



Flood Risk Assessment for land at Pinkham Way (A406)

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Executive Summary


Haringey's allocation of the land at Pinkham Way based on the evidence of a draft Strategic Flood Risk Assessment is of some concern. This concern is then heightened by the statement made by JBA Consulting in their Executive Summary that the assessment *"looks exclusively at flood risk within the London Borough of Haringey."* As required under the NPPG Haringey must use the Strategic Flood Risk Assessment to determine flood risk to and from surrounding areas in the same flood catchment. In the case of Pinkham Way part of the surrounding area lies in London Borough of Barnet and the land is situated within the Bounds Green Brook flood catchment and working collaboratively with other authorities, local planning authorities Haringey can develop a Strategic Flood Risk Assessment covering a wider area and at a river catchment level.

The question that Haringey has to answer is "Will development of the land at Pinkham Way increase flood risk elsewhere". The only way they can answer this question is with a non-isolationist and compliant Strategic Flood Risk Assessment that assesses, in detail, the geology and hydrology of the allocated land and identifies where the sources of flood risk from the land, if any, will impact elsewhere.

If the assessments prove that flood risk will be increased then development cannot be permitted and the risks must be eliminated and or managed by means of Strategic Flood Risk Infrastructure that will guarantee the safety of the people, property and essential infrastructure so affected.

If the flood risks will occur in two or more LPA's outside Haringey then they have a "Duty to Co-operate" with those LPAs and prove that such co-operation has been ongoing and meaningful. Failure to meet this requirement will mean that Haringey's Local Plan will be unsound.

Our Strategic Flood Risk Assessment of the land at Pinkham Way clearly demonstrates that development will increase flood risk elsewhere and the impacts of those risk will be felt in both the London Borough of Barnet and the London Borough of Enfield and the other LPA's downstream in the Lower Lea River network.



Chris Faulkner Eng Tech MIHE

01-03-14

History and hydrology

History

The land at Pinkham Way did not exist prior to 1980 and has never been developed or made any contribution to any of the local sources of flooding.

The land was created by way of an untreated household waste landfill operation carried out by the London Borough of Barnet following the closure of the sewage treatment plant in 1963. The treatment works were first opened in 1893 by the then Friern Barnet Urban District Council and with the increase in population in the Freehold and Muswell Hill communities the works underwent a rapid increase in capacity with the facilities being upgraded a number of times as improved treatment technologies developed.

The landfill operation from 1963 created a plateau of land to some 13m above the original site grade which overlays an extensive London/Thames clay deposit. The waste landfill was capped by a layer of park and highway waste deposited between approximately 1978 and 1980. This capping being responsible for seeding the extensive tree and fauna coverage that has developed on the land over the past 35 years.

The land was first designated by Haringey as a "Site of importance for Nature Conservation" along with the conflicting "Employment" designation in 1998.

Considering the extensive area of the land, some 6.3 ha, it has a very poor planning application history for what should be a very attractive site for development. However, soil surveys carried out on the land in 1998 and 2010/11 showed that the underlying landfill has poor structural cohesion properties with extensive pockets of methane. Significant voids were also identified and from a construction perspective potential developers will find the costs for internal roads, foundations and contamination remediation a significant barrier to any form of development. Especially as the Bounds Green Industrial Estate, located only 100m east would allow a far more cost benefit development. Meeting the requirement to "Enhance the SINC" would also be expensive and limit the area of land available. All the above evidence indicates that the "Employment" designation has a high risk of not being deliverable within Haringey's Local Plan horizon.

Hydrology

Figure 1, opposite, shows the embryonic sewage treatment plant in 1895 along with its relationship to the golf course tributary and the Bounds Green Brook. The tributary clearly provided surface and groundwater drainage to the treatment plant area as well as being an outfall for the treated effluent to the Bounds Green Brook.

Figure 2 shows the vastly expanded and improved STW in 1937 along with the new A406 Pinkham Way, constructed in 1933. The Pinkham Way construction included diverting the Bounds Green Brook northwards and into a man made open culvert, the A406 carriageway being constructed over the original natural water course. The original pipe culvert section of the BGB, running under the rail embankment, was extended eastward and the golf course tributary, where it ran through the STW land was enclosed in a pipe culvert and extended under the A406 to outfall into the newly diverted Bounds Green Brook. A new outfall for the STW to the Bounds Green Brook was created just west of the railway and under the A406 outfalling into the extended rail embankment culvert.

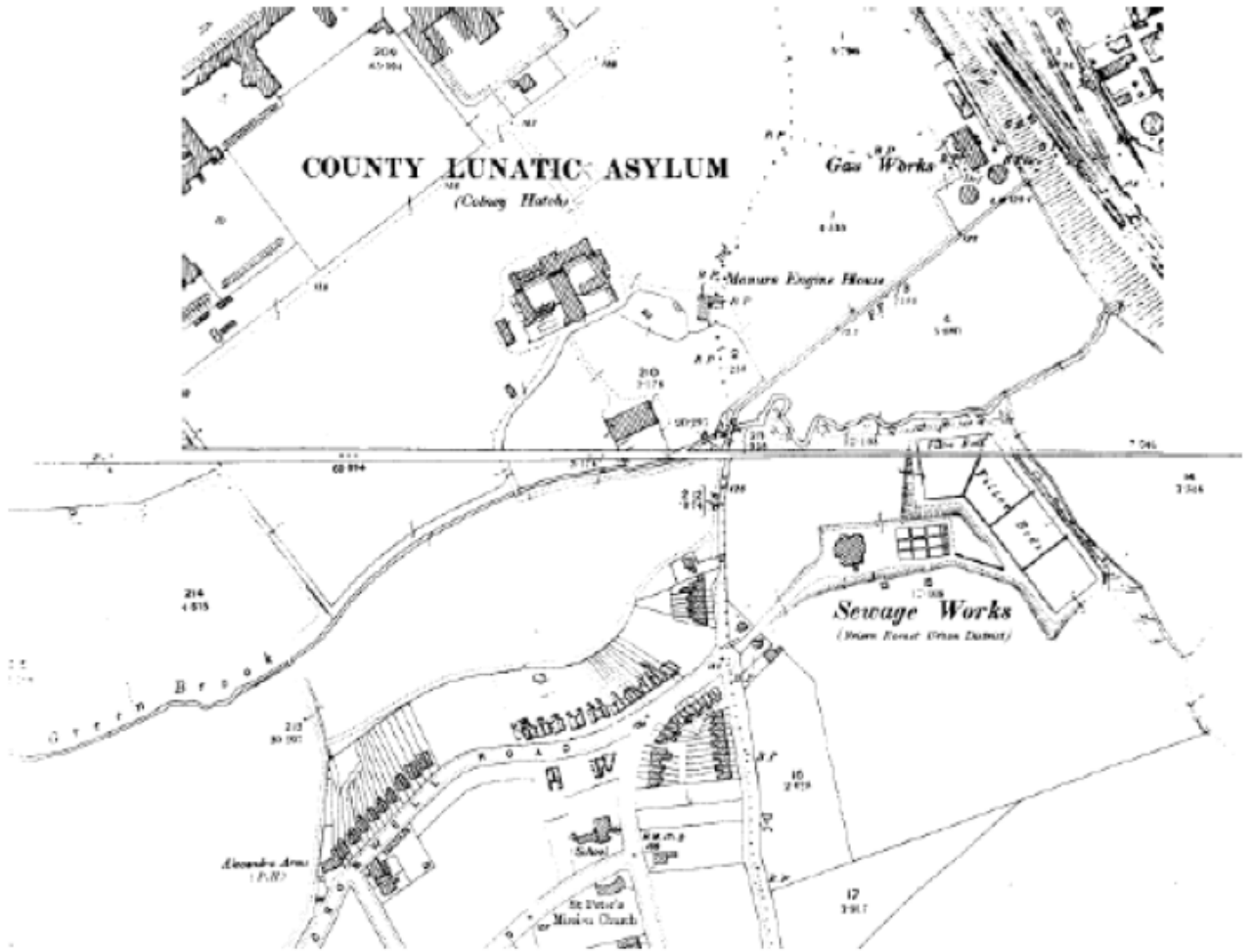


Figure 1



Figure 2

Hydrology cont.....

By enclosing the northern section of the golf course tributary in a pipe culvert under the STW land it effectively isolated the natural route for ground and surface water run off from the land to the tributary and ultimately the Bounds Green Brook. Equally, the man made culvert diversion of the natural Bounds Green Brook water course effectively isolated the natural routes for ground and surface water within the BGB catchment. We have been unable to establish if weep holes were included in the BGB culvert to allow natural infiltration to occur.

The negative characteristics of the land at Pinkham Way, that will present a significant hurdle to any future development, are easily identifiable as positive characteristics for mitigating the future impacts of climate change, enhancing the environmental and ecological value of the area and most importantly protecting the identified Bounds Green Brook and Pymes Brook flood risk areas from any increase in flood risk.

The dense tree and vegetation coverage of the land provides a crucial first line of defence to current rainfall intensities as well as any future climate change increases by slowing or preventing the creation of water flow flood routes across the land. This has the benefit of ensuring the stability of the land especially at the steep inclines up to the raised plateau.

Secondly the extensive tree and vegetation cover facilitates the absorption of rain water into the upper soil layer. Root systems create and increase porosity within the top soil layer as well as transpiring 100,000 of litres of captured water safely back into the atmosphere. Studies have shown the transpiration process is particularly high with broadleaf species of trees which are abundant on the land.

Lastly, and the most significant protection, is provided by the poor cohesive and void filled underlying strata. We have estimated the voids capacity of the landfill based on low, medium and high void ratios for the strata and the results are shown opposite. The average annual depth of London rainfall (without climate change) is approximately 650mm predicted to increase to 845mm with climate change. Our calculation clearly shows that even the estimated low voids ratio is capable of absorbing the future 845mm rainfall with capacity to spare.

Even if the various protections were overwhelmed and the land became "super saturated" then the water would still not have a route to the Bounds Green Brook flood risk area because of the pipe culvert laid in 1933 below the landfill strata. The land is therefore neutral in terms of drainage impact as it has no run off and is directly mitigating the effects of climate change and preventing an increase in risk to the Bounds Green Brook Any development would drastically change this situation.

The proven evidence of the water compatible and flood prevention characteristics of the land fully support it's designation as a Site of Importance for Nature Conservation. Such evidence far outweighing the nebulous value or deliverability of it's "Employment" designation.

Estimated volume of landfill	434,000 cum	Depth of rain m
Voids ratio %	Capacity cum	
10	43400	1.3
20	86800	2.59
30	130200	3.89



Land at Pinkham Way

Strategic Flood Risk Assessment - General

Before allocating the land at Pinkham Way in Haringey's Site Allocation DPD with the dual designations of "Site of Importance for Nature Conservation and "Employment" the decision required evidence to support the two apparently contradictory conclusions. As an allocation Haringey has a duty, under the National Planning Policy Framework, to carry out not only strategic assessments, but also site specific assessments to gain evidence in support of their decision. Crucial amongst these assessments are the Strategic and Specific Flood Risk Assessments. Flood Risk being of material consideration at all levels and stages of Planning.

The SFRA is material evidence in the production of the required Sustainability Appraisal as well as identifying where Local Plan policy actions and development proposals will impact on flooding both inside and outside the Planning Authority area. To be considered sound a SFRA will demonstrate where flooding issues will have cross-boundary impacts and indicate where LPA's will need to comply with their "Duty to Co-operate" with other local authorities on material strategic matters.

Section 181 of the NPPF, shown opposite, shows the requirement.

Flood Risk Assessment - Haringey - Land at Pinkham Way

The allocation of the land at Pinkham Way required Haringey's SFRA to demonstrate the specific flood risks to the land and also to identify the flood risk that any development of the land may have "elsewhere". The method to assess and identify on and off site flood impacts is given in para 10 of the National Planning Policy Guidance. " shown opposite.

The extract below from JBA Consulting's draft SFRA, whilst clearly indicating the on site specific flood risk zone, totally fails to identify the "off site" flood risks, the contributing flood catchment or the cross-boundary impacts.



Based on this evidence, rainfall and flood risk stop at the Haringey Borough boundary. This evidence does not meet the requirements of paras 178 - 181 of the NPPF or the requirements of paras 10 and 11 of the NPPG and is unsound.

NPPF Para 181. Local planning authorities will be expected to demonstrate evidence of having effectively cooperated to plan for issues with cross-boundary impacts when their Local Plans are submitted for examination. This could be by way of plans or policies prepared as part of a joint committee, a memorandum of understanding or a jointly prepared strategy which is presented as evidence of an agreed position. Cooperation should be a continuous process of engagement from initial thinking through to implementation, resulting in a final position where plans are in place to provide the land and infrastructure necessary to support current and projected future levels of development

NPPG Paragraph: 010 Reference ID: 7-010-20140306

How should a Strategic Flood Risk Assessment be used in plan making?

The Strategic Flood Risk Assessment will be used to refine information on river and sea flooding risk shown on the Environment Agency's Flood Map for Planning (Rivers and Seas). Local planning authorities should use the Assessment to:

- determine the variations in risk from all sources of flooding across their areas, and also the risks to and from surrounding areas in the same flood catchment;

- inform the sustainability appraisal of the Local Plan, so that flood risk is fully taken into account when considering allocation options and in the preparation of plan policies, including policies for flood risk management to ensure that flood risk is not increased;

- apply the Sequential Test and, where necessary, the Exception Test when determining land use allocations;

- identify the requirements for site-specific flood risk assessments in particular locations, including those at risk from sources other than river and sea flooding;

- determine the acceptability of flood risk in relation to emergency planning capability;

- consider opportunities to reduce flood risk to existing communities and developments through better management of surface water, provision for conveyance and of storage for flood water.

How should a Strategic Flood Risk Assessment be prepared (in general)?

NPPG Paragraph: 011 Reference ID: 7-011-20140306

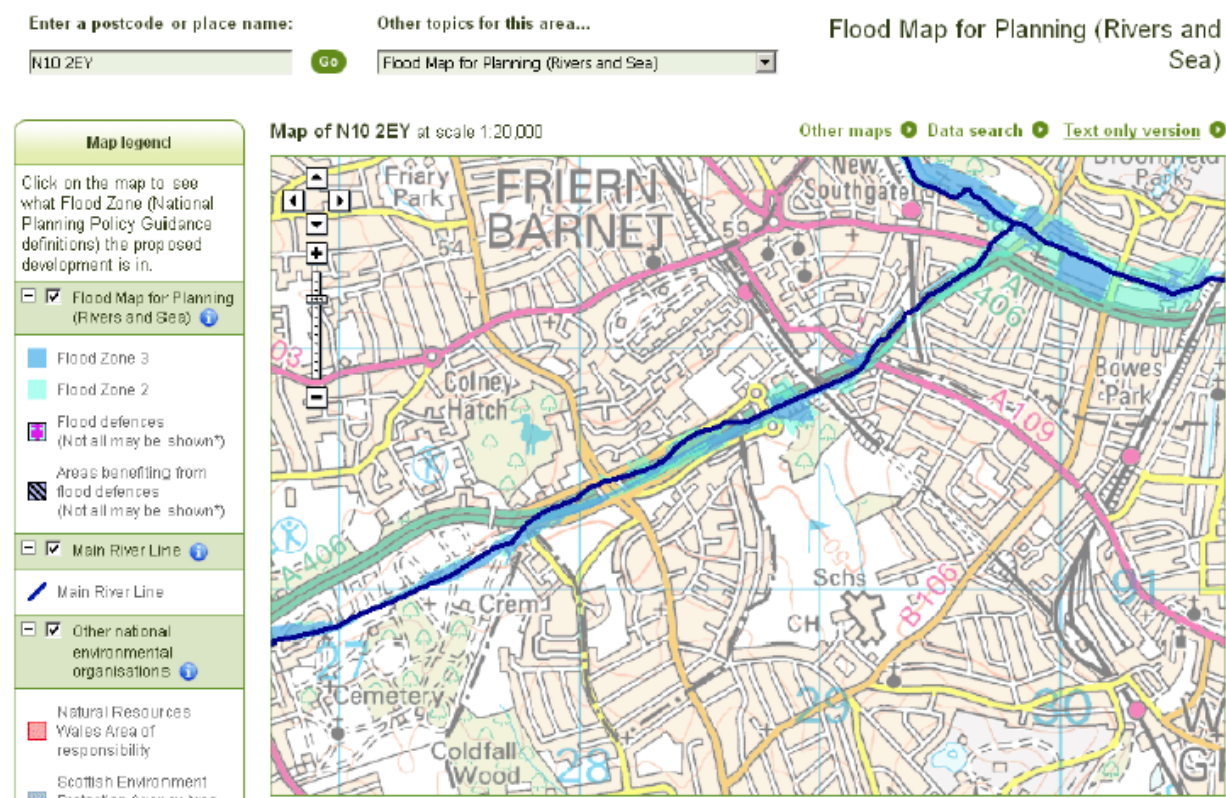
The Strategic Flood Risk Assessment should be prepared by local planning authorities in consultation with the Environment Agency, lead local flood authorities, local planning authorities' own functions of emergency response and drainage authority under the Land Drainage Act 1991 – and where appropriate, internal drainage boards. Where local authorities are the drainage authority, or are a Maritime District Council under the Coastal Protection Act 1949, or the lead local flood authority, local planning authorities should engage their engineering and emergency response staff when preparing the Assessment.

Local planning authorities should consult sewerage undertakers in developing their Local Plans, so that their Strategic Flood Risk Assessment takes account of any specific capacity problems and of the undertaker's drainage area plans.

Working collaboratively with other authorities, local planning authorities can develop Strategic Flood Risk Assessments covering a wider area and at a river catchment level. County level Assessments may also be appropriate where minerals and waste issues can be considered at the same time.

Flood Risk Assessment - Meeting the requirement - Land at Pinkham Way

The initial requirement is to obtain flood risk information from the Environment Agency's Flood Map for Planning (Rivers and Sea)



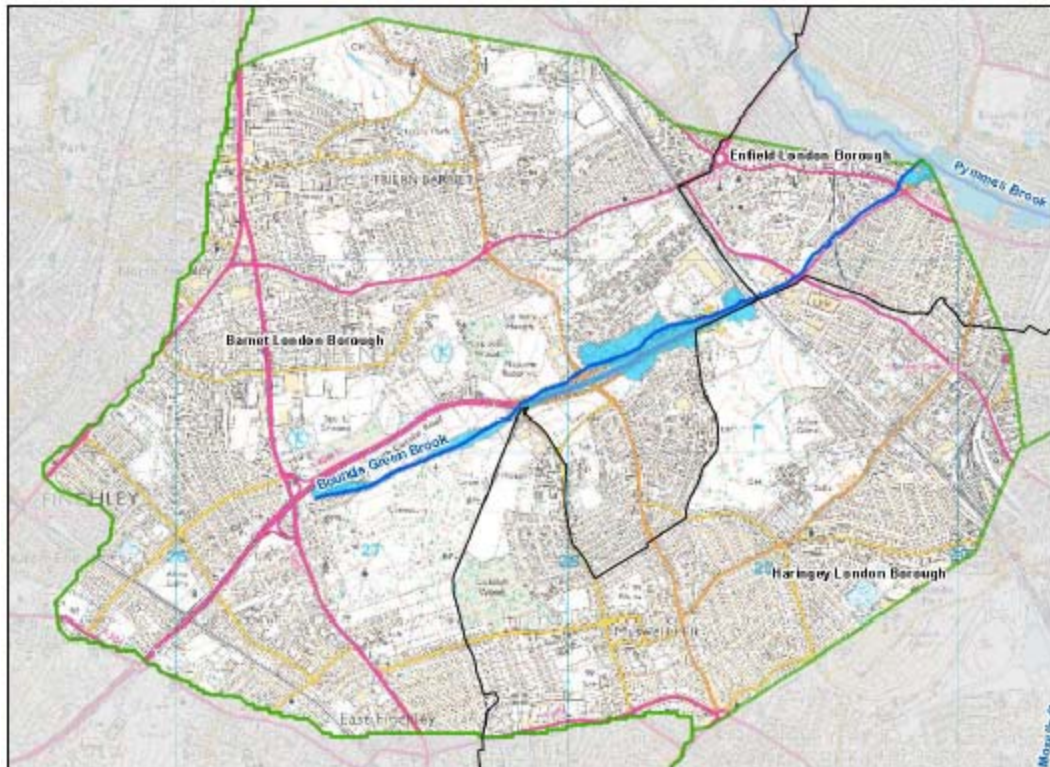
A sound Strategic Flood Risk Assessment should then refine the information shown on the map to.....

NPPG Para 10 - "determine the variations in risk from all sources of flooding across their areas, and also the risks to and from surrounding areas in the same flood catchment".

This map clearly identifies the flood risk to and from the land at Pinkham Way as coming from the identified EA main river watercourse (Bounds Green Brook). It also clearly indicates that the main river is located across Haringey's boundary in the London Borough of Barnet.

The next refinement and requirement is to identify the "flood catchment" contributing to the Flood Risk Area. As a main river watercourse this information is available from the Environment Agency and in a report published in June 2014 and entitled "**Managing Flood Risk in the Lower Lea Catchment, today and in the future**" the EA identified all the individual Flood Risk Areas associated with their main river watercourses along with the contributing catchments.

The Bounds Green Brook catchment.



From this map it can be determined that all the "sources of flood risk" will emanate from the Bounds Green Brook catchment area and unless water can run uphill Haringey is a major contributor to the foreseeable flood risk.

At this early stage the evidence clearly shows that Haringey have a strategic "Duty to Co-operate" with Barnet and Enfield, the two adjoining local authorities, in dealing with BGB Flood Risk and their "ongoing and meaningful" involvement in developing Haringey's site allocation DPD's and Flood Policies is a crucial test of soundness at public examination. There is also a "Duty to Co-operate" with the Lead Local Flood Authorities on possible strategic solutions to the identified risks under the Flood and Water Management Act 2010.

The only sustainable way for Haringey to maintain "Employment" designation beyond this evidential point is to demonstrate under the precautionary principle that any development will "not increase flood risk elsewhere".

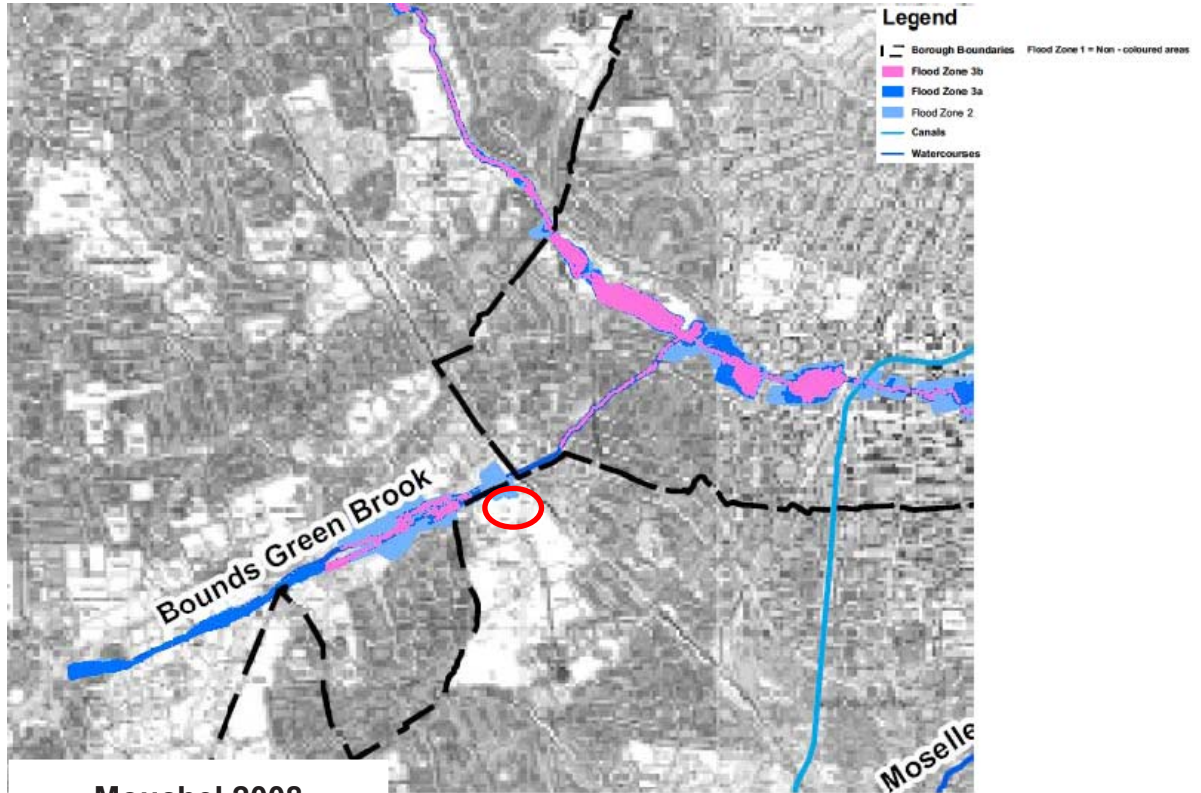
If the land at Pinkham Way had been previously developed and contributed to the Lower Lea River network then the application of "attenuation SuDS", while not reducing the volumetric runoff, would have at least maintained the status quo within the downstream flood risk areas. However, the land has never been developed and, as discussed in Chapter 1, has never made a contribution to the Lower Lea River network. The logical conclusion from this evidence is that any development of the land will produce a significant increase in the volume of water entering the river network with a consequential increase in the risks and consequences of flooding elsewhere.

At this stage the evidence indicates that, as and until the identified strategic flood risks are eliminated or managed, then Haringey, Barnet and Enfield need to co-operate to ensure that robust planning controls are in place within the Bounds Green Brook catchment and that no development on the land at Pinkham Way should be permitted.

Additional Evidence

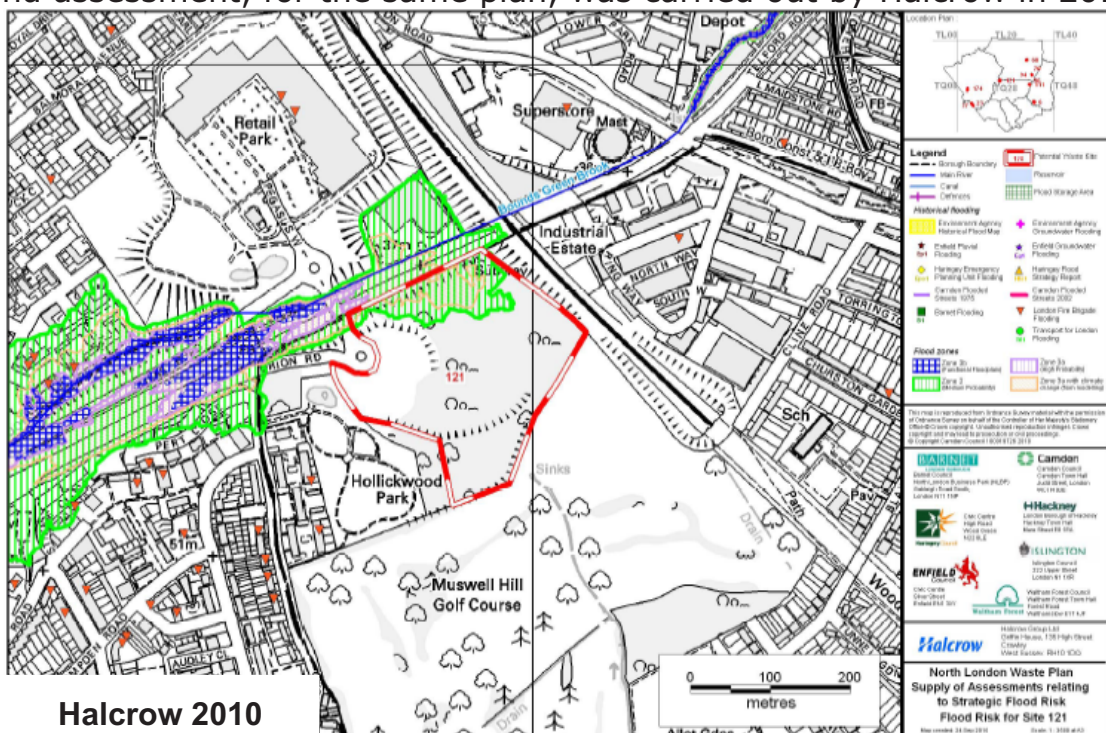
The Bounds Green Brook Flood Risk Area was first identified by a SFRA carried out as part of the original and failed North London Waste Plan in which the land at Pinkham Way had been allocated for waste use.

The assessment was carried out by Mouchel in 2008 and clearly identified the Barnet and Enfield Flood Risk Areas and also the flood risk on the land at Pinkham Way. As partners in the NLWP obviously Haringey were fully aware of the Flood Risk situation when instructing JBA Consulting in preparing their SFRA..



Mouchel 2008

A second assessment, for the same plan, was carried out by Halcrow in 2010



Halcrow 2010

Flood Risk Area - London Borough of Barnet



There are a significant number of residents, north of the BGB, at risk from a flood along with the A406 Pinkham Way and the associated road tunnel which are identifiable "essential infrastructure". Workers and customers of Alan Day Autos, located north of the BGB and adjacent to the rail embankment, are in a hazard area, the EA predicted depth of flood at this point being greater than 900mm. They also carry a car stock on their forecourt valued at £1,000,000 +. The drivers caught in the daily traffic congestion along the Pinkham Way are at a significant risk with those caught inside the road tunnel in a danger of death hazard.

Flood Risk Area - London Borough Enfield

Extract from the Environment Agency's Lower Lea River report on the Pymmes Brook :-

" An estimated 367 properties and the A406 North Circular are at risk of fluvial flooding during a 1% annual probability event. Areas at risk of flooding include parts of Cockfosters, East Barnet and in particular Upper Edmonton.

The Pymmes Brook catchment is particularly vulnerable to changes in flood risk resulting from climate change. If current predictions are borne out, the number of properties at risk of fluvial flooding during a 1% annual probability event may increase to about 1,737. This risk is being taken into consideration when developing the proposals to promote a flood alleviation scheme. There may be sufficient justification to deliver a bigger scheme that accounts for such changes, although this could also mean that the scheme is not delivered as soon as it would be otherwise. We plan to keep the situation under review to determine the optimum design and timing of the proposed scheme."

Figure 3, opposite, shows the direct relationship between the Bounds Green Brook catchment and the Pymmes Brook Flood Risk Area.

Figure 4 shows the proposal in Enfield's A406 Area Action Plan to relocate a primary school at the rear of Broomfield School and in the identified Pymmes Brook FRA.

Figure 5 shows the flood risk to the pupils, staff and parents of Broomfield School along with the proposed Primary School.

There is a direct relationship between the land at Pinkham Way and the danger of death flood risk to the proposed Primary School children in the rear of Broomfield School.



Figure 3

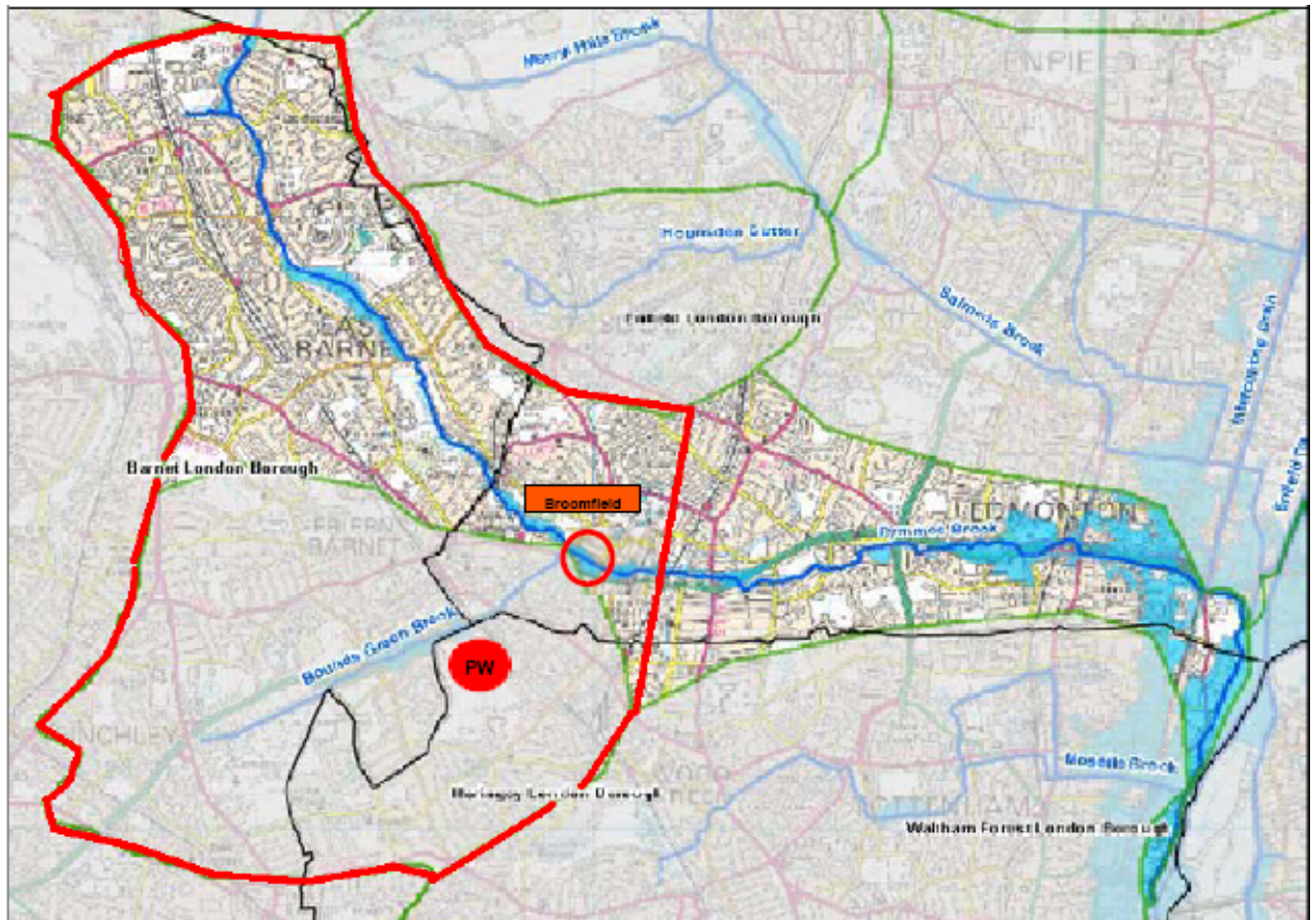


Figure 4



Figure 5

Strategic duty to co-operate on Flood Alleviation.



This map shows the Bouda Green Brook and Pymmes Brook catchment north of the Broomfield School combined. This clearly indicates that the BGB catchment is the major contributor to the Broomfield flood risk and a flood alleviation scheme carried out in the BGB catchment could eliminate the Pinkham Way risks and reduce the flood risks in the Pymmes Brook. By combining the catchments the cost/benefit returns are substantially increased along with the number of possible financial partners needed to bring about the needed flood alleviation infrastructure.

There are seven potential co-operation partners all being contributors to the Pymmes Brook Flood Risk Area. These are :-

The Environment Agency, LB Haringey, LB Barnet, LB Enfield, Transport for London, The Rail Regulator(Network Rail) and Thames Water.

The land owners of Pinkham Way would also benefit from a completed alleviation scheme and all developments within the combined catchments could provide financial contributions via an infrastructure levy imposed by the three LPA's.

The requirements for LPA's to co-operate on plans for strategic flood risk infrastructure are contained in Sections 156 and 157 of the National Planning Policy Framework as shown opposite.

NPPF Strategic Priorities

156 Local planning authorities should set out the **strategic priorities** for the area in the Local Plan. This should include strategic policies to deliver:

- the provision of infrastructure for transport, telecommunications, waste management, water supply, wastewater, flood risk and coastal change management, and the provision of minerals and energy (including heat)
- climate change mitigation and adaptation, conservation and enhancement of the natural and historic environment, including landscape.

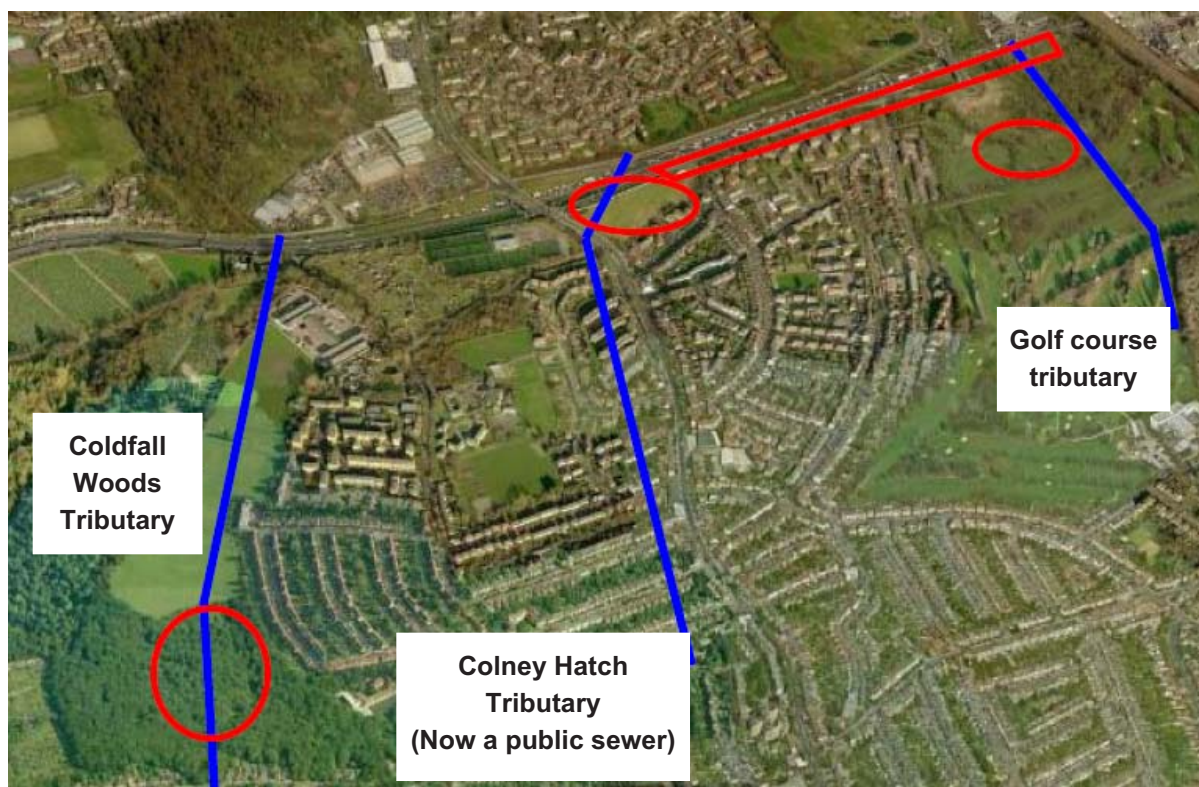
157 Crucially, Local Plans should:

- plan positively for the development and infrastructure required in the area to meet the objectives, principles and policies of this Framework;
- be drawn up over an appropriate time scale, preferably a 15 year time horizon, take account of longer term requirements, and be kept up to date;
- be based on co-operation with neighbouring authorities, public, voluntary and private sector organisations;
- indicate broad locations for strategic development on a key diagram and land use designations on a proposals map;
- allocate sites to promote development and flexible use of land, bringing forward new land where necessary, and provide detail on form, scale, access and quantum of development where appropriate;
- identify areas where it may be necessary to limit freedom to change the uses of buildings, and support such restrictions with a clear explanation;
- identify land where development would be inappropriate, for instance because of its environmental or historic significance; and
- contain a clear strategy for enhancing the natural, built and historic environment, and supporting Nature Improvement Areas where they have been identified.

Possible Haringey Strategic Flood Alleviation schemes.

There are three ordinary watercourse tributaries to the Bounds Green Brook located in the southern section of the Bounds Green Brook catchment. All rise in the London Borough of Haringey with their lower sections passing into the London Borough of Barnet.

The Coldfall Wood and golf course tributaries run through water compatible open space in public ownership. The Colney Hatch Lane tributary, now a public surface water sewer, runs under privately owned water compatible Metropolitan Open Space.



This outline identifies four locations where flood alleviation schemes could be carried out. The schemes could be brought forward individually over a 15 year plan period or introduced and funded as a single scheme. By attenuating the flows from the three tributaries to the Bounds Green Brook and storing the water in the indicated locations the flood risk to the Bounds Green Brook could be eliminated and the flow to the Pymmes Brook/Broomfield FRA significantly reduced.

Because of the urban nature of the Bounds Green Brook catchment the quality of the water entering the Bounds Green Brook is poor and heavily polluted. The brook is performing the function of an open combined sewer. The Coldfall Woods and Colney Hatch tributaries are major contributors to this pollution as they carry cross connected foul water outfalls from large numbers of properties in the Creighton Avenue and Colney Hatch Lane areas. This pollution is then compounded by the Thames Water surface water sewer network, which also discharges into the Bounds Green Brook. A flood from the Bounds Green Brook would present a serious health hazard to those affected and involve an expensive controlled waste clean up operation.

Flood alleviation schemes in the Coldfall Woods area and under the Colney Hatch MOL could provide primary and secondary pollution prevention measures to help reduce pollution levels in the Bounds Green and Pymmes Brooks.

The London Rivers Action Plan has identified the need for any development of the land at Pinkham Way to deculvert the golf course tributary to provide:-

"nature conservation improvements as well as potentially providing amenity and recreational land for local population and education opportunities."

The 13m depth of landfill cover over the pipe culvert will preclude it's deculverting. However, a flood alleviation scheme on the land at Pinkham Way could create an open balancing pond into which the golf course tributary could be diverted. This would have the dual benefit of restricting flow to the Bounds Green Brook as well as enhancing the nature conservation, amenity and recreational use of the land.



A flood alleviation scheme would enhance the designation of the land as a Site of Importance for Nature Conservation and provide a valuable habitat for wildlife. It would also enhance the importance of the land as a pivotal link in the "green infrastructure" along the A406 Pinkham Way and the railway embankment.

London Rivers Action Plan

Project name

Friern Barnet Former Sewage Works

Status

Concept Only

Catchment

Lee

Tributary

Bound Green Brook

OS grid reference

TQ2900291486 to TQ2892391798

Length (m) of enhancement(s)

300m

Type of enhancement(s)

Deculverting and naturalisation of ordinary water course and control of non native species

Reasons for enhancement(s)

Site is planned to be developed, mitigation for this development with nature conservation improvements as well as potentially providing amenity and recreational land for local population and education opportunities.

Key themes of enhancement(s)

Indicate by ticking one or more that apply.

- | | |
|--|---|
| <input checked="" type="checkbox"/> Sustainable urban regeneration/development | <input checked="" type="checkbox"/> Biodiversity/conservation |
| <input type="checkbox"/> Fisheries | <input checked="" type="checkbox"/> Education |
| <input checked="" type="checkbox"/> Recreational amenity (access to nature) | <input checked="" type="checkbox"/> Climate change |
| <input type="checkbox"/> Sustainable flood risk management | <input type="checkbox"/> Other (please state) |
-

Possible constraints

Contaminated land, location of the water course, invasive spp

Potential partnerships

Developers, London Borough of Haringey, EA

Approximate cost

Unknown

Possible funding

Development of land

Next steps

Planning permission negotiations, design objectives

Contact details

Primary contact: Ian Holt - London Borough of Haringey

Other

Conclusions

Haringey's Draft Flood Risk Assessment does not provide the level or standard of evidence required to be relied upon in the preparation of their Sustainability Appraisal or their Site Allocation DPDs.

Other affected LPA's and Lead Local Flood Authorities have not influenced or been involved in developing Haringey's Plans and Policies even though these Plans and Policies will impact in authorities outside Haringey.

This failure to co-operate goes direct to the soundness of Haringey's Local Plan, which will face an EIP sometime in the summer of 2016.

Flooding can cause death and identifying where it will occur is critical.

As the recent events in Cumbria have demonstrated even where flood protection is in place nature can still overwhelm communities with devastating results.

Haringey and all LPA's have a vital roll in preventing and or managing flooding and where financial constraints prevent construction of immediate preventative structures the Planning system can, and should be used robustly to maintain the status quo of the existing risk and prevent any increase. If this is at the cost of a possible development then Haringey should consider it a price worth paying to keep people safe.