Environment Agency

River Tame Flood Risk Management Strategy

May 2011

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The Environment Agency. Out there, making your environment a better place.

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Introduction

This is the River Tame Flood Risk Management Strategy (the Strategy) and sets out our strategic approach to flood risk management on the River Tame by considering opportunities to manage flood risk across a wide area, while providing environmental benefits.

We consulted between May and August 2009 on the options for managing flood risk in the River Tame. Although we have not fundamentally changed our preferred options, we have carefully considered the responses and feedback and modified the Strategy accordingly. The final Strategy was approved for adoption by the Environment Agency's Director of Operations in October 2010.

This documents sets out the adopted Strategy and how we propose to implement it. It should be read in conjunction with the River Tame Flood Risk Management Strategy: Environmental Report, and the River Tame Flood Risk Management Strategy: Statement of Environmental Particulars, to understand the impacts and proposed mitigation for implementing the Strategy. Any developments since the adoption of the Strategy are summarised towards the end of this document.

Overview

The Environment Agency has a vision of a rich, healthy and diverse environment for present and future generations. Part of this vision is to manage flood risk and improve the environment. Flooding is a natural process that can have a major effect on people, communities, the economy and the environment. We cannot prevent all floods but we can prepare for them as part of flood risk management.

The risk of flooding is influenced by river processes, urban drainage and land use. By managing land and river systems, we can reduce the chance of flooding from rivers. To reduce the impact of flooding we:

- provide flood warning systems for river flooding;
- influence the planning process to restrict development in areas at risk of flooding;
- encourage the use of flood resilience measures;
- provide flood storage areas;
- maintain and construct flood defences;
- work closely with local authorities and water utility companies on urban drainage.

Kingsbury Water Park

To plan our activities we take a wide view of flood risk across a large geographical area. We call this a Flood Risk Management Strategy. For Birmingham, the Black Country and Tamworth we have produced the River Tame Flood Risk Management Strategy. This Strategy examines the options available for managing flood risk from the River Tame. The objectives of the Strategy are:

- understanding and raising awareness of the risk of flooding on the River Tame, both now and in the future;
- developing a plan for the management of flood risk on the River Tame that is sustainable, taking into account future changes in the environment (human, built or natural) and the climate;
- ensuring all proposals are technically feasible, economically viable, socially acceptable and environmentally appropriate (by meeting the strategic environmental objectives);
- seeking opportunities for environmental improvements wherever possible through the recommendation of integrated flood risk management measures;
- working in partnership with and encouraging co-operation between stakeholders.

This document is a summary of our proposals for managing flood risk in the area for the next 100 years (from 2009 to 2109).

Tamworth Castle

Our study area

The River Tame is the largest tributary of the River Trent. The total catchment is approximately 1500 square kilometres and the river is 100 kilometres long. Over 1.7 million people live within the catchment area. The River Tame starts as two distinct watercourses: the Oldbury Arm and the Willenhall Arm, in the Black Country. These combine at Bescot and continue eastwards through Birmingham before changing direction at Water Orton. The river then flows north through Tamworth to the confluence with the River Trent. It has a number of major tributaries. The most significant are the Ford Brook, River Rea, River Cole, River Blythe and the River Anker. The tributaries are not included within the Strategy.

Our study area starts at Ashes Road on the Oldbury Arm and County Bridge on the Willenhall Arm and finishes where the River Tame enters the River Trent. The study area is divided into nine sections or reaches as shown on the plan on page 7.

Over time, the River Tame has been heavily modified by human activity. Sections of the river have been engineered with brick walls and concrete. This is not unusual for an urbanised catchment. This has resulted in a river that is very different to its original size, shape and course. The alterations are mainly in the upper catchment of Birmingham and the Black Country.

History of flooding along the River Tame

Like all major river systems, the River Tame has a history of flooding. In Summer 2007, England experienced the wettest three months since records began. Flood events in June and July 2007 caused widespread flooding on the River Tame. Areas that were significantly affected include Bescot, Witton, Water Orton, Fazeley, Tamworth and Elford. Other notable flood events on the River Tame occurred in June 1955, August 1987, December 1992, September 1994, January 1999 and November 2000.

We have used the information from these flood events to inform the River Tame Strategy, ensuring that past knowledge guides future decisions.

One Stop Shopping Centre, Perry Barr

The existing flood risk situation

Terminology
When we explain flood risk we refer to 'flood events'. Flood events are characterised by their size and how often they occur. The larger a flood event, the less often it will occur.

A flood event with a 1% probability of occurring is also expressed as a flood that has a 1 in 100 chance of occurring in any given year. If a flood event of this magnitude occurs in one year the chance of it occurring the following year is still the same, 1 in 100.

A flood event with 0.5% probability of occurring is expressed as a flood that has a 1 in 200 chance of occurring in any given year. A flood of this size occurs less frequently and so it is larger than a flood event with a 1% probability. Consequently, more properties will flood.

In this document we refer to numbers of properties (residential and commercial) at risk of flooding. Unless otherwise stated these figures refer to the number of properties (residential and commercial) that would be flooded in a flood event with a 1% probability (1 in 100 chance of occurring in any given year) of occurring.

All reference to left/right banks in this document are based on looking at the river in a downstream direction.

Existing Flood Risk Management
Currently, there are 3,100 residential and commercial properties at risk from flooding. From 2025 this number is forecast to increase to 5,400 properties as a result of the impact of climate change on flood levels.

There is an existing flood risk management scheme in place in the upper catchment of the River Tame, which provides a varied level of flood risk management. This is a combination of channel maintenance, earth embankments, flood walls and flood water storage areas. The storage areas hold flood water until a flood event has passed, after which it is slowly released back into the River Tame. The existing storage areas are:-

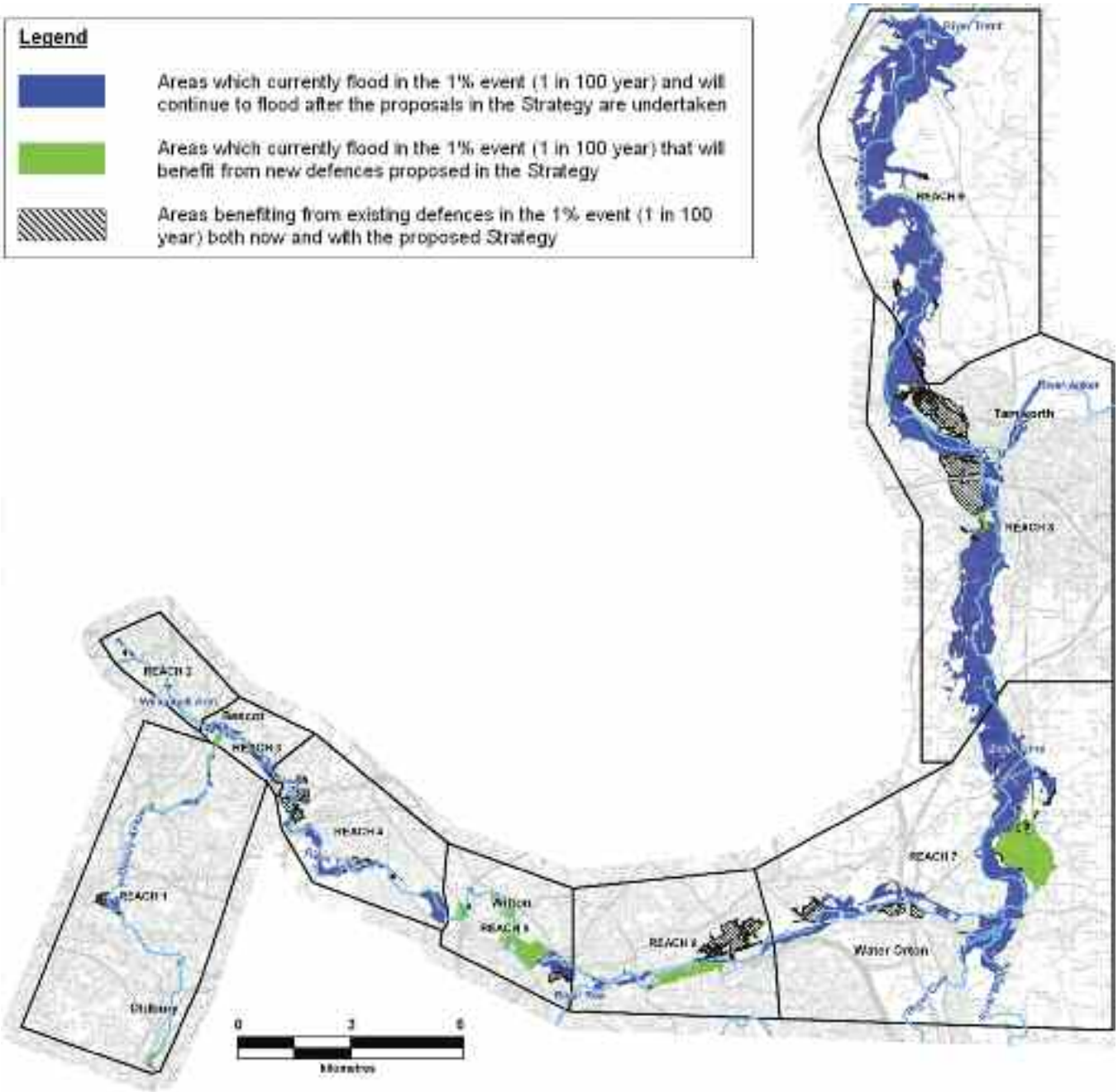
- Sheepwash Balancing Ponds: this area holds 166,000m^3 of water
- Ocker Hill Balancing Pond: this area holds 19,000m^3 of water
- Bescot Controlled Washland: this area holds 37,000m^3 of water
- Forge Mill Lake at Sandwell Valley: this area holds 575,000m^3 of water
- Perry Hall Playing Fields: this area holds 156,000m^3 of water

This system was designed in the 1970s to reduce risk of flooding to an event which at that time had a 2% annual probability of occurring. Forge Mill Lake is the most significant storage area and holds more than double the amount of water of any other location. Other localised flood defences exist downstream at Water Orton, Minworth, Whitacre Heath, Fazeley and Tamworth. We have identified that some of the existing flood defences need replacement in the near future. If we do not take appropriate action there is a risk that in the future these defences could fail and cause widespread flooding.

Climate change
Government guidance sets out how we should predict the effect that climate change may have on flood levels in the future. Using computer flood modelling we can identify how many properties may be affected by these changes.

The Strategy allows us to plan how we respond to these changes. We have predicted that a further 2,300 properties could be at risk in the future (from 2025) as a result of climate change.

River Tame Flood Risk Management Strategy Overview



How we have developed our Strategy

The key aim of the Strategy is to enable us, with partners, to manage flood risk sustainably over the long term. We have developed a Strategy which seeks to embrace a holistic approach and have developed the strategy to follow four key aims of sustainability; maximising environmental benefit; developing safe schemes; and securing value for money.

We apply a clearly defined approach to assessing flood risk management options which is set by the Department for Environment, Food and Rural Affairs (Defra).

To develop our Strategy we have identified all the possible options to manage flood risk at a broad strategic level. We identified the following options:

- **Do nothing** – This would be a 'walk away' option. It would mean that all of the work we currently do now, such as flood warning, channel and defence maintenance would stop. This is a standard option against which the benefits and costs of the other options are compared.

- **Do minimum** – This would mean that we would continue to maintain the existing walls and embankments. However, at the end of their design-life the defences would not be replaced.

- **Do something** – Under this approach we would change what we do now to manage flood risk. The Strategy has considered large-scale options for the whole area and more local options. These options included combinations of:

  ➔ managing the causes of flooding by changing the way people design and use urban and rural

River Tame at Perry Hall playing fields

  ➔ storing water during a flood and slowly releasing it back into the river afterwards;
  ➔ improving the flow of water down a river (this is called conveyance);
  ➔ providing defences to reduce the risk of flooding.

We have engaged external stakeholders to share ideas and expertise and we have assessed these options against the following criteria:

1 The cost of each option compared with the benefits gained, including the number of properties affected.
2 Whether the option would effectively manage flood risk.
3 The environmental impact of each option.

The tables on pages 10 and 11 give a summary of the option assessment:-

Summary of options

The Strategy has adopted the following broad options:
For full list of options please refer to the Environmental Report and the Statement of Environmental Particulars

Option	Justification for taking forward
Option 2: Do minimum	*We will continue current flood risk management activities to reduce the affects of climate change and improve resilience to flooding.*
Option 3: Maintain existing defences	*We will continue to maintain the existing level of flood risk management (as Option 2) and replace defences at the end of their useful life.*
Option 4: Do something – Optimise existing flood storage	*We will improve how the existing storage areas function to reduce the damage caused by flooding.*
Option 6: Do something - Improve conveyance and provide permanent flood defences	*We will improve flow through critical areas of the River Tame by removing/ redesigning bridges and opening up culverts where possible.* *We will also replace and raise existing flood defences and where appropriate, build new defences to manage the risk of flooding.*

River Tame at Forge Mill

Summary of options

The Strategy has dismissed the following broad options:

Option	Justification for dismissal
Do nothing (take no action)	*This option does not reduce flood risk in a managed way and flood risk would increase over time as existing flood defences fail.*
Do something - Underground storage tanks	*This would involve creating large storage tanks underground and diverting flood water into these to reduce flood risk downstream. This option would be too expensive and could have significant environmental impacts.*
Do something - Groundwater recharge	*This option would involve pumping floodwater into underground aquifers. This is technically impractical due to the geology of the area and would have environmental contamination risks.*
Do something - Tributary storage	*This option would involve creating flood storage areas on the tributaries of the River Tame. There are not enough available sites to store significant volumes of water. However, the River Tame Management Strategy will promote the creation of storage areas as policy recommendations for future development of these areas.*
Do something - Dredging	*Dredging the river bed has little effect in reducing flooding and has a significant detrimental environmental impact. This would not provide a sustainable solution.*
Do something - Overland flow diversion	*This would involve creating a diversion for the River Tame, to bypass urban areas such as Birmingham. This would be too expensive and could have significant environmental impacts and disruption.*
Do something - Underground flow diversion	*This option would involve the construction of large culverts for the flood water to flow along bypassing areas that have a high risk of flooding. This option does not work due to the rivers shallow gradient in the area identified for implementation (Witton).*
Do something - Add or remove weirs to the river channel	*This option has little impact to reduce flooding as the weirs become submerged and do not influence levels at high flows. However we may remove or modify weirs for fisheries and biodiversity improvements.*
Do something - Use temporary defences	*Temporary defences could be erected when a flood event is expected and removed after the risk has reduced. This solution is unsuitable as the River Tame catchment responds very quickly to rainfall events and there would not be enough time available to put the defences in place.*

This process has provided a short list of potential options for each of the reaches within the overall study area. Further details of the proposals in each of the nine reaches are provided in the following section. The short listed options are explained below.

Our Strategy

Following the public consultation exercise, we have modified our Strategy to take account of the issues raised. Although fundamentally we have not changed our preferred options, there are various issues we are now aware of that have assisted us in our understanding of flood risk issues and how the Strategy could be implemented. We have also added clarification to parts of our Strategy as a result of responses received.

This document contains our final Strategy. We have also produced a Statement of Environmental Particulars as required by the Environmental Assessment of Plans and Programmes Regulations 2004. It sets out how the findings of the Environmental Report and views expressed during the consultation period have been taken into account as the Tame Strategy has been finalised and formally approved (adopted). This Strategy should be read in conjunction with the Environmental Report and the Statement of Environmental Particulars in order to understand what information the Strategy has taken into account when being drafted and finalised. We also explain the potential impacts of implementing the Strategy, the mitigation proposed to reduce or remove these impacts, and potential environmental and social improvements that we propose to undertake in tandem with implementing the Strategy.

River Tame at Witton

The Tame Strategy study area contains a highly urbanised upstream catchment and a rural downstream catchment. The existing flood risk management involves a combination of flood storage areas, flood walls and embankments. Consequently, there is no simple solution for managing flood risk along the river. The Strategy has identified that it is not viable to provide the same level of flood risk management across all the communities in the flood plain. As a result we are suggesting different proposals within each of the nine reaches. These proposals are based on a high level study undertaken as part of the Strategy development. Whilst we don't anticipate that the preferred options will change, the method of implementation e.g. exact heights of walls may change as a result of more detailed work. The Strategy proposals involve a number of key components which are summarised below.

Management activities

We currently undertake a range of flood risk management activities and we are proposing to continue with these:

- improving the flood warning service and promoting its wider use;
- channel maintenance, where necessary;
- maintaining existing flood defences and replacing them when they reach the end of their useful life, unless there are special circumstances in which we would either cease maintenance or remove the defence;
- continuing to influence planning and development proposals;
- continuing to provide advice on protecting individual properties to increase their resistance to flooding.

Optimise upstream storage
We propose to optimise the existing flood storage areas in the upper sections of the River Tame. We have identified that changes can be made to the existing flood storage areas, in particular at Forge Mill and Perry Hall playing fields to reduce the risk of flooding downstream.

Remove obstructions to flow
Where possible, we will remove or redesign structures that impede the flow of the River Tame in critical locations such as Brookvale Road (Atlas Industrial Estate Bridge) and Nechells/Star City (utility crossings). The alternative is that the height of the flood walls and embankment along parts of the River would need to be increased. This could result in increased construction costs and significant social and environmental impacts.

At Meteor Park, near Spaghetti Junction we are planning to open up the outer arches of the canal bridges to improve conveyance. We also propose to modify existing culverts to improve water flows for example at Titford, just upstream of the Wolverhampton Road, on the Oldbury Arm.

Provide flood defences
In some locations there are existing defences which require replacement in the near future. In other locations there are currently no measures in place, in these locations we will construct new flood defences, where this work can be justified. Some of the existing defences will be raised either now or in the future. This will allow us to manage the impacts of increased water levels through climate change. Where possible, we take opportunities to set back defences, to make more space for water along the river corridor during flood conditions.

The following section explains the strategic preferred option and how the desired reduction in flood risk could be achieved in each of the nine reaches along the river. These options will be further investigated and refined in local areas during the implementation of the Strategy.

Climate change
Without further action an additional 2,400 properties will be at risk of flooding in the future as a result of climate change. However with the proposals recommended in the Strategy this number will reduce to 402. We will review our proposals to manage climate change on a case by case basis but our options will include the following:

- building some defences higher, now, to prevent the risk of flooding in the future;
- designing defences so that they can be raised in the future;
- accepting that in some locations the risk of flooding will increase in the future.


Spaghetti Junction

Oldbury Arm (reach one)

The Oldbury Arm stretches from Ashes Road, Oldbury downstream to Bescot, Wednesbury. This reach is heavily urbanised, containing a mix of residential and industrial areas. Near Horseley Heath, the river flows through Sheepwash Urban Park, which has been designed to store water during a flood event.

Flood risk

- Without defences there would be 1,297 properties at risk in the Oldbury Arm;
- There are currently 286 properties at risk;
- The current flood defences therefore manage the risk of flooding to 1,011 properties;
- There will be 95 properties at risk with the Strategy in place;
- The Strategy will therefore manage the risk of flooding to an additional 191 properties.
- By 2025 an additional 61 properties will be at risk of flooding as a result of climate change.

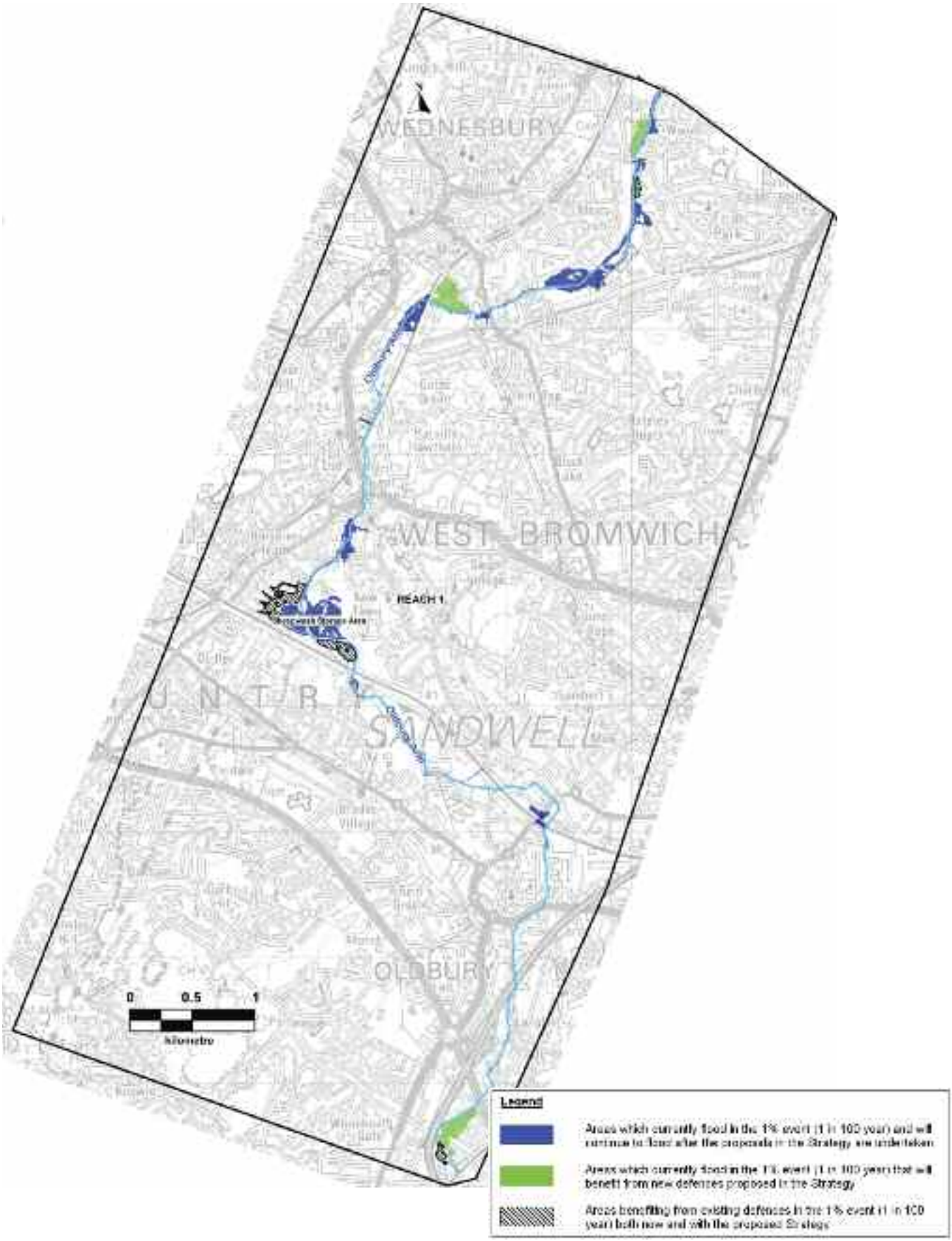
Our proposals – Combination of Option 3 (Maintain) and Option 6 (Improve conveyance and new flood defences)

To improve the flow of water we are proposing to alter a section of the existing culvert in the Titford area (between Titford Road and Titford Pool). We propose to remove the culvert to create an open channel reducing the risk of flooding and creating environmental benefit by increasing public open space and a more natural channel. If this is not possible we propose to increase the size of the existing culvert or to install an additional culvert.

We propose to construct new flood walls on the left bank at Tipton Junction (just upstream of Holloway Bank) and improve the existing defences at the rear of Collins Road, Wednesbury to reduce the risk of flooding to a 0.5% probability in any given year.

In addition we are proposing to replace existing defences when they reach the end of their useful life. We plan to undertake the majority of this work in the short term (next five years) and the remainder within the medium term (20 years).

Oldbury Arm (reach one)



Willenhall Arm (reach two)

The Willenhall Arm runs from the Head of Main River at County Bridge, Willenhall downstream to Bescot, Wednesbury. Like the Oldbury Arm, the Willenhall Arm is heavily urbanised and contains a mix of residential and industrial areas that border the River Tame.

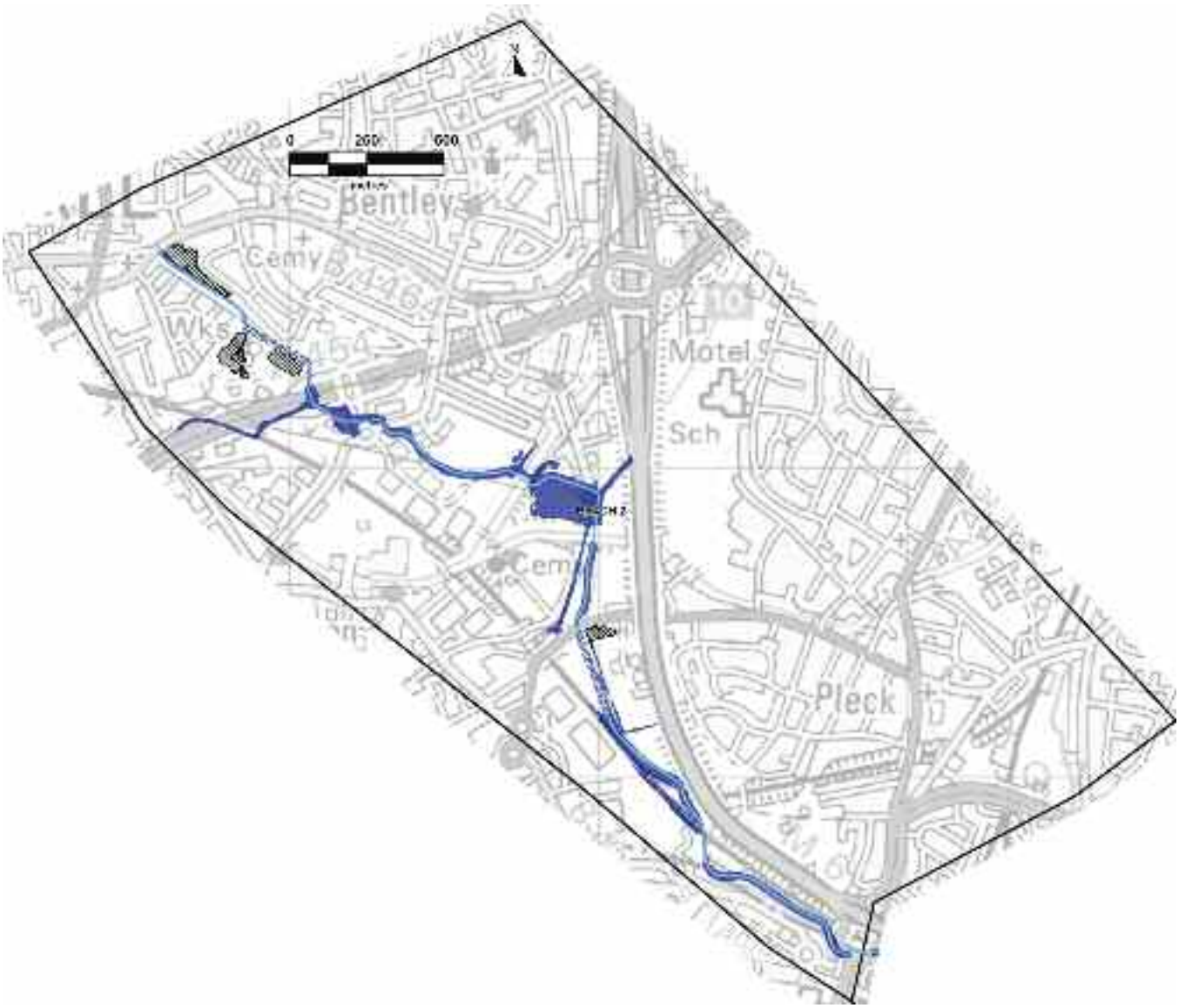
Flood risk

- Without defences there would be 290 properties at risk in the Willenhall Arm;
- There are currently 2 properties at risk;
- The current flood defences therefore manage the risk of flooding to 288 properties;
- There will be 2 properties at risk with the Strategy in place;
- The Strategy will not therefore manage the risk of flooding to any additional properties;
- By 2025 an additional 19 properties will be at risk of flooding as a result of climate change.

Our proposals – Option 3 (Maintain)

Our strategy has shown that the existing defences provide the required level of flood risk management and therefore no new defences or defence raising is required. However, we are proposing to replace existing defences as they reach the end of their useful life. We plan to undertake the majority of this work in the next five years and the remainder within the next 20 years. In addition, we will continue to provide flood warnings and maintain the channel and existing defences.

Willenhall Arm (reach two)



Legend

- Areas which currently flood in the 1% event (1 in 100 year) and will continue to flood after the proposals in the Strategy are undertaken
- Areas which currently flood in the 1% event (1 in 100 year) that will benefit from new defences proposed in the Strategy
- Areas benefiting from existing defences in the 1% event (1 in 100 year) both now and with the proposed Strategy

Bescot Junction (reach three)

The Bescot Junction location contains a mix of residential and industrial properties including the local landmark of Walsall Football Club stadium and a nationally important rail freight yard.

Flood risk

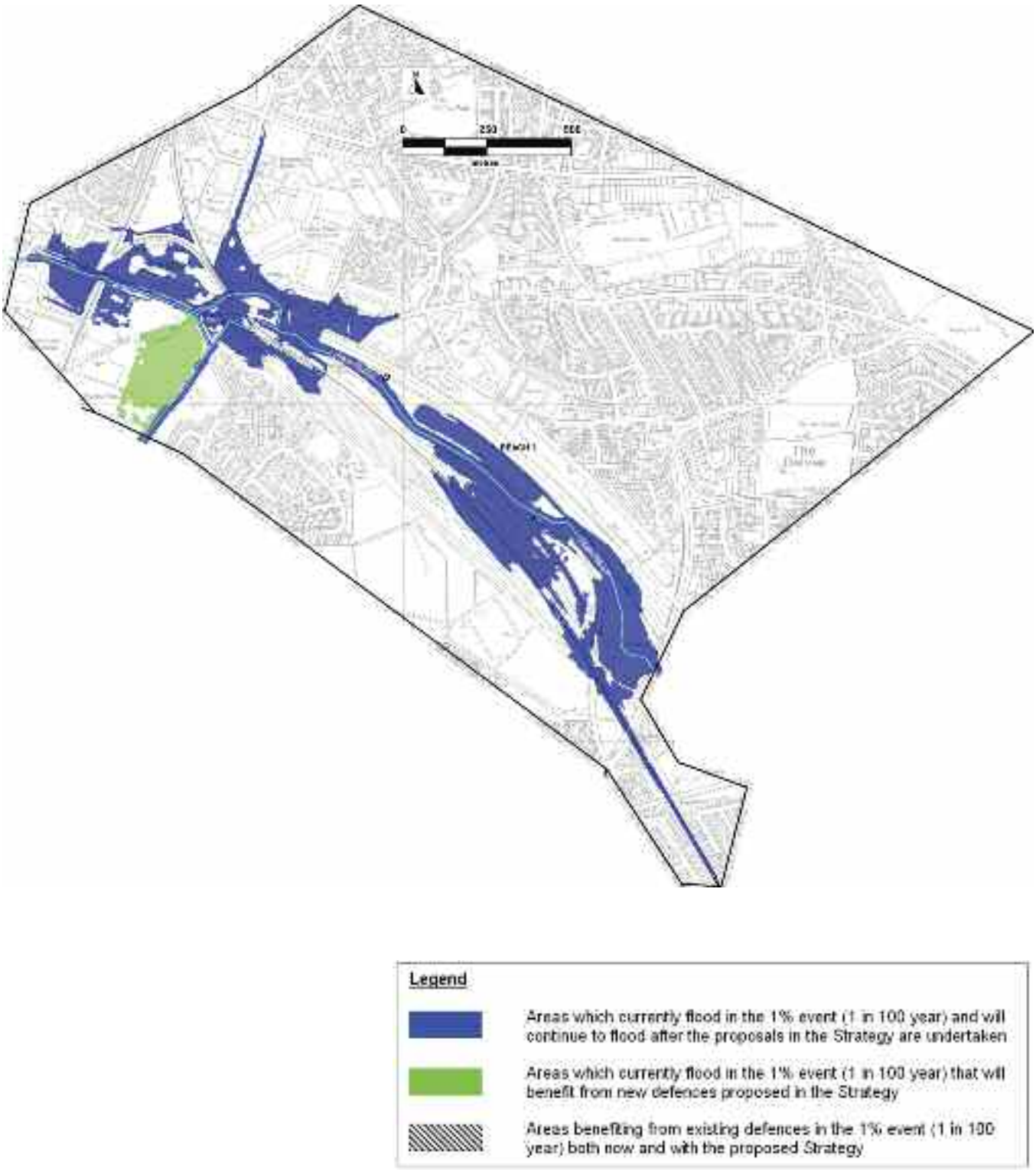
- Without defences there would be 34 properties at risk;
- There are currently 34 properties at risk;
- The current flood defences therefore do not manage the risk of flooding to any properties;
- There will be 20 properties at risk with the Strategy in place;
- The Strategy will therefore manage the risk of flooding to 14 additional properties;
- By 2025 an additional 5 properties will be at risk of flooding as a result of climate change.

Our proposals – Option 3 (Maintain)

The Strategy proposes to increase the height of the existing embankment to approximately 2 metres on the left bank to reduce flood risk to the former Spear & Jackson works. This will reduce the risk of flooding to 0.5% probability in any given year.

We are also proposing to replace existing defences when they reach the end of their useful life. We plan to undertake the majority of this work in the next five years and the remainder within the next 20 years.

Bescot Junction (reach three)



Newton and Hamstead (reach four)

Downstream of Bescot Junction the River Tame flows past Yew Tree and on towards the Sandwell Valley Country Park, which provides 1700 acres of public open space in the heart of the West Midlands. This area is an important haven for flora and fauna and plays an important role in the flood risk management of the River Tame. Forge Mill Lake in the Country Park provides essential flood water storage, in addition to being a Royal Society for the Protection of Birds (RSPB) nature reserve.

Downstream of the park, the river flows through the residential and industrial area of Perry Barr, before entering Perry Hall Playing Fields. The Playing Fields also provide flood water storage.

Flood risk

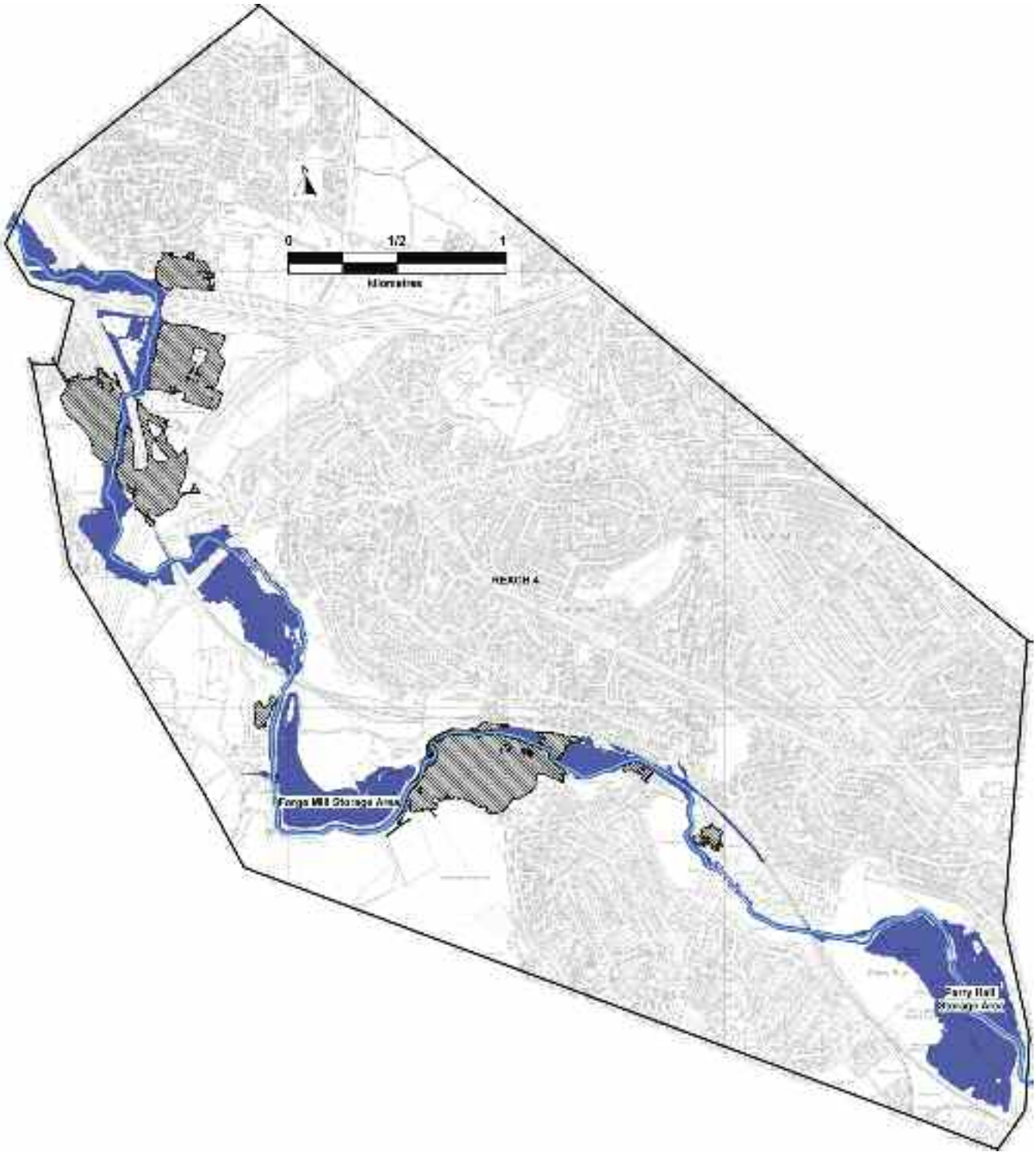
- Without defences there would be 160 properties at risk;
- There are currently no properties at risk;
- The current flood defences therefore manage the risk of flooding to 160 properties;
- There will be no properties at risk with the Strategy in place;
- The Strategy will not therefore manage the risk of flooding to any additional properties;
- By 2025 an additional 24 properties will be at risk of flooding as a result of climate change.

Our proposals – Option 3 (Maintain) and Option 4 (Optimised Storage)

We propose to improve the way in which the flood storage areas of Forge Mill and Perry Hall function. This will be done by allowing water to enter them earlier in a flood event. This will reduce flood risk to communities downstream at Witton in reach five.

One section of defence within this reach is nearing the end of its useful life and is proposed to be replaced within the next five years. Further replacement of existing defences is proposed over the next 20 years.

Newton and Hamstead (reach four)



Perry Barr and Witton (reach five)

This area of the River Tame contains mostly commercial, industrial and residential properties. It covers Perry Barr in the upstream sections, Witton in the middle section, before the River Tame flows underneath the iconic Spaghetti Junction road network.

Flood risk

- Without defences there would be 1,025 properties at risk;
- There are currently 874 properties at risk;
- The current flood defences therefore manage the risk of flooding to 151 properties;
- There will be 10 properties at risk with the Strategy in place;
- The Strategy will therefore manage the risk of flooding to an additional 864 properties.
- By 2025 an additional 124 properties will be at risk of flooding as a result of climate change.

Our proposals – Combination of Option 3 (Maintain) and Option 6 (Improve conveyance and new flood defences)

We propose to improve the flood embankments on the left (north) bank in the Regina Drive area of Perry Barr, adjacent to the "One Stop" shopping centre. The defences will reduce the risk of flooding to a 1% annual probability. As a result of the works on the left bank at this location, a new low defence will be required on the right bank to reduce flood risk to the shopping centre.

We also propose to improve/replace the existing defence walls to the rear of the industrial units on the left bank just downstream of the A34 bridge. These defences will be made continuous and raised slightly higher than the current defences which are in poor condition.

Along the Tameside Drive area of Witton we will improve the flood defences along the edge of the road. This will reduce the risk of flooding to a 0.5% annual probability and will ensure that improvements to defences downstream do not increase flood risk here.

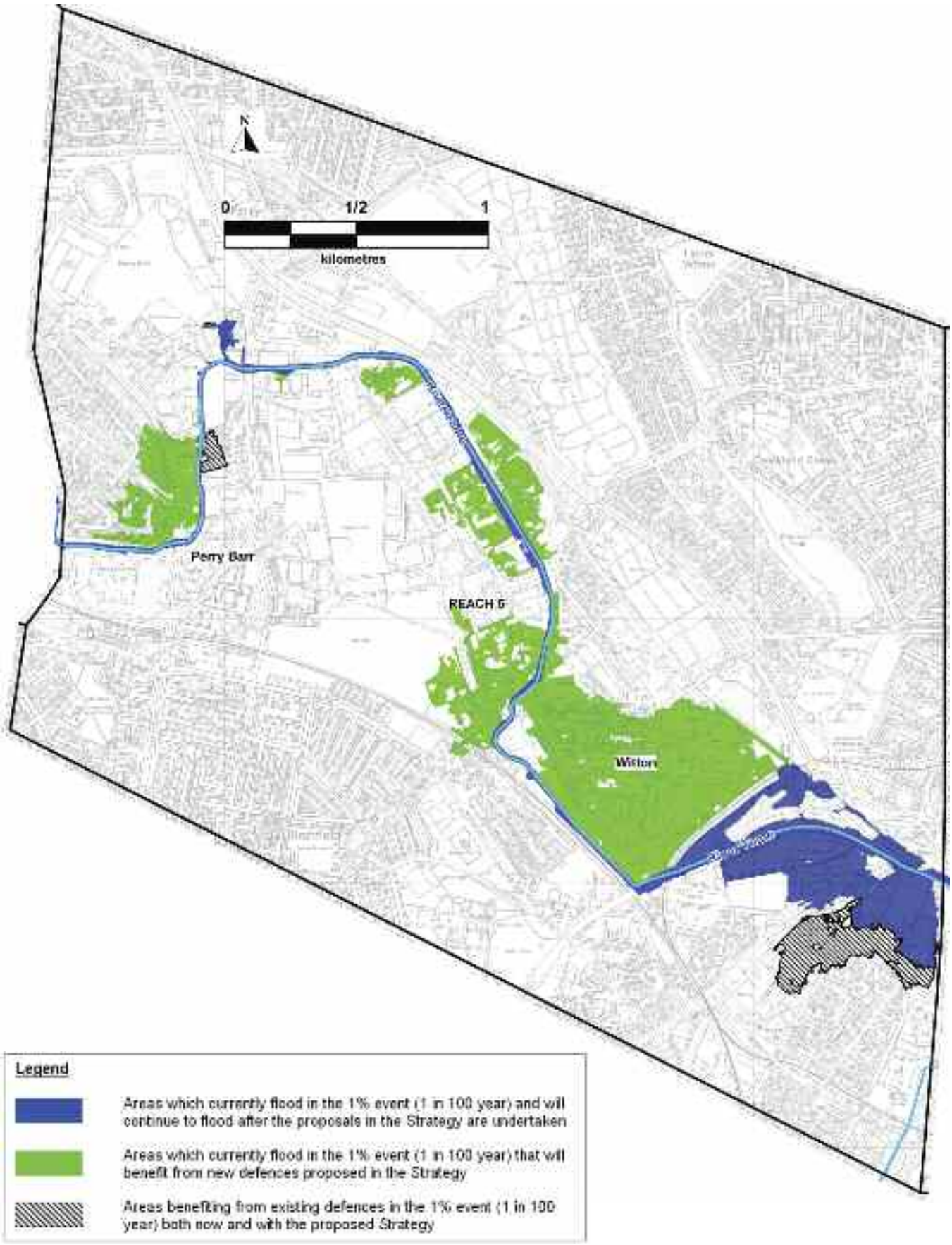
Along the Brookvale Road area of Witton, we propose to raise the existing flood wall to between 1 metre and 2.5 metres high on the left (north) bank and 1 metre and 2 metres high on the right bank. This will reduce the risk of flooding to a 0.5% annual probability in this location. As some of these defences will be up to 2.5 metres high, we will work with the local community to ensure that we reduce the visual impact through sympathetic design.

New defences are proposed on the left bank between the river and Tame Road. These defences will need to tie in to any defences constructed as part of the Siemens housing development and will need to extend down to the Electric Avenue area.

To improve the flow of floodwater in this section we also propose to remove flow restrictions at Brookvale Road (Atlas Road Industrial Estate Bridge) and in Meteor Park, Nechells (open up the outer arches of two canal bridges). If we are unable to undertake this work, the flood defences upstream through the Witton area will need to be built to a higher level.

We also propose to replace existing defences as their condition reduces. These works are proposed within the next 20 years.

Perry Barr and Witton (reach five)



Gravelly Hill and Bromford (reach six)

Downstream of Spaghetti Junction the River Tame flows underneath the M6, through Gravelly Hill, Bromford and Castle Vale. The Gravelly Hill area contains a high number of commercial and industrial properties. Further on, the river flows past the large residential areas of Bromford on the right bank, and Castle Vale on the left bank.

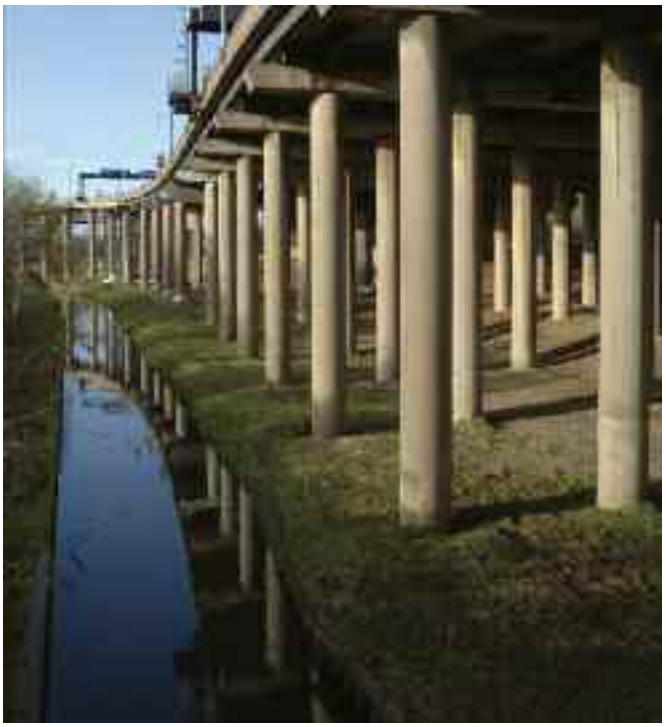
Flood risk

- Without defences there would be 3,410 properties at risk;
- There are currently 1,250 properties at risk;
- The current flood defences therefore manage the risk of flooding to 2,160 properties;
- There will be 11 properties at risk with the Strategy in place;
- The Strategy will therefore manage the risk of flooding to an additional 1,239 properties.
- By 2025 an additional 17 properties will be at risk of flooding as a result of climate change.

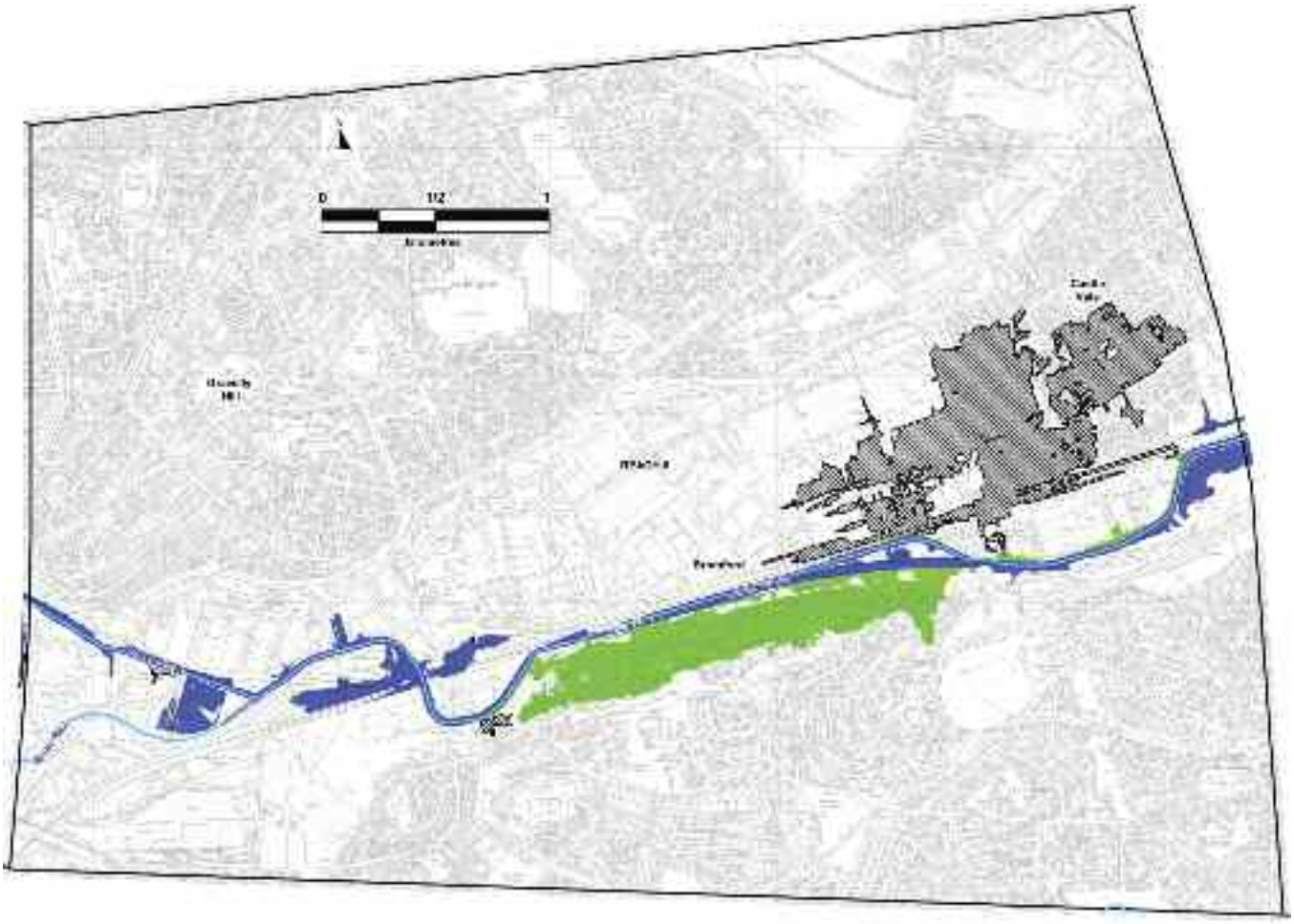
Our proposals – Combination of Option 3 (Maintain) and Option 6 (Improve conveyance and new flood defences)

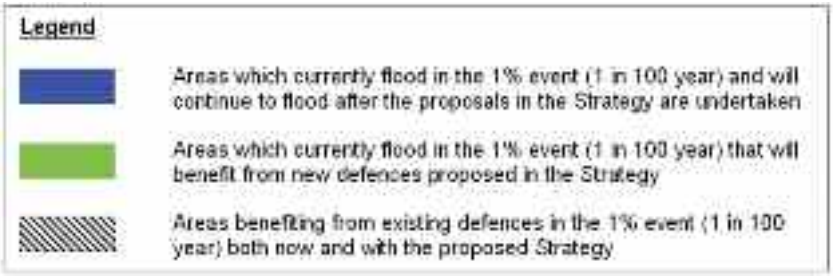
We propose to raise the height of the existing defence on the right bank to manage flood risk in Bromford. This will reduce the risk of flooding to a 1% probability for any given year and will be achieved by constructing new flood defences 1.8 metres high. Flood defences are also proposed to protect the area of Castle Vale on the left bank of the River Tame. These will be built to a 1% annual probability of flooding and will consist of walls between 1 metre and 2.5 metres in height and an embankment approximately 1.5 metres high. These will replace a section of old defences approximately 1 metre high and are required to ensure that the improvements proposed for Bromford do not increase flood risk to Castle Vale.

We are also proposing to replace existing defences when they reach the end of their useful life. Some of this work is proposed in the next five years, but the majority will be undertaken within the next 20 years.



Gravelly Hill and Bromford (reach six)





Water Orton, Lea Marston and Kingsbury (reach seven)

Downstream of Birmingham the River Tame passes through Water Orton. From here it flows through a series of purification lakes at Lea Marston (designed to remove the pollution that originates in the upper reaches of the catchment). Further on it passes through the 600 acre Kingsbury Water Park Country Park. This reach is characterised by small settlements, former gravel workings, and agricultural land with large floodplains.

Flood risk

- Without defences there would be 460 properties at risk;
- There are currently 334 properties at risk;
- The current flood defences therefore manage the risk of flooding to 126 properties;
- There will be 49 properties at risk with the Strategy in place;
- The Strategy will therefore manage the risk of flooding to an additional 285 properties;
- By 2025 an additional 16 properties will be at risk of flooding as a result of climate change.

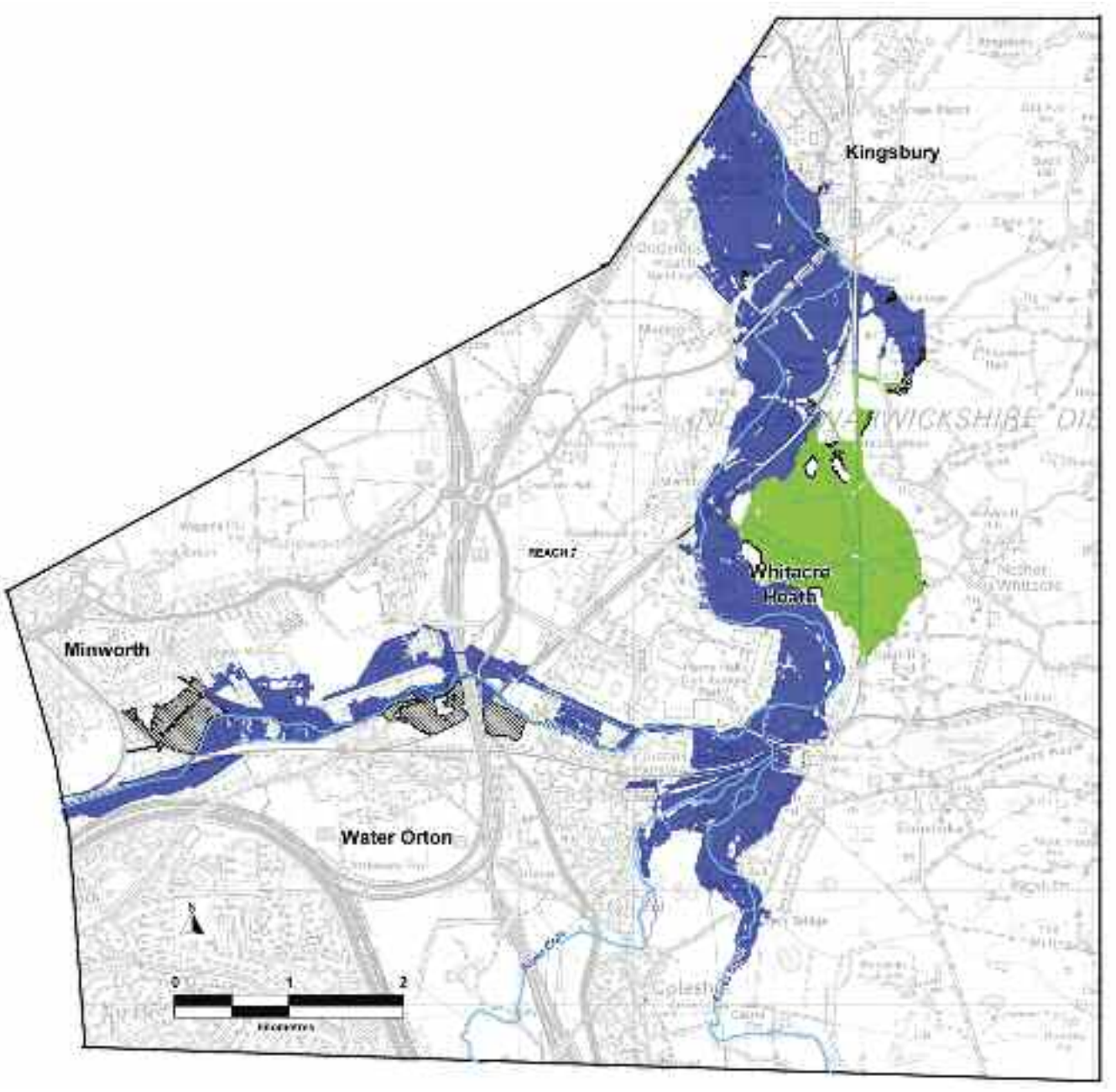
Our proposals – Combination of Option 3 (Maintain) and Option 6 (Improve conveyance and new flood defences)

We propose to raise the height of the existing embankments on the right bank at Whitacre Heath from 1.5 metres to approximately 2 metres. This will reduce the risk of flooding to 0.5% probability in any given year.

As a result of the works proposed at Whitacre Heath, our investigations have shown that there may be a marginal increase in flood risk downstream (in the remainder of reach seven and reach eight). However this is based on a high level assessment based on the information we have now (e.g. approximate property threshold levels/ground levels) and will be reviewed in more detail as part of any future scheme.

We also propose to replace two sections of existing defences within the next five years and one section of defence within the next 20 years.

Water Orton, Lea Marston and Kingsbury (reach seven)



Legend

- Areas which currently flood in the 1% event (1 in 100 year) and will continue to flood after the proposals in the Strategy are undertaken
- Areas which currently flood in the 1% event (1 in 100 year) that will benefit from new defences proposed in the Strategy
- Areas benefiting from existing defences in the 1% event (1 in 100 year) both now and with the proposed Strategy

Fazeley and Tamworth (reach eight)

Downstream of Kingsbury the River Tame continues to flow through agricultural land and former gravel workings. Recent river habitat improvements have been undertaken at Middleton creating a braided channel. The river then flows through Fazeley and Tamworth which are protected by flood walls and earth embankments.

Flood risk

- Without defences there would be 3,030 properties at risk;
- There are currently 304 properties at risk;
- The current flood defences therefore manage the risk of flooding to 2,726 properties;
- There will be 5 properties at risk with the Strategy in place;
- The Strategy will therefore manage the risk of flooding to an additional 299 properties;
- By 2025 an additional 3 properties will be at risk of flooding as a result of climate change.

Our proposals – Combination of Option 3 (Maintain) and Option 6 (Improve conveyance and new flood defences)

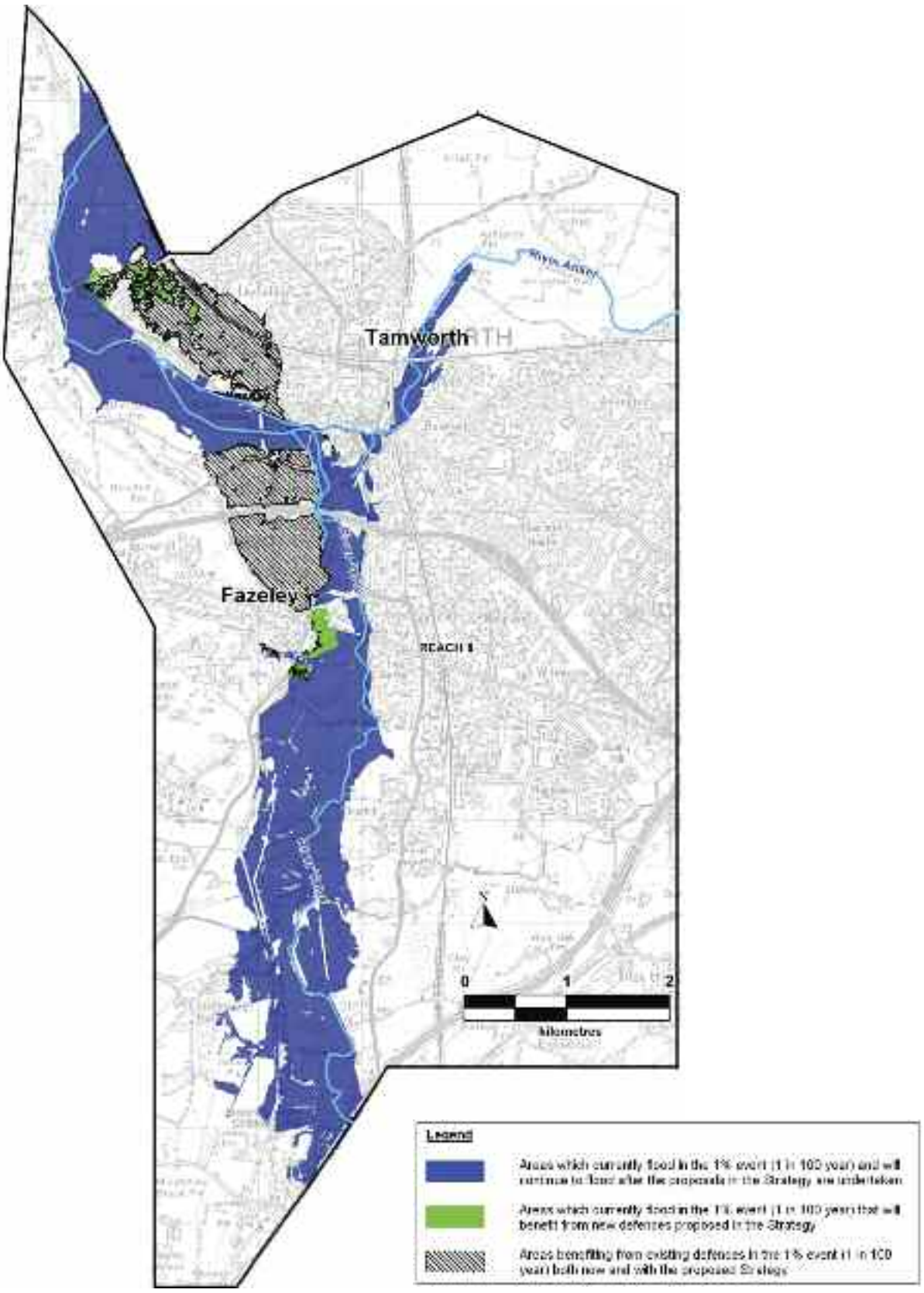
New defences are proposed on the left bank around the Mayfair Drive area of Fazeley. This will consist of a flood embankment built to a height of approximately 1.5 metres that will reduce the risk of flooding to this part of Fazeley to a 0.5% probability of flooding in any given year.

We also propose to reduce the risk of flooding in the Brook End vicinity of Fazeley on the left bank, by increasing the height of the existing embankment defences to approximately 2 metres. These measures will reduce the risk of flooding to properties in this location to a 0.5% annual probability of flooding.

As a result of the preferred options in reach seven, the risk of flooding will be marginally increased in reach eight. Based on the Strategy level investigations, we anticipate that works will be required in the Coton Lane area (in the north of Tamworth) to ensure that the residual flood risk is managed. We propose to construct new embankments to a height of approximately 1 metre. South of here additional embankments are proposed to a similar height to provide a 0.5% probability of flooding in Lichfield Road in the vicinity of Chatsworth Road and The Fox Public House.

None of the existing defences in this reach require replacement within the next five years, however sections of defence will reach the end of their useful life within the next 20 years and will require replacement.

Fazeley and Tamworth (reach eight)



Comberford to Alrewas (reach nine)

Downstream of Tamworth the river flows through a largely rural landscape with wide floodplains, passing the small settlements of Comberford and Elford which are situated on the right bank, before the confluence with the River Trent.

Flood risk

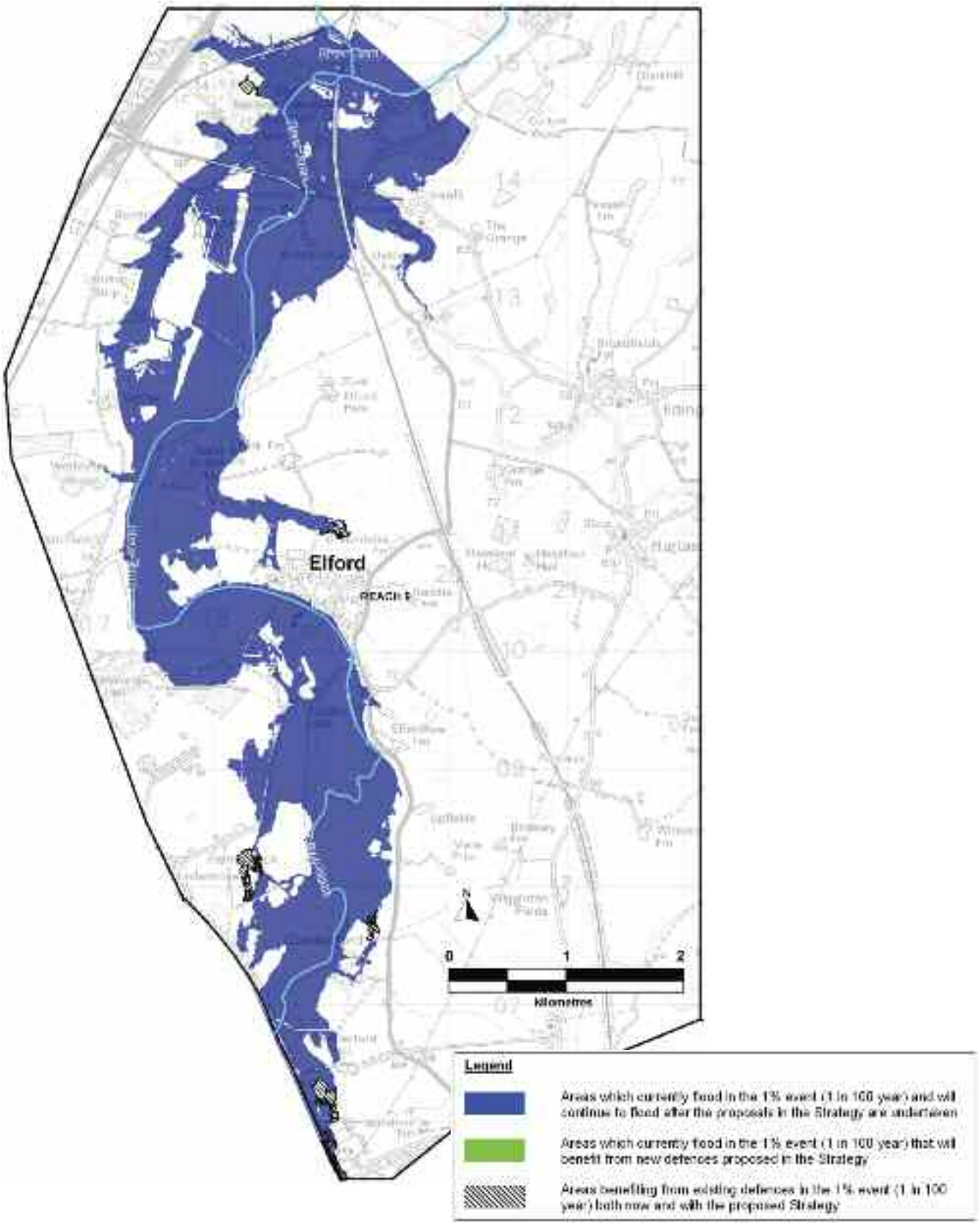
- Without defences there would be 285 properties at risk;
- There are currently 26 properties at risk;
- The current flood defences therefore manage the risk of flooding to 259 properties;
- There will be 31 properties at risk with the Strategy in place;
- We predict that the Strategy will marginally increase flood risk to 5 properties;
- By 2025 an additional 133 properties will be at risk of flooding as a result of climate change.

Our proposals – Option 3 (Maintain)

We propose to continue maintaining current defences and structures to the existing standard of protection, plus removing blockages where they cause a flood risk.

Based on the information we know now, we expect that the measures proposed upstream on the river will marginally increase flood risk to a small number of properties in this reach. These properties are already at risk of flooding, but we expect them to be put at marginally increased flood risk as a result of the Strategy proposals upstream. We will engage with the community and property owners concerned to address this issue and will undertake appropriate flood risk management measures (if required) to minimise this impact. This may for example, include individual property protection. In addition, we will also promote increased use of our flood warning service.

Comberford to Alrewas (reach nine)



Environmental summary

Strategic Environmental Assessment

We have undertaken a Strategic Environmental Assessment (SEA) to understand the impacts of the draft Strategy and propose mitigation for them. We have documented this in the Environmental Report (ER). We have explained how we have dealt with responses to the consultation on the draft Strategy, along with how consultation responses have changed the SEA and the final Strategy, within the Statement of Environmental Particulars (SoEP). Both of these documents should be read in conjunction with this Strategy.

The high level environmental and social impacts of the Strategy are explained in the ER. We have identified mitigation to reduce or eliminate these impacts in the ER, and updated this with consultation responses in the SoEP.

Environmental opportunities

There are significant opportunities for environmental and social improvements which can either be integrated in our flood risk management work or be undertaken alongside our works.

The opportunities that are identified within the ER and updated by the SoEP focus on these themes:

- habitat improvements to improve biodiversity;
- improvements to public access and enjoyment of the River Tame corridor, and interpretation of this environment for the public benefit;
- improvements to fish passage and habitat by installing fish passes on weirs or removing weirs, and creation of fish refuges;
- river restoration and naturalisation.

The opportunities we develop further will depend on the flood risk management works we undertake, our funding, willingness and involvement of partners, whether the proposals will help us achieve our targets to improve the environment, and whether we can achieve targets for other organisations along with ours. We want to work in partnership with other organisations and communities to take more of these opportunities forward than we could do by ourselves.

The Strategy will include and develop the mitigation and environmental improvements identified within the ER and SoEP alongside developing the flood risk management works.

River Tame at Lady Walk

Review of the Strategy

As we implement the Strategy, we will review it to ensure that it remains appropriate. At an appropriate point in the future, for example before our next set of flood risk management assets need to be replaced, we will review the preferred Strategy options along with the strategic environmental assessment to determine whether they are still valid or need reassessing. Our reviews would include determining whether the on-going management activities provide value for money and whether they should be continued.

Summary of the Strategy

The Strategy proposals will reduce the risk of flooding from the River Tame for 2,850 residential and commercial properties. In addition it will manage flood risk to an additional 6,900 properties by maintaining/replacing existing flood defences,

However, there are 223 properties where we cannot justify the economic cost of increasing the level of flood risk management. The majority of these are located in the following reaches:

- Oldbury Arm
- Bescot
- Water Orton and Lea Marston
- Comberford to Alrewas

We will work with these communities to provide general advice and where appropriate identify ways of improving flood resilience.

Responses to the draft Strategy consultation

How we consulted

Public consultation was carried out between May and August 2009. We aimed to contact and provide information to all those affected and interested by the proposals. Consultation documents were made available at our offices, at public libraries as well as on our public website.

We carried out a wide range of consultation activities, including public meetings and drop in sessions. We contacted statutory consultees such as Natural England, English Heritage and local planning authorities. We also consulted parish councils and local flood groups that use the river or have an interest on how it is managed. We did leaflet drops at several locations and issued press releases in local newspapers to raise awareness of consultation on the draft Strategy and to identify interested and affected parties.

We are aware that we may not have reached everyone that has an interest in the Strategy. There will be future opportunities for organisations and individuals to have their say on our proposals when they are developed into more detail, as many detailed decisions still need to be made.

Specific responses to the consultation

Many of the respondents requested further information that we endeavoured to provide. There were many comments relevant to the Strategic Environmental Assessment (Environmental Report), which are dealt with in the Statement of Environmental Particulars. Many comments have resulted in clarifications of or additional information being included in the Strategy above. The following are the key remaining suggestions or issues raised on the Strategy along with our responses to them.

Query: The proposals to improve flood risk management in the upper reaches will increase flooding to downstream locations. How will this be managed?

Response: We will ensure that any impacts as a result of measures undertaken elsewhere are mitigated and that no property receives a reduced standard of protection as a result of the proposals.

Query: There is a risk that flooding may be made worse temporarily if the improvements start at the upstream end and progress down the river. How will the work be sequenced to avoid this situation?

Response: As part of the Strategy implementation stage, we will review the sequencing of the work to ensure that flooding is not made worse for anyone.

Query: The Strategy should make it clear that the Environment Agency has responsibility over groundwater flooding.

Response: Currently, there is no single organisation responsible for all forms of flooding, including groundwater flooding. Recent recommendations have been made to give the Environment Agency sole responsibility for all forms of flooding. However, at present we are unable to take responsibility for groundwater flooding.

Query: The Strategy doesn't refer to Regional Spatial Strategy, which proposes a significant increase in house building across the West Midlands region, in particular Birmingham and the Black Country.

Response: The Strategy doesn't refer to specific housing development within the Tame catchment area, as any new developments built on floodplain would need to provide their own flood risk management measures.

Query: The Strategy should give provide greater detail on how the flood warning system operates and how local businesses and residents can sign up to receive warnings.

Response: The Environment Agency can issue direct flood warnings to customers when river levels begin to rise and there is a risk of your property flooding. You can receive warnings by telephone, mobile, email, sms text message or fax. You can find out if your property or business is at risk of flooding by calling Floodline on 0845 988 1188 or by visiting www.environment-agency.gov.uk/floodmidlands. You can sign up to the Environment Agency's free 24 hour flood warning service online or via the Floodline number above.

Query: Vegetation growth and littering cause blockages in the water course and increase flooding - who is responsible for clearing vegetation and removing litter?

Response: The Environment Agency may undertake routine maintenance of its assets on main rivers, however ultimate responsibility to remove vegetation and litter lies with the riparian owners. However, if there are blockages in the watercourse, which cause increased flood risk, we may take action to remove them. Everyone can reduce the likelihood of blockages causing flooding by not littering or dumping rubbish near rivers.

Query: The Strategy fails to recognise the serious problems caused by building the large bunds around the Water Ski Centre, just north of Kingsbury village. These bunds have been erected in recent years on natural flood plain with the result that during severe flood events, more water is pushed towards the Birmingham and Fazeley Canal exacerbating flooding problems in Kingsbury.

Response: Whilst the Strategy does not specifically make reference to the bunds around the Water Ski Centre the Strategy has identified that they cause minimal impact to flood levels due to the wide nature of the floodplain. We are currently working with the landowner to reinstate the floodplain by altering the bunds. This will avoid the need to remove the bunds, which would cause significant local disruption.

Query: Will the proposal to increase the height of the existing embankments on the right bank at Whitacre Heath by 500mm send more water along the valley into the Kingsbury Water Park and potentially increase flooding in the park?

Response: We have investigated this issue as part of the Strategy. Based on the information we know now, we expect that there will be a marginal increase to flood risk at Kingsbury Water Park. As we obtain more information and details, we will be able to quantify the impact, if any and discuss any mitigation works with the relevant parties.

Other issues

The following is a summary of issues that were raised through the consultation exercise, which have not been considered in detail in the Strategy. These issues will be considered as the Strategy is implemented and as more details become available.

- Review flood risk in the Titford Road area (Oldbury Arm), taking in to account the recent drainage improvements undertaken by Severn Trent Water Authority.
- The affect that raised defences may have on the canal network.
- Any proposed works to improve flood defences should take in to account public rights of ways and ensure there are no negative impacts.
- Need to identify opportunities in the urban sections of the Tame to re-engage the public with the River course, through promotion and development of the Tame walkway, linkages from adjacent parks and open space and education/recreation.
- Any proposed works near/adjacent to the Strategic Road Network will need to be discussed and reviewed with the Highways Agency.
- To consult with the relevant emergency planning organisations such as the Staffordshire Resilience Forum.
- To identify opportunities to improve recreational areas and promote wildlife especially in the urban areas in consultation with local communities.
- Any new/improvement works to the defences in Witton will need to take in to account the proposal for a new residential development on the old Siemens site, off Brookvale Road.
- Investigate the flood route along the Birmingham & Fazeley Canal which causes flooding to a number of cottages in Kingsbury Water Park as well as flooding of a housing estate close to the marina at Fazeley.
- Investigate the culvert along the A51 by the Fox Public House (reach eight) which is thought to contribute to flooding in this location.

River Tame at Tamworth

Next steps

We will now look at specific solutions to reducing flood risk in line with the adopted Strategy. This will involve further investigation and design of the individual works that can be justified and promoted.

Key stages

The Strategy has now been approved by the Environment Agency, allowing us to move forward to implementation. To enable this, we will produce more detailed proposals for each of the recommendations made in the Strategy to ensure that the solutions are developed within the strategic vision and in an integrated manner. In doing so, the Tame Flood Risk Management Strategy will provide the best opportunity to:

a) reduce flood risk;
b) minimise and mitigate potential impacts;
c) maximise opportunities for environmental improvements.

We have developed a programme to take forward the recommendations made within the Strategy. We plan (subject to funding) to deliver the short term (five year) recommendations through a number of separate projects, which may be phased over several years depending on funding availability and the most efficient way of delivering the works on the ground.

To support the delivery of the Strategy recommendations, in some areas we will need to secure contributions from beneficiaries. Any contributions we receive (financial or cost avoidance) towards the costs of implementing the improvement works will increase the likelihood of those works going ahead.
This is in line with the Environment Agency's Flood and Coastal Risk Management External Contributions Policy (http://www.environment-agency.gov.uk/research/planning/33700.aspx)

We have recently completed one of the recommendations made in the Strategy through a scheme which has optimised the Perry Hall Flood Storage Area at Perry Hall Playing Fields, Birmingham. This has improved the standard of protection to downstream communities in the Witton area of Birmingham.

For each of the projects arising from the Strategy we will obtain more information and data to establish whether the Strategy option can be implemented and to develop detailed proposals in each area. We will consult further with local communities to explain these proposals and our overall timetable.

The longer term measures recommended in the Strategy will be reviewed and updated as the changes and developments occur within the catchment. Programmes of work to deliver this work will be identified and delivered in line with the Strategy in order to manage flood risk over the next 100 years.

Forge Mill Flood Storage Area

What has changed since the adoption of the Strategy?

Since the adoption of the Strategy, there has been a number of policy changes within the Environment Agency, which has resulted in a refocus on our priorities. These are summarised below:

• Following recent changes to Environment Agency policy we have amended our approach to environmental improvements on the River Tame. The draft Strategy recommended the creation of Biodiversity Action Plan (BAP) habitat as the main environmental opportunity. However, large scale freshwater BAP habitat creation at Middleton Lakes is no longer a priority target for the Environment Agency. New environmental targets set by government include our statutory requirement under the Water Framework Directive to improve the ecological quality of water bodies, for example improvements to water quality or creation of more natural channels, especially in the urban areas. Therefore, we will review environmental opportunities proposed in the Strategy and SEA and our priority will change to focus on these new targets. We have discussed this change with the key stakeholders affected.

• We have reviewed the proposals to improve flood storage in the upper Tame in more detail while investigating ways to implement the preferred option in reach four. As part of the consultation exercise, concerns were raised by the RSPB and Sandwell Metropolitan Borough Council regarding the impact on birds and the nature reserve of using the storage area at Forge Mill more frequently. Further detailed investigation in to the operation of the existing flood storage areas has identified that stand alone improvements at Perry Hall Playing Fields will provide an acceptable reduction in flood risk downstream at Witton. This means that the Strategy can currently be implemented with none of the foreseen impacts at Forge Mill Lake. The improvements to the storage area at Perry Hall playing fields have recently been completed on site.

• In some cases the Strategy identifies new/improved defences which would benefit development land only. In these cases, we would expect the landowner to provide their own defences as part of any future redevelopment proposals.

Perry Park, Birmimgham

Glossary

Assets	These are flood defences and structures such as sluices that we maintain and may also own.
Braided channel	A river with a variation in water depths and water flow. It incorporates series of inter-connecting channels. This encourages river biodiversity.
Catchment	The area contributing flow to a point on a drainage system.
Climate change	The predicted variations in the earths climate whether by human or natural causes.
Confluence	Where one river joins another.
Conveyance	The flow of a river through a section of channel. Conveyance can be reduced by obstacles or constrictions to flow.
Culvert	A man-made channel usually used to divert flows around or under structures. A culvert can be covered to form a tunnel.
Design life	The time when a defence is considered acceptable in terms of serviceability and structural strength.
Dredging	Lowering the river bed or widening the banks to create a larger or deeper channel profile.
Flood resilience measures	These are measures that can be introduced to properties that limit damage during a flood and subsequently speed up recovery after a flood.
Floodplain	Any area of land over which water flows or is stored during a flood event or would flow but for the presence of flood defences.
Flood Risk	The level of flood risk is the product of the frequency or likelihood of the flood events and their consequences (such as loss, damage, harm, distress and disruption).
Flood Risk Management Strategy	A long-term (usually 100 years) documented plan for river or coastal management, including all necessary work to meet defined flood and coastal defence objectives for the target area.
Impacts	A change in the baseline condition due to the implementation of the option (e.g. the works associated with the construction of defences on the River Tame).
Statement of Environmental Particulars	A document that outlines the changes that have occurred to a Plan or Strategy as a result of consultation on the draft Plan or Strategy. It explains how environmental information has influenced the Strategy as adopted.
Reach	Sections or lengths of river.
Standard of protection	The level of flood protection provided by a defence.

Strategic Environmental Assessment (SEA)	The application of environmental assessment at a strategic level in the decision-making process. The application has become statutory under both UK and European legislation.
Sustainability	Development which meets the needs of the present without affecting the ability of future generations to meet their own needs. It should also take account, for example, of the long-term demands for non-renewable materials.

Notes

Notes

Related publications

River Tame Flood Risk Management Strategy: Environmental Report (May 2009) - this documents the likely impacts of the draft Strategy, how they could be mitigated, and opportunities for environmental improvements. The impacts and mitigation have not fundamentally changed since consultation during finalisation of the Strategy.

This document is available on our website under the following chapters:

Chapter 1 - Introduction and Background, Chapter 2 - Approach to SEA, Chapter 3 - Relevant Plans and Strategies, Chapter 4 - Consultation
Product code: GEMI0511BTWV-E-E

Chapter 5 - Key Issues, Constraints and Opportunities, Chapter 6 - Assessment of Environmental Effects and Evaluation of Impact Significance (part 1/2)
Product code: GEMI0511BTWW-E-E

Chapter 6 - Assessment of Environmental Effects and Evaluation of Impact Significance (part 2/2)
Product code: GEMI0511BTWX-E-E

Chapter 7 - Implementation and Monitoring Plan and Figures
Product code: GEMI0511BTWY-E-E

Glossary of terms and abbreviations, Appendix A: Relevant Plans and Policies, Appendix B: Consultation
Product code: GEMI0511BTWZ-E-E

Appendix C: Results of Option Screening, Appendix D: Summary of Options Appraisal - Individual Flood Cells
Product code: GEMI0511BTXA-E-E

Appendix E: Indicative Landscape Plans
Product code: GEMI0511BTXB-E-E

River Tame Flood Risk Management Strategy: Statement of Environmental Particulars (May 2011) - this document explains how consultation responses on the draft Strategy have been taken into account, how the environment has been taken into account when finalising the Strategy, clarifies aspects of the Environmental Report, adds more detail to some mitigation, and identifies additional opportunities for environmental improvements.

This document is availabe on our website.

Statement of Environmental Particulars:
Product code GEMI0511BTWU-E-E

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GEMI0511BTWT-E-E