



# Sustainability & Transport Overview & Scrutiny Committee

## Scrutiny Inquiry: **Managing the Risk of Flooding in Birmingham**

Written Evidence

19<sup>th</sup> July 2018



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## Sustainability & Transport O&S Committee

### Managing the Risk of Flooding in Birmingham

Thursday 19<sup>th</sup> July 2018

Committee Room 2, Council House, Victoria Square, Birmingham B1 1BB  
1000-1300 hours

Purpose: To explore how the City Council and partners can better work together to prevent or minimise the risk of major flooding incidents (such as in May 2018) happening in the future.

Meeting type: Public meeting live-streamed via the internet with possible press attendance

- All timings are approximate and include the opportunity for Members to ask questions if needed

| Time          |  |
|---------------|--|
| 10.00 – 10.05 | Introduction by Chair, Cllr Liz Clements – Purpose of the session and anticipated outcomes   |
| 10.05 - 10.20 | Overview: Flooding on the public highway & the role of the City Council – Kevin Hicks, Assistant Director, Highways, Birmingham City Council   |
| 10.20 – 10.40 | Paul Cobbing, Chief Executive, National Flood Forum  |
| 10.40 – 11.00 | Representatives of FLAG Groups and Ward Councillors<br><br>John Clayton, Selly Park South, Flood Action Group (FLAG)<br>Graham Allen, Selly Park Residents Community Association<br>Cllr Nicky Brennan – Sparkhill Ward<br>Cllr Lou Robson – Hall Green North Ward (TBC)<br>Cllr Karen McCarthy – Bournbrook and Selly Park Ward (TBC) |
| 11.00 – 11.20 | Mike Grimes, Director, West Midlands and Ian Jones FCRM Manager, West Midlands - Environment Agency  |
| 11.20 – 11.40 | Tim Smith, Severn Trent Water  |
| 11.40 – 12.00 | Michael Enderby, Head of Resilience and Kevin Hicks, Assistant Director, Highways Birmingham City Council  |
| 12.00 – 12.20 | Richard Cowell, Assistant Director, Development and Jacob Bonehill, Principal Planning Policy Officer, Birmingham City Council   |
| 12.20 – 12.30 | Closing Statement and Next Steps – Chair, Cllr Liz Clements  |



# Managing the risk of flooding in Birmingham

## Sustainability & Transport Overview & Scrutiny Committee

|                              |  |
|------------------------------|--|
| <b>Lead Member:</b>          | CLlr Liz Clements  |
| <b>Inquiry Members:</b>      | CLlrs David Barrie, Zaker Choudhry, Kath Hartley, Tim Huxtable, Josh Jones, Chaman Lal, Hendrina Quinnen   |
| <b>Officer Support:</b>      | Rose Kiely, Group Overview and Scrutiny Manager<br>Baseema Begum, Scrutiny Officer   |
| <b>Key question:</b>         | Why did the major flooding incident happen in May 2018, how effective was the response, how effective was communication with local residents in affected areas and how can the city prevent or minimise the risk of similar major flooding incidents happening in the future.  |
| <b>Key lines of enquiry:</b> | <ul style="list-style-type: none"> <li>• What were the main causes of the major flooding incident in Birmingham in May 2018?</li> <li>• Who are the main responder agencies with a role for major flooding incidents and what are their responsibilities?</li> <li>• How was the City Council response to the incident managed on the day?</li> <li>• How was the response co-ordinated with multi-agency partners?</li> <li>• What work has been done with householders and local communities in affected areas to raise awareness and communicate the level of risk in their area and what is achievable in terms of local flood risk management?</li> <li>• How was communication and liaison with local people managed on the day and in the immediate aftermath of the incident?</li> <li>• What are the main flood alleviation schemes to reduce the impact of flooding the affected areas and how are they progressing?</li> <li>• What can planners do to embed flood risk management into development policies to mitigate risks in relation to future development to prevent flooding where possible and to minimise the impact of development on flood risk, especially in high risk areas?</li> <li>• How can planning guidance and enforcement be strengthened to encourage developers to use sustainable drainage to minimise the impact of development in at risk areas?</li> </ul> |



|  |  |  |
|--|--|--|
| <p><b>Anticipated outcomes:</b></p>              | <ul style="list-style-type: none"> <li>• Improved understanding of why the major flooding event in Birmingham in May 2018 happened and how the response was handled incorporating feedback from local communities.</li> <li>• Identifying possible areas for further work where planning could potentially make improvements towards future flood prevention and mitigation</li> <li>• Both of the above with a view to flagging up issues for further investigation by the relevant scrutiny committee.</li> <li>• Taking a report to City Council for debate in September 2018.</li> </ul>   |  |
| <p><b>Key witnesses to include:</b></p>          | <ul style="list-style-type: none"> <li>• Mike Grimes, Area Director, Kathryn Wilkins, Business Manager, West Midlands, Environment Agency</li> <li>• Tim Smith, Severn Trent Water</li> <li>• Paul Cobbing, Chief Executive, National Flood Forum</li> <li>• Michael Enderby, Head of Resilience</li> <li>• Kevin Hicks, AD, Highways &amp; Infrastructure</li> <li>• Jacob Bonehill, Principal Planning Policy Officer</li> <li>• John Clayton, Selly Park South Flood Action Group</li> <li>• Graham Allen, Selly Park Community Residents Association</li> <li>• Councillors Nicky Brennan, Lou Robson and Karen McCarthy – as representatives for local areas affected by flooding.</li> </ul> |  |
| <p><b>Background information to include:</b></p> | <p>Local Flood Risk Management Strategy for Birmingham Oct 2017</p>  |  |
| <p><b>Inquiry Plan:</b></p>                      | <p>June 2018<br/>19 July 2018<br/>July/Aug<br/>wc 6 Aug<br/>wc 13 Aug<br/><br/>wc 20 Aug<br/>31 Aug 2018</p>   | <p>TOR agreed<br/>Evidence gathering<br/>Report drafting<br/>Share first draft with Members<br/>Amend report and re-circulate to Members<br/>Meeting with relevant Cabinet Member<br/>Final Report agreed by Committee Members<br/>Final Report published on CMIS to be debated at City Council Meeting on 11<sup>th</sup> September</p> |

# Flood Risk Management

## BCC Overview

Sustainability and Transport Overview and Scrutiny Committee

19<sup>th</sup> July 2018



# Principal Organisations

## Birmingham City

- Lead partner responsible for ensuring that Flood Risk objectives are set and met and that a partnership approach is adopted.

## Environment Agency

- Essential partner responsible for main river and coastal flooding.
- Also have a national coordination role.

## Severn Trent Water

- Essential partner responsible for public sewer systems and the reduction of sewer flooding.

# Local Partnerships

- From Pitt Review recommendations, the lead local flood authority work closely with their partners.
- Partnerships have been developed over a number of years through joint working
- Formalised into a 3-tier structure to managing flood risk in Birmingham
- Developed and agreed with those organisations most closely involved with the management and operation of the water drainage systems for the area



# Organisational Hierarchy

Tier 1

Birmingham Strategic Flood  
Risk Management Board

Tier 2

Birmingham Water Group

Tier 3

Project  
Specific  
Groups

# Local Flood Risk Management Strategy

- Birmingham City Council has a duty to maintain, apply and monitor the application of a Strategy in its area.
- To ensure that local flood risk is understood and managed in a coordinated way
- The strategy sets out 7 objectives and 20 policies in relation to:
  - Roles and responsibilities
  - The type and level of flood risk
  - How flood events are managed and investigated
  - How flood risk schemes are prioritised
  - Reducing the impact of development
  - Environmental Considerations
  - Sustainable Drainage (SuDS)
- Approved by Cabinet In October 2017

# BCC Drainage Assets

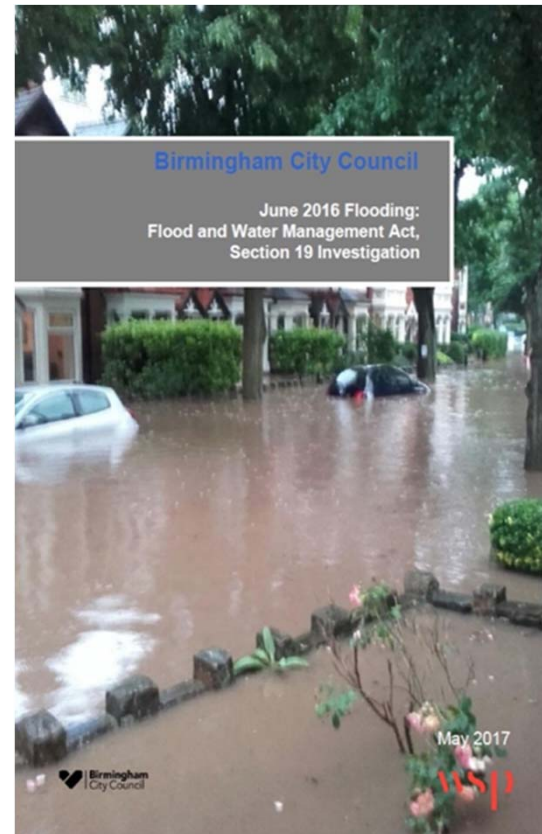
- BCC Undertake inspections
  - twice annually on Highway Drainage Assets
  - regular inspections of Flood assets which include grill structures, flood walls, watercourses and bunds
  
- Maintaining an Inspection Asset Register

# May 27<sup>th</sup> 2018 Flooding

- BCC along with Partners are currently investigating 126 Roads and up to 1600 properties affected by flooding
- Made contact with 1011 properties for information.
- Public consultations in Sparkhill and Selly Park have taken place since the flooding.

# Section 19 Investigation Report

- Report will outline:
  - Source of the flooding
  - Flooding mechanism
  - Responsible parties
  - Investigation undertaken
  - Actions undertaken
  - Future actions



## A report on the flooding in Selly Park South on Sunday 27<sup>th</sup> May 2018

### Cause of the flooding:

In a period of approximately 3 hours during the late afternoon and early evening of Sunday 27<sup>th</sup> May 2018, the Selly Park and Edgbaston areas received 82mm of rain (Note 1). In just one hour between 5pm and 6pm there was 59mm of rain (Note 2). To put this in context the long-term average total monthly rainfall for this location is 62mm (Note 2). The rainfall in those 3 hours was exceptional in terms of both quantity and intensity. The level of the River Rea at the Environment Agency's Calthorpe Park river level gauge, which has been operational for half a century, set a new record high. The Selly Park river level gauge, which became operational in 2009, also recorded a new record high.

Notes: 1 Recorded by the rain gauges of my own weather station in Cecil Road, Selly Park and closely matched by nearby Winterbourne Weather Station. 2. Data derived from Winterbourne Weather Station, University of Birmingham, Edgbaston.

### Type of flooding:

Despite the very high river level **there was NO river flooding (fluvial flooding) of roads or properties in the Selly Park South neighbourhood**. This was because of the new Selly Park South Flood Alleviation Scheme flood defences which became operational in December last year. Based on previous experience I believe that without the scheme flooding would have been much more extensive and severe. Under what was an extreme first test, the scheme worked perfectly and with considerable safety margins. The scheme is designed to safely contain flood water upstream of Dogpool Bridge, releasing it downstream at a controlled maximum rate during the period of the flood and afterwards as the river level falls. **The flooding which occurred in the Selly Park South neighbourhood was entirely pluvial in nature** - surface water flooding caused by the torrential rainfall overwhelming the urban drainage system and exceeding the infiltration capacity of any open ground such as gardens and open land.

### Location of the flooding:

All of the streets in Selly Park South were awash with rainwater, as were probably most of the streets in Birmingham. However, in several locations in the Selly Park South neighbourhood, the water on the roads and pavements was up to an estimated maximum of approximately 50cm deep. The locations were:

- Dogpool Lane between Cecil Road and Fashoda Road.
- Fashoda Road between Dogpool Lane and Hobson Road – particularly the eastern side of the street which is lower than the western side.
- A small section of Kitchener Road to the west of Cecil Road.
- Moor Green Lane between Dad's Lane and the river bridge. (This is in Moseley/Stirchley but is included within the designated area of Selly Park South Neighbourhood Forum).

The water was deeper in these locations because of small but highly significant variations in topography and the flow routes of the surface water.

In these locations the water was sufficiently deep to enter the front gardens of properties, lap against door steps and in a limited number of cases, enter houses. In some locations this was made worse by traffic attempting to pass through the floodwater creating bow waves. In a few locations too,

floodwater got around to the backs of houses via alley ways (Fashoda Road and through to the rear of adjacent Cecil Road properties). In at least one road location drainage inspection covers were forced off by water surging out from the overloaded system. There was no evidence of this coming from the foul water sewers, although in another location on the Pebble Mill playing fields, foul water debris was left around inspection covers which had lifted.

### **Responses to the flooding:**

Very soon after the outset of the rain storm, when its exceptional intensity became apparent, I set about mobilizing the volunteers of the Selly Park South Flood Action Group and distributed *Hydrosnakes*® – hygroscopic flood defence sacks - to some of the most vulnerable locations, including the houses in lower Moor Green Lane, but the speed and scale of the event limited what could be achieved with our local resources. In the past Fashoda Road suffered fluvial and pluvial flooding, in September 2008, June/July 2012 and June 2016, and many residents have experience in attempting to defend their properties and in some cases possess makeshift equipment to deploy to this end. Members of the Flood Action Group assisted residents where possible. I phoned the emergency control room requesting sandbags from Birmingham City Council, but it was not possible to deliver these because of the speed of the flooding and the traffic chaos which blocked many main roads including Pershore Road and Bristol Road. With further storms possible later in the week I requested, and the City Council arranged, a precautionary delivery of 200 sandbags to the locations in our neighbourhood most at risk, namely Fashoda Road between Hobson Road and Dogpool Lane and the Moor Green Lane houses by Dogpool Bridge. At the same time I distributed temporary (adhesive) air brick covers from the Flood Action Group stock to the same locations and also provided more *Hydrosnakes*® for the Kitchener Road location. Since the flood event I have worked with relevant officers of the Environment Agency in providing information and carrying out analysis of the event, through meetings, site visits, telephone conversations and emails.

### **Conclusions:**

This was an exceptional event because of its speed of development and intensity. Whilst the Met Office and Flood Forecasting Centre had issued Yellow Warnings well in advance, such warnings are commonplace in summer and alert us to the possibility of problems. It would be impractical, however, to deploy sandbags on every occasion a Yellow Warning was issued. Amber Warnings (take action!) as far as I'm aware were not received until the event was underway. The development of more precise forecasting of intensive convective rainfall events remains a need.

Our flood action group is used to dealing with fluvial flooding from the River Rea in which the lead time is longer and sequence of events slower and more predictable. This is the first time we have faced exclusively pluvial flooding, which was in this case of an exceptionally extreme nature.

From the nature of the flood water in Fashoda Road and personal observation, I believe a significant amount of the surface runoff came from the undeveloped land on the opposite side of Dogpool Lane owned by St Andrews Healthcare. It was planned to develop a new hospital on this land, planning permission granted and indeed St Andrews contributed partnership funding for the Selly Park South Flood Alleviation Scheme. This development however has been put on hold, and until it is completed, with its associated sustainable urban drainage features and runoff attenuation measures, the open land will remain a worrying source of surface runoff. This factor needs addressing.

The urban drainage system needs to be maintained at maximum operating condition at all times. Even then, I doubt whether it would have the capacity to cope with rain storms of the magnitude of the 27th May event.

Steps need to be taken to prevent through traffic passing along Dogpool Lane, Moor Green Lane and the terraced streets of Selly Park South because the waves created make the effect of the floodwater considerably worse. Too many drivers take no notice of requests from residents and Flood Action Group volunteers not to use these routes, and indeed some drivers are very abusive. Following abusive behaviour by drivers on 27<sup>th</sup> May, I have now advised Flood Group members, for their own personal safety, to desist from requesting drivers not to pass. In my opinion the only authority which some drivers will accept is that of the police and during the previous flood of 16<sup>th</sup> June 2016 I made repeated calls to the police which brought no response, so on this occasion I did not seek police support. The whole issue of traffic management during flood events needs addressing.

**My own background:**

I have a degree in Geography and Education and have specialised in the study and teaching of hydrology and meteorology. For several years I also worked in a part time consultancy role with the Royal Meteorological Society. I became the Coordinator of Selly Park South Flood Action Group on it's foundation following the September 2008 flooding in the neighbourhood. I have experienced several flood events in the neighbourhood since then and have worked closely with officers of Birmingham City Council (Drainage and Resilience) and the Environment Agency. Until recently I also spent several years as a member of the Environment Agency Trent Regional Flood and Coastal Committee. This report is based on my own personal observations and information gathered during the flood event of 27<sup>th</sup> May 2018 and during previous flood events.

John Clayton B.Ed. (Geography and Education – University of Birmingham), FRGS.



## SUSTAINABILITY AND TRANSPORT SCRUTINY COMMITTEE

### Report on the Severe Flood Event In 'Selly Park North' 27th May 2018

*Compiled by the 'Selly Park North' Flood Action Group. The group was formed as a sub group of the Selly Park Residents' Community Association (SPRCA) at a special meeting on 25th June 2018 as a direct response to the Flood Event.*



#### **1. What Happened**

In a period of three hours on the afternoon of Sunday 27 May 2018, Selly Park experienced 82 mm of torrential rainfall. This was an exceptional localised weather event. Between 5pm and 6pm there was 59 mm of rain. To put this into context, the average monthly rainfall for May in Selly Park is 62 mm. The rainfall is a new record in terms of quantity and intensity. New record highs were also recorded on the gauges for the River Rea in Stirchley and further downstream in Calthorpe Park. The depth of the Bourn Brook, the main cause of flooding to Selly Park North, is not known as the Environment Agency (EA) have no gauges or monitoring in place to measure it.

This exceptional amount of rainfall caused flooding in 'Selly Park North' on Reaview Drive, Pershore Road, Sir Johns Road, Fourth Avenue and Third Avenue. Whilst the weather was exceptional, it is not unprecedented.

Convection storms and periods of heavy rain caused flooding in the same area on Saturday 6 September 2008 and Thursday 16 June 2016. The flooding of 27 May 2018 followed the same pattern. The 2016 event was significantly worse than 2008. The 2018 event was marginally worse than 2016.

The cause of the flooding is well documented and researched by the EA. It is primarily fluvial flooding from the nearby Bourn Brook, exacerbated by surface water flooding as the ageing drainage and sewerage systems are totally overwhelmed. The Bourn Brook flows from West to East in a channel through the former BBC Pebble Mill site, through a bridge under the Pershore Road then through more bridges and a narrower channel in The Birmingham Wildlife Conservation Park before joining the River Rea in Cannon Hill Park. The bridge at the Pershore Road and the channel through the Conservation Park constrict the flow of the Bourn Brook. The water backs up and fills the floodplain formerly occupied by the old BBC Social Club (Plot 6). The floodwater then spills onto the Pershore Road and flows in a southerly direction before turning into Sir Johns Road. It then splits northwards flowing into the River Rea at the north end of Sir Johns Road and southwards down Fourth Avenue into the bottom of Third Avenue and then into the Rea. Fortunately, so far, the River Rea has managed to cope with the Bourn Brook's overspill.



Following the flood of 2008, the Environment Agency / Rea Catchment Partnership came up with a design and funding for a major flood alleviation scheme consisting of a flood storage area upstream at Harborne Lane and a 2.4m diameter culvert on the site of the old BBC Social Club to route the overflow of the Bourn Brook under the Pershore Road and under 'Zoo Drive' into the River Rea. The scheme was still in the planning process when the 2016 flooding event occurred. Originally planned for completion in late 2017, constructors ran into technical difficulties due to the range of services encountered whilst tunnelling under the Pershore Road. Consequently, the main part of the scheme is still not functional. The flood storage area at Harborne Lane made little difference to the scale of the flooding. Work continues on the tunnel and it is hoped the scheme will be functional by September 2018.

On 27 May, floodwater was pouring down Sir Johns Road by 5.40pm. Its rapid rate of flow constituted a very real threat to health and safety. The force of the water lifted off sewerage manhole covers. Fortunately, there were no fatalities. Members of the Fire Service were present at the scene shortly after 6.00pm and with direction from helpful neighbours offered reassurance and assistance to older people and other residents, ferrying them to safety. Residents registered with 'Floodline' received a Flood Warning at 6.16pm, 30 minutes after the first properties were already flooded. These warnings are issued in response to measurements of the River Rea and therefore not directly relevant to the cause of flooding for Selly Park North. The floodwater reached its peak around 7.00pm. The floodwater in houses had subsided below floor level by approximately 9.30pm. The road was clear of floodwater by midnight.

Approximately 150 houses were effected either directly or indirectly as the overspill from the Bourn Brook flowed from West to East to join the River Rea. In simple terms, the worst flooding was from 2 - 12 on the eastern side of Sir Johns Road and all of the 24 houses on Fourth Avenue which were flooded to a depth of 40 cms approx. The western side, Nos. 1 - 19 and eastern side Nos 14 - 22 of Sir Johns Road, were flooded to a depth of 20 cms approx. Nos. 19 - 35 Third Avenue, on the north side of the road were flooded to 14 cms approx. The Survey undertaken by BCC in 2016 and the survey being undertaken presently will give a more precise picture of the damage caused.

## **2. Observations, Comments and Concerns**

Three major flood events in ten years from the same set of causes have left our community feeling angry, frustrated and vulnerable. The presence of the Environment Agency and representatives from Birmingham City Council (BCC) at the SPRCA meeting on 6th June to answer questions was much appreciated. The absence of a representative from Cathorpe Estates was

lamentable. It was our understanding that Plot 6 of the Pebble Mill site would not be developed until the scheme was functional. It was a floodplain but is not anymore. The ground level has been raised significantly and a 2m high levee on the south side of the Bourn Brook has been created with a gap for the proposed channel leading to the scheme's culvert. Our only residual flood protection was compromised. How was this allowed to happen?

### **Our Questions:**

#### **a. *To the Environment Agency***

- i. What can be done to speed up completion of the Flood Alleviation Scheme?
- ii. When the delay to the scheme was first identified did you consider putting any other flood protection measures in place? Can anything be put in place now?
- iii. An enormous amount of trust is being placed on the projected efficiency of the Flood Alleviation Scheme. In addition to the scheme, can other low cost measures be put in place working jointly with BCC to expedite the flow of floodwater into the River Rea? For example: changing the surface topography of 'Zoo Drive', modifying the alleyways and kerbs on Fourth Avenue and the east side of Sir Johns Road to act as channels. Dropping kerbs and removing walls certainly helped water flow into the Rea more easily at the bottom of Third Avenue. Can the eastern end of Sir Johns Road be modified in a similar way?
- iv. Can more be done to the infrastructure to improve the flow of the Bourn Brook at the bridge under the Pershore Road and through the Wildlife Conservation Park?
- v. Have all opportunities to increase flood water storage capacity upstream in the Bourn Brook catchment been explored and considered?
- vi. Can more opportunities be provided for water to be reversed through the sewer network further up the catchment to reduce peak river flows?
- vii. Can the level of the Bourn Brook be monitored and linked to the Floodline Warning Service?

***b. To Birmingham City Council (both as the Council and Lead Local Flood Authority)***

- i. Why was building work on the former floodplain (Plot 6) of the Pebble Mill site allowed to go ahead prior to the completion of the Flood Alleviation Scheme?
- ii. The high-density development of the Pebble Mill site has had a huge impact on the Selly Park North area already and is only partly completed. Has the planning process adequately scrutinised its impact on the potential flood risk to the area?
- iii. Can you work in conjunction with the EA, Severn Trent (ST) and Calthorpe Estates (CA) to consider and put in place the additional measures suggested above to supplement the flood scheme?
- iv. The Strategic Partnership (BCC, EA, ST, and CA) for the Selly Park North scheme does not appear to have addressed satisfactorily the risks associated with the delays. How can it be improved to be more dynamic and effective (such as resident representatives)?
- v. Can surface water drainage in the area be improved?
- vi. Are Sustainable Urban Drainage Systems (SuDS) in place in the catchment and working effectively?

**Selly Park Residents' Community Association  
10 July 2018**

## Selly Park - May 2018 floods

### Frequently asked questions

The following frequently asked questions were provided to us by the local community at drop in sessions and through residents approaching us directly. Working together with Birmingham City Council and Severn Trent Water, the Environment Agency have developed the following information.

### The events of 27 May 2018

#### What happened?

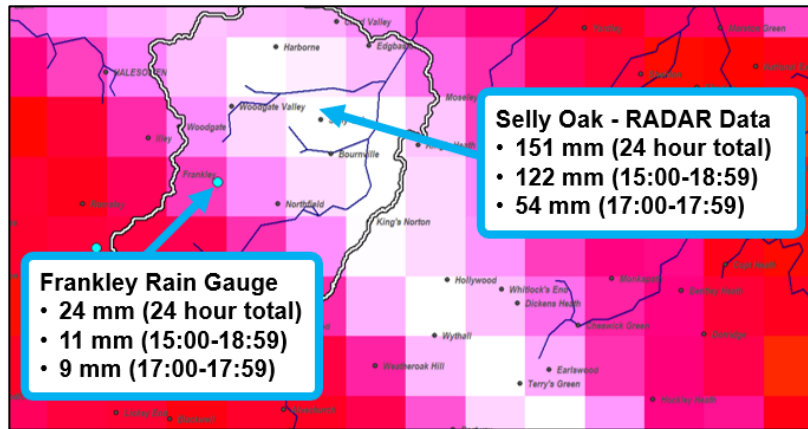
- During the early evening of Sunday 27<sup>th</sup> May 2018 a significant rainfall event occurred with extremely high rainfall totals being recorded across the Bourn Brook catchment. In the Selly Park area of Birmingham we saw the highest recorded rainfall totals ever seen, in an incredibly short period of time.
- The high intensity rainfall triggered flooding from surface water and the backing up of drainage systems. Anecdotal reports suggest that most properties did not suffer internal flooding as a result of this initial surface water build up. It is, however, recognised that voids underneath buildings, gardens and the highway were impacted.
- Shortly after the initial onset of the storm, the Bourn Brook breached its banks and started to flood the old Pebble Mill Sports and Social club site. As in previous events, the depth of water on the Pebble Mill site was such that water flowed onto the Pershore Road and was routed towards properties aligning the Pershore Road and the Selly Park north community.
- Computer modelling and onsite reports confirm that significant flooding of property occurred once the rush of water came through from the Bourn Brook. This is contrary to some initial media reports that suggested the event was solely a result of surface water flooding.
- The evidence collected confirms that the flood event on the Bourn Brook was the largest recorded and was greater than those witnessed in 2008 and 2016.

#### How large was this event?

The nearest Met Office rain gauge to the Selly Park community is the Winterbourne gauge located at the Botanical Gardens in Edgbaston (approximately 1km from Selly Park). This gauge recorded considerable rainfall totals during the event as shown in the below table. The **monthly** average rainfall for May is 55mm.

| Winterbourne No. 2 | 1 hour | 2 hours | 3 hours |
|--------------------|--------|---------|---------|
| Rainfall (mm)      | 58.6   | 73.6    | 80.8    |

Images taken from radar data show that the rainfall experienced over the Selly Park area was even more intense than recorded at Winterbourne (see following image). Whilst not as reliable as gauge data, these records do provide an insight into the severity of rainfall experienced. It is also worth noting the relatively small rainfall totals recorded 4km away at Frankley, showing the variability of the storm.



Based on these rainfall totals, the **rainfall event** experienced was significantly larger than anything recorded previously. Calculations have concluded that this was an event with less than a 0.5% chance of occurring in any given year (i.e. greater than a 1 in 200 year **rainfall return period event**).

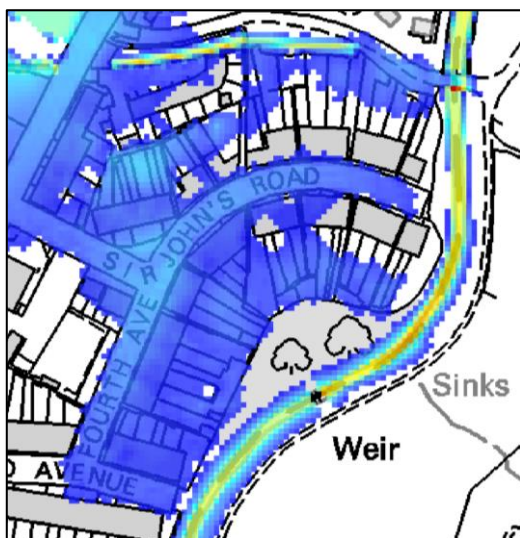
It is important to note that whilst Selly Park experienced this rainfall event, other parts of the Bourn Brook catchment experienced far less intense rainfall. As such, the size of rainfall event experienced in this one location does not translate to the same size river return period event on the Bourn Brook.

Modelled analysis of the Bourn Brook suggests that the event experienced from the watercourse had a 2% chance of occurring in any given year (i.e. a 1 in 50 year **river return period event**). For comparison, the flood event experienced in 2016 is estimated to have had a 5% chance of occurring in any given year.

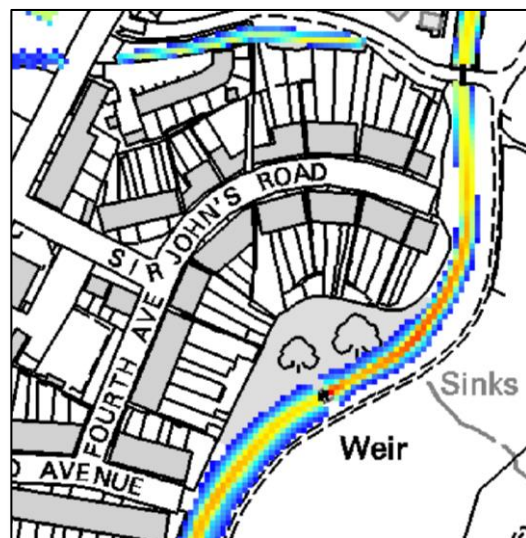
The Selly Park area is estimated to have a 10% chance of flooding in any given year. This puts the area in the highest category of flood risk (very significant). Whilst the regularity of flooding in recent times may seem to contradict quoted return periods (E.g. 1 in 50 year event) this terminology is used to express a probability and is assessed from data records over a considerable period of time.

## Would the Selly Park North scheme have worked?

The flood alleviation scheme would have managed all flows from the Bourn Brook and as such, would have significantly reduced the impacts of the event experienced. Our analysis confirms that the scheme would have coped with this event, with capacity still remaining within the upstream storage area and bypass culvert.



Re-creation of May 2018 Event – River Flood Risk



May 2018 Event with Flood Defence Complete

customer service line  
03708 506 506

incident hotline  
0800 80 70 60

floodline  
0345 988 1188

## The Flood Alleviation Scheme

### How does the flood alleviation scheme work?

The scheme involves deepening and widening of an existing flood water storage area near the Bourn Brook Walkway on Harborne Lane. This work was completed before the flood event and has more than doubled the capacity of the storage area.

Flow improvement works are also being carried out, including land raising and creating an overland flow route to direct flows to a new bypass culvert (2.4m in diameter) running underneath the Pershore Road. This will reduce the risk of flood water getting onto the highway and being routed towards the community.

Once completed, the project will reduce the risk of flooding in the Selly Park area from very significant to low, with the scheme being designed to deal with river flood events having a 1% chance of happening in any year, including an additional allowance made for climate change.

### How has the scheme been modelled?

The detailed hydraulic computer model, initially created in 2009/10, was improved and updated during development of the flood alleviation scheme to include a series of improvements. These included the addition of new survey data and making sure flow calculations were in line with recognised best practice for urban catchments. The model has been calibrated and verified with gauged data and anecdotal evidence collected during discussions with local residents. During the appraisal and design of the flood alleviation scheme, the computer model was reviewed by three different Environment Agency framework consultants to provide confidence in the approaches taken.

Following the flood event in 2016, significant analysis was undertaken to ensure that the computer model used as the basis for the flood alleviation plans, was robust. The storm was re-created, based on local rain gauge records and radar data, and then applied to the model to replicate the event. Similar analysis has been carried out since the May 2018 flood event. The outputs from these model simulations correlate very closely with observed flooding. Flood extents and depths have been verified, and analysis at the Calthorpe Park river gauge (1.5km downstream on the River Rea) shows a very good correlation between observed and modelled flows and levels.

Both the 2016 and 2018 flood events have been simulated with the flood alleviation proposals included, to ensure that the scheme would have prevented the spill of flood water from the Bourn Brook onto the Pershore Road and into the Avenues that ultimately resulted in flooding to properties. This analysis demonstrates that the proposals would have been sufficient to prevent this flooding from occurring. It should also be noted that the analysis undertaken, demonstrates that the flood alleviation proposals would have been able to cope with a larger event than those experienced in June 2016 and May 2018.

### When will the Selly Park North scheme be completed?

The Selly Park north scheme is scheduled to be completed by the end of 2018, but is likely to be operational (i.e. providing flood risk betterment to the Selly Park community) before then (likely late summer/autumn 2018).



## Why has the project not been completed?

It is important to recognise that we have not changed what we are doing but have changed how it is being delivered. We are confident that the flood alleviation scheme will work as designed by specialist flood risk consultants.

Tunnelling underneath a busy, strategically important road is a highly complex task which comes with a series of risks that need to be managed. Whilst discussions with Severn Trent Water (STW) had taken place during the design of the flood alleviation scheme (to ensure that the scheme would work once completed) it was the application for tunnelling machinery to pass beneath their services that resulted in further analysis being required. As is industry standard, this application was submitted to STW by our contractors undertaking the works, once they had determined the tunnelling methodology that would be used to construct the flood bypass culvert.

This application brought to light a series of questions regarding the condition, age and sensitivity of the water main which needed to be fully examined before the tunnelling machine could pass safely underneath the service. The importance of these discussions was further highlighted by other water main bursts across the Severn Trent network.

As analysis of the pipe continued, it became evident that measures would need to be put in place to ensure that the tunnelling operation did not induce strains that could result in a breach of the water main. This was important to a) protect the life of the operatives controlling the tunnelling machine underground b) prevent the potential for flooding resulting from a mains water breach and c) prevent significant damage to the Pershore Road and other infrastructure.

Development of the measures required to protect the main took time, but was undertaken in full partnership with STW and has been independently verified. A series of different options were considered and examined to ensure that the implemented solution is robust.

During design of these measures, works continued at Harborne Lane and implementation of the temporary works needed to support the water main were carried out below ground from a launch pit in the entry way to Zoo Drive. These works have now been completed, enabling the tunnelling works to re-commence.

## Was the water main on the risk register?

Utility services are always on our risk register for large flood defence construction projects such as this. There are a number of risks associated with utilities infrastructure which were captured and reviewed throughout scheme development. These risks include delays to project completion, technical risks resulting in limited viable engineering solutions and cost risks, potentially resulting in scheme termination. Unfortunately on this project the risks associated with services within the Pershore Road were realised and measures needed to be taken to ensure that the infrastructure was secured and the risk to operatives underground was managed.

## Has Partial Completion of the Scheme Increased Risk?

The partial completion of the scheme has not increased flood risk to the community. With the construction of any flood alleviation scheme, a lot of analysis is carried out to ensure that the phasing of the project is undertaken in such a way to avoid an increase in flood risk at any point to third parties. In this instance, land has been raised on part of the Pebble Mill site in the first phase of embankment works. However, this has been significantly offset by the completion of the flood storage works at Harborne Lane. To set this in context, the net increase in storage along the Bourn Brook is in excess of 5,000m<sup>3</sup>.

We can confirm that during the flood event on Sunday 27<sup>th</sup> May the Harborne Lane storage area did operate as designed, reducing impacts in the downstream catchment. However, it is important to recognise that it is the 2.4m diameter tunnel at Pebble Mill that will make the biggest difference in reducing flood risk to the Selly Park north area.

## Flood Warning

### How did the Environment Agency respond to the event?

The Environment Agency works with Councils, Severn Trent Water and other partners to prepare for, manage, and recover from flood incidents. We share information, forecasts and advice with our partners via daily telephone conferences and email communications.

During the latest event our Birmingham & Black Country Field team were out on the Bourn Brook at approximately 8pm on Sunday 27<sup>th</sup> May, ensuring the screens were cleared on the river. Our staff were out in the area from the next day to support residents where we could and we have been working closely with Birmingham City Council on recovery since.

### Why was the flood warning issued late?

We do not have a specific warning for flooding from the Bourn Brook. Currently residents can sign up to receive warnings from the River Rea, however we do advise customers that this only provides an indicative warning.

You can check local river levels at <https://flood-warning-information.service.gov.uk/river-and-sea-levels>

### What can be done to improve flood warning for Selly Park North?

We are working closely with national colleagues and local partners to establish what options might be available for an earlier warning to the Selly Park north community. Given the rapid onset of flooding experienced in this area it is likely that this will be a warning issued based on weather forecast (potentially supported by CCTV monitoring of the watercourse). There are a number of limitations associated with this, with it being likely that the warning will be issued fairly regularly during the summer months when there is the possibility of storm conditions.

We will engage with the community as this develops to ensure that whatever system is put in place is effective at a local level.

## Surface Water Flooding

### Will I be at surface water flood risk once the Bourn Brook works have been completed?

The Bourn Brook and surface water runoff both contributed to the flooding at Selly Park north. Reports from local residents and mapped simulations carried out prior to the flood event, confirm that the majority of properties, if not all, did not suffer internal flooding as a result of surface water. Whilst surface water is incredibly disruptive, it is the overtopping of the Bourn Brook that resulted in flooding to people's homes, as was the case in 2016.

Our Risk of Flooding from Surface Water maps, available at <https://flood-warning-information.service.gov.uk/long-term-flood-risk/map> show what we expect to happen in a rainfall event, without flooding from the Bourn Brook. This shows that flooding to the highway is expected in a similar storm, but that the vast majority of houses would not be affected even in a much larger storm than that recently experienced.

## What can be done to reduce surface water flood risk?

The Environment Agency, Birmingham City Council and Severn Trent Water will be working together to better understand the risk from surface water flooding. Severn Trent Water have recently checked the majority of the sewers in the area to make sure there is nothing that would prevent water draining away. They will also be reviewing how the sewers operate during heavy rainfall, including the potential interactions with river flows and surface water run-off, and whether there are any drainage improvements that can be made to help reduce the risk. Alongside this work, Birmingham City Council will be investigating whether any changes can be made to land elevations (especially at the end of Sir Johns Road and Third Avenue) to improve the flow of surface water into the River Rea.

## What Happened at Selly Park South?

Our completed scheme at Selly Park south, worked as designed and protected homes from the River Rea. Some homes were still affected by surface water flooding, however, the impacts were far less widespread than if the scheme had not been in place. Initial reports suggested around 10 properties had been affected by surface water flooding, with a number of these being a direct result of bow waves from vehicles moving through flood waters. Based on anecdotal reports and gauged records, river levels at Selly Park south were similar to those experienced during the 2008 flood event when nearly 100 homes were flooded from the River Rea.

## How and when do Birmingham City Council maintain local drains?

Drains are inspected and assessed twice a year, photos taken, and if needed are then cleaned within 28 days.

## Have tarmacked driveways added to the problem of surface water flooding and how are these regulated?

Paving front gardens can cause a small increase in the risk of flooding. From 1 October 2008, the Government introduced changes to the General Permitted Development Order, making the hard surfacing of more than five square metres of domestic front gardens permitted development only where the surface in question is rendered permeable. Use of traditional materials, such as impermeable concrete, where there was no facility in place to ensure permeability, requires an application for planning permission. Birmingham City Council will advise if and when planning permission is required – however following approval, or if undertaken as permitted development, there are no checks to ensure it has been undertaken in accordance with approval/regulation unless a complaint is raised.

## Can traffic be stopped during flood events to prevent bow waves exacerbating the effects of flooding?

A road can be closed if flooding created a safety issue, a risk to personal safety or damage to property. A closure can also be imposed to facilitate works required. Emergency road closures by their nature cannot be planned, so are usually arranged by Birmingham City Councils Highway Maintenance Partner, Amey as an emergency.

## Impact of New Development

### Has development on the Pebble Mill Sports and Social Club site increased flood risk?

Development on Pebble Mill will be constructed in accordance with the approved Flood Risk Assessment (FRA) forming part of the planning application submitted to Birmingham City Council. In line with the successful works completed at Harborne Lane, development on the sports and social club site will not result in an increase in flooding during the interim period leading up to completion of the flood alleviation scheme. Any queries related to the development itself should be directed to either Calthorpe Estates or Birmingham City Council's planning team.

### Has development further upstream increased flood risk and are new developments incorporated into the scheme model?

When modelling and designing the scheme, we have considered the whole catchment and assumed that in large events, drainage systems will be overwhelmed (creating a worst case scenario to design against).

Any new development must comply with the National Planning Policy Framework (NPPF) and Birmingham's Local Plan. This requires Sustainable Drainage Systems (SuDS) to be included in redevelopments, runoff rates reduced, and exceedance flows managed. As such, any new development in the Birmingham area will ensure that there is no increase in run off from the site into local drainage systems. In the vast majority of instances run off will be significantly reduced and stored within the development site until it can be discharged at a safe rate into the drainage network.

### Why did I receive a planning letter about more development two days after the flood event?

The letter was sent out automatically in accordance with the LPA's registration targets following submission of a planning application. It was unfortunate that this timing occurred in line with the flood event.

## Health and Well Being

You can find guidance on planning, managing and recovering from a flood at <https://www.gov.uk/government/publications/flooding-planning-managing-and-recovering-from-a-flood>

Plus more detailed health related questions and answers <https://www.gov.uk/government/publications/flooding-questions-and-answers-about-health>

### How do I check if flood water in my home was contaminated and what's the best way to deal with silt in my house?

All flood water will contain some degree of sewerage, so it is advisable to assume there has been contamination even if the water looked clean. Hard surfaces should be scrubbed using suitable protective equipment, and soft furnishings discarded or professional advice sought on cleaning and disinfecting. Silt removal may require professional services, as more damage may be caused by cleaning by shovel or pressure washer. There is more detailed advice on cleaning your home safely at <https://www.gov.uk/government/publications/floods-how-to-clean-up-your-home-safely>

## Is there funding available for homeowners to help with recovery?

Birmingham City Council do not offer 'Emergency Hardship Funding' for affected homeowners or businesses.

## What are the health and wellbeing implications of flooding and walking through flood water?

The advice from Public Health England is to always avoid entering flood water, as it will contain contamination, and there may be hidden risks to life such as electrocution risks and submerged hazards such as raised drain lids.

Infection problems arising from floods in this country are rare. Usually any harmful bugs in floodwater become very diluted and present a low risk, but there are a few precautions to be aware of when dealing with flooding which should prevent unnecessary additional health problems:

- wherever possible, try to avoid coming into direct contact with floodwater. If you have to go into the water, wear waterproof gloves and rubber boots and remember to be careful of potentially concealed hazards
- wash your hands – this is the most important way to get rid of harmful bugs.
- keep children out of the water
- do not eat any food that has been in contact with floodwater or sewage

For more detailed advice see

<https://www.gov.uk/government/publications/flooding-questions-and-answers-about-health>

## Am I entitled to compensation?

We fully understand the significant distress the recent flooding has caused and the frustration that this has happened during construction of the scheme. The National Flood Forum have worked with many communities across the country, and offer expert advice on many aspects of life after a flood and where to go for help, including with matters that affect health and wellbeing.

The Environment Agency undertake capital projects under our permissive powers and we have worked hard to get this scheme developed and funded working with partners. Whilst we are fully committed to delivering this scheme, there is no obligation to reduce flood risk to any community so compensation is not payable.

## Other

## Can temporary defences/measure be installed?

Given physical constraints and the highly urbanised nature of the local area there is limited scope for temporary measures to be installed. Construction of demountable defences takes a considerable amount of time in comparison with the rapid onset of flooding experienced from the Bourn Brook and are likely to be ineffective. In addition, altering flow paths along the Pershore Road is likely to increase flood risk to other areas which is not permitted.

We will be working with Birmingham City Council and the local community to determine whether sand bags would prevent future flooding, potentially linked to the flood warning improvements mentioned above.

## Advice on Insurance

Following completion of the flood alleviation scheme we will provide you with a letter for your insurance company stating that your risk of flooding has been reduced from very significant to low. The letter will be in a format agreed with the Association of British Insurers and is usually taken into account by insurance companies when assessing renewals/new applications. An example of this letter can be found on the SPRCA website. We will also update our online maps to reflect the reduced level of risk.

If you are in an area that has seen flooding it can seem harder to get insurance cover for a reasonable price. You should still shop around, but some insurers have agreed to make sure their insurance covers flooding without being too expensive or having too large an excess. There is a list of these companies on this website - <https://www.floodre.co.uk/>

The National Flood Forum have worked with many communities across the country, and offer expert advice on insurance and where to go for help. Their website is <https://nationalfloodforum.org.uk/> or you can phone them on 01299 403 055.

## Future Communications

We are keen to work closely with the community and would be happy to attend meetings, share information or provide advice wherever we can. For further information on any of the topics raised in this briefing or should you have queries not covered in the above, then please contact our enquiries team –

[Enquiries\\_Westmids@environment-agency.gov.uk](mailto:Enquiries_Westmids@environment-agency.gov.uk)

We will provide a copy of the “Frequently Asked Questions” document on the Rea Catchment Partnership website ([www.reacatchmentpartnership.co.uk](http://www.reacatchmentpartnership.co.uk)) where you will be able to find updates as applicable.

- What were the main causes of the major flooding incident in Birmingham in May 2018?  
The main causes of the flooding was from rivers and watercourses, sewer surcharging and surface water flooding as a result of an extreme rainfall event. The Environment Agency (EA) is currently undertaking a detailed analysis of the event.
- Who are the main responder agencies with a role for major flooding incidents and what are their responsibilities?  
The main responders and their roles are defined in the Flood Water Management Act (FWMA) and the Civil Contingencies Act 2004 and are principally the EA, Severn Trent Water (STW) and BCC. Arrangements are set out locally within the West Midlands Local Resilience Forum (WMLRF) with respect to flood planning arrangements.
- How was the City Council response to the incident managed on the day?  
The BCC response was managed through the normal out-of-hours processes. Amey directly managed the incidents of highways flooding and on-call BCC duty officers from highways, drainage and Resilience supported response activities, together with a number of other teams from across the council (e.g. housing).
- How was the response co-ordinated with multi-agency partners?  
BCC duty officers were informed of an incident of flooded properties in Selly Park North and Pershore Road and in consultation with West Midlands Police (WMP) the BCC officers activated a rest centre, opened the BCC control room and supported the needs of residents. After consultation with WMP, the rest centre was 'stood down' as most residents elected to stay in their homes. One vulnerable resident at the rest centre was placed in the hands of local authority care.

Whilst a major incident was not declared by any partner, following the storm event, a multi-agency group including the Environment Agency, BCC and other partners was established through the Flood Advisory Service telecom. Whilst BCC did not receive direct communication with the Environment Agency during the event the Council did work closely with them during recovery.

- What work has been done with householders and local communities in affected areas to raise awareness and communicate the level of risk in their area and what is achievable in terms of local flood risk management?  
The Local Flood Risk Management Strategy for Birmingham sets out how the Council will raise awareness and communicate the level of flood risk. The Strategy also sets out what is achievable in terms of flood risk and how schemes are prioritised for funding.

Where properties have flooded internally the Council are committed to undertaking a full investigation in accordance with the requirements of the Flood and Water Management Act 2010. The findings of this investigation are published and all residents that responded to the initial investigation are notified that the report has been published.

Where resources permit, the Flood Risk Management team supports drop in events, ward meetings and public consultations in relation to flooding. In 2015, the Flood Risk Management team hosted a community/business drop in event (FloodFest) which aimed to bring together for the first time information about flood risk

management, sustainable drainage and environmental issues. It provided an opportunity for residents, businesses and those with a professional interest in flood risk to find out more, network and engage.

- How was communication and liaison with local people managed on the day and in the immediate aftermath of the incident?  
During the evening of the flooding, BCC duty officers were not made aware of the impact of flooding outside of Selly Park North for which the rest centre was opened. Post flood event reconnaissance has highlighted the wider extent of flooding, including flooding in areas not previously known to BCC.

A recovery group was established working closely with the Environment Agency as further situational updates came in highlighting the extent of the flooding. Any issues raised at recovery drop-in sessions by attending BCC/EA officers were followed up through normal BCC channels. In addition BCC waste and highways crews provided direct support to residents in the immediate days after the flooding.

Since the event on 27<sup>th</sup> May the level of officer support provided for residents and businesses from BCC and partner agencies has been a subject of discussion across all of the organisations involved. As a result BCC are seeking to establish a form of clear commitment from the full range of service areas (both internal and external to BCC) that will for future events ensure a wider breadth of support to those affected by flooding events both during and after the events.

This commitment will principally focus on the attendance of officers at the locations affected in order to ensure that those affected by the flooding have direct access to the relevant and correct organisations and services to support their particular needs. Those needs will inevitably change as the event moves from the initial emergency response through to recovery, and the commitment (possibly in the form of a Memorandum of Understanding) needs to recognise the changing emphasis in the required support roles as an event moves forward.

- What are the main flood alleviation schemes to reduce the impact of flooding the affected areas and how are they progressing?  
The Flood Risk Management team are in the process of collating data on flooded areas and issuing flood investigation questionnaires to locations where we understand internal flooding took place.

Our current understanding is that there are some locations which have flooding previously and therefore have been subject to a detailed study or were included in the Section 19 flooding investigation into the June 2016 event. There are a number of further areas where there is no previous history of flooding and therefore a flood alleviation scheme is not proposed at the current time

Current flood alleviation schemes in areas affected are:

- Selly Park North – EA can provide further details
- Slade Road – Property Level Resilience – BCC delivery 2018



Proposed future flood alleviation scheme in areas affect are: (these are subject to securing funding and will be delivered 2021+)

- Upper Bourn Catchment – EA/BCC/STW partnership project. Proving flood risk management benefits across the upper Bourn Brook catchment, including areas of Woodgate, Bartley Green, Quinton, Harborne and Selly Oak.

Flood alleviation schemes which have been investigated but are unable to achieve required cost benefit ratio to bring forward are:

- Sparkhill – EA can provide further details
- What can planners do to embed flood risk management into development policies to mitigate risks in relation to future development to prevent flooding where possible and to minimise the impact of development on flood risk, especially in high risk areas?

The Birmingham Development Plan includes Policy TP6 sets out the requirements for managing flood risk in new developments.

In terms of ensuring future funding of flood prevention measures through developments, the pursuit of planning contributions should be continued to contribute towards the cost and implementation of flood alleviation schemes.

- How can planning guidance and enforcement be strengthened to encourage developers to use sustainable drainage to minimise the impact of development in at risk areas?

Possible strengthening of aspects of planning control could be;

**Making relevant guidance in to policy** - The Sustainable Drainage: Guide to Design, Maintenance and Adoption could be translated into planning policy. The current document is guidance, managed by the Flood Risk Management team.

**Increased levels of planning enforcement** – enforcement is required in cases where construction has taken place without planning consent or for the discharge of planning conditions. However there are reduced and limited enforcement officer resources within the Authority to carry out this function.

**Adoption of Sustainable Drainage Systems (SuDs)** - Adoption remains a key issue with sustainable drainage, principally due to maintenance obligations of those drainage assets and the reticence of developers/scheme promoters to meet that cost. The council developing its own adopting body would enable all features to be adopted as one possible solution to making the maintenance operation easier on new developments. But this would still potentially require a significant level of financial subsidy by the City Council to make the option of SuD systems attractive to developers.

## **Managing the risk of flooding in Birmingham**

### **Sustainability and Transport Overview & Scrutiny Committee 19/07/2018**

#### **The role of the planning system in mitigating and reducing the risk of flooding**

##### Summary

This statement provides evidence for the following key lines of enquiry:

- What can planners do to embed flood risk management into development policies to mitigate risks in relation to future development to prevent flooding where possible and to minimise the impact of development on flood risk, especially in high risk areas?
- How can planning guidance and enforcement be strengthened to encourage developers to use sustainable drainage to minimise the impact of development in at risk areas?

It sets out the role of the planning system and in particular the City Council as Local Planning Authority in mitigating and reducing the risk of flooding in Birmingham. It consists firstly of an overview of the relevant national and local policies. It then explains the mechanisms by which such policies may be reviewed and revised, including the timescales associated with doing so. Finally it provides an overview of enforcement activity with regards to potential planning breaches that may increase flood risk.

##### National Planning Policy

The National Planning Policy Framework (NPPF) is the main document with regards to national policy for planning. This document is supplemented by the online Planning Practice Guidance (<https://www.gov.uk/government/collections/planning-practice-guidance> updated regularly) which provides detailed guidance on how to apply and interpret the NPPF. High Court decisions result in case law that provide further clarity on how, in the opinion of the Court, decision makers (such as Local Planning Authorities, the Planning Inspectorate and the Secretary of State – Housing, Communities and Local Government) should lawfully apply policy and legislation in relation to planning.

The NPPF makes a number of references to flood risk and associated topics throughout the document, with the key chapter on flooding being chapter 10 'Meeting the challenge of climate change, flooding and coastal change.' The text of this chapter is attached to this statement for information purposes and the full NPPF is available at <https://www.gov.uk/guidance/national-planning-policy-framework> .

Paragraph 94 of the NPPF notes that 'Local planning authorities should adopt proactive strategies to mitigate and adapt to climate change, taking full account of flood risk, coastal

change and water supply and demand considerations. Paragraphs 99 to 104 set out in further detail how this should be done with additional guidance contained in the planning practice guidance (<https://www.gov.uk/guidance/flood-risk-and-coastal-change> ). These paragraphs are summarised below:

Paragraph 99 – Sets out that Local Plans should take account of climate change over the longer term, including factors such as flood risk. Directs that new development should be planned to avoid increased vulnerability to the impacts of climate change and when development is brought forward in areas which are vulnerable ensure that risks can be managed through suitable adoption measures.

Paragraph 100 – Sets out that inappropriate development in areas at risk of flooding should be avoided, but where it is necessary making it safe without increasing flood risk elsewhere. Requires a Strategic Flood Risk Assessment (SFRA) and consideration of advice from the Environment Agency (EA) and other relevant flood risk management bodies such as the lead local flood authority (in Birmingham this is the City Council). Local Plans should take a sequential, risk-based approach to the location of development.

Paragraphs 101 and 102 explain the respective roles of the sequential and exception tests which are applied during both the plan making process and in determining planning relevant applications. The sequential test aims to steer new development to areas with the lowest probability of flooding. The exception test requires firstly that development that cannot be located in zones of lower probability of flooding to demonstrate that the development provides wider sustainability benefits that outweigh flood risk. Secondly a site-specific flood risk assessment must demonstrate that the development will be safe for its lifetime, without increasing flood risk elsewhere and, where possible, reduce flood risk overall. Both elements of the exception test have to be passed for development to be allocated or permitted.

Paragraph 103 requires local planning authorities when determining applications to ensure that flood risk is not increased elsewhere and that within a site the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons not to and to ensure that development is appropriately flood resilient and resistant, including safe access and escape routes as well as giving priority to the use of sustainable drainage systems. Footnote 20, which is referenced in this section also sets out that site-specific flood risk assessments are required for proposals of 1 hectare or greater in Flood Zone 1; all proposals for new development (including minor development and change of use) in Flood Zones 2 and 3, or in an area with Flood Zone 1 which has critical drainage problems (as notified to the local planning authority by the Environment Agency); and where proposed development or a change of use to a more vulnerable class may be subject to other sources of development.

Paragraph 104 clarifies that allocated sites that have been through a sequential test do not need to apply the sequential test a second time. Furthermore minor development and change of use (excluding change of use to caravan, camping etc. sites) should not be subject to the sequential or exception tests but should still meet the requirements for site-specific flood risk assessments.

Chapter 14 of the draft revised NPPF which was recently consulted upon and is anticipated to be published in the next few weeks in final form follows a very similar approach to the current NPPF. Minor changes include a requirement that on specific sites subject to the exception test at the time of plan making may require a reapplication of aspects of the exception test due to the nature and extent of flood risk identified during plan production and the age of that information. A further proposed change is the introduction of a new paragraph that makes clear that major developments should incorporate sustainable urban drainage systems unless there is clear evidence that this would be inappropriate and sets further guidance that such systems should:

- Take account of advice from the lead local flood authority
- Have appropriate minimum operational standards,
- Have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development; and
- Where possible, provide multifunctional benefits.

#### Local Planning Policy

The Birmingham Development Plan (BDP), which was adopted in January 2017 is the main strategic planning document for Birmingham and is what is known as a Development Planning Document (DPD). The main policy within this document relating to flood risk is policy TP6 'Management of flood risk and water resources'. This policy is repeated in full at the end of this statement, however in summary the main topics that it covers include:

- Clarifying that site specific Flood Risk Assessments are required in accordance with both national policy (currently defined in footnote 20 of the NPPF as discussed above) and the guidance outlined in the Birmingham Strategic Flood Risk Assessment (SFRA).
- Requires all major developments to have a Sustainable Drainage Assessment and Operation and Maintenance Plan.
- Sets a requirement that developments that require a site specific Flood Risk Assessment or Sustainable Drainage Assessment demonstrate that disposal of surface water from the site will not exacerbate existing flooding and that exceedance flows will be managed. Surface water discharge rates for such sites are

required to be limited to the equivalent site-specific greenfield runoff rate for all return periods up to the 1 in 100 year plus climate change event, unless it is demonstrated that the cost of achieving this would make the proposed development unviable.

- Requires all development proposals to manage surface water through Sustainable Drainage Systems (SuDS). Where possible natural drainage is preferred and surface runoff should be managed as close to its source as possible in line with a drainage hierarchy that seeks storage for later use first before moving through a range of other options in order of preference with the least preferable option being discharge to a combined sewer. SuDS are required to protect and enhance water quality and to have long-term operation and maintenance arrangements in place for the lifetime of the development.
- Notes that rivers and streams are liable to natural flooding and requires them to be managed to ensure that this flooding takes place in locations which will not place built development or sensitive uses at Risk. The Sustainable Management of Rivers and Urban Frameworks SPD (SMURF) provides more detailed guidance. Notes the role of river corridors and floodplains as part of the City's green infrastructure network and sets out development principles for rivers and streams including:
  - Easements between developments and watercourses
  - Promotes the re-instatement of natural river channels
  - Promotes the opening up of culverted watercourses where feasible
  - Existing open watercourses should not be culverted.
- Sets out that opportunities to enhance the value of natural water features and canals will be encouraged provided that there is no adverse impact upon water quality, flood risk or the quality of the natural environment. Conversely, development will not be permitted that would have a negative impact on surface water (rivers, lakes and canals) or groundwater quantity or quality.
- Encourages provision of additional trees and woodland to aid water management and flood alleviation.

Further policies in the BDP that seek to reduce flood risk include policy TP2 'Adapting to Climate Change' which encourages measures to ensure greater resilience to extreme weather conditions in the built environment and in transport, energy and other infrastructure.

The Birmingham Strategic Flood Risk Assessment, which helped inform the development of the BDP, reinforces the need to apply a sequential test and exception test to many proposed

developments. It also includes further policies to ensure that all sources of flood risk are managed as part of any development. It is available from [https://www.birmingham.gov.uk/downloads/download/387/flood\\_risk\\_assessments](https://www.birmingham.gov.uk/downloads/download/387/flood_risk_assessments) .

The Sustainable Management of Rivers and Urban Frameworks SPD (SMURF) provides further guidance for development located within river corridors in Birmingham which encourages better linkages between land use planning and water management, access and visual amenity. It is available from [https://www.birmingham.gov.uk/downloads/download/356/sustainable\\_management\\_of\\_urban\\_rivers\\_and\\_floodplains\\_supplementary\\_planning\\_document](https://www.birmingham.gov.uk/downloads/download/356/sustainable_management_of_urban_rivers_and_floodplains_supplementary_planning_document) .

The City Council's validation criteria sets out when site specific flood risk assessments are required to be submitted with planning applications in accordance with the requirements currently set by footnote 20 of the NPPF.

#### Examples of recent applications where national and local policies have improved surface water run-off rates

The City Council can currently only confirm the run-off rate proposed by individual approved planning applications by interrogating the associated planning application files. As such an overview of how many approved applications in the relevant parts of the City proposed the expected greenfield run-off rates is not immediately available as it would require reviewing the individual planning application file for each development. In terms of the scale of this task in the financial year 2017/18 the City Council determined 4,773 planning applications. However, the City Council are currently in the process of reviewing its systems and processes to facilitate improved monitoring of planning applications which will allow this information to be more easily produced.

The examples below provide a sample of applications where national and local policies have secured improved surface water run-off rates:

Site address: Lifford Park - former Arvin Meritor Works

Application references: 2016/03703/PA (outline), 2017/05884/PA (reserved matters), 2018/01947/PA (discharge of conditions including SuDS not yet determined)

Proposed development: Erection of 101 residential units with associated infrastructure and open space.

Flood Zone: 1

Improvement to surface water run off rates proposed: At outline stage it was estimated that the proposed SuDS scheme would result in a 90% reduction in run-off compared to existing brownfield discharge rates. There is a current application to discharge the relevant

condition being assessed which proposes a maximum peak discharge rate (33.5 l/s) consistent with the greenfield run-off rate for the site (13.1 l/s/ha).

Site address: Hall Green Stadium

Application references: 2016/01219/PA (outline), 2018/04103/PA (reserved matters not yet determined)

Proposed development: Demolition of Hall Green stadium and residential development of up to 210 dwellings.

Flood Zone: 1

Improvement to surface water run off rates proposed: At outline stage it was considered that the proposed SuDS scheme would comply with the relevant local and national standards specifically the hierarchy of discharge, runoff rate and volume criterion. It included an indicative drainage network design which shows that the site could be successfully drained in a sustainable manner and that there is sufficient space on site to incorporate SuDS features. The design was to be further developed at the reserved matters stage including proposals to address localised flooding issues in neighbouring gardens. The reserved matters application is currently being assessed and further information has been requested from the applicants to confirm the anticipated run-off rates of the proposed SuDS scheme.

Site address: Martineau Centre

Application references: 2014/05096/PA (full), 2015/02929/PA (discharge of conditions)

Proposed development: Residential development of 121 dwellings and associated works. Change of use of clock tower building from office (Use Class B1a) to 6 residential dwellings (Use Class C3) and community floor space (Use Class D1), addition of associated landscaping and two access points onto Balden Road (revised scheme).

Flood Zone: 1

Improvement to surface water run off rates proposed: SuDS scheme approved through discharge of conditions expected to achieve run-off rates of 15 l/s. It is unclear from the application how this compares to the site specific greenfield runoff rate as this was not a adopted policy requirement at the time, but this was clearly a betterment and Severn Trent supported this proposal on the basis of this runoff rate.

Site address: Selly Oak Ex-servicemen's Memorial Institute Social Club

Application references: 2017/08369/PA (outline)

Proposed development: Outline application for the demolition of existing building and erection of 10no. dwellings (Landscaping reserved for future consideration)

Flood Zone: 1

Improvement to surface water run off rates proposed: The applicant worked extensively with officers from the Lead Local Flooding Authority (LLFA) to ensure an appropriate sustainable drainage strategy for the site. The LLFA confirmed that they raise no objection subject to conditions for a surface water drainage scheme and a sustainable drainage operation and maintenance plan, which would include details of the party responsible for the maintenance; specification for inspection and maintenance actions; proposed arrangements for adoption/ownership to secure operation of the scheme throughout its lifetime and details of proposed contingency plans for failure of any part of the drainage systems. In particular the proposed maximum peak discharge rate of 5.0l/s for all return periods up to the 1 in 100 year plus climate change event was considered acceptable in principle to the LLFA. A reserved matters application and discharge of conditions application for this scheme are awaited.

#### Permitted development

Some forms of development do not require planning permission as they permitted development which have approval through the Town and Country Planning (General Permitted Development) (England) Order 2015. In particular it is permitted development to install a new or replacement driveway to the front of houses if permeable (or porous) surfacing is used such as gravel, permeable concrete block paving or porous asphalt, or if the rainwater is directed to a lawn or border to drain naturally. If the surface to be covered is more than 5 square metres planning permission is required for impermeable driveways that do not provide for the water to run to a permeable area. There are no controls, in replacing side or rear gardens with impermeable surfaces as this is permitted development.

#### Changing planning policy

National planning policy can only be changed by the Government, although the City Council can and does seek to encourage positive changes through taking part in consultations on proposed changes.

Local planning policy contained within a Development Planning Document (DPD), such as the BDP, can only be changed through either a review of the document or the preparation of a new DPD. As DPDs set out strategic policies the process to amend or introduce new DPDs is relatively lengthy and includes:

- the assembly of appropriate evidence (including a Sustainability Assessment),
- substantial and meaningful public consultation,



- an Examination in Public led by a Planning Inspector acting on behalf of the Secretary of State and;
- Further consultation on any proposed changes before adoption of the new DPD.

The precise time required to progress a new or revised DPD through the above stages varies depending on the scope of the proposed DPD, but timescales are generally in the order of years.

Policy contained within Supplementary Planning Documents (SPDs) such as the Sustainable Management of Rivers and Urban Frameworks SPD have less onerous requirements as they should only provide guidance and clarification on the applications of policies contained within a DPD. New or revised SPDs are required to be consulted on proportionally before being amended as necessary and then adopted by the Local Planning Authority. This process again varies but can be undertaken depending on scope in 1 to 2 years.

Finally the process to remove permitted development rights is known as an article 4 direction. In many ways similar to the process for introducing new or revised DPDs (including the need for appropriate evidence, consultation and an examination by an appointed Planning Inspector) this is again a relatively lengthy process of a minimum of two years. As this relates to removing existing rights a strong case for doing so is required which must be backed by evidence justifying why the right should be removed.

### Enforcement

Planning enforcement can only be considered on the basis of the policies that apply at the time the development took place and there is a limitation of 4 years on how long action can be taken against a breach of a planning before it benefits from deemed consent. With regards to complaints about the installation of impermeable surfaces at the front of residential properties a quick assessment of cases that included mention of driveways in the description of the potential breach resulted in 14 cases being raised in 2017, approximately 1% of the circa 1,400 cases received that year. In the majority of cases investigations led to confirmation that appropriate permeable surfacing or other drainage measures as required for the development to be permitted had been used. In the very few cases where this is not the case homeowners nearly always comply when threatened with enforcement action. Finally, in the rare cases when homeowners do not comply an assessment is undertaken as to whether or not it is expedient to pursue further action considering all of the relevant factors of each individual case.

### Appendices

Appendix 1 - NPPF Chapter 10

Appendix 2 - BDP Policy TP6

- provision of appropriate facilities for outdoor sport, outdoor recreation and for cemeteries, as long as it preserves the openness of the Green Belt and does not conflict with the purposes of including land within it;
  - the extension or alteration of a building provided that it does not result in disproportionate additions over and above the size of the original building;
  - the replacement of a building, provided the new building is in the same use and not materially larger than the one it replaces;
  - limited infilling in villages, and limited affordable housing for local community needs under policies set out in the Local Plan; or
  - limited infilling or the partial or complete redevelopment of previously developed sites (brownfield land), whether redundant or in continuing use (excluding temporary buildings), which would not have a greater impact on the openness of the Green Belt and the purpose of including land within it than the existing development.
90. Certain other forms of development are also not inappropriate in Green Belt provided they preserve the openness of the Green Belt and do not conflict with the purposes of including land in Green Belt. These are:
- mineral extraction;
  - engineering operations;
  - local transport infrastructure which can demonstrate a requirement for a Green Belt location;
  - the re-use of buildings provided that the buildings are of permanent and substantial construction; and
  - development brought forward under a Community Right to Build Order.
91. When located in the Green Belt, elements of many renewable energy projects will comprise inappropriate development. In such cases developers will need to demonstrate very special circumstances if projects are to proceed. Such very special circumstances may include the wider environmental benefits associated with increased production of energy from renewable sources.
92. Community Forests offer valuable opportunities for improving the environment around towns, by upgrading the landscape and providing for recreation and wildlife. An approved Community Forest plan may be a material consideration in preparing development plans and in deciding planning applications. Any development proposals within Community Forests in the Green Belt should be subject to the normal policies controlling development in Green Belts.

## 10. Meeting the challenge of climate change, flooding and coastal change

93. Planning plays a key role in helping shape places to secure radical reductions in greenhouse gas emissions, minimising vulnerability and providing resilience to the impacts of climate change, and supporting the delivery of renewable

and low carbon energy and associated infrastructure. This is central to the economic, social and environmental dimensions of sustainable development.

94. Local planning authorities should adopt proactive strategies to mitigate and adapt to climate change,<sup>16</sup> taking full account of flood risk, coastal change and water supply and demand considerations.
95. To support the move to a low carbon future, local planning authorities should:
  - plan for new development in locations and ways which reduce greenhouse gas emissions;
  - actively support energy efficiency improvements to existing buildings; and
  - when setting any local requirement for a building's sustainability, do so in a way consistent with the Government's zero carbon buildings policy and adopt nationally described standards.
96. In determining planning applications, local planning authorities should expect new development to:
  - comply with adopted Local Plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and
  - take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.
97. To help increase the use and supply of renewable and low carbon energy, local planning authorities should recognise the responsibility on all communities to contribute to energy generation from renewable or low carbon sources. They should:
  - have a positive strategy to promote energy from renewable and low carbon sources;
  - design their policies to maximise renewable and low carbon energy development while ensuring that adverse impacts are addressed satisfactorily, including cumulative landscape and visual impacts;
  - consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure the development of such sources;<sup>17</sup>
  - support community-led initiatives for renewable and low carbon energy, including developments outside such areas being taken forward through neighbourhood planning; and

<sup>16</sup> In line with the objectives and provisions of the Climate Change Act 2008.

<sup>17</sup> In assessing the likely impacts of potential wind energy development when identifying suitable areas, and in determining planning applications for such development, planning authorities should follow the approach set out in the National Policy Statement for Renewable Energy Infrastructure (read with the relevant sections of the Overarching National Policy Statement for Energy Infrastructure, including that on aviation impacts). Where plans identify areas as suitable for renewable and low-carbon energy development, they should make clear what criteria have determined their selection, including for what size of development the areas are considered suitable.

- identify opportunities where development can draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers.
98. When determining planning applications, local planning authorities should:
- not require applicants for energy development to demonstrate the overall need for renewable or low carbon energy and also recognise that even small-scale projects provide a valuable contribution to cutting greenhouse gas emissions; and
  - approve the application<sup>18</sup> if its impacts are (or can be made) acceptable. Once suitable areas for renewable and low carbon energy have been identified in plans, local planning authorities should also expect subsequent applications for commercial scale projects outside these areas to demonstrate that the proposed location meets the criteria used in identifying suitable areas.
99. Local Plans should take account of climate change over the longer term, including factors such as flood risk, coastal change, water supply and changes to biodiversity and landscape. New development should be planned to avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure.
100. Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere.<sup>19</sup> Local Plans should be supported by Strategic Flood Risk Assessment and develop policies to manage flood risk from all sources, taking account of advice from the Environment Agency and other relevant flood risk management bodies, such as lead local flood authorities and internal drainage boards. Local Plans should apply a sequential, risk-based approach to the location of development to avoid where possible flood risk to people and property and manage any residual risk, taking account of the impacts of climate change, by:
- applying the Sequential Test;
  - if necessary, applying the Exception Test;
  - safeguarding land from development that is required for current and future flood management;
  - using opportunities offered by new development to reduce the causes and impacts of flooding; and
  - where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long-term, seeking

<sup>18</sup> Unless material considerations indicate otherwise.

<sup>19</sup> Technical guidance on flood risk published alongside this Framework sets out how this policy should be implemented.

opportunities to facilitate the relocation of development, including housing, to more sustainable locations.

101. The aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower probability of flooding. The Strategic Flood Risk Assessment will provide the basis for applying this test. A sequential approach should be used in areas known to be at risk from any form of flooding.
102. If, following application of the Sequential Test, it is not possible, consistent with wider sustainability objectives, for the development to be located in zones with a lower probability of flooding, the Exception Test can be applied if appropriate. For the Exception Test to be passed:
- it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a Strategic Flood Risk Assessment where one has been prepared; and
  - a site-specific flood risk assessment must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

Both elements of the test will have to be passed for development to be allocated or permitted.

103. When determining planning applications, local planning authorities should ensure flood risk is not increased elsewhere and only consider development appropriate in areas at risk of flooding where, informed by a site-specific flood risk assessment<sup>20</sup> following the Sequential Test, and if required the Exception Test, it can be demonstrated that:
- within the site, the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons to prefer a different location; and
  - development is appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed, including by emergency planning; and it gives priority to the use of sustainable drainage systems.<sup>21</sup>
104. For individual developments on sites allocated in development plans through the Sequential Test, applicants need not apply the Sequential Test. Applications for minor development and changes of use should not be

<sup>20</sup> A site-specific flood risk assessment is required for proposals of 1 hectare or greater in Flood Zone 1; all proposals for new development (including minor development and change of use) in Flood Zones 2 and 3, or in an area within Flood Zone 1 which has critical drainage problems (as notified to the local planning authority by the Environment Agency); and where proposed development or a change of use to a more vulnerable class may be subject to other sources of flooding.

<sup>21</sup> The Floods and Water Management Act 2010 establishes a Sustainable Drainage Systems Approving Body in unitary or county councils. This body must approve drainage systems in new developments and re-developments before construction begins.

subject to the Sequential or Exception Tests<sup>22</sup> but should still meet the requirements for site-specific flood risk assessments.

105. In coastal areas, local planning authorities should take account of the UK Marine Policy Statement and marine plans and apply Integrated Coastal Zone Management across local authority and land/sea boundaries, ensuring integration of the terrestrial and marine planning regimes.
106. Local planning authorities should reduce risk from coastal change by avoiding inappropriate development in vulnerable areas or adding to the impacts of physical changes to the coast. They should identify as a Coastal Change Management Area any area likely to be affected by physical changes to the coast, and:
  - be clear as to what development will be appropriate in such areas and in what circumstances; and
  - make provision for development and infrastructure that needs to be relocated away from Coastal Change Management Areas.
107. When assessing applications, authorities should consider development in a Coastal Change Management Area appropriate where it is demonstrated that:
  - it will be safe over its planned lifetime and will not have an unacceptable impact on coastal change;
  - the character of the coast including designations is not compromised;
  - the development provides wider sustainability benefits; and
  - the development does not hinder the creation and maintenance of a continuous signed and managed route around the coast.<sup>23</sup>
108. Local planning authorities should also ensure appropriate development in a Coastal Change Management Area is not impacted by coastal change by limiting the planned life-time of the proposed development through temporary permission and restoration conditions where necessary to reduce the risk to people and the development.

## 11. Conserving and enhancing the natural environment

109. The planning system should contribute to and enhance the natural and local environment by:
  - protecting and enhancing valued landscapes, geological conservation interests and soils;
  - recognising the wider benefits of ecosystem services;
  - minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the

<sup>22</sup> Except for any proposal involving a change of use to a caravan, camping or chalet site, or to a mobile home or park home site, where the Sequential and Exception Tests should be applied as appropriate.

<sup>23</sup> As required by the Marine and Coastal Access Act 2009.

## Management of flood risk and water resources

### Introduction

**6.29** Flooding is one of the most immediate and visible consequences of extreme weather. Measures to minimise the risk of flooding and mitigate its effects are therefore required. The City Council will work with the Environment Agency to reduce floodrisk in Birmingham in line with the River Trent Catchment Flood Management Plan.

### Why we have taken this approach

**6.30** Parts of Birmingham are at risk of flooding from main rivers, ordinary watercourses, surface water, sewer flooding and groundwater. There is also the potential for canal and reservoir breach and overtopping. As there has been development within flood zones, particularly along the Rea and the Tame, fluvial flood risk is an issue. There have also been considerable instances of flooding from surface water with small watercourses and sewers being particularly susceptible to flash flooding.

**6.31** In order to manage this risk it is essential that future development is planned appropriately to ensure that where possible:

- Development is located in the lowest areas of flood risk.
- Measures are put in place to mitigate new development against flood risk and ensure that it does not increase flood risk elsewhere.
- Surface water is managed effectively on site through the appropriate application of Sustainable Drainage Systems.
- Opportunities should be sought to reduce the overall level of floodrisk in the area and beyond through the layout and form of development.
- Development should be designed to be safe throughout its lifetime, taking account of the potential impacts of climate change.

## Policy TP6 Management of flood risk and water resources

### Flood Risk Assessments

Site specific Flood Risk Assessments will be required in accordance with the requirements of the relevant national planning policy and the guidance outlined in the Birmingham Strategic Flood Risk Assessment (SFRA).

### Sustainable Drainage Assessment and Operation and Maintenance Plan

A Sustainable Drainage Assessment and Operation and Maintenance Plan will be required for all major developments, as defined in Article 2(1) of the Town and Country Planning (Development Management Procedure) (England) Order 2015.

As part of their Flood Risk Assessment (FRA) and Sustainable Drainage Assessment developers should demonstrate that the disposal of surface water from the site will not exacerbate existing flooding and that exceedence flows will be managed.

For all developments where a site-specific Flood Risk Assessment and/or Sustainable Drainage Assessment is required, surface water discharge rates shall be limited to the equivalent site-specific greenfield runoff rate for all return periods up to the 1 in 100 year plus climate change event, unless it can be demonstrated that the cost of achieving this would make the proposed development unviable.

### Sustainable Urban Drainage (SuDS)

To minimise flood risk, improve water quality and enhance biodiversity and amenity all development proposals will be required to manage surface water through Sustainable Drainage Systems (SuDS). Wherever possible the natural drainage of surface water from new developments into the ground will be preferred. Surface water runoff should be managed as close to its source as possible in line with the following drainage hierarchy:

- Store rainwater for later use.
- Discharge into the ground (infiltration).
- Discharge to a surface water body.
- Discharge to a surface water sewer, highway drain or other drainage system.
- Discharge to a combined sewer.

All SuDS must protect and enhance water quality by reducing the risk of diffuse pollution by means of treating at source and including multiple treatment trains where feasible. All SuDS schemes should be designed in accordance with the relevant national standards and there must be long-term operation maintenance arrangements in place for the lifetime of the development.

### Rivers and Streams

Rivers and streams are liable to natural flooding and will be managed in ways which will ensure that this can take place in locations which will not place built development or sensitive uses at risk. The Sustainable Management of Urban Rivers and Floodplains SPD (SMURF) provides more detailed guidance. River corridors are also important elements of the City's green infrastructure network. The management of floodplains will also need to take into account the potential to increase benefits to wildlife.

*continued...*

The following development principles will apply:

- An easement should be provided between the development and watercourses where appropriate and feasible
- Opportunities should be taken to benefit rivers by re-instating natural river channels.
- Culverted watercourses should be opened up where feasible.
- Existing open watercourses should not be culverted.

### Enhancements of Water Resources

As well as providing water and drainage, the City’s rivers, streams, canals, lakes and ponds are an important amenity and are also valuable as wildlife habitats. Opportunities to increase the wildlife, amenity and sporting value of natural water features and canals will also be encouraged, provided that there is no adverse impact upon water quality, flood risk or the quality of the natural environment. Proposals should demonstrate compliance with the Humber River Basin Management Plan exploring opportunities to help meet the Water Framework Directive’s targets.

Development will not be permitted where a proposal would have a negative impact on surface water (rivers, lakes and canals) or groundwater quantity or quality either directly through pollution of groundwater or by the mobilisation of contaminants already in the ground.

### Trees and Woodland

Trees and woodland can provide significant benefits in terms of water management and flood alleviation and as part of SuDs in addition to their wider landscape, recreation, economic and ecological benefits. The provision of additional trees and woodland will therefore be encouraged.

### Implementation

|            | Local/<br>National<br>Funding | Partnerships | CPO | CIL/<br>Section<br>106 | Planning<br>Management | Other Local Plan/<br>SPD/Regeneration<br>Framework |
|------------|-------------------------------|--------------|-----|------------------------|------------------------|--|
| Policy TP6 | ✓                             | ✓            |     |                        | ✓                      |  |

- Birmingham City Council, the Environment Agency and Severn Trent Water are working in partnership to deliver flood risk and environmental improvements throughout the River Rea catchment. To deliver these improvements, third party external funding is required to secure capital funds from government. Developers are encouraged to consult with the above mentioned partnership to identify opportunities and synergies prior to planning.

**6.32** The Strategic Flood Risk Assessment (SFRA) reinforces the need to apply a Sequential Test and the Exception Test, in accordance with the relevant national planning policy, to many proposed development schemes. Furthermore the SFRA includes further policies to ensure that all sources of flood risk are managed as part of any development.

**6.33** The SFRA outlines the need to implement adequate SuDS techniques as part of a development. Large increases

in impermeable areas for a site could contribute to a significant increase in surface water run-off, peak flows and volumes. In turn this could contribute to an increase in flood risk elsewhere. A Sustainable Drainage: Guide to Design, Adoption and Maintenance will be produced to provide detailed guidance to support the implementation of sustainable drainage systems including guidance on the national requirements for SUDS, the local requirements placed on developers and the technical requirements.

**6.34** In taking forward the SFRA the City Council will have regard to developing strategies such as the Local Flood Risk Management Strategy, Surface Water Management Plan, Trent Catchment Flood Management Plan, Humber River Basin Management Plan and future development of the Flood and Water Management Act 2010.

**6.35** Historically many of Birmingham’s watercourses have been culverted. This limits their amenity and wildlife value and may also inhibit the potential for natural drainage. The removal of culverting through development can therefore bring significant benefits and contribute to the Water Framework Directive targets. Birmingham lies within the Tame, Anker and Mease catchment for which a catchment-based approach is being promoted by DEFRA and the Environment Agency. A Catchment Management Plan has been prepared for the Birmingham element of this catchment.

**6.36** Water courses are important for some sports and the improvement of the main water courses will also enhance the sporting experience.

**6.37** Canals have a wildlife and amenity value and take a proportion of surface water run-off. They also have a role as non-natural watercourses to help alleviate flooding in some cases.