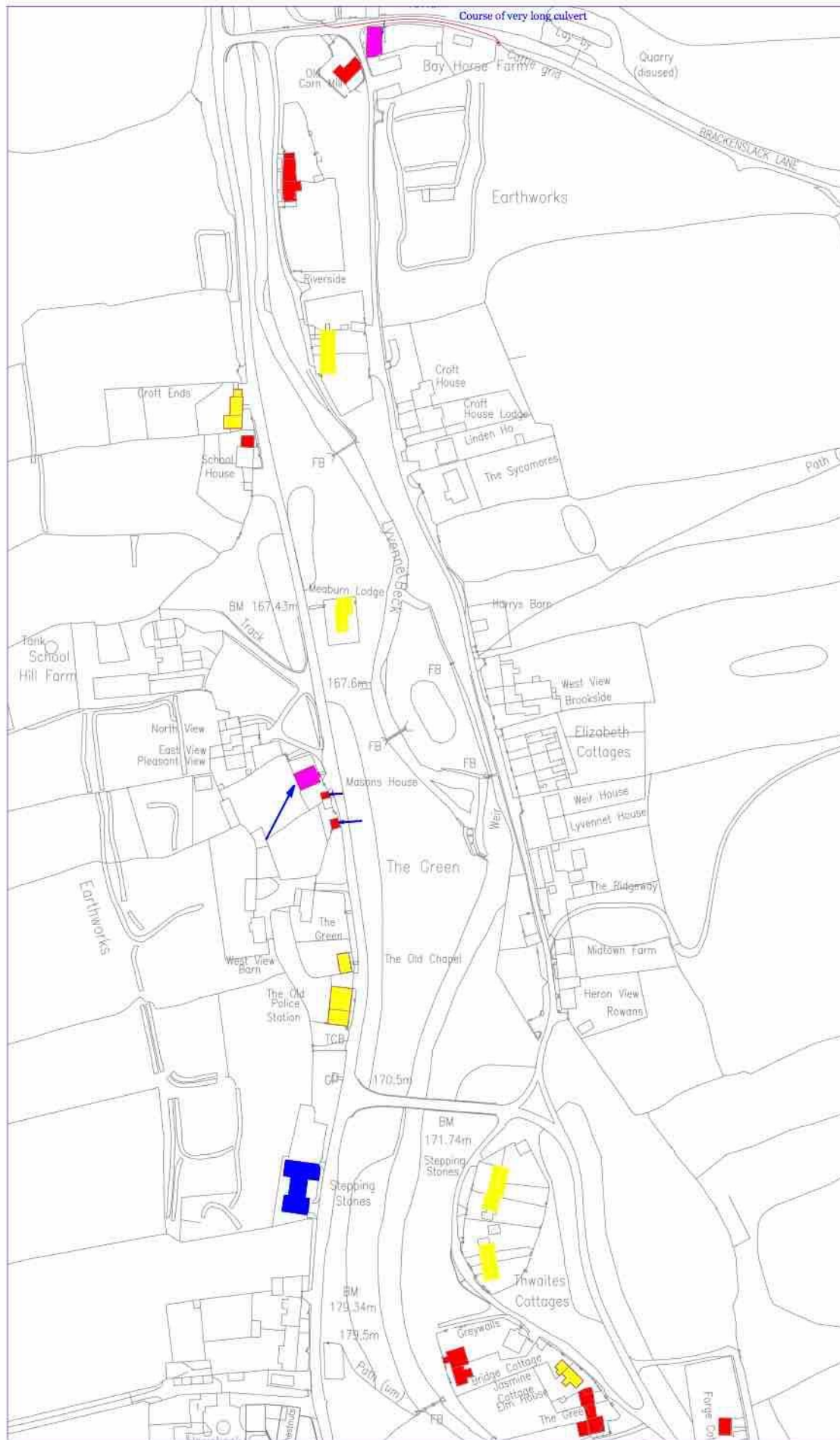
	Depth of flooding (m)									
Velocity in m/s	0.05	0.1	0.2	0.3	0.4	0.5	0.6	0.8	1	1.5
0										
0.1										
0.25										
0.5										
1										
1.5										
2										
2.5										
3										
3.5										
4										
4.5										
5										

M/Sec.	MPH
1	2.236936
2	4.473872
3	6.710808
4	8.947744
5	11.18468
6	13.421616
7	15.658552
8	17.895488
9	20.132424
10	22.36936
11	24.606296
12	26.843232
13	29.080168
14	31.317104

The DEFRA calculator – conventional approach – People and Properties & Beneficiaries pay

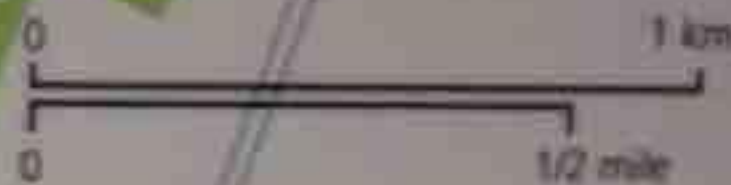


- ➔ Cost benefit analysis process designed to identify which schemes get allocated funds
- ➔ Catchment based approach?
- ➔ Upstream storage on tributaries?
- ➔ Property level resilience (i.e. More than just property level protection – more tanking of properties)





FORRES



Muiry Wood

Sanguhar Loch

Chapelton

Dam

YOU ARE HERE

Flood Storage Area
(maximum flood extent when the dam is in operation)

Sanguhar Woods

Wildlife hide

Chapelton Wetland

The Dava Way

Dallas Dhu Distillery

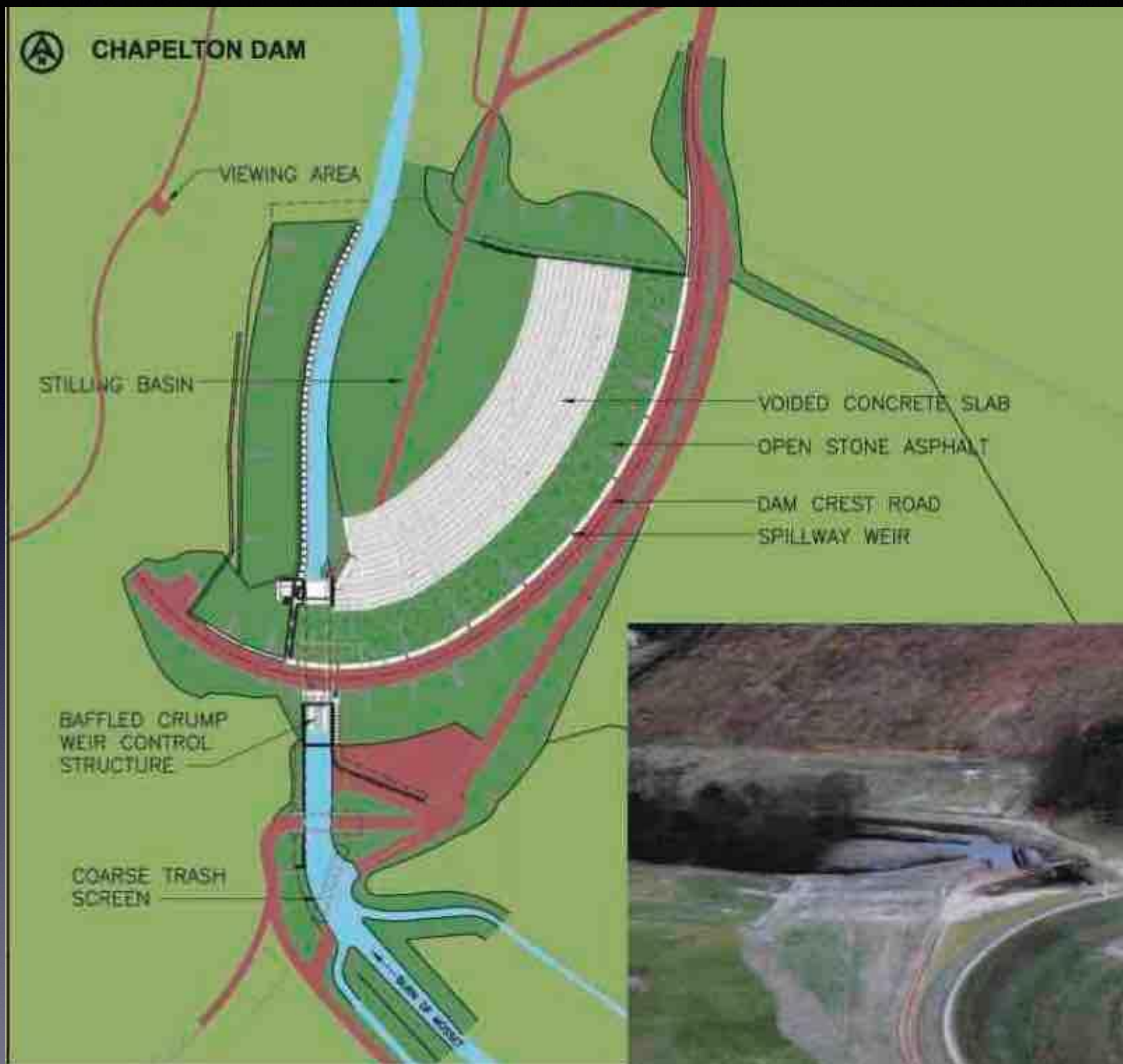
Sanguhar Mains

Burn of Mosset

Marcassie



CHAPELTON DAM



"I challenge
deliver
complex
My mea
that the
'invisible'
Not only
but the
ahead o
budget.
the outc

Peter Haslam

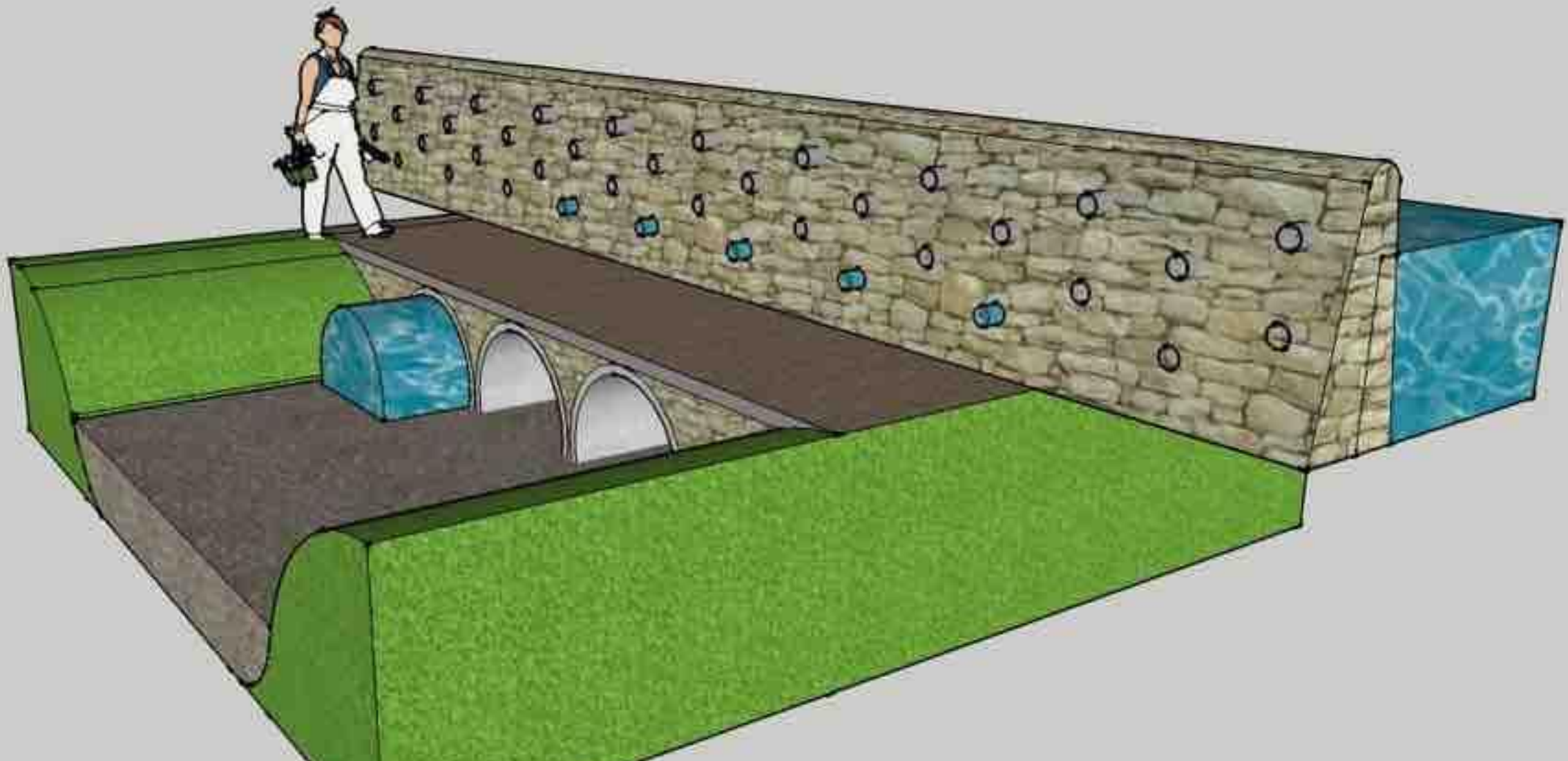


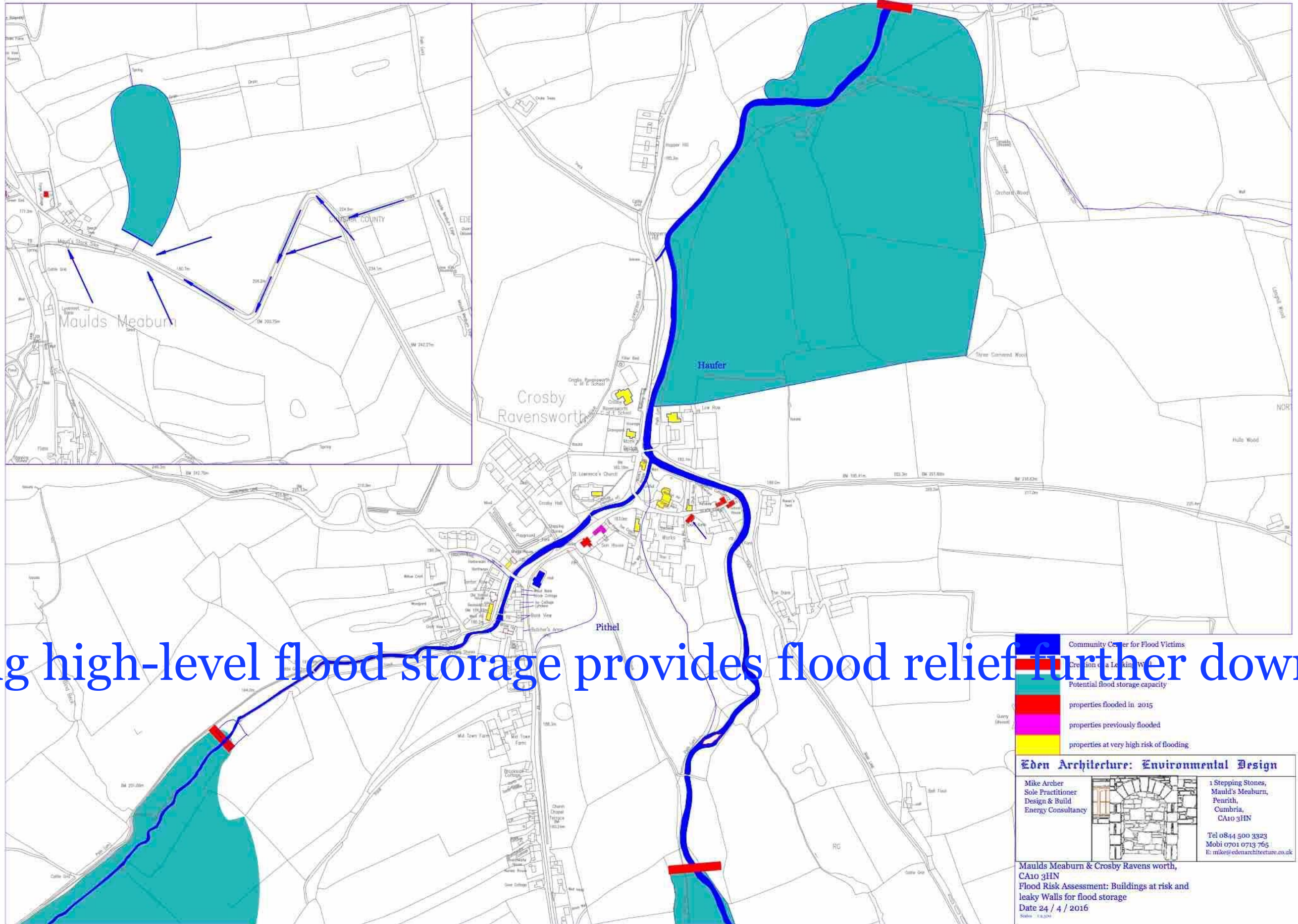
Key Messages

- ➔ Not a huge catchment 25km² but still big volumes to manage – rough guess from model flows;
- ➔ = > 300,000m³ (25m³/s x 60 x 60 x 4)
- ➔ A number of different sources of flood water – runoff from land behind, springs, small watercourses, down roads etc. Could spend a lot of money on upstream measures and still experience flooding from other sources
- ➔ Is concentrating on making the properties more resilient more appropriate?
- ➔ Use ACT / EA to develop a community plan

Potential Leaky wall locations:

1. Dale Banks Beck up to Low Dale Banks
2. Flass boundary on Low Row land
3. Maulds Slack Syke
4. Gilts Lane (down street of Holme Bridge)





ng high-level flood storage provides flood relief further down

Edén Architecture: Environmental Design

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FD2320/T2

Establishing specifications of means of access & exit;

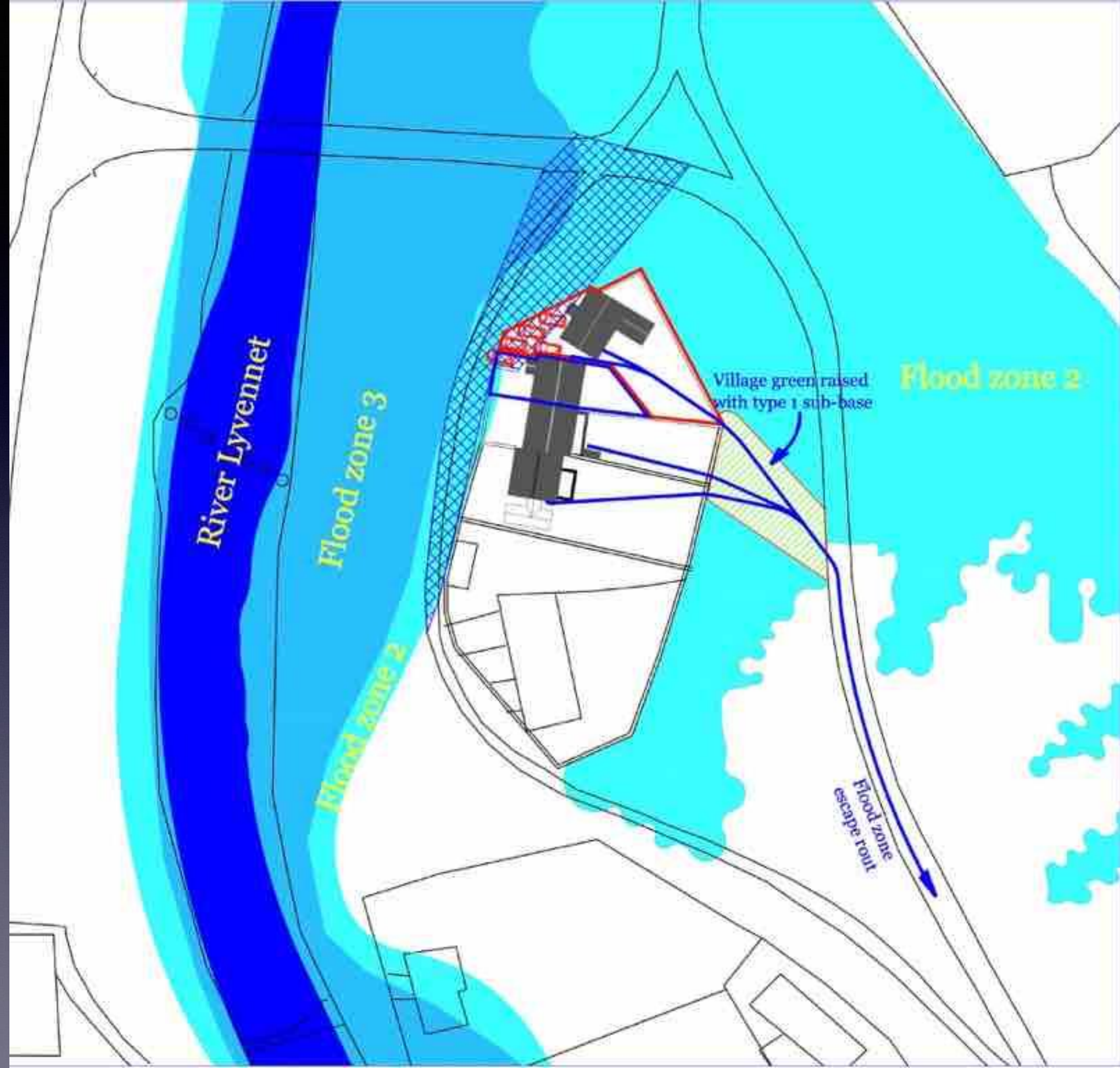
New developments are required to provide safe access and exit during a flood and the measures by which this will be achieved should be clear in the Flood Risk Assessment (FRA).

*“Safe access and exit is required to enable the evacuation of people from the development, **provide the emergency services with access to the development during a flood** and enable flood defence authorities to carry out any necessary duties during the period of flood.”*

*“A safe access or exit route is a route that is safe for use by occupiers **without the intervention of the emergency services** or others. Safe routes **should be identified both inside and beyond the boundary of the new development**. Even where a new development is above the floodplain and considered acceptable with regard to its impact on **flood flows and flood storage**, it should be demonstrated that the routes to and from the development are also safe to use.*

A route can only be completely safe in flood risk terms if it is dry at all times.”

The property should, as a condition of planning, form a footpath of sandstone flags or similar solid masonry a minimum of 1m wide, with LED lighting to IP65 for garden lights, with PV solar collectors on 1m intervals up to the gateway; at the gate an L.E.D IP65 flood light.



Below is a list of passive design specifications to be included as a matter of good practice:

- 1. The FloodSafe 3000 Alarm System**
- 2. None return valves to be added to the existing and proposed drains** preventing any flood water flowing back into the proposed development;
- 3. Lifting the internal floor level as high as possible:** Freeboard above 1:1000 year flooding occurrence
- The external leaf of the building to be 250mm coursed snecked rubble, bound with cement based mortar, backed with 7kN dense concrete blocks. This is to be **certified by a structural engineer** to ensure that it is capable of withstanding hydrological pressures to 1.5m above internal finished floor level;
- 5. Solid concrete foundation and floor slab as one integral unit**, with rebar returned into external masonry leaf, effectively tying the external leaf into the ground floor as one homogeneous unit;
- 6. Sovereign Hey'di K11 cementitious tanking applied to internal surfaces** of the concrete blocks continuous with the concrete slab to a height of 1.2m above FFL. In line with manufacturer's specifications: full cover with Sovereign tanking fillet to all returned corners totally impregnable to all damp and hydraulic pressures;
- 7. All electrics to be kept a minimum of 900mm from the floor** with ring mains housed in the first floor construction;
- 8. All openings to have flood defence doors fitted** and a water tight seal formed between them capable of withstanding hydraulic pressures to 1m above internal FFL;
- 9. First floor windows to open sufficiently to allow egress** in the event of an extraordinary flooding event.
- 10. Natural stone floor covering** that can be brushed down and swilled out if flooding rises above the climate change level.



The FloodSafe 3000 Alarm System



- £96 Non Return Valve local suppliers
- £150 double NVR
- Mechanically locking sealed IC lid. £60.00











FLOOD SAFETY DOOR

Flood Safety Door Awarded the Q Mark Award! What is this?

A new generation in flood protection products, the BSI Kitemarked Flood Safety Door features an innovative, patented design with ISIS Technology™. Requiring no human intervention, the flood door blends into its surroundings with an aesthetically pleasing structure uncommonly found in flood defence products.

ISIS Technology™ ensures the flood door acts as a barrier up to a predetermined height

01923 518 582

<https://youtu.be/rtN4mGJxeYY>

Benefits

1. Flood Resistant
2. Independently tested at HR Wallingford for flood protection PAS 1188. Report sent upon request.
3. **Advanced 10 point locking mechanism**
4. Double rebated compression weather seal
5. Every door is given its own unique ID number for tracing, warranty and maintenance purposes.





Protect your Property with a Flood Angel Airbrick

The Flood Angel Airbrick is retro-fitted in the place of the standard air brick and it is used to allow air to free pass through as a usual, (complying with BS493:1995) but under flood conditions it shuts down when in contact with water. A removable mesh prevents the passage of debris which may otherwise impinge on the moving part.

This unique mesh is imperative to the efficient functioning of the air brick.

<http://stormguardfloodplan.com/air-bricks/>