Bourne Valley Report

Defra
Small Schemes Pathfinder

April 2016

Hampshire
County Council

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Executive Summary

1. In this report Hampshire County Council sets out the outcomes of its Small Schemes Pathfinder based on the communities along the Bourne Rivulet in the Bourne Valley: Vernham Dean, Upton, Hurstbourne Tarrant, Stoke and St Mary Bourne.

2. The Bourne communities have a history of groundwater flooding, the most recent being in 2013/14 when residential properties, a local school and large sections of the highway were flooded.

3. The County Council has used the Pathfinder to test its emerging catchment based approach to flood risk management and develop a 'package' of realistic low key and proportionate measures to help alleviate flood risk along the Bourne Rivulet. Potential measures include:
   - the creation of flood storage areas;
   - improving flow paths;
   - lowering ground levels to increase flow velocity;
   - new or resized culverts;
   - new gullies and grips; and
   - re-grading stream bed levels.

4. The Pathfinder has demonstrated the value of taking a catchment/sub-catchment approach to flood risk management from which a number of lessons have been drawn. These include:
   - creating a compelling story that identifies clear stages and where partners and communities 'fit-in';
   - the value of an active flood action group representing all the communities with a key local figure, such as the Chair, nominated as the first point of contact and spokesperson for the community;
   - the benefit of undertaking a brief appraisal of what, from experience, common sense and local knowledge 'feel' like the range of options available. This provides the opportunity to scale future actions, discard options that are not proportionate or affordable, and help indicate the likely scale of local contributions required.
   - low key, low cost interventions as part of a portfolio of measures provides opportunities for local initiatives and direct action by communities.
   - being clear from the outset that to draw down Grant in Aid (GiA) funding will in most cases require significant 'contributions' from local sources including the community.
   - there are many sectors involved with the water environment e.g. the agricultural industry. Working with organisations in these sectors opens up potential access to other specialisms, advice, funding streams as well as joint working, providing economies of scale and producing multiple benefits.

Part I

Background Information

1. Introduction

1.1. In February 2015, Defra (Department for Environment, Food and Rural Affairs) invited bids to a 'Small Schemes Pathfinder' from Local Authorities to look at efficiencies available through assessment of a 'package' of small schemes, up to (and including) the appraisal stage. In responding to feedback from local authorities that the efficient development of flood and coastal erosion risk management projects is difficult where a number of small, disparate communities are at risk, the Pathfinder had two aims:

- To improve and promote understanding of the current processes and guidance that can ensure proportionate effort when appraising several small schemes; and
- Drive innovation in proportionate approaches to all stages of an FCERM project, and promote the best resulting ideas.

1.2. Hampshire County Council's proposal for the communities along the Bourne Rivulet (Vernham Dean, Upton, Hurstbourne Tarrant, Stoke and St Mary Bourne) was one of 6 bids nationally to be accepted.

1.3. The following report sets out the outcomes and lessons learnt from the Pathfinder. The report is in three sections:

- Part 1 sets the scene, providing an explanation of the flooding issues along the Bourne Rivulet and the county council's evolving catchment-based approach to flood risk management which the pathfinder will help inform;
- Part 2 summarises the package of possible mitigation measures; and
- Part 3 sets out the key lessons learnt from the Pathfinder exercise.

1.4. The report is to be submitted to Defra and the Environment Agency with the aim of sharing the outcomes and good practice with a wider audience.

2. Background

1.1. Hampshire experiences flooding from all sources i.e. fluvial, surface water, groundwater and coastal. However, groundwater flooding is a significant issue in the county, affecting in particular many small diffuse rural communities. In some instances they are effectively forced to "shut down" from normal life for the duration of the flooding which can be for several weeks.

1.2. Past flooding from groundwater has been caused both directly as water levels rise above ground level, and indirectly as high groundwater causes flooding of rivers which are dominated by water from aquifers. Significant groundwater flooding occurred across

Hampshire in 2000/2001, particularly in the Hampshire chalk groups of central Hampshire, which is dominated by the catchments of the Rivers Test and Itchen. More than 700 properties in over 100 settlements throughout the county were affected by groundwater flooding during this period. A number of villages also experience problems of sewage back-up into properties due to groundwater infiltrating into the pipes, and 'knocking out' septic tanks, when groundwater levels are high.

1.3. In 2013/14 Hampshire again experienced considerable groundwater flooding (in some cases contaminated with sewage) combined with both fluvial and surface water flooding.

1.4. The villages of Vernham Dean, Upton, Hurstbourne Tarrant, Stoke and St Mary Bourne are located in the upper catchment of the River Test, some 10km north of Andover. The River Swift, also known locally as the Bourne Rivulet, starts its course around Vernham Dean, travelling through the other four villages before joining the River Test about 5km south east of St. Mary Bourne. Designated as a 'main river', the Bourne Rivulet is a winterbourne and therefore its flows are dominated by the groundwater levels.

1.5. The Bourne Rivulet communities, as they are collectively known, are ranked 8th in terms of flood risk in the Groundwater Management Plan for Hampshire[1] (October 2013). The overall local flood risk for groundwater is assessed as 'high' with the communities experiencing ground floor flooding, cellar flooding and sewage surcharging.

[1] http://www3.hants.gov.uk/flooding/hampshireflooding/surfacewatermanagement/groundwater.htm

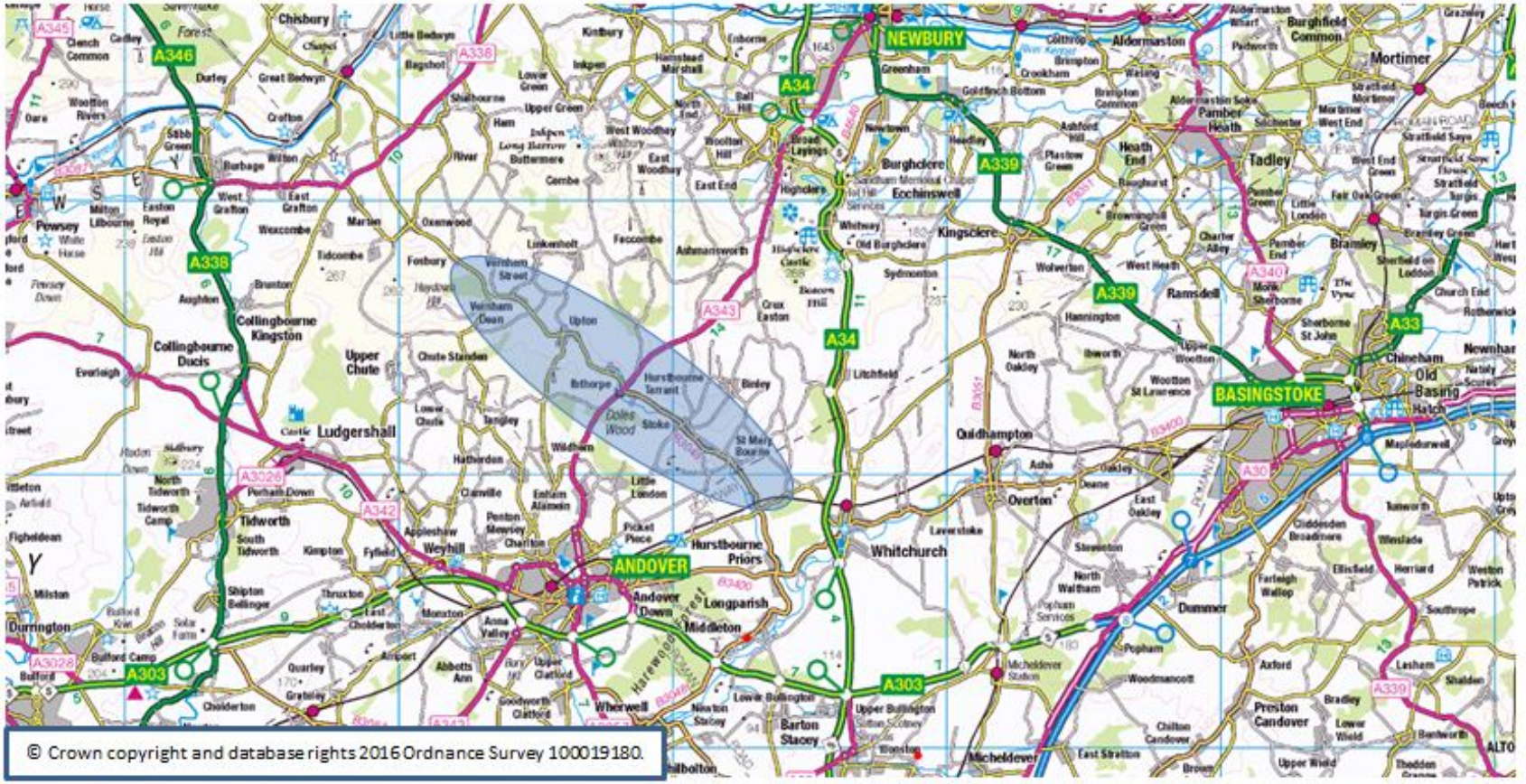


Figure 1: Location Map of The Bourne Valley: The study area stretched from Vernham Dean to St Mary Bourne

Figure 2: Study area showing the Bourne Valley from Vernham Dean to St Mary Bourne

1.6. Table 1 indicates the number of properties at flood risk in each Bourne Rivulet community, based on the Environment Agency Risk of Flooding from Surface Water Maps (see appendices 1-5 for the maps):

Location	High Risk	Medium Risk	Low Risk
Vernham Dean	12 (including Primary School)	30	17
Upton		2	7
Hurstbourne Tarrant (including Ibthorpe)			48 (including Primary School)
Stoke			3
St. Mary Bourne (including Swampton)		12	62
Total no. of properties	**12**	**44**	**137**

Table 1: Risk of Flooding from Surface Water

1.7. The Bourne Rivulet villages have a history of ground water flooding with recent events in 1995, 2000/01, 2002, 2012/13 and 2013/14. In 2000/01, 13 properties flooded (excluding external 'clean' flooding), 5 with cellar flooding, and 6 with ground floor flooding. 2 properties were flooded externally by (sewage) contaminated water. Flooding was caused by several factors i.e. high groundwater levels, emerging springs and surface water run-off from heavy rainfall that overwhelmed drainage networks.

1.8. During the 2013/14 flood events, 36 properties in the Bourne Rivulet were known to have flooded internally, although it is believed that more actually flooded. This is more than the number of properties that were affected in either Romsey or Winchester.

1.9. There were similarly significant impacts on the highway (A343 and B3048), community facilities and the local economy. For example, the Primary School at Vernham Dean flooded and was closed for a period of 2 weeks, the George and Dragon PH at Hurstbourne Tarrant also ceased trading, and critical infrastructure e.g. electricity substations and pumping stations were placed at risk.

2. Recovery

2.1. Since the flood events the County Council, as the Highways Authority, has undertaken extensive maintenance and capital works to improve the capacity of the existing drainage infrastructure. In addition to managing the Emergency Planning response, the County Council has provided support to help establish Flood Action Groups for

Hurstbourne Tarrant (including Ibthorpe and Upton) and Vernham Dean and advised in the preparation of flood action plans.

2.2. There have also been practical examples of community based flood resilience. For example, at Hurstbourne Tarrant the Flood Working Group has helped with maintenance works on ordinary watercourses, published a new emergency plan and set up a northern Bourne Valley Facebook site to improve communications with residents during emergencies.

2.3. Following an investigation under Section 19 of the Flood and Water Management Act by the County Council in December 2012 at St. Mary Bourne, Southern Water produced an Infiltration Reduction Plan to develop a programme of investigation and works to reduce the risk and impact of ground water flooding. A £1m programme to seal the sewer network was undertaken in 2013.

3. Establishment of River Test Pilot Strategy

3.1. Having regard to the experiences and lessons learnt from the 2013/14 flood events, Hampshire County Council established two areas of study around the River Test and the River Itchen. The aim of these pilot areas was to work more holistically with other authorities and agencies and to improve co-ordination of actions, moving the management of flood risk within Hampshire from a ward / district based approach to a catchment area based approach. This shift in approach was approved by the authority's Cabinet in December 2014, recognising that measures in one part of a catchment can affect flood risk in another part hence the importance of promoting an integrated multi-agency response, in active partnership with local communities.

3.2. The approach also recognises the likelihood of future groundwater flooding events. Therefore, the pilots are seeking to adapt their local environment to become more resilient. Central to this thinking has been the importance of local alleviation measures, maintaining the integrity of the transport system, and supporting and promoting property level protection measures by the local community.

3.3. Since December 2014 significant work has been undertaken to establish the catchment-based approach.

3.4. A River Test Working Group was set up and meets approximately 6 times per year and is comprised of: the Lead Local Flood Authority and Highway Authority (Hampshire County Council), Environment Agency, Test Valley Borough Council, Southern Water and the Hampshire and Isle of Wight Wildlife Trust. The Group uses a partnership approach to co-ordinate activities across the catchment and develop and monitor the Action Plans, setting out the agreed flood mitigation actions, which sit within the River Test Catchment Flood Risk Management Plan currently being prepared. This Working Group

may develop and change over time depending on the type of measures and issues identified for the catchment

3.5. As part of the River Test Pilot, evidence has been gathered from a wide range of sources to provide both bottom-up and top-down information. A key innovation in terms of the County Council's approach has been an extensive 'walk through' of the affected area by County Council officers with representatives from each community, the Environment Agency, Test Valley Borough Council, Basingstoke and Deane Borough Council, Parish Councils and other key partners to identify issues and possible options for flood risk reduction and consider who would lead on the required response. Rather than a piecemeal approach to individual flooding events, this approach considers the interaction of flooding events within the catchment areas and seeks to identify measures that manage the risk as a whole. It also places the community at the heart of the process, not only in relation to identifying the issues and options but also its role in delivering actions on the ground.

3.6. Expected outcomes from developing the catchment-based approach include:

- A better understanding of the complexity of flood risk management in Hampshire, in particular the combination of groundwater flooding with other sources of flooding;
- A well developed central evidence base, built on recent flooding events;
- Joint strategic priorities agreed, and flood mitigation and alleviation measures identified and embedded into existing work programmes;
- More joined-up programmes of work across different partner and agency organisations which together can better manage flood risk; and
- More effective presentation of evidence to improve the likelihood of securing national grant and other funding needed to deliver flood alleviation schemes.

4. Draft Action Plan

4.1. The key outcome from the catchment 'walk through' was a draft Action Plan for the Bourne Valley. For each community the plan identified the issues, potential actions, the lead responsible for delivery of each action, and timescale for completion i.e. short term (in-year), medium term (1 – 6 years) and long term (6 years +). This reflected the reality that it would not be possible to deliver all the actions in the immediate future. At this stage most of the actions were uncosted and had not been prioritised. However, the process of walking through the villages and talking through the issues and discussing potential alleviation measures had the immediate benefit of building up the key stakeholders understanding and knowledge of the area, in particular the mechanisms and processes that are responsible for flooding in the

locality. Importantly, it also involved and engaged the local community from the outset.

4.2. The draft Action Plan identified a range of potential interventions/measures such as:

- a review of the emergency flood plans;
- maintenance of watercourses;
- upgrades to the highway drainage system;
- re-grading of land to encourage/control flow path;
- bunding/flood walls;
- flood water storage; and
- upstream land management.

4.3. The Action Plan is hosted on Resilience Direct[2] a secure web-based platform for the resilience community to share information amongst all Category 1 and 2 emergency responders and agencies for planning, response and recovery. The aim is for the Action Plan to be a living document that partners have access to in order to be able to update as and when required. The initial draft Action Plan can be found at Appendix 11.

[2] https://www.gov.uk/guidance/resilient-communications

Part II
Technical Report

5. Overarching principles

5.1. From the outset it was determined that the 'Small Schemes Pathfinder' would be built on three key principles:

- community engagement and understanding;
- partnership working; and
- a catchment-wide approach having regard to all sources of flooding.

6. Management and Governance

6.1. Following the County Council' successful bid for Pathfinder funding, a Project Steering Group was established drawn from the existing River Test Working Group (see Part 1) to help coordinate Pathfinder led activities across the Bourne Valley communities.

6.2. The project group held a series of meetings with the local Flood Action Group, including representatives from all the villages across the catchment area, district councils and councillors, and the local school. The group also met with Natural England and the Wessex Chalk Streams and Rivers Trust in relation to Catchment Sensitive Farming and the Sediment Pathways Project. The purpose of the meetings was twofold: to seek support for and involvement in the project, and gather further information that would help inform the next stage of the project.

7. Interventions that have been implemented since the 2014 flood event

7.1. The flooding that occurred in 2014 led to a number of actions taking place to reduce the immediate impact of flooding and also to prevent future flooding. It is considered that these interventions improved the flood resilience of the valley as a whole.

7.2. Valley-wide Interventions includes:

- Road gullies emptied.
- Roadside ditches cleaned.
- Individual property owners have installed property level protection (PLP) measures. Whilst it's known that 15 properties have had measures fitted, it is believed that the actual number is higher. Those measures together with other interventions are explained in more detail in the following section and identified on the maps contained in Appendices 6 to 9.

7.3. Vernham Dean Interventions

7.3.1. Property level protection has been installed on a number of the properties that were flooded by groundwater in 2014. These measures include tanking of buildings, and the installation of pump stations to reduce ground water levels under and around individual properties.

7.3.2. A pumping sump has been installed in Dean Terrace and another is proposed for School Lane. This is to allow over-pumping of flood waters to the cricket pitch during flood events. The buildings in the flood route between Dean Terrace and the cricket pitch form a barrier to the free flow of flood water and the low ground levels in this area combine to form a low spot where flood levels can become quite deep resulting in property flooding. The sumps should help speed the flow of floodwater through this area.

7.3.3. The cricket pitch car park may act as a barrier to the release of flood waters from the School Lane and Gillums School play area. A drainage channel was cut during the flood itself, running behind the car park, to take flood water into the cricket pitch. Anecdotal evidence provided by the local community suggests that this was sufficient for the flood waters to bypass the car park.

7.4. Upton Interventions

7.4.1. Property level protection has been installed on at least 3 of the properties that were flooded by ground water in 2014..

7.5. Hurstbourne Tarrant Interventions

7.5.1. A ditch has been cut across ‘The Green’ by the local flood action group to speed flow into the highway drain and prevent the build-up of long term standing water that was thought to have been the reason for the flooding of properties in this small localised area.

7.5.2. The 600mm diameter main highway drain was blocked by roots during the 2014 flood, which contributed to the widespread road flooding and the resulting concentration of flood waters in the location of the pub. This pipeline has now been cleared and is considered to be in satisfactory condition.

7.6. Stoke Interventions

7.6.1. The ditch adjacent to ‘Summerhayes’ has been trimmed back by the local residents and the verge level was reduced to allow highway water to flow back into the watercourse during the 2014 floods.

7.7. Swampton Interventions

7.7.1. Some householders have removed gravel from the stretches of stream that pass through their properties, which has improved the flow of water through these sections.

7.8. St Mary Bourne Interventions

7.8.1. A flood wall was built to protect 'Mundays' one of the properties flooded during 2014.

7.8.2. In parallel with the Pathfinder work, the Environment Agency (EA) is undertaking an Initial Assessment (IA) of flood risk for St Mary Bourne and Stoke. The purpose of the IA is to understand the issues, to identify potential measures, and to start to quantify the benefits of any potential interventions.

7.8.3. In addition recognising that some areas will remain vulnerable to future flood events, the EA's national 'Supporting Communities that Remain at Risk' project aims to increase local resilience by preparing plans and equipment for the deployment of temporary defences before and during flooding. The agency is procuring temporary flood defence equipment through this project so that it will be available, if required, in St. Mary Bourne and Stoke, and other vulnerable areas, this winter.

7.8.4. Southern Water are carrying out an ongoing infiltration survey of the sewer system around St Mary Bourne as part of continuing maintenance work in the area.

8. Refining the Action Plan

8.1. In order to identify a potential package of further measures to take forward from the Action Plan it was necessary to undertake additional work to underpin the evidence base, to confirm the validity of the proposed actions, to identify other possible interventions, and to test their relative importance.

8.2. This involved desktop investigations that looked at geology, catchment size, LiDAR (*Light Detection and Ranging* to provide 3D ground modelling) information data other information gathered from the initial villages 'walk through', further site visits, which involved community representatives and approximation of culvert measurements.

9. Proposed package of interventions

9.1. The root cause of the flooding problems in the Bourne Valley is groundwater. This cannot be prevented as it is a natural feature of a steep sided chalk valley. However, it is considered that the effects of the groundwater flooding, once it emerges above ground, can be

attenuated in a number of ways and directed away from sensitive areas towards less sensitive ones.

9.2. The process of refining the Action Plan resulted in an increased number of potential actions. These ranged from routine maintenance activities to 'capital' construction works including:

- creation of flood storage areas;
- improving flow paths;
- lowering ground levels to increase flow velocity;
- new or resized culverts;
- new gullies and grips; and
- re-grading stream bed levels.

The specific measures proposed in each village are shown in Appendices 6 to 9. In summary:

- **Vernham Dean** – Improvements to flow paths, installation of culverts, re-grading of land and creation of flood storage.
- **Upton** – New ditches and grips cut and existing ones re-cut, pipe and gulley cleaning, road re-profiling, improvements to flow path, re-grading of stream bed and extension of highway drainage.
- **Ibthorpe** – Culvert cleaning, re-grading of land and creation of flood storage.
- **Hurstbourne Tarrant** – Installation of pipework, creation of flood storage and re-grading the stream bed.
- **Stoke** – Grip cutting, creation of flood storage, re-grading stream bed, removal of obstructions, re-grading of ditches, increasing culvert capacity, and a reduction of the stream bed level.
- **St Mary Bourne** – Installation of marker posts, reduction of stream bed levels, new kerb-lines and installation of high level overflow.

9.3. To give some order of priority to the implementation, the actions have been allocated priority 1, 2 or 3 status. Where appropriate, interventions have been allocated an additional reference indicating the optimum sequence for implementation. For example an action with a reference such as '*R1, 1, R14'* would mean that action *R1* is of top priority *1* status, but that it should not be implemented until action *R14* is in place.

9.4. Due to the large number of possible actions and their nature, all actions are shown on plans of the whole catchment to make them easier to understand, and to reveal how they interact with the other potential actions. The actions are shown on one of four drawings, numbered EC/RJ504876/101, 02, 03 and 04 and these can be found in the Appendices 6-9.

9.5. A catchment-wide approach guides the interventions. This ensures that regard of the consequences of an individual action, or group of

actions, on communities downstream is taken when dealing with known issues and problems.

9.6. On a valley-wide scale, it is considered that the identified flood storage areas, and the general maintenance of existing infrastructure, will have the most beneficial impact on flood risk management. These measures will ensure that above ground flows make their way down the valley without, as far as possible, hindrance.

9.7. At a village and individual level, it is considered that the interventions that will have the most beneficial impact will be property level resilience, adequate maintenance of highway and land drainage, and preventing the obstruction of the stream channel by landowners and householders.

10. Implementation of interventions

10.1. One of the outcomes from the joint site surveys with the local flood action groups was a mutual appreciation of their capability to carry out some of the identified actions. The local representatives were very open to the idea that they might carry out stream bed dredging, ditch clearance and bund building, if they were shown what needed to be done on the ground.

10.2. As a result, the work on the ground is likely to be undertaken by multiple agencies, including the local representatives. An advantage of this approach is that local landowners are more likely to be receptive to measures on their land should the approach involve a representative from within the local community rather than solely by officers from outside organisations and authorities.

10.3. Notwithstanding this, future discussions with landowners will need to be handled with great sensitivity to optimise the potential for a satisfactory outcome for both the landowner and wider community interests.

11. Monitoring and assessment of success of interventions

11.1. It is proposed that interventions are monitored and an assessment made of their effectiveness post implementation. One way of doing this is will be to correlate groundwater levels, and the level of the Bourne Rivulet, with flood levels in the highway during flooding events. As the timing of this will be determined by future flood events, it is suggested that monitoring will be a long term activity and is perhaps something in which the local Flood Action Groups might be usefully engaged. This will provide empirical evidence of the level of improvement in flow through the valley and the reduction in flooding levels as a result of interventions that have been implemented.

12. Environmental implications of interventions

12.1. Some of the actions, for example, the re-profiling of stream beds, will have an ecological impact. The multi-agency approach to the flooding issues in the Bourne Valley has prepared the way for such matters to be dealt with in a climate of cooperation, with the issues and potential impacts well known and understood across the relevant agencies.

12.2. These environmental considerations will result in restrictions to working practices and permitted working periods but do not present a barrier to suitably programmed work activities.

13. Costings of interventions

13.1. Costings are scheduled and can be found in Appendices 6-9. At this stage all costs are estimated and show a high and low value. Actual costs will only be available as each element of the package of measures is progressed and detailed design is undertaken.

13.2. Taking a midpoint between the high and low value, the overall 'package' of works is estimated to cost some £408,000, excluding fees, utility and other third party costs.

14. Outcome of interventions

14.1. The outcome of the proposed interventions will be to:

- Increase the discharge rate of the Bourne Rivulet, to allow faster drain down of groundwater flows as they rise;
- Increase the flood storage in the valley, as a whole, so that the peak flow in the Rivulet may be actively controlled; and
- Return highway drainage, ditches and other watercourses to good condition to improve the drainage capacity along the whole valley.

14.2. The 'package' of proposals is not aimed at protecting individual properties, but rather to protect the community as a whole by managing groundwater flows through the Bourne Valley.

14.3. It is a feature of the Bourne Valley that the settlements, and the main road connecting them, are all located in the bottom of the valley and this valley bottom is also the route that groundwater naturally takes upon emergence. Should rainfall be persistent for an extended duration, the chalk hills become reservoirs that continue to discharge into the valley bottom for long periods. This scenario will be repeated in future and should be treated as the natural occurrence that it is. This project seeks, as far as possible, to manage these flows and to ensure that the flow path is as unobstructed as possible. This will not remove the flooding on roads and the valley bottom generally but will reduce the amount of time they are flooded for. Nor will it remove flooding to

basements, cellars or ground floors from groundwater rising beneath individual properties. Property level resilience should therefore remain the principal option for protecting properties and particularly those that are in that zone most at risk i.e. the valley floor.

14.4. The Partnership Funding Calculator indicates a raw score of 20%[3] (See Appendix 10).

[3] The Partnership Funding Calculator converts the potential FCRM Grant in Aid available into a "raw" Partnership Funding Score, which describes the proportion (%) of costs that can be justified against national budgets. Funding contributions from other sources can be used to adjust and boost the Partnership Funding score. The adjusted Partnership Funding score must exceed 100% before FCRM Grant in Aid is allocated and a project can proceed.

Part III
Conclusions and Lessons learnt

15. Conclusions

15.1. The Small Scheme Pathfinder has utilised and built upon the innovative work undertaken by the River Test pilot referred to in Part I Section 3, the outcome being a package of prioritised and costed mitigation measures for each of the five Bourne Valley communities. In this respect, the Bourne Valley project has achieved the County Council's Pathfinder objective to identify a 'package' of realistic low key and proportionate measures to manage the risk of flooding from all sources. Nevertheless, the real test will be taking the 'package' forward to business case and whether it can secure Grant in Aid (GiA) funding. These and other issues are discussed further in Section 20 'Beyond the Initial Assessment Stage'.

15.2. The Pathfinder has demonstrated the value of taking a catchment-based approach to flood risk management and reinforced the importance of placing communities at the heart of the process. This enables risk management authorities to get a better understanding of the issues and problems, and the communities are more able and willing to take responsibility for many of the ensuing actions.

15.3. The outcomes of the Pathfinder will inform the County Council's 'River Test Catchment Flood Risk Management Plan' and, importantly, guide and influence the approach taken to all subsequent catchment plans and sub- catchment plans in the County. This will be particularly useful as the County Council will shortly be commencing the review of the 'Local Flood Risk Management Strategy', which will be based on river catchments and sub catchments as opposed to the current approach based on administrative boundaries.

Lessons Learnt

16. Community Engagement and Empowerment

16.1. ***Creating a compelling story that identifies clear stages and where partners and communities 'fit in'*** – The Bourne Rivulet experience has demonstrated the value of a coordinated approach to the Emergency and Recovery phases of a flood event, and a relatively quick follow-up which, courtesy of the multi-agency approach and walk-through, successfully established a picture of what improved resilience might look like. This picture, and who was to take part in pulling it together, was captured on the initial Action Plan (Appendix 11). What needed to happen next, but access to resources did not allow, was to translate those actions into meaningful, achievable,

costed and prioritised tasks (prioritised according to a rational set of technical criteria to ensure that regard of the consequences of an individual action on communities downstream is taken (Section 9.3)). This process of rationalisation provides greater clarity about what can be done, when and by whom. In particular, it should both enable and empower local communities to do more for themselves. The importance of this in a time of increasing constraints on public resources, devolution, and a growing focus on local initiative, is reflected in the following hierarchy which is a reversal of the usual top-down approach:

- What the community can do for itself
- What the community (parish councils, groups and individuals) can do with help from us (HCC, agencies and organisations).
- What we can do with the communities help.
- What we can do.

Please see the flow chart below on page 22.

16.2. ***We are all in it together*** - Projects such as the Bourne Rivulet that involve small disparate rural communities (some with and some without an existing Flood Action Group) demonstrate that time invested early in the process to encourage and help communities establish an overarching Flood Action Group pays dividends later. The group provided the necessary leadership and helped empower the local community to take responsibility for the strategy, and crucially, collective ownership for the delivery of some of the key outcomes e.g. riparian ownership responsibilities. The group also provides a helpful conduit for engaging with the wider community, particularly with individuals and landowners whose assistance and support for aspects of the strategy will be essential.

Top Tip: Identify a key local figure such as the Chair of the Flood Action Group who acts as the first point of contact and spokesperson for the community(s), and through which communications with others can be made.

16.3. ***It could be worse*** - Whilst it can also create pressure to 'do something', national flood events such as the flooding in Lancashire and Cumbria in December 2015 can helpfully focus minds on resilience and preparedness, and create perspective around where local circumstances fit in the 'bigger picture', relative priorities, and likelihood of access to funding.

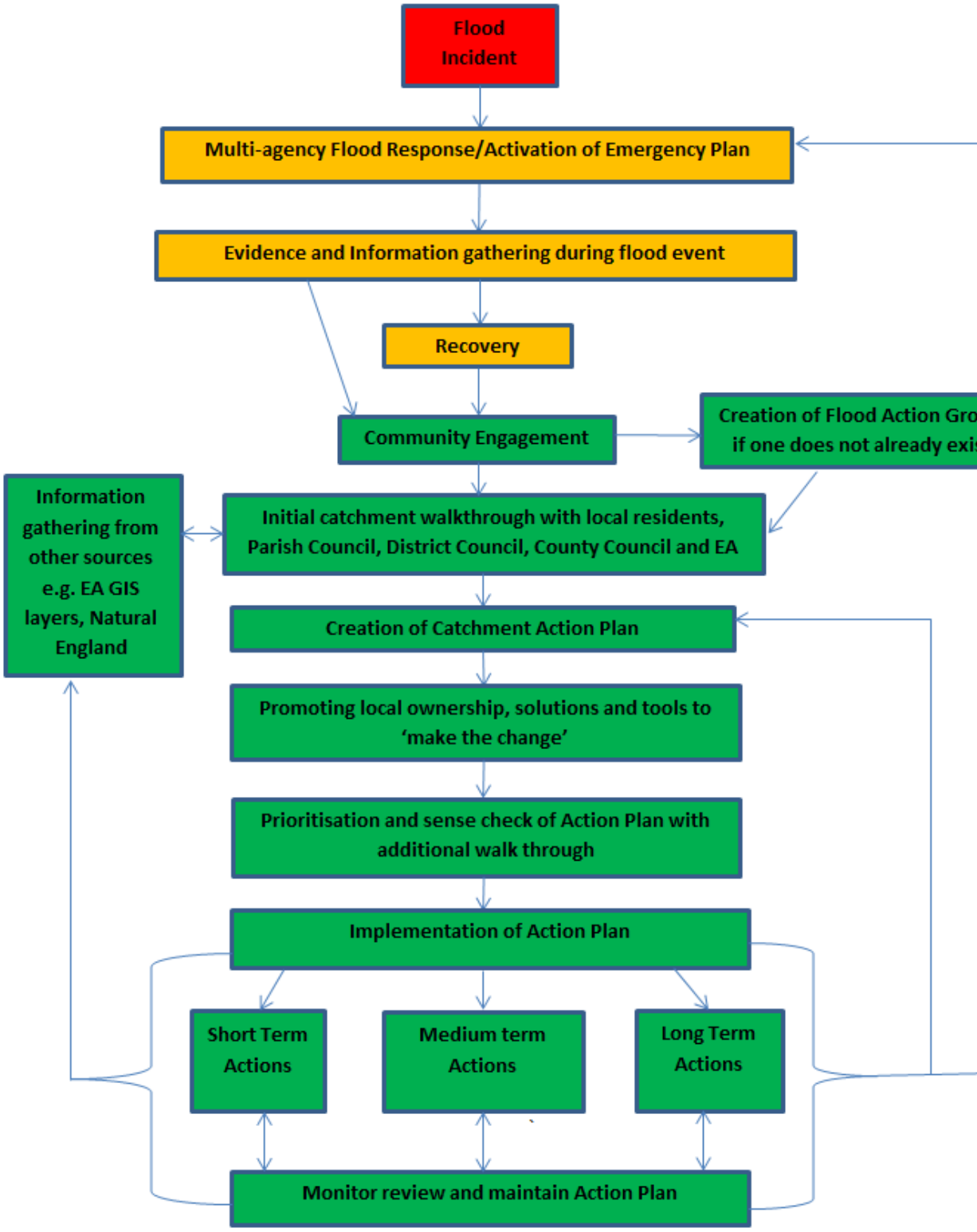


Figure 3: A Flow Chart clearly showing the stages of where partners and communities 'fit in' during a flood event.

17. Day to day practicalities (who does what and how)

17.1. ***Trust your instincts*** – It's worthwhile carrying out a brief appraisal of what, from a combination of experience, common sense and local knowledge, 'feel' like the range of options that might be available. This will provide an early indication of how the numbers stack up, the economic case in the broadest sense, and viability of the 'headline' options. This process can enable you to scale future actions appropriately, discard the options that are clearly neither proportionate nor affordable, and help shed light on the likely scale of local contributions required.

17.2. ***It's good to talk*** – Bringing together communities that are either linked by catchment (i.e. Bourne Valley), geography, experience or theme creates efficiencies, enables information sharing, cross-fertilisation of ideas and solutions, and consistency of approach. It can also help create 'perspective' (see section 16.3 above).

17.3. ***Helping people help themselves*** – Regardless of location, flood risk management authorities are very often looking at a range of responses that are predictable and applicable across a range of circumstances e.g. riparian owner responsibilities, ditch clearance, sediment pathways, cleansing of gullies, kerbing to guide overland flows, attenuation techniques and land management practices. Building-up a 'portfolio' of measures and interventions over time can provide information on:

- what individuals can do; and
- how they do this e.g. what permissions are required.

This can help establish local ownership, promote good practice that can be used elsewhere, help prevent the tendency to 'reinvent the wheel', and assist with achieving efficiencies.

17.4. ***Small is beautiful*** – Working with natural processes and the emphasis on low key, low cost interventions is a key part of a portfolio approach to managing flood risk. It can help shift the emphasis of catchment partnerships so that flood risk reduction activity is more evident, provide opportunities for 'hands-on' direct action and local initiatives, and achieve multiple benefits e.g. flood and water management, biodiversity and capacity building etc.

18. Funding

18.1. ***Honesty is the best policy*** - Be clear from the outset that GiA funding is unlikely to fully fund any works and that to stand a chance of drawing down GiA will, in most cases, require significant contributions from the local authorities and communities themselves i.e. business and residents who will benefit from any flood alleviation measures. Managing expectations from the outset is essential.

Top Tip: Managing expectations is critical. Be clear from the outset that the delivery of any actions is a shared responsibility which will be

dependent upon a number of factors. These include resource availability, funding, approvals, land ownership negotiations, and technical issues etc. In particular be clear about the project's limitations i.e. what cannot be delivered e.g. major schemes.

19. Information Sharing and Proportionality

19.1. ***It's good to share: breaking down barriers*** - Risk Management Authorities (RMAs) and others hold a significant amount of flood data/information such as modelling. However, the visibility around what data is held, and by whom, within an organisation is not always as explicit and transparent as it should be. RMAs need to be more open about data they hold and the means of access to it, including by the public. Doing so increases efficiency, raises awareness and helps to build up evidence for appraisal.

19.2. ***Thinking out of the box*** - There is much work being undertaken by a range of organisations at a catchment/sub-catchment level with potential to deliver flood risk management benefits, both direct and indirect. In the Bourne Valley this includes the Test and Itchen Catchment Partnership (led by the Wessex Chalk Stream & Rivers Trust and Hampshire & Isle of Wight Wildlife Trust) Sediment Pathway Project and the Catchment Sensitive Farming Project, a project run by Natural England in partnership with the Environment Agency and Defra. Working with such projects provides access to other disciplines, specialist advice, access to potential funding streams, opportunities for joint working, and economies of scale. By opening-up the potential to provide multiple benefits it also creates a platform to engage a wider audience.

19.3. ***Just how much evidence do you need?*** - A proportionate approach is required, particularly when working with small rural communities. At the beginning it's worthwhile taking stock to establish what information, work and modelling is actually necessary to achieve a good outcome, both for the RMA's and the communities involved. Managers need to ask themselves the following question: Is the up-front investment in time, resources and public engagement etc., reflected in the cost and benefit of the implemented works, having regard to the funding likely to be available? For example, on this project detailed hydraulic modelling was not pursued due to the uncertainties that typify permeable catchments. See Environment Agency Flood Estimation Guidelines for more information.

20. Beyond the Initial Assessment Stage - reflections on outstanding issues

20.1. A clear outcome from the Pathfinder has been the willingness of the local communities to take ownership and responsibility for the delivery of many of the measures outlined in the report. However, to fully capitalise on this good will and local enterprise, here and at other

locations across the country where communities are incentivised to do things for themselves, the authorities need to consider potential barriers in the process that can hinder or deter progress beyond the initial assessment stage. This is becoming increasingly important as communities continue to express their frustration over the time it can take for ideas to become a project delivered on the ground. The potential areas of concern relate to legal and administrative restrictions, the consenting regime and access to funding.

20.1.1. Legal/administrative

The relevant authorities need to ask themselves whether there is more they can do to ensure that communities and individuals are fully empowered to be able to deliver actions on the ground without undue restrictions and obstacles, often perceived as unnecessary 'red tape' placed in their path. For example, are there ways to make it easier for communities to access equipment and undertake works without breaching health and safety regulations?

20.1.2. Consenting regime

Is the existing consenting regime 'fit for purpose' in relation to small scale works? For example elsewhere in Hampshire problems have previously been encountered when small scale drainage works have been proposed but have been resisted by Natural England due to environmental considerations. Resolving such matters can be time and resource consuming and act as a barrier, particularly when increasingly we are looking to empower communities to undertake measures for themselves. Is there scope to further simplify and speed up the process to allow early actions to be achieved by communities in a more straightforward manner which provides more certainty?

20.1.3. Access to funding

Funding for flood protection is currently allocated on a prioritised basis to secure the maximum public benefits, according to nationally set criteria e.g. the number of households better protected. This approach can disadvantage small dispersed rural communities that may find it difficult to attract FCERM GiA, even when 'packaged' together, due to the relatively small number of properties involved compared to more urbanised areas that will have a higher priority for funding.

In addition flood risk management at a catchment or sub-catchment scale involves a combination of measures that may include land management practice, natural flood management, property level protection as well as hard engineering solutions, with some measures easier to model and calculate the risk reduction than others. This can make the FCERM funding process even more challenging.

The real test for the Pathfinders and for the communities who have been involved is whether beyond the appraisal stage the current funding system will be able to deliver tangible 'capital' measures on the ground, or whether the existing method for calculating and prioritising funding still needs to be made more adaptive/flexible to address flood issues, particularly groundwater flooding, in rural communities. In the Bourne Valley a significant number of properties

were directly flooded by groundwater rising into cellars, basements and ground floor areas often compounded by the peculiarities of groundwater flooding i.e. long duration and the silent impacts e.g. infiltration and septic tank flooding but they are not GiA applicable. A comparatively low number of properties were impacted by groundwater generated surface water run off or indirect effects such as bow waves and ponding but overall there was a substantial impact on the 'life' of the community for its residents, businesses and the transport network.

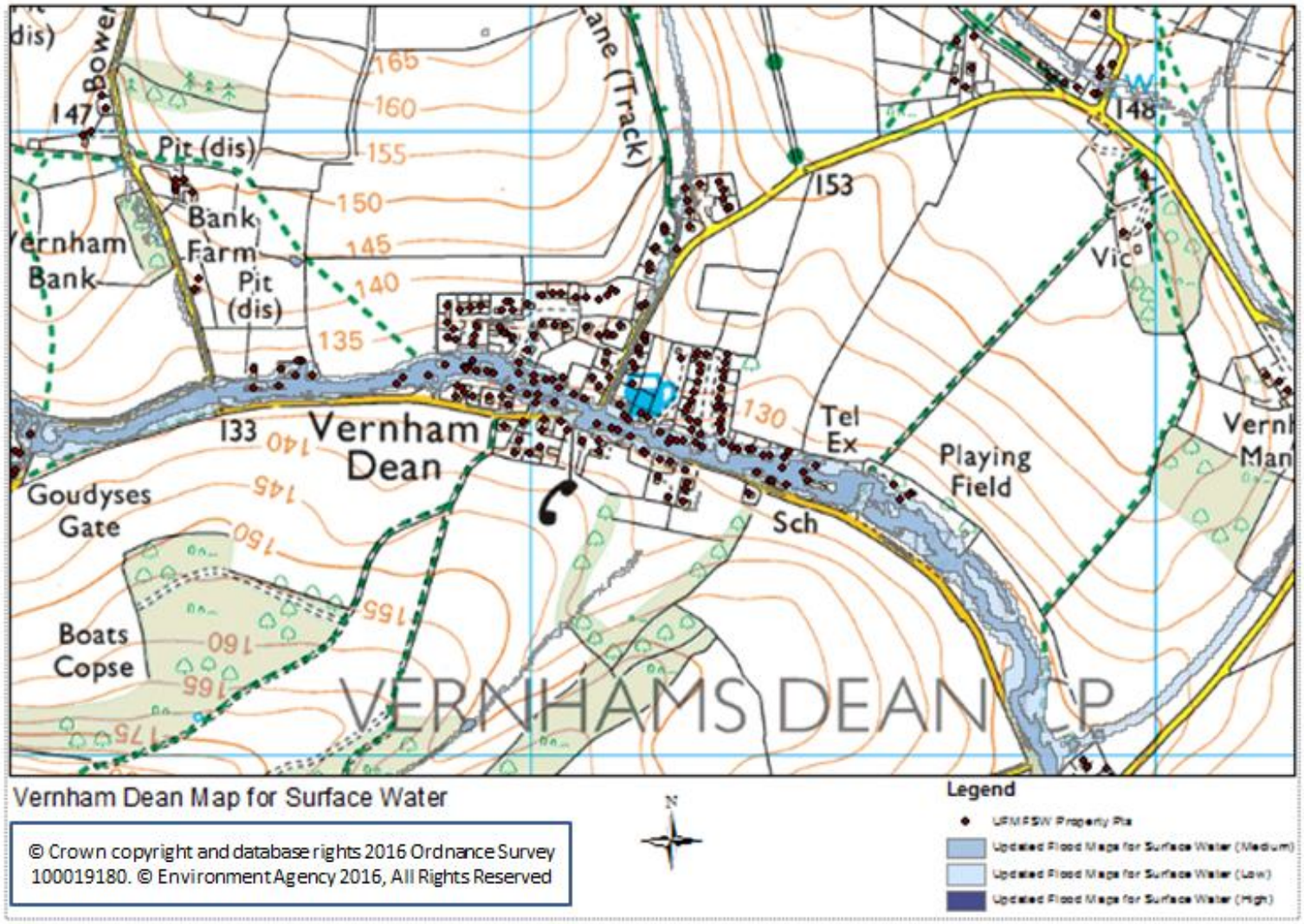
One solution may be to open up FCERM GiA to communities to bid for when sponsored by the LLFA or local authority, perhaps from a dedicated 'community pot' set aside for each Regional Flood and Coastal Committee or devolved to LLFA's/LA's to administer.

The County Council has previously suggested that the opportunity to devolve national flood risk management budgets, to support the implementation of reduction measures at the local level, be explored through its own Hampshire Groundwater Pathfinder. This would enable the County Council and its multi-agency partners to assess the benefits that managing flood alleviation at a catchment level can bring to reducing groundwater flooding impacts on business, peoples' lives and rural community cohesion. The County Council considers that there would be still be merit in this approach not least in promoting greater local visibility, ownership and accountability around the delivery of flood risk reduction measures.

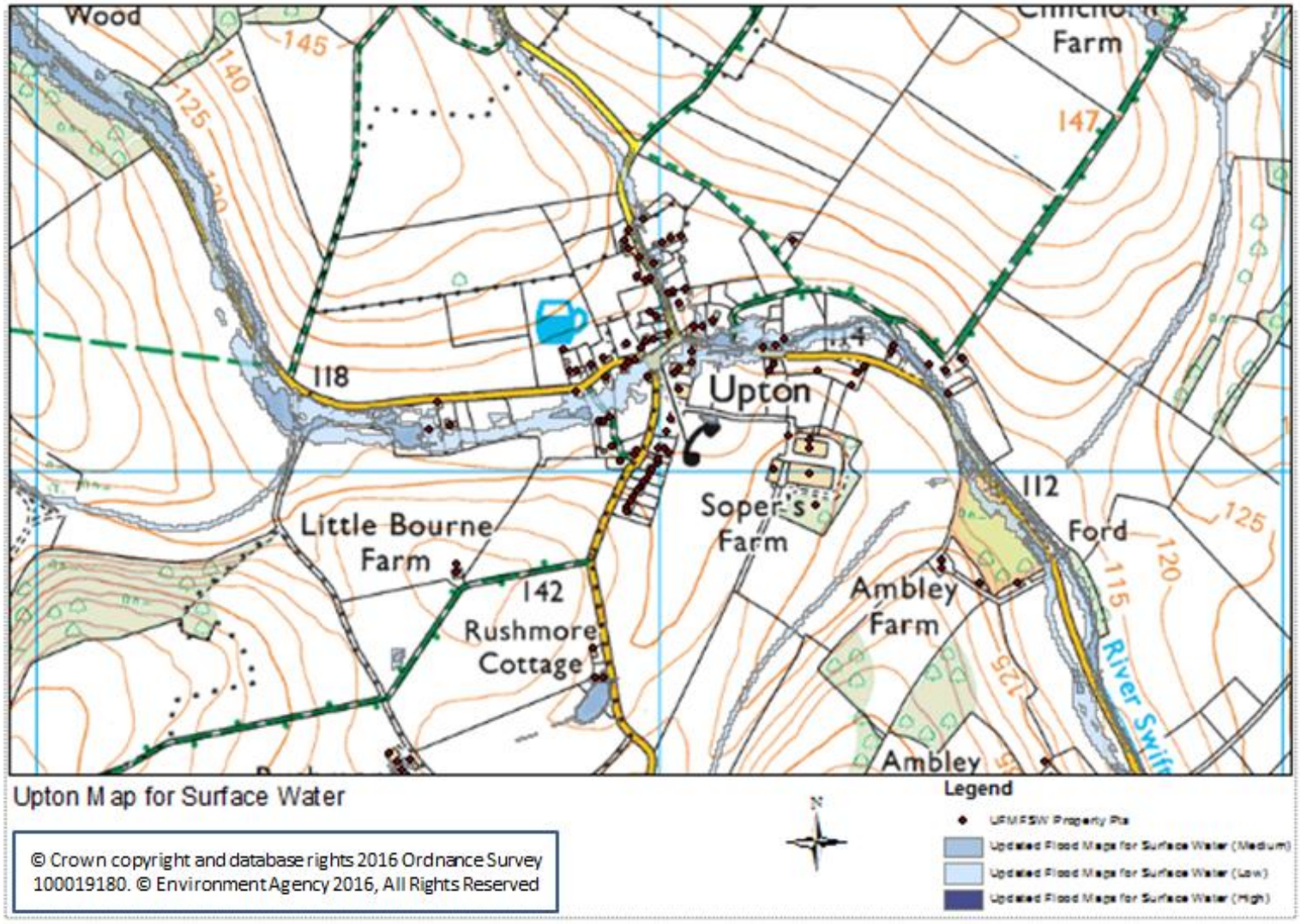
The County Council will apply the outcomes and lessons learnt from the Small Schemes Pathfinder to its own locally resourced Flood Risk and Coastal Defence programme, to demonstrate good practice and effective engagement with the FCERM process.

APPENDICES

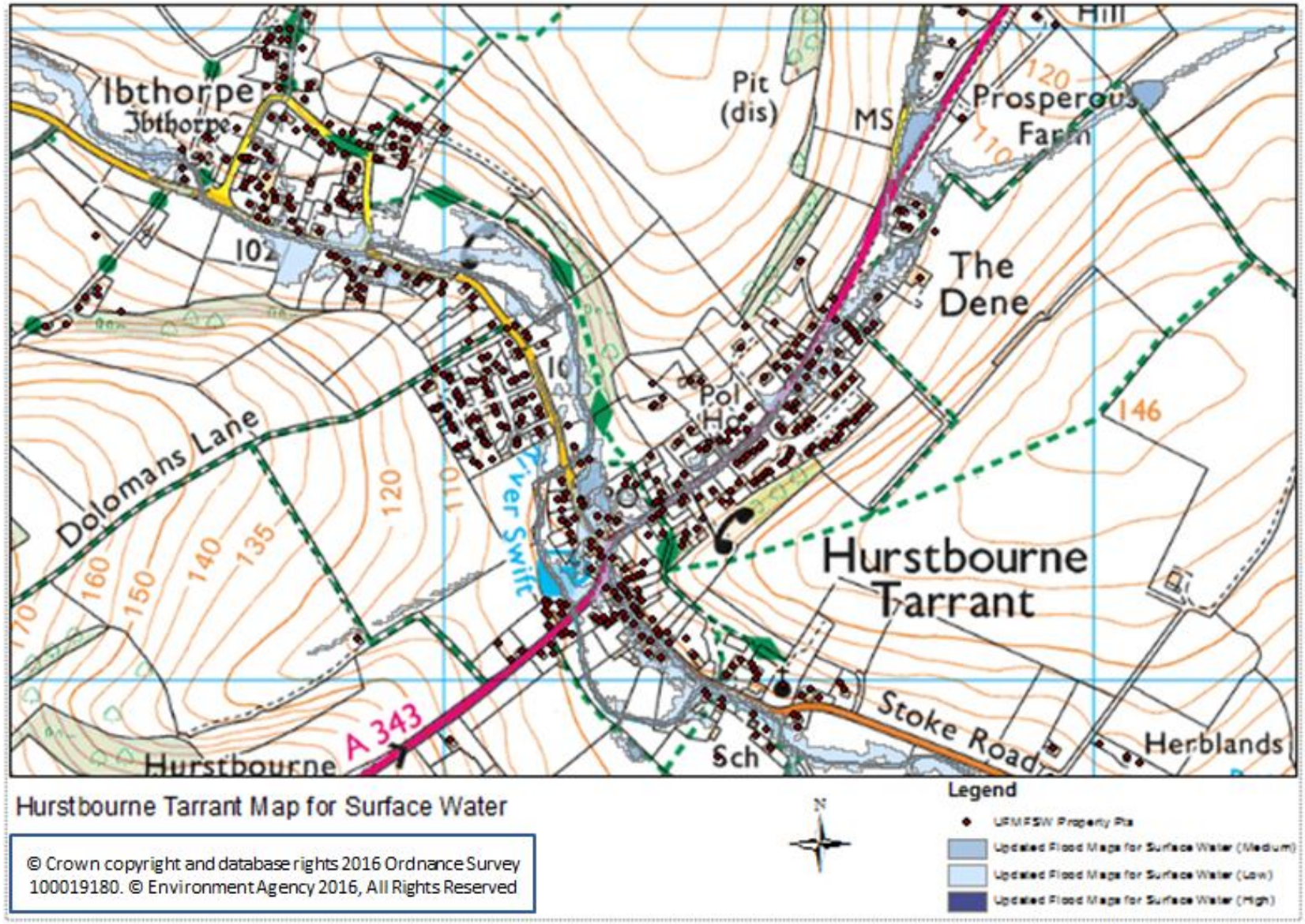
Appendix 1: Vernham Dean Surface Water Map



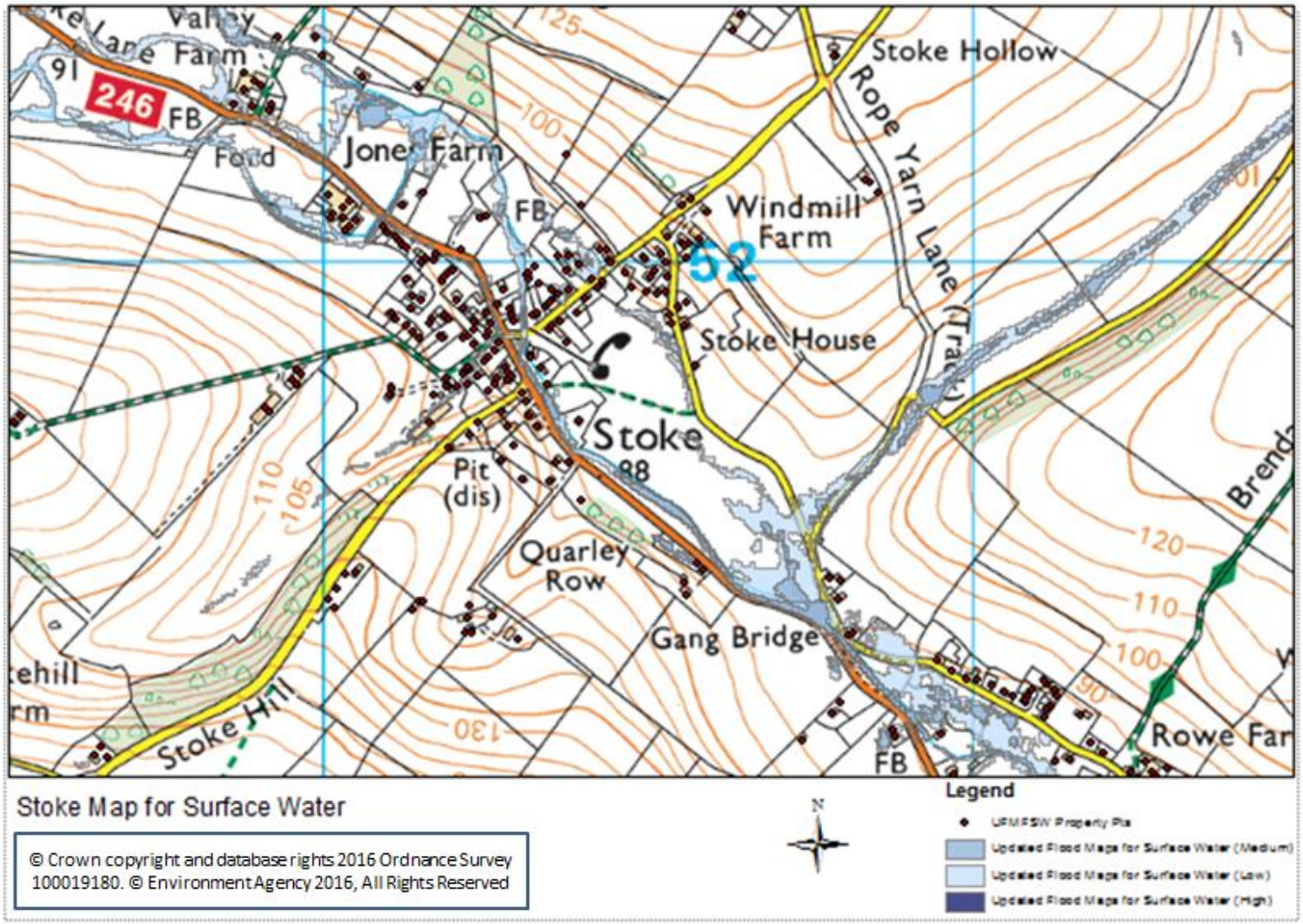
Appendix 2: Upton Surface Water Map



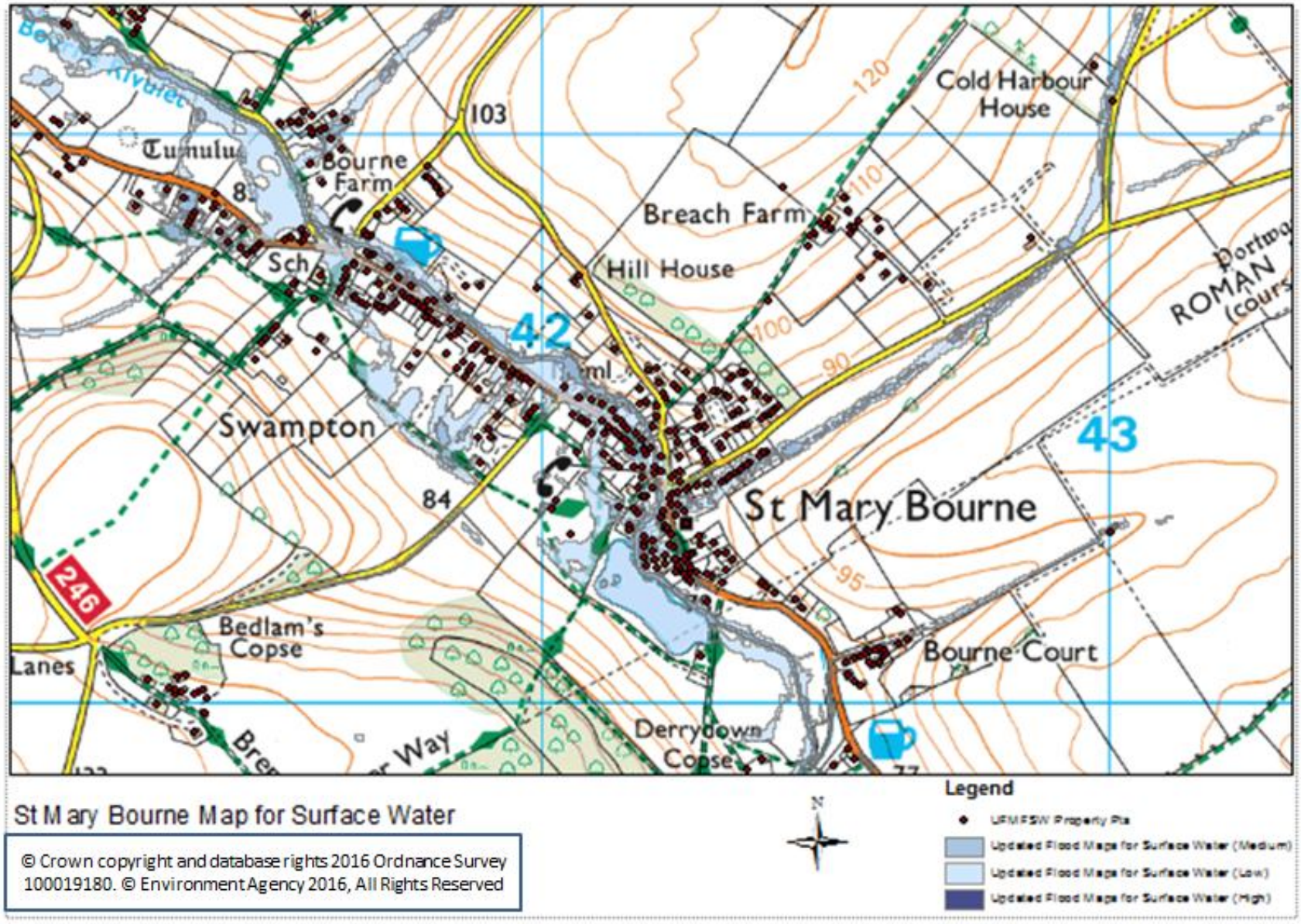
Appendix 3: Hurstbourne Tarrant and Ibthorpe Surface Water Map



Appendix 4: Stoke Surface Water Map

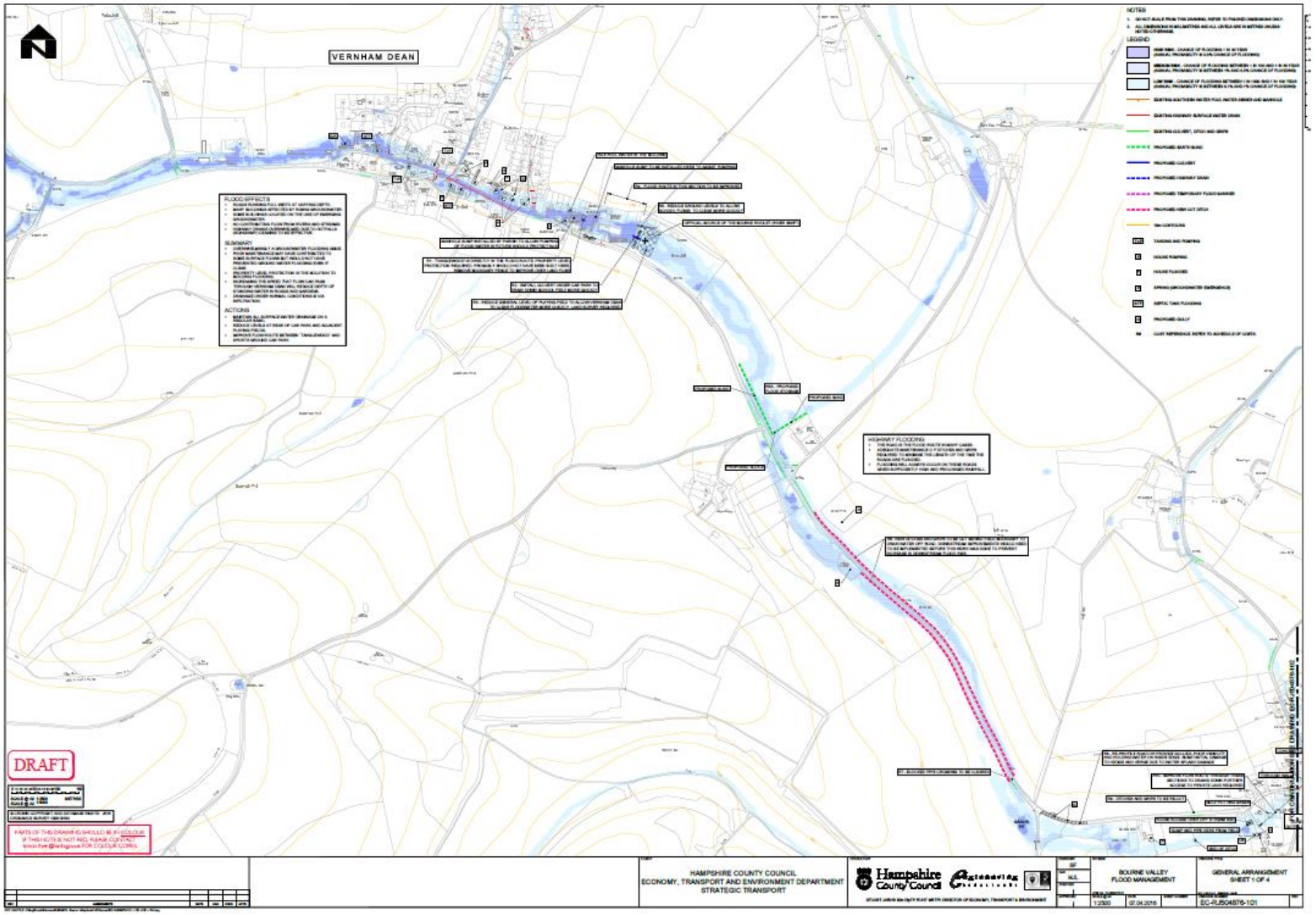


Appendix 5: St Mary Bourne Surface Water Map



Appendix 6

Action Plan for Vernham Dean and Associated Costs

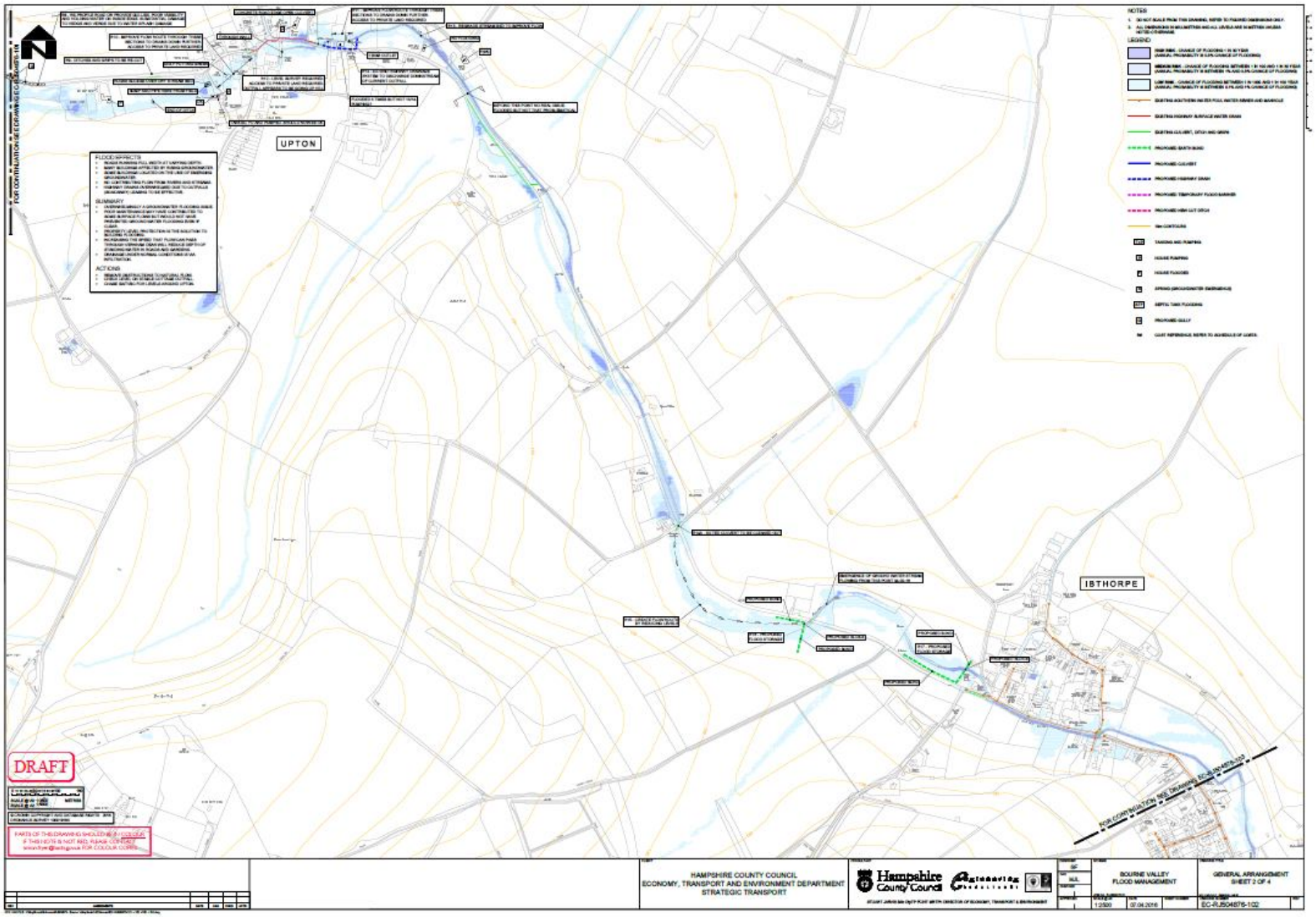

VERNHAM DEAN
DRAFT
HAMPSHIRE COUNTY COUNCIL
ECONOMY, TRANSPORT AND ENVIRONMENT DEPARTMENT
STRATEGIC TRANSPORT
BOURNE VALLEY
FLOOD MANAGEMENT
GENERAL ARRANGEMENT
SHEET 1 OF 4

Action reference	Location	Work Item	Priority and precursor (if any)	Budget Cost	
				Low	High
R1	Vernham Dean	Tanglewood' property blocks overland flow path. Modify boundary fence to improve flood route through the property	1	£1,000.00	£2,000.00
R2	Vernham Dean	Install culvert under cricket pitch car park to drain down the school play areas faster	1, R3	£3,000.00	£5,000.00
R3	Vernham Dean	Lower level of cricket field locally to increase flow velocity away from the village centre	1	£3,000.00	£5,000.00
R4	Vernham Dean	Flood route to be improved between Tanglewood and the cricket pitch by small scale re-grading and clearing obstacles from the flood path	1	£1,000.00	£2,000.00
R5	Vernham Dean	Reduce levels around the rear of car park to increase flow velocity to the cricket pitch	1	£500.00	£1,000.00
R5A	Vernham Dean	Create flood storage area using earthwork bunds connected by a drop board sluice. The sluice will be set so as not to restrict high but acceptable flow levels and then boards can be added to hold flow back in extreme conditions.	3	£20,000.00	£30,000.00

These budget costs are indicative and are for construction work only. Fees, consents, utility and other third party costs are not included.

Appendix 7

Action Plan for Upton and Ibthorpe and Associated Costs


UPTON
IBTHORPE
DRAFT
HAMPSHIRE COUNTY COUNCIL
ECONOMY, TRANSPORT AND ENVIRONMENT DEPARTMENT
STRATEGIC TRANSPORT
Hampshire County Council
BOURNE VALLEY
FLOOD MANAGEMENT
GENERAL ARRANGEMENT
SHEET 2 OF 4
1:2500
07.04.2016
EC-RJS04875-102

Action reference	Location	Work Item	Priority and precursor (if any)	Budget Cost	
				Low	High
R6	Vernham Dean to Upton	Cut new ditches and grips to clear water from the highway during flooding events. These will need to be on private land behind the boundary hedges as the highway verge is opf insufficient width. This work will increase downstream flood risk so cannot be implemented until the improvement work proposed downstream has been completed.	3, R7 onward	£30,000.00	£40,000.00
R7	Upton	Blocked road crossing pipe to be cleaned out	1	£400.00	£800.00
R8	Upton	Re-profile road or add gullies to inside of bend to drain the highway. This is a highway safety risk as visibility is poor round the bend, water stands in the carriageway and can freeze and the verge is being eroded by splash back.	1	£20,000.00	£40,000.00
R9	Upton	Existing ditches and grips to be re-cut	1	£1,000.00	£2,000.00

R10	Upton	Improve flood flow velocity thorough the section between The Cottage and the main road to drain the flood water down more quickly. This is all on private land and will need to be agreed with landowners. Proposals would be low impact actions such as lowering ground levels locally and modifying property boundary fences to make them more permeable to flood flow.	2	£2,000.00	£10,000.00
R11/R12	Upton	Improve flood flow velocity from Stable Cottage to the stream bed beyond Upton House. The existing twin culverts under Upton House and the open highway culvert as well as the levels of the highway drainage in this area will need to be land surveyed to identify the best solution in this area.	2	£4,000.00	£8,000.00
R13	Upton	Re-grade stream bed to improve flow	2	£5,000.00	£10,000.00
R14	Upton	Extend highway drainage from Stable Cottage down the main road to form a new outfall into the stream downstream of Upton House	2	£20,000.00	£30,000.00

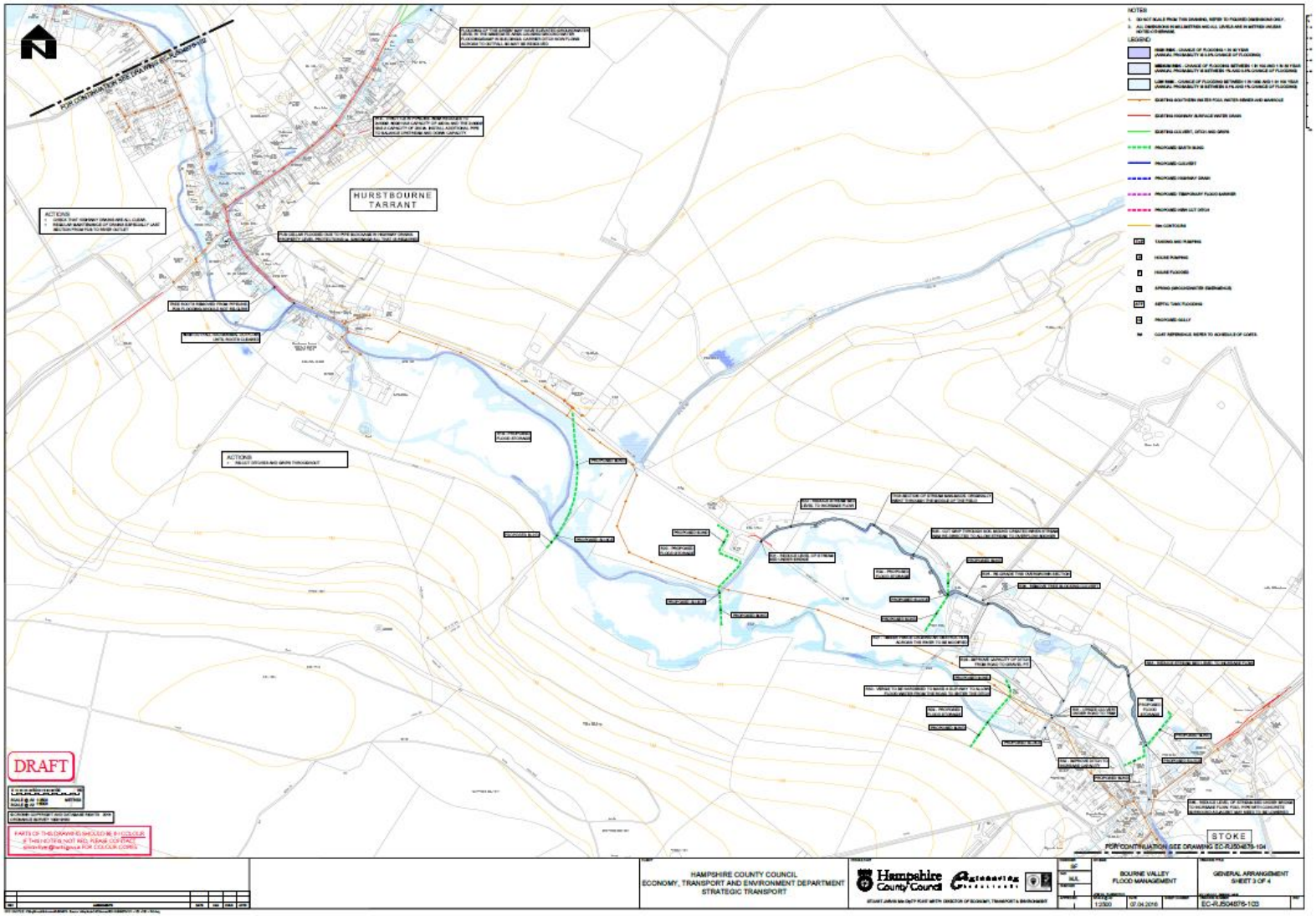
These budget costs are indicative and are for construction work only. Fees, consents, utility and other third party costs are not included.

Action reference	Location	Work Item	Priority and precursor (if any)	Budget Cost	
				Low	High
R14A	Ibthorpe	Culvert to be cleaned	1	£1,000.00	£2,000.00
R15	Ibthorpe	Lower ground levels locally south of the pumping station to maximise flow through the highway culvert and drain down upstream flood water more quickly.	3	£5,000.00	£8,000.00
R16	Ibthorpe	Create flood storage area using earthwork bunds connected by a drop board sluice. The sluice will be set so as not to restrict high but acceptable flow levels and then boads can be added to hold flow back in extreme conditions.	3	£10,000.00	£20,000.00
R17	Ibthorpe	Create flood storage area using earthwork bunds connected by a drop board sluice. The sluice will be set so as not to restrict high but acceptable flow levels and then boads can be added to hold flow back in extreme conditions.	3	£15,000.00	£20,000.00

These budget costs are indicative and are for construction work only. Fees, consents, utility and other third party costs are not included.

Appendix 8

Action Plan for Hurstbourne Tarrant and Associated Costs


HURSTBOURNE TARRANT
DRAFT
STOKE
HAMPSHIRE COUNTY COUNCIL
ECONOMY, TRANSPORT AND ENVIRONMENT DEPARTMENT
STRATEGIC TRANSPORT
BOURNE VALLEY
FLOOD MANAGEMENT
GENERAL ARRANGEMENT
SHEET 3 OF 4
EC-RJS04875-103

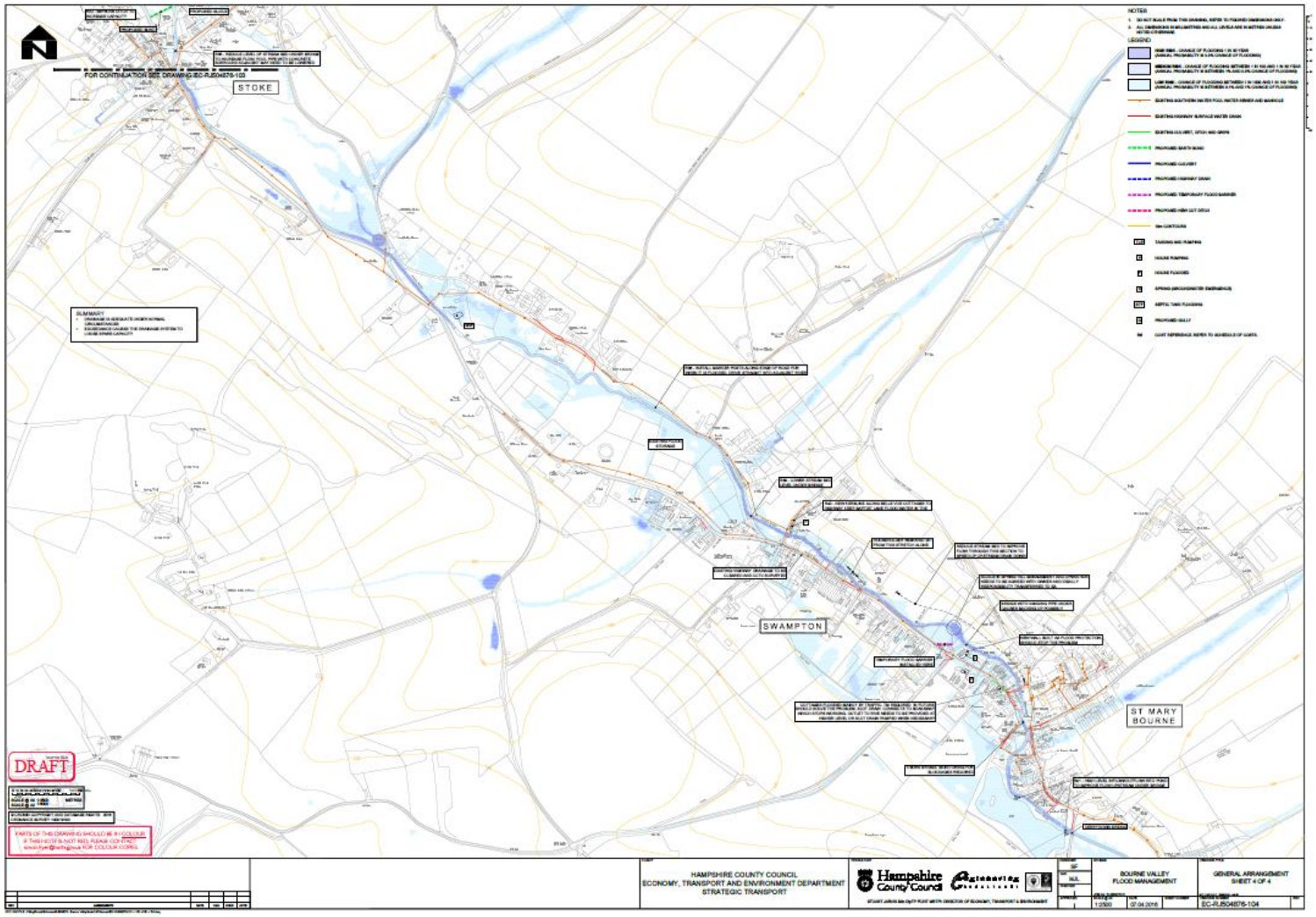
Action reference	Location	Work Item	Priority and precursor (if any)	Budget Cost	
				Low	High
R18	Hurstbourne Tarrant	Install a manifold of pipes at 'The Crescent' to supplement the twin 300mm pipes at present so that the throttle in the 600mm diameter highway drain is removed. This will help drain down 'The Green' more quickly and improve the performance of the highway drains keeping flows off the highway.	1	£10,000.00	£15,000.00
R19	Hurstbourne Tarrant to Stoke	Create flood storage area using earthwork bunds connected by a drop board sluice. The sluice will be set so as not to restrict high but acceptable flow levels and then boards can be added to hold flow back in extreme conditions.	2	£20,000.00	£30,000.00
R20	Hurstbourne Tarrant to Stoke	Create flood storage area using earthwork bunds connected by a drop board sluice. The sluice will be set so as not to restrict high but acceptable flow levels and then boards can be added to hold flow back in extreme conditions.	3	£20,000.00	£30,000.00
R21	Hurstbourne Tarrant to Stoke	Re-grade the stream bed level on the approach exit and under the road bridge to improve flow	2	£10,000.00	£15,000.00

R22	Hurstbourne Tarrant to Stoke	Re-grade stream bed level to improve flow	2	£15,000.00	£20,000.00

These budget costs are indicative and are for construction work only. Fees, consents, utility and other third party costs are not included.

Appendix 9

Action Plan for Stoke and St Mary Bourne and Associated Costs


STOKE
SWAMPTON
ST MARY BOURNE
DRAFT
HAMPSHIRE COUNTY COUNCIL
ECONOMY, TRANSPORT AND ENVIRONMENT DEPARTMENT
STRATEGIC TRANSPORT
Hampshire County Council
BOURNE VALLEY
FLOOD MANAGEMENT
GENERAL ARRANGEMENT
SHEET 4 OF 4
EC-RL5046T6-104

Action reference	Location	Work Item	Priority and precursor (if any)	Budget Cost	
				Low	High
R23	Stoke	Cut grips through bund to allow the river to flood adjacent meadow in times of flood. The river has been re-routed in this area and this has resulted in a fast narrow and shallow section.	1	£1,000.00	£2,000.00
R24	Stoke	Create flood storage area using earthwork bunds connected by a drop board sluice. The sluice will be set so as not to restrict high but acceptable flow levels and then boards can be added to hold flow back in extreme conditions.	3	£15,000.00	£20,000.00
R25	Stoke	Re-grade overgrown section of stream	2	£10,000.00	£15,000.00
R26	Stoke	Remove tree blocking culvert bore	1	£500.00	£1,000.00
R27	Stoke	Relocate fence across stream to present less of an obstruction	1	£500.00	£1,000.00
R28	Stoke	Re-grade ditch to improve flow capacity	2	£2,000.00	£3,000.00
R29	Stoke	Create flood storage area using earthwork bunds connected by a drop board sluice. The sluice will be set so as not to restrict high but acceptable flow levels and then boards can be added to hold flow back in extreme conditions.	3	£15,000.00	£20,000.00

R30	Stoke	Harden roadside verge to provide a slipway for water to flow offf the highway in to the ditch	2	£2,000.00	£3,000.00
R31	Stoke	Upsize culvert to 750mm diameter to increase flow under the highway	2, R28	£4,000.00	£8,000.00
R32	Stoke	Re-grade ditch to improve flow capacity	1	£2,000.00	£3,000.00
R33	Stoke	Re-grade stream bed level to improve flow	2, R35	£10,000.00	£15,000.00
R34	Stoke	Create flood storage area using earthwork bunds connected by a drop board sluice. The sluice will be set so as not to restrict high but acceptable flow levels and then boards can be added to hold flow back in extreme conditions.	3	£20,000.00	£30,000.00
R35	Stoke	Reduce stream bed level under bridge. Foul sewer may need to be lowered.	2	£5,000.00	£20,000.00

These budget costs are indicative and are for construction work only. Fees, consents, utility and other third party costs are not included.

Action reference	Location	Work Item	Priority and precursor (if any)	Budget Cost	
				Low	High
R36	Stoke/St Mary Bourne	Road edge cannot be seen during floods and stream is immediately adjacent. Install marker posts along edge of road.	2	£1,000.00	£2,000.00
R37	St Mary Bourne	Reduce stream bed level under bridge	2	£2,000.00	£3,000.00
R38	St Mary Bourne	New kerb line adjacent Belle Vue Cottages to prevent flood water from highway entering the property.	2	£5,000.00	£8,000.00
R39	St Mary Bourne	High level overflow to be installed from stream to pond to speed up drain down from upstream when stream level at capacity	3	£2,000.00	£3,000.00

The Estimated Total Cost for the Whole package of Interventions for the Bourne Valley is shown below:

	Low	High
Total	£313,900.00	£502,800.00

Average	**£408,350.00**

These budget costs are indicative and are for construction work only. Fees, consents, utility and other third party costs are not included.

Appendix 10

Partnership Funding Score

FCRM Partnership Funding Calculator for Flood and Coastal Erosion Risk Management Grant in Aid (FCRM GiA)

Version 8 January 2014

Project Name					Bourne Rivulet Groundwater Alleviation					
Unique Project Reference					R.J504876/June 2016					
Key					Input cells					
All figures are in 'pounds" (£)			\z\z				Calculated cells			
Figures in Blue to be entered onto MTP										
SUMMARY: prospect of FCRM GiA funding										
Scheme Benefit to Cost Ratio:			**3.04**				to 1			
Effective return to taxpayer:			**19.57**				to 1			
Raw Partnership Funding Score	**20%**		(1)		*Effective return to area:*		**4.82**		to 1	
External Contribution or saving required to achieve an Adjusted Score of 100%	**373,988**				(2)				Cell (2) shows the minimum amount of contributions and/or reductions in scheme cost that are required to raise the Adjusted PF Score to at least 100%. Further increases on this will improve this scheme's chances of an FCRM GiA allocation in the desired year. Planned savings and contributions should be entered into cells(9,10,12) and cells(14-17). See NOTE below.	
Adjusted Partnership Funding Score (PF)			**100%**				(3)			
PV FCERM GiA towards the up-front costs of this scheme (PV Cost for Approval)			**92,308**				(4)			
1. Scheme details										
Risk Management Authority type of asset maintainer	**LA**			(5)	**Yes**			(6)		
Is evidence available that a Strategic Approach has been taken, and that double counting of benefits has been avoided ?										
Duration of Benefits (years)			**100**				(7)			
PV Whole-Life Benefits:			**1,806,380**				(8)			
All costs and benefits must be on a Present Value (PV) Whole-Life basis over the Duration of Benefits period. Where Contributions are identified these should also be on a Present Value basis.										
PV Costs										
PV Appraisal Costs			0				(9)			
PV design & Construction Costs			467,308				(10)			
Sub Total - PV Cost for Approval (appraisal,design,construction)			**467,308**				(11)			
PV Post-Construction Costs			125,951				(12)			
PV Total Whole-Life Costs:			**593,259**				(13)			
The total value of any necessary contributions will depend on whether maintenance (ongoing costs) is funded through revenue FCRM GiA, or by other means.										
PV Contributions secured to date										
PV Local Levy secured to date			(14)				NOTE: This scheme is to be maintained by an RMA other than the EA (ref cell 5). Capital FCRM GiA will fund the appropriate share of the up-front costs (cell 11) with any shortfall needing to be paid for via contributions identified in cells(14-17). Future ongoing costs (cell 12) and any contriubutions towards them are a matter for local agreement by the RMA and should NOT be included in cells(14-17). It is recommended that the RMA takes the opportunities created during scheme development to separately secure contributions towards future ongoing costs (cell12).			
PV Public Contributions secured to date			375,000				(15)			
PV Private Contributions secured to date							(16)			
PV Funding from other Environment Agency functions/sources secured to date							(17)			
PV Total Contributions secured to date			375,000				(18)			
2. Qualifying benefits under Outcome Measure 2: households better protected against flood risk										
Number of households in:		Before			After			Change due to scheme		
20% most deprived areas	-		-		0		0		0	
21-40% most deprived areas	-		-		0		0		0	
60% least deprived areas	130	45	15	131	49	10	1	4	-5	
At:	Moderate risk	Significant risk	Very significant risk	Moderate risk	Significant risk	Very significant risk	Moderate risk	Significant risk	Very significant risk	
Annual damages avoided, compared with a household at low risk		150			600			1,350		
Change in household damages, in:		Per year			Over lifetime of scheme			**Qual. benefits (discounted)**		
20% most deprived areas		**OM2 (20%)**		-£		-£		-£		
21-40% most deprived areas		**OM2 (21-40%)**		-£		-£		-£		
60% least deprived areas		**OM2 (60%)**		125,426£		4,200-£		420,000-£		
3. Qualifying benefits under Outcome Measure 3: households better protected against coastal erosion										
Number of households in:			Damages per household avoided:				Before			
20% most deprived areas	-		-		Annual damages avoided		6,000£		6,000£	
21-40% most deprived areas	-		-		Loss expected in	50	20		years	
60% least deprived areas	-		-		1,184£		3,015£		Present value of Year 1 loss (i.e. first year damages, discounted based on when loss is expected)	
Long-term loss		Medium-term loss			Long-term loss			Medium-term loss		
Change in household damages, in:		Year 1 loss avoided:			Over lifetime of scheme:			**Qual. benefits (discounted):**		
20% most deprived areas		**OM3 (20%)**		-£		**-£**		-£		
21-40% most deprived areas		**OM3 (21-40%)**		-£		-£		**-£**		
60% least deprived areas		**OM3 (60%)**		-£		-£		**-£**		
4. Qualifying benefits under Outcome Measure 4: statutory environmental obligations met										
Payments under:			Assumed benefits per unit:				**Qual. benefits (discounted):**			
OM4a	0.00		Hectares of net water-dependent habitat created		OM4a		-£		15,000£	
OM4b	0.00		Hectares of net intertidal habitat created		OM4b		-£		50,000£	
OM4c	0.00		Kilometres of protected river improved		OM4c		-£		80,000£	
OM4					**-£**					
5. Qualifying benefits arising from the overall scheme, for entry into the Medium-Term Plan										
OM, deprivation:		Qual. benefits:			Payment rate:			FCRM GiA contribution:		
OM1	5.56			p in the £1		1,680,954£			93,386£	
OM2	20% most			45.0		-£			-£	
21-40%		30.0			-£			-£		
Least 60%		20.0			125,426£			25,085£		
OM3	20% most			45.0		-£			-£	
21-40%		30.0			-£			-£		
Least 60%		20.0			-£			-£		
OM4		100.0			-£			-£		
Total		1,806,380£			**118,472£**			Maximum for Outcomes delivered		

Sensitivity Testing. *It is important that users of this calculator appreciate the implications on funding from changes to input data which may become necessary as the project develops and better information is available. Five typical tests are provided below. Users should consider how appropriate these are to their project, what other tests may be appropriate and how best to use the information with all those that may be involved in the project.*

Raw Score		Contribution for 100% Score(£k)
As scenario above	20%	373,988
Sensitivity 1 - Change in PV Whole Life Cost (25% increase)	14%	505,072
Sensitivity 2 - Change in OM2 - 50% of households in Very Significant (Before)	17%	388,264

risk may already be in Significant Risk band		
Sensitivity 3 - Change in OM3 - 50% of households in Medium Term loss (Before) may already be in Long Term loss	17%	388,245
Sensitivity 4 - Increase Duration of Benefits by 25%	#N/A	#N/A
Sensitivity 5 - Reduce Duration of Benefits by 25%	17%	387,190

END OF WORKSHEET

Appendix 11

Superseded Original Action Plan

Bourne Valley Action Plan - Draft

Updated 25/08/2015

Number	Community	Added by	Issues	Action	Statutory Authority (Lead/ *Assisting*)	Comments	Timescale fo Completion
1	Vernham Dean	EA	The surface water system is either overland flows or a piped network discharging to soakaways and a non lined attenuation pond.	Undertake level survey to determine the effectiveness of the surface water network in flood conditions, actions from survey to consider alterations to system to prevent inundation by groundwater.	HCC	Feasibility study subject to outcome of bid to DEFRA Small Scheme Pathfinder	Medium Term
2	Vernham Dean	EA	School Close property blocks overland flow path.	Consider how to maintain overland flow paths and protect properties - consider PLP and bunding	HCC	Feasibility study subject to outcome of bid to DEFRA Small Scheme Pathfinder	Medium Term
3	Vernham Dean	EA	School car park is raised and acting as a flood barrier.	Install kerbing to keep overland flows on the road, influenced by the level survey	HCC Highways	Assume kerbing will be required across School Close junction. Pump/Sump work to be carried out.	Subject to level su consider undertak work within school Summer holidays Autumn half term Coordinate with pi work to sump at s
4	Vernham Dean	EA		Extend surface water network to school playing fields	HCC	Feasibility study subject to outcome of bid to DEFRA Small Scheme Pathfinder	Medium Term
5	Vernham Dean	EA		Flood emergency response plan	Vernham Dean Flood Action Group		
6	Vernham Dean	EA		consider downstream storage of the school in fields/land management			
7	Vernham Dean	EA		Review of winterbourne overland flow path mapping and recording			
8	Upton	EA		Upstream storage/land management	EA/Riparian landowners		
9	Upton	EA		Flood bund around the first two semi-detached cottages	Riparian land owners		
10	Upton	EA		Alter inlet to channel running across the front of the two cottages	Riparian land owners		
11	Upton	EA		Highways to review drainage of road to side ditches	HCC Highways		Complete review Autumn 2015
12	Upton	EA		Construct bund/regrading of ground between the watercourse and the two cottages	Riparian land owners		
13	Upton	EA	No channel evident.	Shallow re-grading of land through Oriel Cottage Farm to encourage/control flow path	Riparian land owners/EA		
14	Upton	EA		Highways signage to be in place to denote ford at road junction immediately south of Oriel Farm	HCC Highways	Liaison with with HCC Traffic Team to consider appropriate signage.	Complete works Autumn 2015

15	Upton	EA	Water ponds at this junction due to levels and is only able to drain down the road however this leads to levels backing up considerably effecting upstream properties.	Undertake review of flow from this junction through Soper's Farm or through highways drainage.	HCC/EA	Note, should development occur then part of the planning condition should be the reinstatement of the watercourse channel to allow flow away from the junction and through the land/barn. Also there used to be a low level archway in the barn to allow flow through can this be re-opened?	
16	Upton	EA		Highways network maintenance	HCC Highways		Ongo
17	Upton	EA		Consider re-grade of channel downsteam of the highways concrete section below Stable cottage	EA/Riparian landowners		
18	Hurstbourne Tarrant	EA	Possible highways drain blockages	CCTV survey of highways drain	HCC highways	Existing pipe cctv'd and found to be full of roots. (Refer also action 21 below)	Com clear oper
19	Hurstbourne Tarrant	EA		Consider installation of new ditch through the Dene connecting the highways drainage up	Parish Council		
20	Hurstbourne Tarrant	EA		Upgrade the pipework on the Dene and re-profile of the channel	Parish Council		
21	Hurstbourne Tarrant	EA		Possible diversion/new pipe of the highways drain at the junction of the A343 and B3040 by The George PH.	HCC highways	Existing pipe cctv'd and found to be full of roots. (Refer also action 18 above)	Com clear oper
22	Hurstbourne Tarrant	EA		Consider upstream land management	Parish Council/EA/Riparian Landowners		
23	Hurstbourne Tarrant	EA		Review of emergency flood plan. Agree location of flood barrier and sand bags/pumps etc to be deployed upon certain trigger levels (to be set) being reached.	EA/HCC/ PC/ Flood action group		
24	Stoke	EA		Upstream of Stoke, consider flow management and linking river to floodplain	EA/Riparian landowners		
25	Stoke	EA		Maintenance of watercourse/debris/silt clearance under highways bridge at grid reference SU3944352463.	Hampshire Highways	Bridge B164 - Small brick arch with 2.6m span. No blockages or obstructions identified at inspection. Silt clearance considered to be short term solution, possibly increase risk of scour and will backfill quickly. Level under bridge lower than surroundings.	No w local pres
26	Stoke	EA		Maintenance of grips on edge of highway (Stoke Lane)	Hampshire Highways	Grips maintained as and when necessary. In normal rain water drains road to watercourse but in heavy rain river level is high and floods onto road therefore have to sandbag the grips. Review and 'refresh' grips.	Com Autu Loca inspe any clear

27	Stoke	EA		Consider new channel under road (Stoke Lane) immediately upstream of Jones Farm	Hampshire Highways/EA	There is an existing la adjacent. Feasibility, funding to be consider
28	Stoke	EA		Construct bund/flood wall adjacent to the north west boundary of property at location SU4026351965.	Riparian owner	
29	Stoke	EA		Low flood wall at front of Housing Association properties at SU4012752032 approx.	HA/EA/PC	
30	Stoke	EA		Manage surface flows off highway at crossroads junction - centre of village back to the river.	Hampshire Highways	Existing positive drain during normal rain eve aware of any significa road flooding near the Subject to further disc EA, prioritisation and f
31	Stoke	EA		Home Mead and Bridge cottage construction of flood wall/bund along the bank of the river/side of properties.	Riparian owners/EA	
32	St Mary Bourne	EA	risk of vehicles driving into river	Install highways signage to warn of risk/ bank of river is the edge of the carriageway (Gangbridge Lane) in high flow conditions	Hampshire Highways	Note - Parish council a action group have req informed when EA un watercourse maintena west). Verge markers previously used to der edge of the road but w removed at the reque Parish because of the appearance. Funding Issue. Current proces the road as requested Parish Council in 2013 flooded.
33	St Mary Bourne	EA		Belle Vue cottages. New kerbing to keep surface highway flows down road and not into rear of properties, then divert back into flood plain river. Riparian owners to consider bund construction as well.	Hampshire Highways/riparian owners	HCC Highways not aw complaints on flooding Vue Cottages nor req sandbags. Subject to discussions with EA, p and funding.

34	St Mary Bourne	EA		Highways engineer to look at draining road junction T-junction and cross roads on B3048/Gandbridge Lane and B3048/Babtis Hill and Batsford.	Hampshire Highways	HCC Highways not aware of any particular issues with highway drainage in this location. Precautionary cleanse will be scheduled.	
35	St Mary Bourne	EA		Review operational maintenance of the sluice owned by Spring Hill immediately upstream of Mundays. Elether look to agree operation procedure with riparian owner or consider designating to HCC Asset register.	EA/HCC/Riparian owner		
36	St Mary Bourne	EA		Flood wall/bund to protect Mundays cottage.	Riparian owner		
37	St Mary Bourne	EA		Review of emergency flood plan. Agree location of flood barrier and sand bags/pumps etc to be deployed upon certain trigger levels (to be set) being reached.	EA/HCC Emergency Planning/ PC/ Flood action group		
38	St Mary Bourne	EA		Review of highways "shallow pipe" and drainage network immediately north of Bourne Meadow on the main road. Aim to collect highways surface flows and discharge back to river, consider reinstating/replicating old drainage ditch.	Hampshire Highways.	Due to the topology the pipe has to take a convuluted route to drain into the river which in some places is higher than the adjacent road. The issue has been looked at many times without a 'solution' being apparent. It is questionable whether the old ditch could be reinstated over it's full length and even if it could, given the relative levels, it is considered unlikely it would produce any improvement. Subject to further discussion with EA re. feasible options, prioritisation and funding.	
39	St Mary Bourne	EA	Derrydown Clinic road bridge impedes the flow. This is the last pinch point before the river leaves the village.	Consider designating to HCC Asset register and improving capacity of the bridge.	HCC FWM and Structures Teams	The path leading to Derrydown Clinic is not adopted as highway, it is listed as a Right of Way footpath, therefore the bridge is not listed as a highway structure. The local Engineer confirms he has never had any maintenance work done on the path.	
40	St Mary Bourne	EA	Springhill Lane Bridge impedes the flow and contributes to water coming out of bank and flooding the road and Mundays	Consider designating to HCC Asset register. Line added to MTP by EA to consider options for the bridge e.g. Regrade land to divert water back in bank or build an extra overflow pipe.	HCC FWM and Structures Teams	The Springhill Lane bridge is known to Structures as St Marybourne bridge. It is a 3 span brick arch with spands of 1.2m, 1.8m and 1.2m. Structures suggest there is reaonable capacity here but debris can get caught on the piers causing blockages.	