Surface Water Management Plan – Hotspot Selection

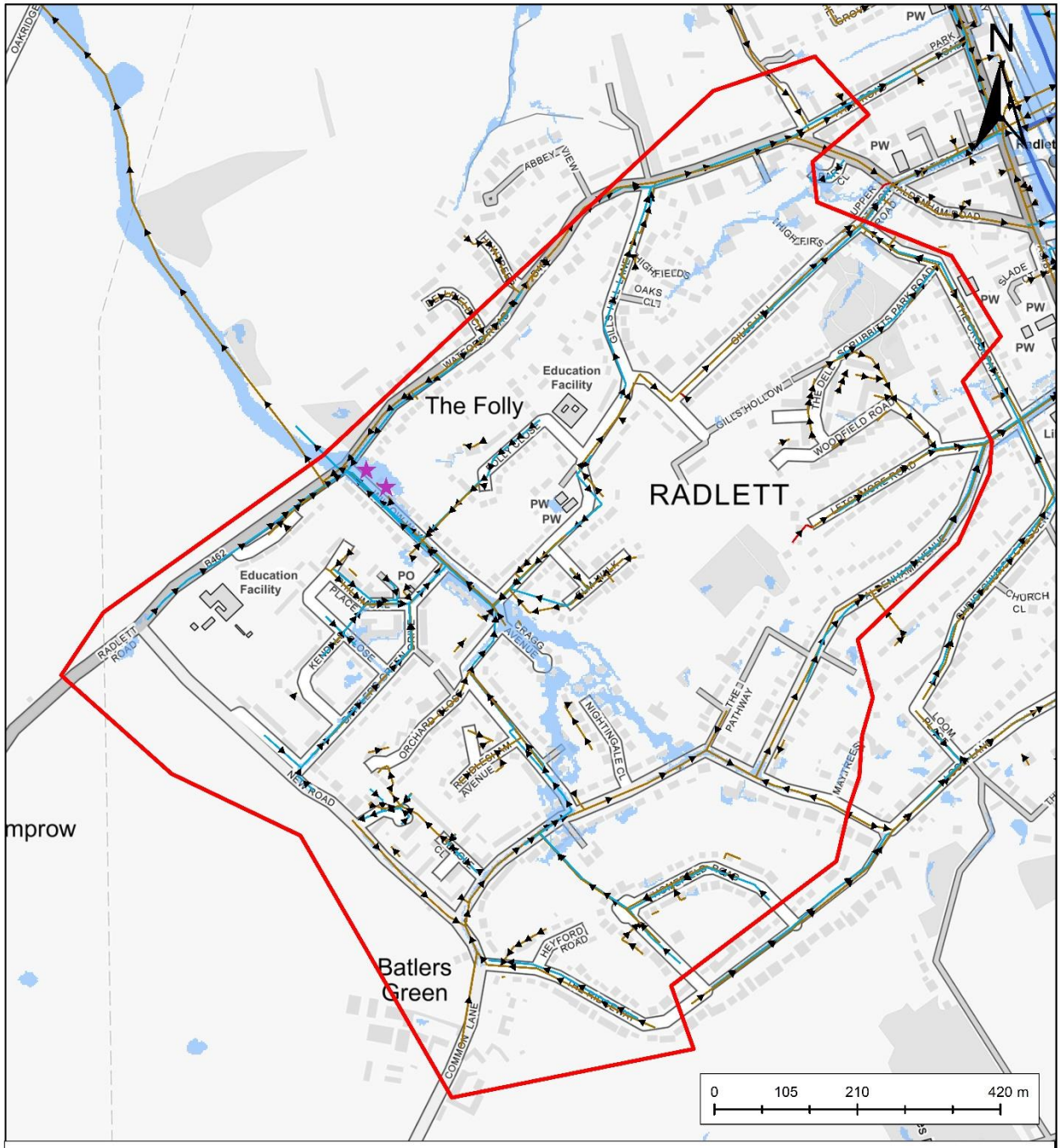
Overview

Hotspot Code	HBC1	
Hotspot Name	Radlett	
Postcode	WD7 8DX	
Hotspot Area	**OS Grid Reference**	TL 15431 99358
	X coordinate	515431
	Y coordinate	199358
Local Authority	Hertsmere Borough	

Hotspot summary

Risk of Flooding from Surface Water (RoFSW) mapping	Surface water flows south east to north west following Orchard Close, Gills Hill Lane and Willow Way. The surface water flood risk follows the route of the roads, and enters the hotspot area from one main flow path, from higher elevations around Oakridge Lane. The site visit on 29/11/2017 confirmed the surface water flow paths match up well with the RoFSW mapping.
Sewerage	There are surface water and foul sewers that drain out of the catchment. The surface water sewers enter the hotspot area from the south around Battlers Green and exit at Radlett Road. The surface water network flows in the same direction as the foul network, but upon existing the catchment along Willow Way, it is not connected to another sewer (from observation of the data available).
Other Drainage	HCC records show a network of highway drainage gullies across the hotspot. The connectivity of these is unknown, but it is assumed that they drain to the surface water sewers where present. During the site visit HBC stated that where the surface water sewer ends there is a "sink hole" where water drains away. It is unknown where this water flows to after it has entered the sinkhole.
Watercourses	There are no watercourses present within this hotspot.
Flood incidents recorded	2 reported flood incidents with source unknown on Willow Way and Watford Road. The hotspot does not fall in the EA's historic flood map area, however the areas to the east of the hotspot is covered by it, around Kendalls Brook.
Topography and ground conditions	High level ground (105m) in southern part of hotspot slopes gently down Willow way to 90m. The hotspot area is residential with an education facility in the north. There are a number of green spaces within the hotspot, particularly Battlers Green and around The Folly.

JBA Project Code	2017s6531
Project Name	Hertfordshire County Council SWMP Hotspots
Client	Hertfordshire County Council
Document	Hotspot Selection
Hotspot Code	HBC1



Legend

HCC Flood Incident Record
- Fluvial
- Foul sewer
- Groundwater
- Multiple
- Ordinary watercourse
- Private sewer
- Surface water
- Surface water & foul water sewer
- Surface water sewer
- Unknown

Thames Water Sewers FMfSW
- Combined
- Effluent
- Foul
- Surface water

- 1 in 100 year extent
- Main River
- Ordinary Watercourse

Flood Risk

History of flooding	The flood incident record from HCC showed that June 2016 flooding was reported at 2 properties at the bottom of Willow Way. The pathway of the flooding is thought to have been along the roads, and the receptors were residential properties. It is unknown whether internal flooding occurred on Willow way, but both internal and external flooding occurred on Watford Road (B462). Observations from the site visit on 29/12/17 confirmed the open channel and outlet adjacent to the road in Radlett. it was also observed that there is a sinkhole adjacent to Radlett Road, following the path of surface water.		
Properties at risk from surface water (high, medium, low)(count)	**High (30yr)**	**Medium (100yr)**	**Low (1000yr)**
	2	3	14
Sewer flooding incidents	5 sewer flooding incidents have been recorded by Thames Water in the postcode sector of WD7 8. No sewer flooding history has been reported in this area since 15/05/2014. Discussion at the hotspot selection workshop with TW reported that in 2004 there was a scheme in place to resolve a sewer flooding issue at the time.		
Local authority incidents	2		

Modelling and existing studies

Existing river models	No model extents covering this area have been provided by the EA.
Existing sewer models	Maple Lodge catchment. Macro (coarse) modelling of foul sewerage only.
Previous studies (including other SWMPs)	No detailed studies have been carried out for this hotspot area.
LiDAR coverage	Yes, the area is covered by LiDAR (EA 2m)

Other catchment needs and opportunities	
Water quality	There are no watercourses within hotspot.
Development	There are 5 areas of proposed development within this hotspot area, These are around Homefield Road, Cragg Avenue and along Watford Road (B462).
Green spaces and designations	An area of greenspace (woodland) can be found between Rendlesham Avenue, Gills Hill Lane and Loom Lane. There are no sites with environmental designations.
Working with natural processes	No potential for WWNP has been identified in this hotspot area under the mapping.
Ongoing and proposed schemes	None have been identified.

Recommendations and options

Recommendations

Recommended way forward	Discussions during the site visit on 29/11/17 suggested an option going forward is to assess the measures that could be put in place to hold the flow of water upstream, or to efficiently drain water across/beneath the B462. Modelling may not be justifiable with only 2 internal floodings properties. Little benefit of modelling to confirm RoFSW, however modelling could assist option design.	
Agreed decision	Significant risk identified and further modelling required	
	Non-modelled hotspot (see next section for proposed action	✓
	No further actions	

Options (section to be completed for non-modelled hotspots only)

Proposed action	Lead organisation	Partners	Costs

Photographs

Site Photo 1		Image of roundabout on Watford Road at Willow Way junction, showing topography and adjacent field where there are several sink holes.
Site Photo 2		Watford Road topography, illustrating slight slope.
Site Photo 3		
Site Photo 4		

JBA Project Code	2017s6531
Project Name	Hertfordshire County Council SWMP Hotspots
Client	Hertfordshire County Council
Document	Hotspot Selection
Hotspot Code	HBC2

Surface Water Management Plan – Hotspot Selection

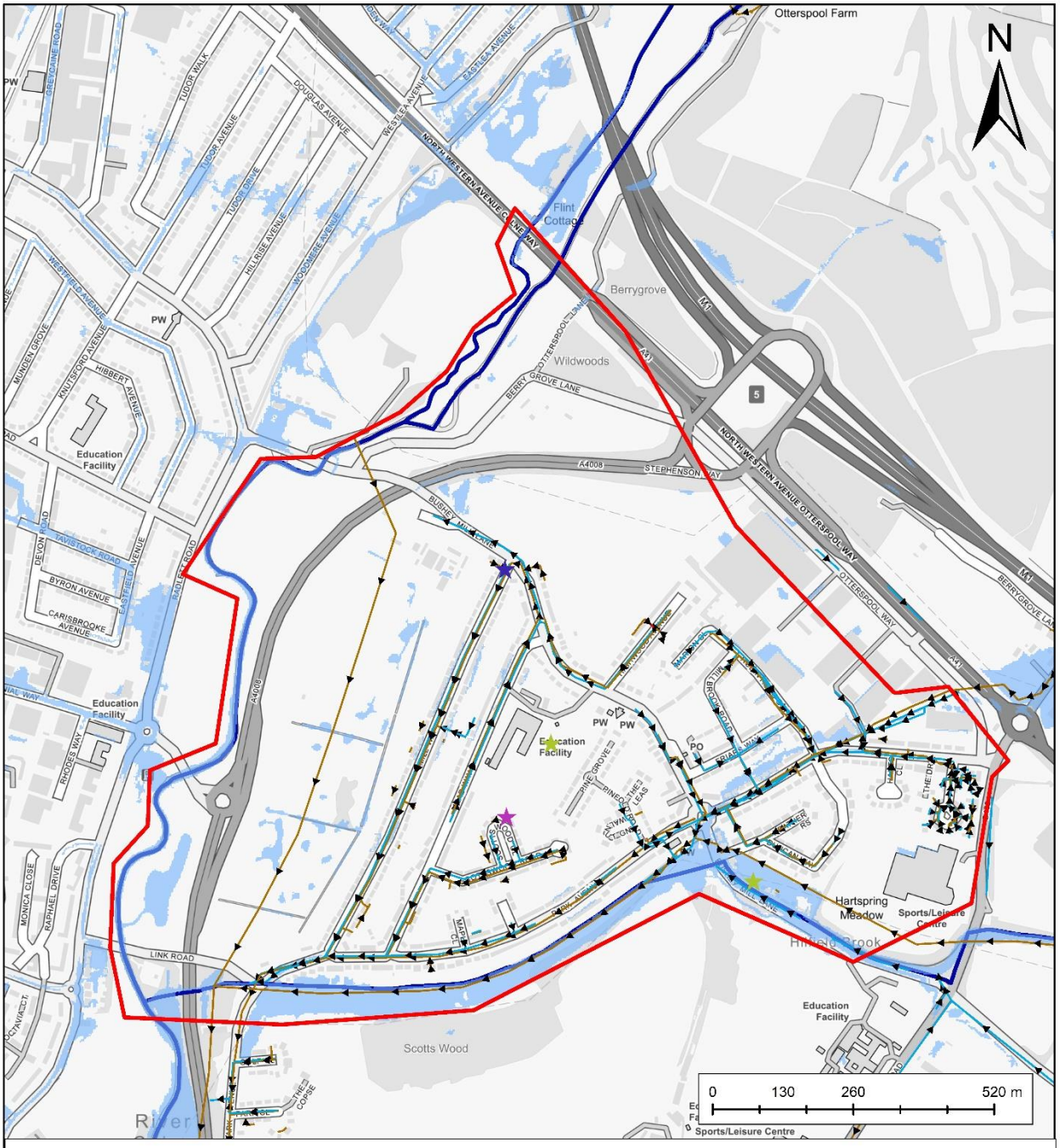
Overview

Hotspot Code	HBC2	
Hotspot Name	Mead Way	
Postcode	WD23 2DP	
Hotspot Area	**OS Grid Reference**	TL 12437 97500
	X coordinate	512437
	Y coordinate	197500
Local Authority	Hertsmere Borough	

Hotspot summary

Risk of Flooding from Surface Water (RoFSW) mapping	The surface water flow path within this hotspot area flows along the roads, but the majority of the flow path is linked to the main river that runs through the hotspot. The most risk is around the south east of the hotspot area, along Bushey Mill Lane and Friars Way.
Sewerage	There are surface water and foul sewer networks that drain out of the catchment towards the south west. The surface water sewer network drains into Hilfield Brook, whilst the foul sewer network drains further south towards Watford.
Other Drainage	HCC records show a network of highway drainage gullies across the hotspot. The connectivity of these is unknown, but it is assumed that they drain to the surface water sewers where present.
Watercourses	River Colne and Hilfield Brook + ordinary watercourse
Flood incidents recorded	2 flood incidents have been reported for this area, two of the events have been due to surface water flooding along Bushey Mill Lane, there has been 1 incident along Scottwood Close which is from an unknown source, and a foul sewer flood incident at the postcode WD23 2AD. The flood incidents have occurred over June 2016 June 2017 and over two dates that were not reported in the flood incident record. Discussions from the site visit on 29/11/2017 revealed the June 2016 flooding to have affected the school. The houses were also vulnerable since they are lower than the level of the road. Along Bushy Hill Lane, it was observed that the grill floods frequently.
Topography and ground conditions	The topography of this hotspot follows the natural topography of the valley, an area of depression around the area of the watercourse (both Hillfield Brook and The River Colne. The land then is slightly raised at either side of the valleys, with the steepest elevation in the far east, at 73.57mAOD. The lower elevation by the watercourses are approximately 56.68mAOD. This area is mostly rural, with an area designated as sports facilities, an education facility and an industrial estate in the north east.

JBA Project Code	2017s6531
Project Name	Hertfordshire County Council SWMP Hotspots
Client	Hertfordshire County Council
Document	Hotspot Selection
Hotspot Code	HBC2



Legend

Hotspot

HCC Flood Incident Record

- Fluvial
- Foul sewer
- Groundwater
- Multiple
- Ordinary watercourse
- Private sewer
- Surface water
- Surface water & foul water sewer
- Surface water sewer
- Unknown

Thames Water Sewers

- Combined
- Effluent
- Foul
- Surface water

FMfSW

- 1 in 100 year extent
- Main River
- Ordinary Watercourse

Flood Risk

History of flooding	There have been 4 flood incidents that have occurred within this hotspot boundary. The cause of the flood events have been due to surface water flooding and foul sewer flooding. There is one event that has not been attributed to a source of flooding. The flood incidents have either not caused internal flooding, or it is unknow. However all events have caused external flooding to properties. The flooding that occurred at Highwood Primary School on Bushey Mill Lane caused an estimate damage cost of £200,000. The site visit discussions that were had during the course of the day on 29/11/2017, showed that there is a trash screen on Bushy Hill Lane which is used during high flows of surface water. The trash screen was estimated to be approximately 4m wide. Flood incidents have been related to the screen blockage but could also be due to nearby culverted watercourses.		
Properties at risk from surface water (high, medium, low)(count)	**High (30yr)**	**Medium (100yr)**	**Low (1000yr)**
	8	21	56
Sewer flooding incidents	18 flood incidents have been recorded in the postcode sector of WD23 2.– Last reported issue was on 28/11/2016 due to wet wipe blockage in I/C. At the hotspot selection workshop TW reported sewer upsizing along 11HG Park Avenue. Implemented as a result of previously reported flooding along Park Avenue to the main road. Since the scheme, no sewer flooding has been recorded.		
Local authority incidents	4		

Modelling and existing studies

Existing river models	This area is covered by the Upper Colne Mapping study. At the hotspot selection workshop on 16/01/2018 the EA confirmed that there are no further imminent plans to undertake modelling of the HIllfield Brook. However it was reported in the workshop that the brook may overlap with a future Watford Study, however this is likely to be outside of the timescale of this SWMP study, so is not relevant to report on at this stage.
Existing sewer models	Maple Lodge catchment. Macro (coarse) modelling of foul sewerage only.
Previous studies (including other SWMPs)	No detailed studies have been carried out for this hotspot area.
LiDAR coverage	Yes, the area is covered by LiDAR (EA 2m)

Other catchment needs and opportunities	
Water quality	The River Colne (from confluence with Ver to Gade) has an overall status of "Moderate" under the WFD water quality classifications (2016). No data is available for Hilfield Brook
Development	No development is proposed in this hotspot area.
Green spaces and designations	A large part of this hotspot is made up of green spaces around both watercourses. This includes Scotts Wood and Hartspring Meadow. Other named green spaces include Munden Drive Open Space, Knutsford Recreation Ground and Bushy Hall Golf Course. There are no other designations that have been identified in this hotspot area.
Working with natural processes	Within this hotspot there is potential for a large amount of floodplain woodland to be implemented along the valley of the River Colne, although this would not reduce local surface water risk.
Ongoing and proposed schemes	None have been identified.

Recommendations and options

Recommendations

Recommended way forward	The evidence that has been collated for this hotspot area is very scattered and there is not enough to make it warrant a modelling study at the moment.	
Agreed decision	Significant risk identified and further modelling required	
	Non-modelled hotspot (see next section for proposed action	
	No further actions	✓

Options (section to be completed for non-modelled hotspots only)

Proposed action	Lead organisation	Partners	Costs

Photographs

Site Photo 1		Trash screen on Bushy Mill Lane
Site Photo 2		Second image of trash screen
Site Photo 3		
Site Photo 4		

JBA Project Code	2017s6531
Project Name	Hertfordshire County Council SWMP Hotspots
Client	Hertfordshire County Council
Document	Hotspot Selection
Hotspot Code	HBC3

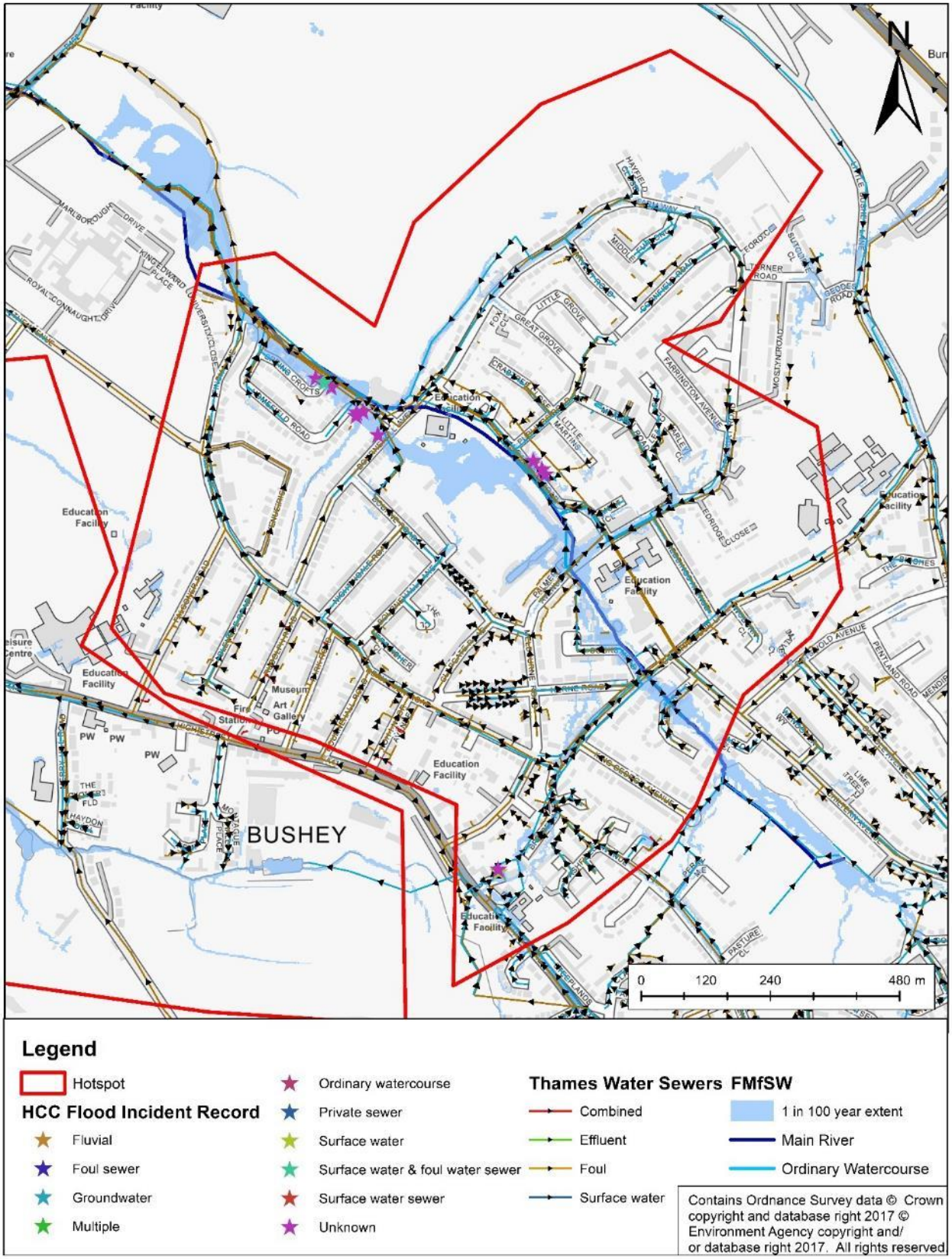
Surface Water Management Plan – Hotspot Selection

Overview

Hotspot Code	HBC3	
Hotspot Name	Moatfield Road	
Postcode	WD23 3AX	
Hotspot Area	**OS Grid Reference**	TL 13555 95867
	X coordinate	513555
	Y coordinate	195867
Local Authority	Hertsmere Borough	

Hotspot summary

Risk of Flooding from Surface Water (RoFSW) mapping	The RoFSW in this hotspot is predominately from the route of the main river (King George Drain) that exists through the centre of the hotspot area. The flow paths follow the roads, particularly Moatfield Road and Hardcourt Road. The site visit confirmed that the flow paths presented by the mapping seem accurate.
Sewerage	There are surface water and foul sewer networks that drain both in and out of the catchment. The surface water network feeds into the King George Drain. The foul sewer network exits the hotspot area in the west, along Finch Lane and up from Bournhall Avenue.
Other Drainage	HCC records show a network of highway drainage gullies across the hotspot. The connectivity of these is unknown, but it is assumed that they drain to the surface water sewers where present.
Watercourses	King George Drain - Main river + Ordinary watercourse
Flood incidents recorded	There have been 16 recorded flood incidents that have occurred in this hotspot. The flood incidents that have occurred along the High Street, Homefield Road, Spring Crofts, Moatfield Road and Bournehall Avenue. The hotspot is not covered by the EA historic flood map. the flood incidents on the flood incident record provided by HCC were all recorded in June 2016.
Topography and ground conditions	The topography of this hotpot has a range in elevation of between 83.46mAOD and 96.70mAOD. The topography of the land dips slightly along the course along King George Drain. The highest area of elevation exist in the hotspot in the south west, where it is 100.14mAOD.


N
BUSHEY
Education Facility
Museum
Art Gallery
Fire Station
PW
0
120
240
480 m
Legend
Hotspot
HCC Flood Incident Record
Fluvial
Foul sewer
Groundwater
Multiple
Ordinary watercourse
Private sewer
Surface water
Surface water & foul water sewer
Surface water sewer
Unknown
Thames Water Sewers
Combined
Effluent
Foul
Surface water
FMfSW
1 in 100 year extent
Main River
Ordinary Watercourse
Contains Ordnance Survey data © Crown copyright and database right 2017 © Environment Agency copyright and/or database right 2017. All rights reserved

Flood Risk

History of flooding	The 16 flood events that have occurred in the hotspot are from surface water and foul sewers. Many of the events that have occurred however, have been from unknown sources. The incidents on Moatfield Road have reportedly been described as the drains not coping, and the foul water manholes surcharging and overflowing onto the land. Flood incidents on the high street caused some residents to seek sheltered accommodation due to the flood event. Discussions from the site visit on 29/11/2017 included that along Moatfield Road, surface water drains have surcharged during previous flooding and has caused flooding in property gardens and houses. Along Finch Lane, there is a dip in the road that causes flood water to pond and presents risk to houses. There are also surface water sewers that surcharge into the road from houses. Behind the watercourse near to Spring Crofts in the north of the hotspot, there were discussions over the foul water and how it has tended to surcharge during flood conditions and affect the rear of an area of land that is allocated to allotments.		
Properties at risk from surface water (high, medium, low)(count)	**High (30yr)**	**Medium (100yr)**	**Low (1000yr)**
	33	67	247
Sewer flooding incidents	15 sewer flooding incidents have been recorded for the postcode sector that is covered by this hotspot, WD233. Last visit was 10/05/2017 with a network Engineer and FOS Sitra to investigate surface water line dispute with customer.		
Local authority incidents	16		

Modelling and existing studies

Existing river models	No model extents covering this area have been provided by the EA.
Existing sewer models	Maple Lodge catchment. Macro (coarse) modelling of foul sewerage only.
Previous studies (including other SWMPs)	There is an ongoing S19 Report that is due to be published in March 2018.
LiDAR coverage	Yes, the area is covered by LiDAR (EA 2m)

Other catchment needs and opportunities	
Water quality	There is no WFD class defined for the ordinary watercourse that are in this hotspot area, in addition to the main river, King George Drain. However, they drain into the River Colne which has an overall WFD class of "Moderate" under the WFD water quality classifications (2016).
Development	There are 9 areas of proposed development within this hotspot boundary.
Green spaces and designations	There are green areas such as behind Farm Way, around the education facility along Palmer Avenue and Bushey Rose Garden. There are no other designations that have been identified in this hotspot area.
Working with natural processes	Under the WWNP mapping there is opportunity for wider catchment woodland in the majority of the hotspot area, whilst there is a small central band of opportunity to implement riparian woodland near Bourne Road.
Ongoing and proposed schemes	None have been identified.

Recommendations and options

Recommendations

Recommended way forward	It is recommended that this hotspot is modelled and includes both the surface water and foul sewer networks. This hotspot area is the focus of flood risk in the borough of Hertsmere.	
Agreed decision	Significant risk identified and further modelling required	✓
	Non-modelled hotspot (see next section for proposed action	
	No further actions	

Options (section to be completed for non-modelled hotspots only)

Proposed action	Lead organisation	Partners	Costs

Photographs

Site Photo 1		Image of Moatfield road illustrating the flat topography
Site Photo 2		Image showing slope downwards along Finch Lane

Site Photo 3		Image of Finch Lane of area where water has tended to pool in the past
Site Photo 4		

JBA Project Code	2017s6531
Project Name	Hertfordshire County Council SWMP Hotspots
Client	Hertfordshire County Council
Document	Hotspot Selection
Hotspot Code	HBC4

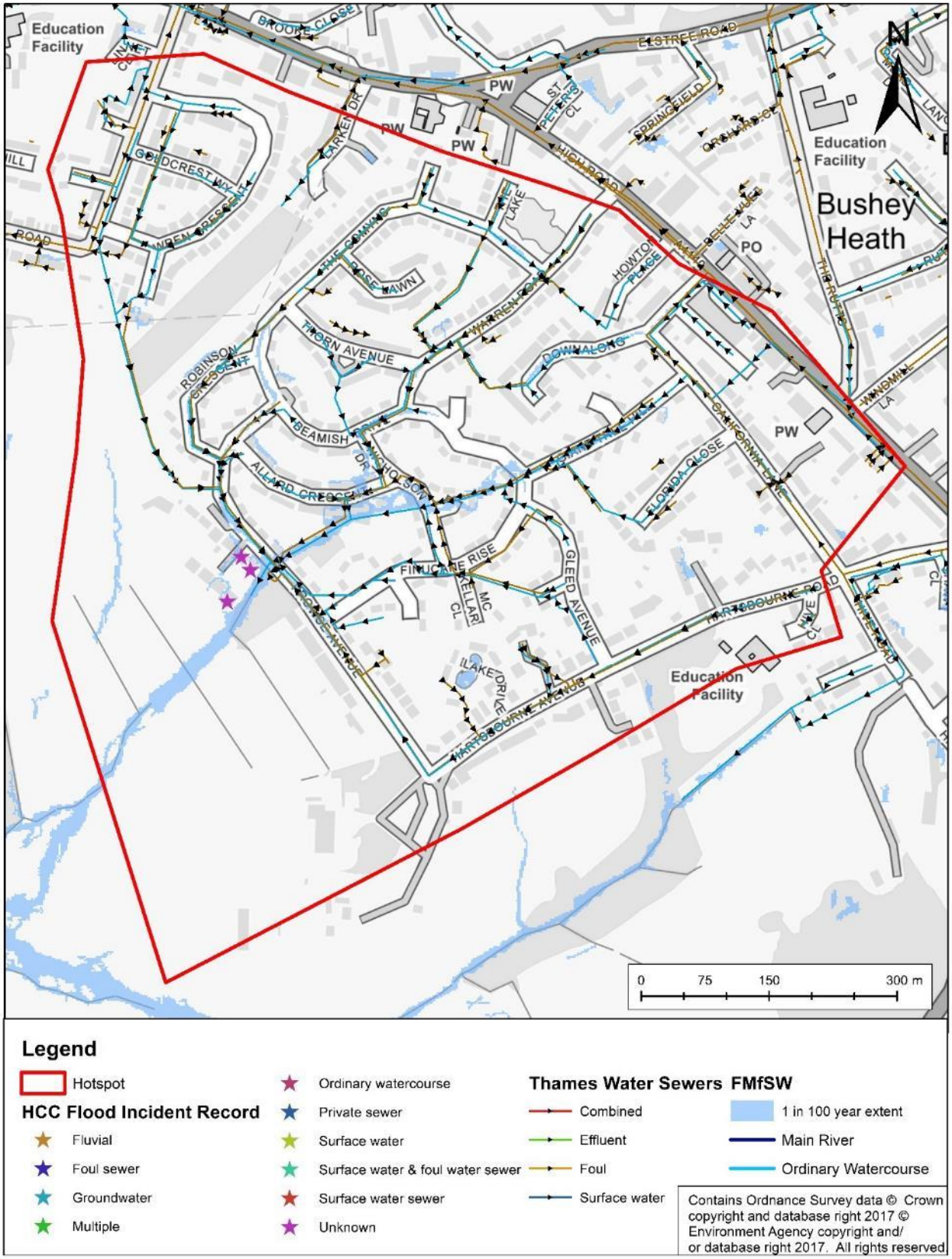
Surface Water Management Plan – Hotspot Selection

Overview

Hotspot Code	HBC4	
Hotspot Name	Prowse Avenue	
Postcode	WD23 1LB	
Hotspot Area	**OS Grid Reference**	TL 14254 93892
	X coordinate	514254
	Y coordinate	193892
Local Authority	Hertsmere Borough	

Hotspot summary

Risk of Flooding from Surface Water (RoFSW) mapping	The RoFSW comes in from the west of the hotspot area and diverts along one main pathway which is Prowse Avenue. The surface water flood risk is linked to the ordinary watercourse and the flow path flows along the fields behind Prowse Avenue before diverting along the roads in this hotspot, particularly Giant Tree Hill, Allard Crescent and Robinson Crescent. The site observations confirmed the pathway of the flood risk seems accurate and reasonable.
Sewerage	There are surface water and foul sewer networks that drain into the catchment from the east, and drain out of the catchment to the north west.
Other Drainage	HCC records show a network of highway drainage gullies across the hotspot. The connectivity of these is unknown, but it is assumed that they drain to the surface water sewers where present.
Watercourses	Ordinary watercourse
Flood incidents recorded	The 3 flood events have occurred along Prowse Avenue and Abercorn Dell. The events have not been linked to a specific cause. They occurred in June 2016. This hotspot area is not covered by the EA historic Flood Map.
Topography and ground conditions	The topography of this hotspot slopes from the east to the west. The gradient rises gently over three main bands of elevation. The elevation ranges from approximately 101.31mAOD to 126.32mAOD to 141.83mAOD.


Education Facility
Education Facility
Education Facility
Bushey Heath
PW
PO
0
75
150
300 m
Legend
Hotspot
HCC Flood Incident Record
Fluvial
Foul sewer
Groundwater
Multiple
Ordinary watercourse
Private sewer
Surface water
Surface water & foul water sewer
Surface water sewer
Unknown
Thames Water Sewers
Combined
Effluent
Foul
Surface water
FMfSW
1 in 100 year extent
Main River
Ordinary Watercourse
Contains Ordnance Survey data © Crown copyright and database right 2017 © Environment Agency copyright and/ or database right 2017. All rights reserved

Flood Risk

History of flooding	The flood incidents that have been recorded within this hotspot have all been from unknown sources. They have caused both internal and external flooding to properties. Observations from the site visit no 29/11/2017 along Prowse avenue showed that there are a number of rain gardens to intercept the flow. There is a good amount of road drainage along Prowse Avenue, however it is evident from the slope along the road that there is a strong surface water pathway. Property number 39 has been known to flood such as in 2009 from road runoff and foul sewer pumps that have surcharged.		
Properties at risk from surface water (high, medium, low)(count)	**High (30yr)**	**Medium (100yr)**	**Low (1000yr)**
	1	4	21
Sewer flooding incidents	7 sewer flood incidents have been recorded for the postcode sector WD23 1 which covers this hotspot area. Some blockage jobs over last few years. Recent issue of roots in the lateral of a property that required a root cut. This was 04/01/2018. The hotspot selection workshop on 16/01/2018 revealed that there was a study by TW undertaken in 2012 to investigate the interaction between the surface water and foul sewer network.		
Local authority incidents	3		

Modelling and existing studies

Existing river models	No model extents covering this area have been provided by the EA.
Existing sewer models	Maple Lodge catchment. Macro (coarse) modelling of foul sewerage only.
Previous studies (including other SWMPs)	No detailed studies have been carried out for this hotspot area. However, detailed S19 Investigation reports have been requested. Approximately 10-15 years ago, Hertsmere Borough Council improved the headwall and grills.
LiDAR coverage	Yes, the area is covered by LiDAR (EA 2m)

Other catchment needs and opportunities	
Water quality	There is no WFD class defined for the ordinary watercourse that are in this hotspot area. However, they drain into Hearts Bourne which feeds into the River Colne which has an overall WFD class of "Moderate" under the WFD water quality classifications (2016).
Development	No development is proposed in this hotspot area.
Green spaces and designations	There is a green area in the west of this hotspot are, which occupies part of an ordinary watercourse, which enters the area from Little Hartsbourne wood on the western boundary of the hotspot. Mary Forsdyke Garden is a named green space area in the hotspot boundary, as well as Hartsbourne Country Club that is in the south west of the hotspot, with its entrance being at the end of Prowse Avenue.
Working with natural processes	Under the WWNP there is opportunity for riparian woodland and wider catchment woodland that has been identified with the WWNP mapping.
Ongoing and proposed schemes	None have been identified.

Recommendations and options

Recommendations

Recommended way forward	It has been decided that this hotspot will be taken forward as a non-modelled hotspot due to there only being 1 property to have experienced flooding. It would be difficult to implement any flood prevention measures due to the fence line and the location of property at risk. The recommended action is to undertake PLR work at this location. Note that there is a Thames Water (foul) SPS along the road. Maintenance on the drainage curb that has been implemented is a potential option here.	
Agreed decision	Significant risk identified and further modelling required	
	Non-modelled hotspot (see next section for proposed action	✓
	No further actions	

Options (section to be completed for non-modelled hotspots only)

Proposed action	Lead organisation	Partners	Costs

Photographs

Site Photo 1		Image of Prowse Avenue illustrating the slope down the road.
Site Photo 2		Prowse Avenue downwards elevation and location of Bushey SPS owned by Thames Water (PROWP1ZZ)
Site Photo 3		
Site Photo 4		

JBA Project Code	2017s6531
Project Name	Hertfordshire County Council SWMP Hotspots
Client	Hertfordshire County Council
Document	Hotspot Selection
Hotspot Code	HBC5

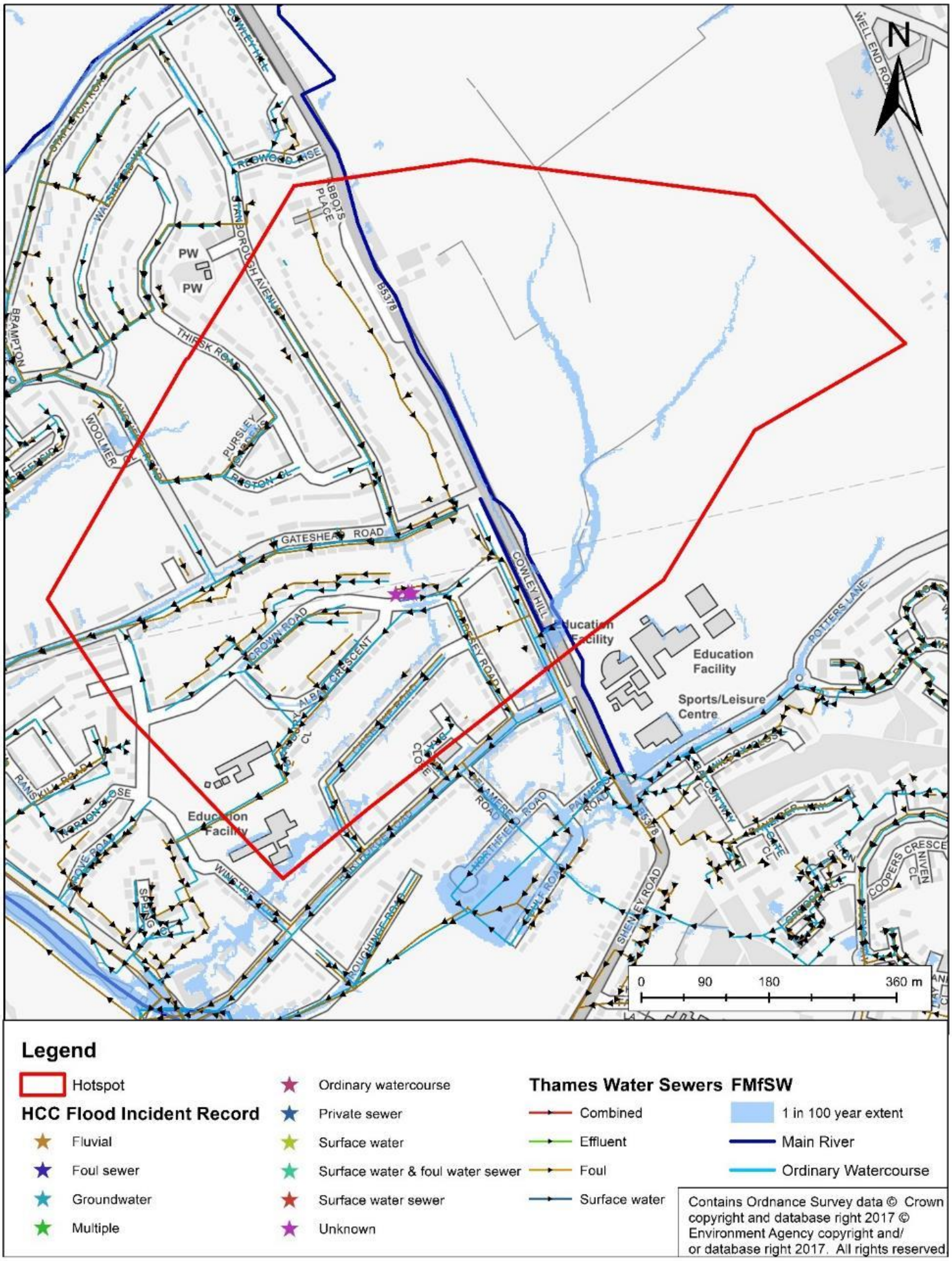
Surface Water Management Plan – Hotspot Selection

Overview

Hotspot Code	HBC5	
Hotspot Name	Crown Road	
Postcode	WD6 5JH	
Hotspot Area	**OS Grid Reference**	TL 19705 97968
	X coordinate	519705
	Y coordinate	197968
Local Authority	Hertsmere Borough	

Hotspot summary

Risk of Flooding from Surface Water (RoFSW) mapping	The RoFSW follows the natural topography of the land. The flow route goes from the north east to the south west. The flow route is predominately along the roads, with it draining across the fields in the north east initially. There is possibility that the areas drainage capacity in this hotspot has been underestimated which could potentially mean tha the RoFSW is over estimated.
Sewerage	There are surface water and foul sewer networks that drain out of the catchment towards the south and along Hartford Road.
Other Drainage	HCC records show a network of highway drainage gullies across the hotspot. The connectivity of these is unknown, but it is assumed that they drain to the surface water sewers where present. Along the B5378, they probably drain directly to the culverted watercourse.
Watercourses	Catherine Bourne - main river, 2 ordinary watercourses
Flood incidents recorded	The flooding in this area has been recorded on Crown Road, but the cause of the flood events are unknown. The flood event recorded for this hotspot area took place in June 2016.
Topography and ground conditions	The topography of the land slopes from the north east to the south west. The surface water flow path follows the topographic nature of the catchment area. There is a range in the elevation of between 124.92mAOD to 89.43mAOD.



N
COWLEY HILL
REDWOOD RISE
ABBOTS PLACE
STANBOROUGH AVENUE
B5378
PW
PW
THIRSK ROAD
BRAMPTON
WOOLMER
PURSLEY
RISTON CL
GATESHEAD ROAD
CROWN ROAD
ALBAN CRESCENT
Education Facility
Education Facility
Sports/Leisure Centre
POTTERS LANE
Education Facility
NORTHFIELD ROAD
WINSTRE
SHENLEY ROAD
COOPERS CRESCE
NIVEN CL
RANSKILL ROAD
WELL END ROAD
0
90
180
360 m
Legend
Hotspot
HCC Flood Incident Record
Fluvial
Foul sewer
Groundwater
Multiple
Ordinary watercourse
Private sewer
Surface water
Surface water & foul water sewer
Surface water sewer
Unknown
Thames Water Sewers
Combined
Effluent
Foul
Surface water
FMfSW
1 in 100 year extent
Main River
Ordinary Watercourse
Contains Ordnance Survey data © Crown copyright and database right 2017 © Environment Agency copyright and/ or database right 2017. All rights reserved

Flood Risk

History of flooding	There have been 3 flood incidents that have been recorded within this hotspot. It is not known if the flood events caused internal flooding, but external flooding to properties was reported. It was reported that water from the main sewer flowed down the footpath and into the side garden on a property along Crown Road. Observations from the site visit on 29/11/2017 shows that along Crown Road there are balancing ponds nearby and Maxwell Drain crosses Elsury Way has flooded on several occasions from the drain surcharging. Maxwell Park has also been known to flood. In 2003 there was a flood incident that was due to the surcharging of the drain only.		
Properties at risk from surface water (high, medium, low)(count)	**High (30yr)**	**Medium (100yr)**	**Low (1000yr)**
	0	3	22
Sewer flooding incidents	There have been 8 recorded sewer flooding incidents for the postcode sector that is covered by this hotspot, WD6 5. TW reported to have found a wet wipe blockage job for Crown Road under WD6 5JJ which was 14/08/2017. The hotspot selection workshop with TW on 16/01/2018 revealed that there has been foul water flooding incidents in 1992 and 2000, however both events have contributed to single property flooding only.		
Local authority incidents	3		

Modelling and existing studies

Existing river models	No model extents covering this area have been provided by the EA.
Existing sewer models	Maple Lodge catchment. Macro (coarse) modelling of foul sewerage only.
Previous studies (including other SWMPs)	No detailed studies have been carried out for this hotspot area.
LiDAR coverage	Yes, the area is covered by LiDAR (EA 2m)

Other catchment needs and opportunities	
Water quality	There is no WFD class defined for the ordinary watercourse or main river (Catherine Bourne) that are in this hotspot area. However, they drain into the River Colne after it goes through Mimmshall Brook which has an overall WFD class of "Moderate" under the WFD water quality classifications (2016).
Development	There is a small amount of proposed development within this hotspot area is Oddesey Road.
Green spaces and designations	There is a large area of green space (fields) adjacent to Catherine Bourne, the main river that runs through the hotspot. The named green spaces in the area are Thriskcliffe Nature Park and Aycliffe Park that are located in the north east of the hotspot. No other designations have been identified in this area.
Working with natural processes	No potential for WWNP has been identified in this hotspot area under the mapping.
Ongoing and proposed schemes	None have been identified.

Recommendations and options

Recommendations

Recommended way forward	This hotspot has been considered to have lower priority, and doesn't warrant being modelled Any possible future modelling should look at retaining any water within the highway e.g. at Gateshead Road. It is advised that this hotspot is taken forward for PLR work and that the known flood incidents are looked at in more detail.	
Agreed decision	Significant risk identified and further modelling required	
	Non-modelled hotspot (see next section for proposed action	✓
	No further actions	

Options (section to be completed for non-modelled hotspots only)

Proposed action	Lead organisation	Partners	Costs

Photographs

Site Photo 1		Image of area around Hartforde Road/ Cowley Hill
Site Photo 2		Image of area around Hartforde Road/ Cowley Hill
Site Photo 3		
Site Photo 4		

JBA Project Code	2017s6531
Project Name	Hertfordshire County Council SWMP Hotspots
Client	Hertfordshire County Council
Document	Hotspot Selection
Hotspot Code	HBC6

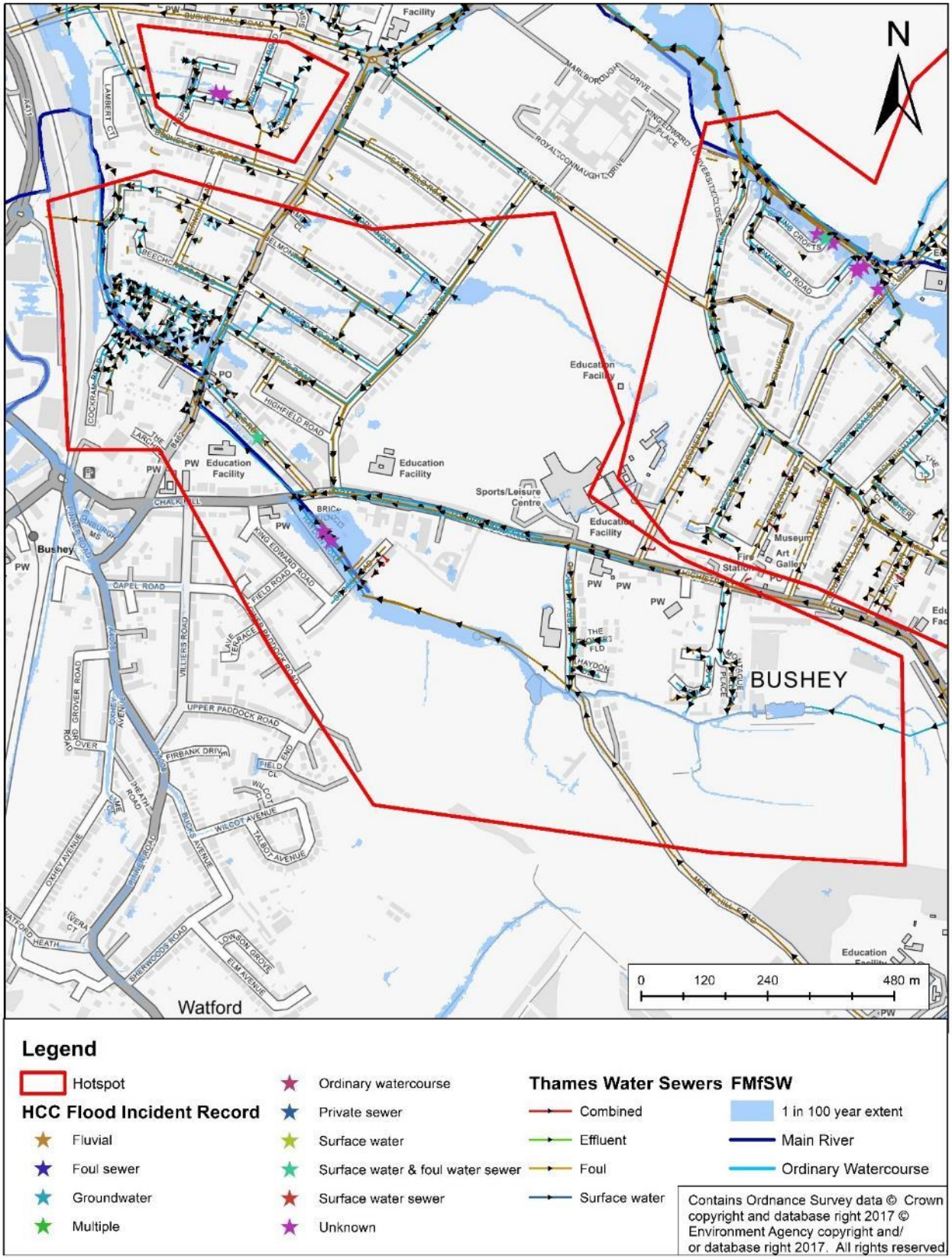
Surface Water Management Plan – Hotspot Selection

Overview

Hotspot Code	HBC6	
Hotspot Name	Bushey (Roads including Moatfield Road, Spring cross, Vale Road, Hayden Road and Homefield Road)	
Postcode	WD19 4DG	
Hotspot Area	**OS Grid Reference**	TL 12309 95437
	X coordinate	512309
	Y coordinate	195437
Local Authority	Hertsmere Borough	

Hotspot summary

Risk of Flooding from Surface Water (RoFSW) mapping	The RoFSW in this hotspot follows the natural sloping valley, from the north of the hotspot down to the south east. There is one main route that the flow path takes, along Vale Road and then across the fields (Attenborough's Fields) and down along Merry Hill Road.
Sewerage	The surface water and foul sewer network sewers in this hotspot drain out of the catchment. They enter from the south east and exist by the north at Chalk Hill.
Other Drainage	HCC records show a network of highway drainage gullies across the hotspot. The connectivity of these is unknown, but it is assumed that they drain to the surface water sewers where present.
Watercourses	Waterfields Way Ditch main river + ordinary watercourse. The main river adjoins the ordinary watercourse across Attenborough's Fields.The hotspot selection workshop revealed that the line of the main river in this hotspot is potentially incorrect and is an orinary watercourse instead.
Flood incidents recorded	There have been 3 flood incidents that have been recorded in the hotspot. The area is not covered by the EA historic flood map.
Topography and ground conditions	The topography of the hotspot area ranges between 102.1mAOD and 59.1mAOD. The lower elevated area exists around the main river.


N
BUSHEY
Watford
Bushey
Sports/Leisure Centre
Education Facility
Museum
Art Gallery
Fire Station
0
120
240
480 m
Legend
Hotspot
HCC Flood Incident Record
Fluvial
Foul sewer
Groundwater
Multiple
Ordinary watercourse
Private sewer
Surface water
Surface water & foul water sewer
Surface water sewer
Unknown
Thames Water Sewers
Combined
Effluent
Foul
Surface water
FMfSW
1 in 100 year extent
Main River
Ordinary Watercourse
Contains Ordnance Survey data © Crown copyright and database right 2017 © Environment Agency copyright and/or database right 2017. All rights reserved

Flood Risk

History of flooding	They have been caused by surface water flooding and foul water sewage along Vale Road and the two incidents that have been recorded on Hayden Road have been due to unknown causes. Observations from the site visit on 29/11/2017 confirmed that there is a culvert that runs alongside the front gardens of the houses along Haydon Road. The culvert has been identified as part of the may river, and the culvert entrance was estimated to be approximately 1m by 1.2m with a 250m pipe going into the inlet. A clear dry winterbourne channel exists behind Hayden Road in Attenborough Fields. There are airbricks that were identified under the doors of house entrances.		
Properties at risk from surface water (high, medium, low)(count)	**High (30yr)**	**Medium (100yr)**	**Low (1000yr)**
	23	30	100
Sewer flooding incidents	There have been 6 sewer flooding incidents that have been recorded for the postcode sector WD19 4 that is covered by this hotspot. TW reported to have found a few odd blockage jobs on S24 / S105 lines under WD19 4D. The most recent was 02/12/2017 due to fat abuse blocking an I/C. The hotspot selection workshop on 16/01/2018 with TW revealed that there have been sewer flood incidents recorded along Grange Road. The workshop also revealed flood incidents to be recorded by TW on Woodlands Road. Sewer upsizing and flow diversion took place to resolve the problem (date unknown).		
Local authority incidents	3		

Modelling and existing studies

Existing river models	No model extents covering this area have been provided by the EA.
Existing sewer models	Maple Lodge catchment. Macro (coarse) modelling of foul sewerage only.
Previous studies (including other SWMPs)	No detailed studies have been carried out for this hotspot area.
LiDAR coverage	Yes, the area is covered by LiDAR (EA 2m)

Other catchment needs and opportunities	
Water quality	There is no WFD class defined for the main river that is in this hotspot area. However, they drain into the River Colne which has an overall WFD class of "Moderate".
Development	There are several areas of posed development that exist in this hotspot area, with main areas of proposed development along Vale Road and Aldenham Road.
Green spaces and designations	There are large open green spaces in this hotspot including Attenborough's Fields. Behind Attenborough Fields is Oxhey Green and to the north of that is Bushey Baptist Church. To the far east of the hotspot is another green area that has been identified as The Bushey Arena. No other designations have been identified in this hotspot area.
Working with natural processes	In this hotspot there is potential for implementation of riparian woodland and wider catchment woodland opportunities, particularly in the west of the hotspot.
Ongoing and proposed schemes	None have been identified.

Recommendations and options

Recommendations

Recommended way forward	It is recommended that this hotspot is taken forward as a modelled hotspot. We recommend modelling the hotspot from the start for the a section of the ordinary watercourse, along to the culvert and modelling the watercourse at the outlet as well as Vale Road. To model this hotspot, OWC survey would need to be carried out.	
Agreed decision	Significant risk identified and further modelling required	✓
	Non-modelled hotspot (see next section for proposed action	
	No further actions	

Options (section to be completed for non-modelled hotspots only)

Proposed action	Lead organisation	Partners	Costs

Photographs

Site Photo 1

Image of Haydon Road

Site Photo 2

Culvert along Haydon Road at the entrance to Attenborough Fields

Site Photo 3		Winterbourne stream in Attenborough Fields which is on the boundary of Hertsmere and Watford.
Site Photo 4		

JBA Project Code	2017s6531
Project Name	Hertfordshire County Council SWMP Hotspots
Client	Hertfordshire County Council
Document	Hotspot Selection
Hotspot Code	HBC7

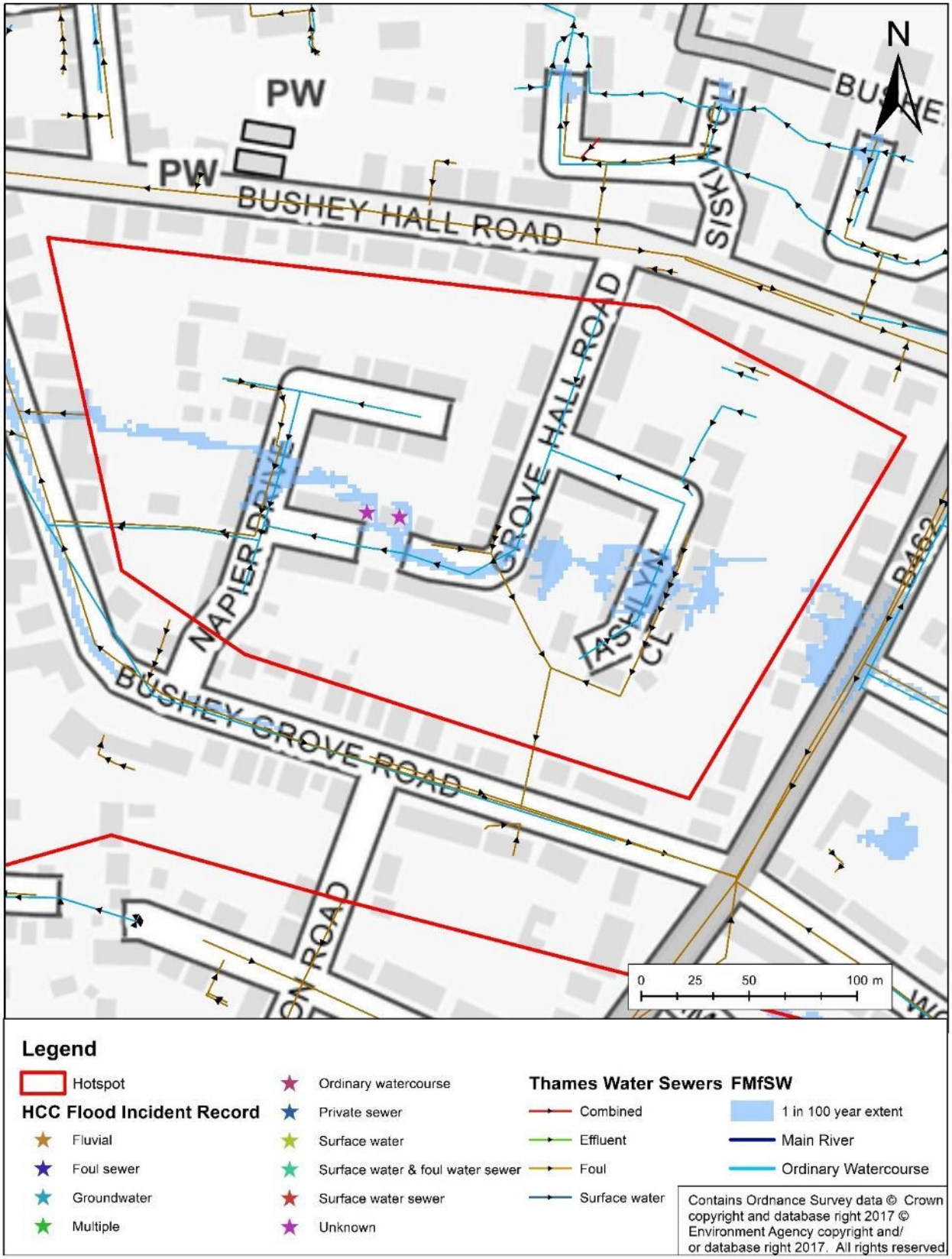
Surface Water Management Plan – Hotspot Selection

Overview

Hotspot Code	HBC7	
Hotspot Name	Napier Drive	
Postcode	WD23 2JH	
Hotspot Area	**OS Grid Reference**	TL 12170 96188
	X coordinate	512170
	Y coordinate	196188
Local Authority	Hertsmere Borough	

Hotspot summary

Risk of Flooding from Surface Water (RoFSW) mapping	The RoFSW in this hotspot area flows across the central band of the boundary, through the residential housing area and along the roads. The main area that is at risk is Bushey Grove Road, Napier Drive and Ashlyn Close.
Sewerage	Surface water and foul sewer networks run through this hotspot. The surface water sewer network exits the hotspot boundary on Bushey Grove Road in the west, whilst the foul sewer network exits to the south of Bushey Grove Road. An assessment made by HCC on Google StreetView of this area showed the drain to span the width of the road. There is an ACO drain at the hotspot over the highway of St Lenoards Close which is at the T junction of Napier Drive, as identified in another study that HCC are doing.
Other Drainage	HCC records show a network of highway drainage gullies across the hotspot. The connectivity of these is unknown, but it is assumed that they drain to the surface water sewers where present.
Watercourses	There no watercourses present within this hotspot
Flood incidents recorded	2 flood incidents have been recorded in this hotspot area, along Grove Hall Road and Hastings Way. These flood incidents relate to June 2016.
Topography and ground conditions	The topography of the land slopes slightly from the south east to the north west. The elevation ranges between 68.59mAOD and 61.87mAOD. The hotspot is within a residential area of Hertsmere.


N
PW
PW
BUSHEY HALL ROAD
GROVE HALL ROAD
NAPIER RD
BUSHEY GROVE ROAD
0 25 50 100 m
Legend
Hotspot
HCC Flood Incident Record
Fluvial
Foul sewer
Groundwater
Multiple
Ordinary watercourse
Private sewer
Surface water
Surface water & foul water sewer
Surface water sewer
Unknown
Thames Water Sewers
Combined
Effluent
Foul
Surface water
FMfSW
1 in 100 year extent
Main River
Ordinary Watercourse
Contains Ordnance Survey data © Crown copyright and database right 2017 © Environment Agency copyright and/ or database right 2017. All rights reserved

Flood Risk

History of flooding	The cause of the flood events that have been recorded in this hotspot area are not known. They were reported to have caused external flooding to properties. Observations from the site visit on 29/11/2017 showed that the flooding in the hotspot is very localised and the events are unrelated.		
Properties at risk from surface water (high, medium, low)(count)	**High (30yr)**	**Medium (100yr)**	**Low (1000yr)**
	0	2	16
Sewer flooding incidents	18 sewer flooding incidents have been recorded for the postcode sector WD23 2 that is covered by this hotspot area. TW reported the last issue was in 2014 due to river holding high.		
Local authority incidents	2		

Modelling and existing studies

Existing river models	No model extents covering this area have been provided by the EA.
Existing sewer models	Maple Lodge catchment. Macro (coarse) modelling of foul sewerage only.
Previous studies (including other SWMPs)	No detailed studies have been carried out for this hotspot area.
LiDAR coverage	Yes, the area is covered by LiDAR (EA 2m)

Other catchment needs and opportunities	
Water quality	No watercourses are present within this hotspot area
Development	There is one small area of proposed development that exists in this hotspot area, at the end of Ashlyn Close.
Green spaces and designations	There are no green space and designation areas in this hotspot.
Working with natural processes	No potential for WWNP has been identified in this hotspot area under the mapping.
Ongoing and proposed schemes	None have been identified.

Recommendations and options

Recommendations

Recommended way forward	The flood risk along Napier Drive was not considered to be significant enough to warrant being modelled and it is advised that if anything, localised PLR action would be the way forward. An assessment of the highway drainage is recommended.	
Agreed decision	Significant risk identified and further modelling required	
	Non-modelled hotspot (see next section for proposed action	
	No further actions	✓

Options (section to be completed for non-modelled hotspots only)

Proposed action	Lead organisation	Partners	Costs
HBC to investigate the localised flood risk in this hotspot through PLR work.			

Photographs

Site Photo 1		Image of Napier Drive
Site Photo 2		Negative thresholds along Napier Drive – showing steps down to houses, presenting areas of ponding/vulnerability to houses
Site Photo 3		
Site Photo 4		

JBA Project Code	2017s6531
Project Name	Hertfordshire County Council SWMP Hotspots
Client	Hertfordshire County Council
Document	Hotspot Selection
Hotspot Code	HBC8

Surface Water Management Plan – Hotspot Selection

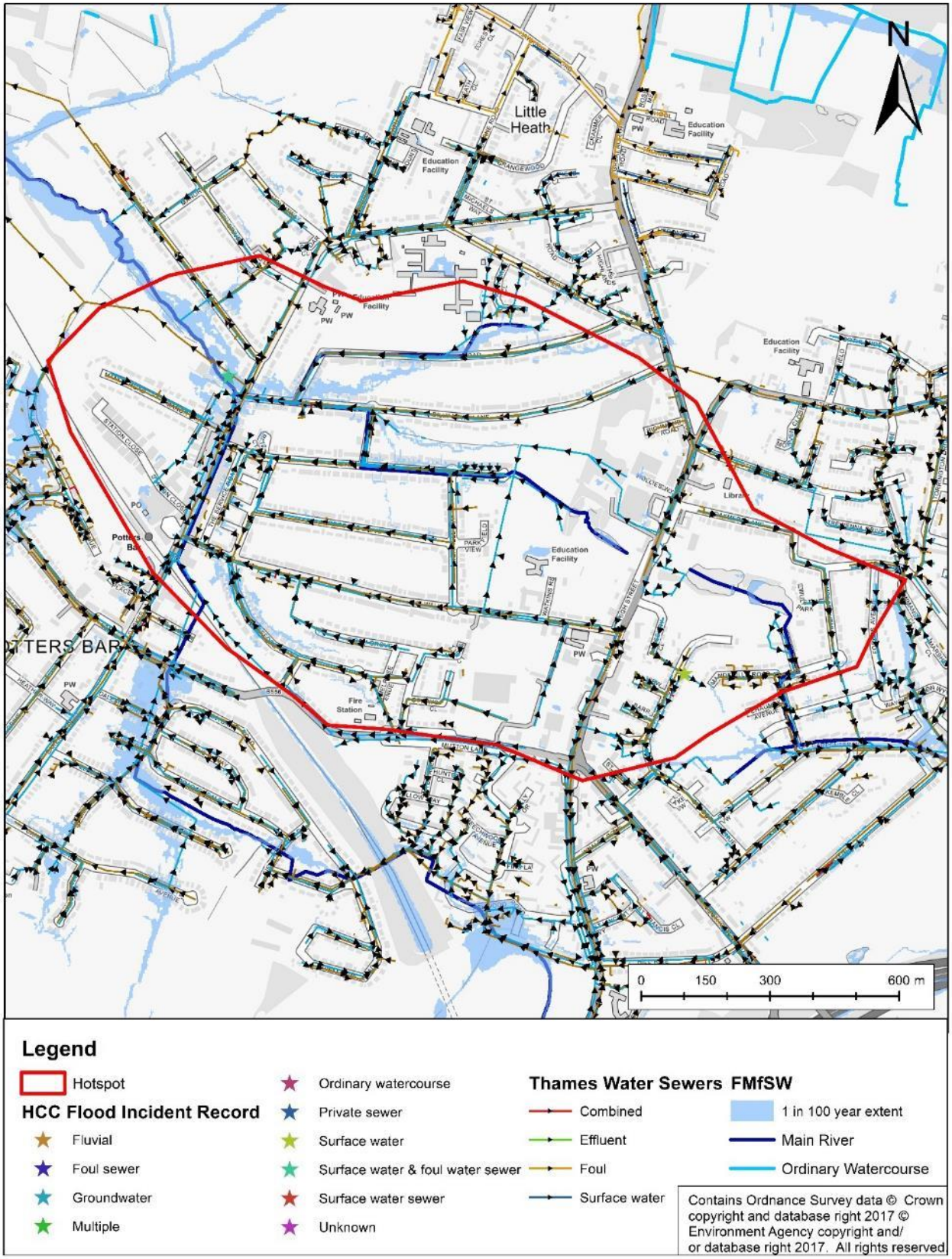
Overview

Hotspot Code	HBC8	
Hotspot Name	Highview and Darkes Lane	
Postcode	EN6 1DD	
Hotspot Area	**OS Grid Reference**	TL 25200 01750
	X coordinate	525200
	Y coordinate	201750
Local Authority	Hertsmere Borough	

Hotspot summary

Risk of Flooding from Surface Water (RoFSW) mapping	The RoFSW in this hotspot area flows in from the main river Potters Bar Brook, which enters the catchment from the north west. The flow path diverts into three smaller routes along roads, as it follows the natural topography, as it follows the natural slope of the land.
Sewerage	This hotspot area has surface water and foul sewer networks draining into the hotspot boundary from the east, and draining out towards the east. Some of the surface water network also drains to the south.
Other Drainage	HCC records show a network of highway drainage gullies across the hotspot. The connectivity of these is unknown, but it is assumed that they drain to the surface water sewers where present.
Watercourses	Oakmere Drain , classified as a main river is within this hotspot boundary as well as Parkfield Drain, Mount Grace Road Drain ad Billy Lows Lane Drained. Parkfield Drain flows into Potters Bar Brook which is also a main river.
Flood incidents recorded	The flood incidents that have occurred in this hotspot area have been due to surface water and foul sewer water. The recorded incidents date to August 2015 at Potters Bar golf club and June 2017 at Highview Gardens.
Topography and ground conditions	The topography of the area ranges between approximately 90.1mAOD and 111mAOD.

JBA Project Code	2017s6531
Project Name	Hertfordshire County Council SWMP Hotspots
Client	Hertfordshire County Council
Document	Hotspot Selection
Hotspot Code	HBC8



JBA Project Code	2017s6531
Project Name	Hertfordshire County Council SWMP Hotspots
Client	Hertfordshire County Council
Document	Hotspot Selection
Hotspot Code	HBC8

Flood Risk

History of flooding	The 2 recorded flood events that have been recorded, caused by surface water and foul sewer water caused external flooding to properties but not internal flooding. The pathway of the flooding was along the roads.		
Properties at risk from surface water (high, medium, low)(count)	**High (30yr)**	**Medium (100yr)**	**Low (1000yr)**
	4	15	110
Sewer flooding incidents	12 sewer flooding incidents have been recorded for the postcode sector EN6 1 which covers the area that this hotspot is in. TW reported there to be a historical case under EN6 1DE which relates to the Golf Course and flooding to the car park. The hotspot selection workshop revealed that TW have carried out several investigations along Byng Drive and Darkes Lane to assess the interactions between the surface water and foul water network. TW also reported that improvements to the sewers were made in 1999.		
Local authority incidents	2		

Modelling and existing studies

Existing river models	No model extents covering this area have been provided by the EA.
Existing sewer models	Maple Lodge catchment. Macro (coarse) modelling of foul sewerage only.
Previous studies (including other SWMPs)	No detailed studies have been carried out for this hotspot area.
LiDAR coverage	Yes, the area is covered by LiDAR (EA 2m)

Other catchment needs and opportunities	
Water quality	There is no WFD class defined for the main rivers that are in this hotspot area. However, they drain into the River Colne after it goes through Mimmshall Brook which has an overall WFD class of "Moderate" under the WFD water quality classifications (2016).
Development	There are 5 areas of proposed development within this hotspot boundary. The largest one being in the west, near Darkes Lane, at the edge of this hotspot boundary.
Green spaces and designations	There is an area of green space around the education facility and behind Oakmere Lane where the main river (Oakmere Drain) flows through and there are 2 ponds. Named green space areas in the hotspot boundary include Oakmere Park, Potters Bar Cricket Club and Potters Bar United Reformed Church. No other designations have been identified in this hotspot area.
Working with natural processes	In the eastern area of this hotspot boundary, the WWNP mapping has presented opportunity for the implementation of riparian woodland and wider catchment woodland.
Ongoing and proposed schemes	None have been identified.

Recommendations and options

Recommendations

Recommended way forward	There is currently a modelling study that is being carried out here by Hertfordshire County Council to improve the fluvial mapping in the area. As a result, this other study that is being carried out will take account of recommendations and actions. This study will be taken forward as a non-modelled hotspot to recognise the risk associated with the site/continued identification of the potential risk. There is potential for local level funding for this hotspot area.	
Agreed decision	Significant risk identified and further modelling required	
	Non-modelled hotspot (see next section for proposed action	✓
	No further actions	

Options (section to be completed for non-modelled hotspots only)

Proposed action	Lead organisation	Partners	Costs
Other study will take account of the recommendations and actions.			

Photographs

Site Photo 1	No images taken for this hotspot area
Site Photo 2	
Site Photo 3	
Site Photo 4	