Watercourse Advice Note- Aylesbury Vale Area

Note for Planners, Designers and Developers

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Key Principles Checklist

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2. Developments should be in accordance with the development plan and planning policies relevant to watercourses and the natural environment

3. Developments should contribute towards helping a waterbody reach ‘good’ ecological status under the Water Framework Directive and must not cause a deterioration of, or prevent a waterbody from achieving this (See VALP Policy I5 (a)

4. Developments should deliver Biodiversity Net Gains (see VALP Policy NE1 (c))

5. Developments must be compliant with all necessary legislation covering protected sites, habitats and species

6. Developments must take precautions to ensure that no invasive non-native species are introduced, and if already present ensure they are not allowed to spread (see VALP Policy NE1 (c) and (h))

7. Developments must have the necessary permits and consents for works, on or near watercourses from the relevant consenting body

8. Developments shall provide or retain a minimum 10m ecological buffer zone to watercourses unless existing physical constraints prevent. A long-term landscape and ecological management plan is required for this buffer (see VALP Policy NE2)

9. Developments should seek opportunities to re-naturalise the river channel and restore bankside and instream habitats (see VALP Policy NE2 and NE1 (h))

10. Developments must not involve the culverting of watercourses and should actively pursue de-culverting opportunities (see VALP Policy NE2)

11. Developments providing pond complexes to achieve biodiversity net gain or enhancements or that are creating sustainable drainage systems (see VALP Policy NE2 and I5) should utilise best practice guidance (The Pond Creation Toolkit)

12. Developments should reconnect rivers with their floodplains and where biodiversity net gains or enhancement is required, create habitats such as wetlands, scrapes and backwaters (see VAP Policies NE1, NE2, I4)

13. Developments should avoid pollution by incorporating mitigation or design solutions during and after construction. Consult the Environment Agency for advice on measures necessary to prevent pollution of surface and ground water (see VALP Policy I4 o-u and NE5)

1. Introduction

1.1 Status of the Guidance and Consultation Process

Buckinghamshire Council (BC) recognises the importance of our watercourses, including rivers and streams, as well as associated corridors with features such as floodplains and ponds. This advice note provides guidance to planners, designers and developers for use with planning applications near to watercourses and their associated corridors in the former Aylesbury Vale area.

The guidance supports section '9 Natural Environment' policies of the adopted Vale of Aylesbury Local Plan 2013-2033 ((September 2021) accessed at https://www.buckinghamshire.gov.uk/planning-and-building-control/planning-policy/local-development-plans/). These policies state what is expected from all development proposals within the Vale and should be read in conjunction with this document.

This document is an advice note and therefore does not set policy, it has not been adopted as supplementary planning guidance, but it is a material consideration of reference for planning application reports and appeals. The purpose is to provide practical advice to make for a better planning application and understand the issues considered when planning in the context of watercourses.

KEY PRINCIPLE 1: Watercourses and their corridors should be considered early on as part of the planning process. Use of this guidance will be a key requirement for all development proposals adjacent to and/or containing watercourses and their corridors

Early consultation is advised using the Council's pre-application service (https://www.buckinghamshire.gov.uk/planning-and-building-control/planning-services-and-fees/#planning-advice-services) and also with the Council's ecology and flooding/sustainable drainage sections at the time a planning

application is submitted (and evidence of this must be provided) to understand the baseline position on ecology assets and water resources.

This advice note is produced by Buckinghamshire Council's Environment and Strategic Flood Management Teams, working with specialists from Buckinghamshire Council, the Environment Agency, the Freshwater Habitats Trust and the River Thame Conservation Trust.

1.2 Watercourses in the Aylesbury Vale area

This document uses the Environment Agency definition of a 'watercourse' at https://www.gov.uk/guidance/owning-a-watercourse#find-out-if-you-own-a-watercourse as the term is not defined in the Vale of Aylesbury Local Plan. Therefore, the definition includes a river, brook, beck, ditch/drain, stream, Leat, Goyale, Rhyne and a culvert.

The Vale of Aylesbury in Buckinghamshire is home to a vast network of streams, many of which flow through our towns and villages and there are many ponds, ditches and springs dotted across the landscape. Several of these fall within areas which are recognised as being important for wildlife on a county or regional scale, and are known as Biodiversity Opportunity Areas.

Several rivers flow through the Vale:

The River Thame, which begins to the east of the village of Hulcott near Bierton meanders through meadows to the north and west of Aylesbury down to the Thames at Dorchester in Oxfordshire;

The River Ray further to the north, which flows west to the River Cherwell and then into the Thames near Oxford;

The River Ouzel which springs near Dagnall in the south west of the Vale and flows to Leighton Buzzard and Milton Keynes and Newport Pagnell to its junction with the Great Ouse.

The **River Great Ouse** which flows east from Syresham in Northamptonshire through Buckingham towards Bedfordshire, Cambridgeshire to the North Sea at The Wash.

These watercourses are fed from groundwater and rainfall. The land use in the catchment influences how and when water reaches the watercourse and also influences water quality.

For more information on the distribution of watercourses in Aylesbury Vale please refer to the Aylesbury Vale Main Rivers and Ordinary Watercourses Plan which is provided as an Appendix to this advice note.

1.3 Understanding the impact of development on watercourses

Watercourses are under significant pressure with only 14% of the United Kingdom's rivers in good health (source: Environment Agency 2018 The state of the environment: water quality. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/709493/State_of_the_environment_water_quality_report.pdf).

Developments can negatively impact our watercourses and associated corridors by:

- Polluting discharges and/or contaminated run-off entering the surface water or groundwater environment as a result of construction
- Reducing water quality due to contaminated run-off during the construction and/or operation of the proposed development
- Degrading the watercourse environment and increasing risk of blockage and flooding as a result of culverting
- Increased disturbance of natural watercourse habitats by humans and domestic animals
- Poor watercourse environment management practise causing over shading and or loss of bankside vegetation cover
- Change in hydro morphology, quantity and flow of surface waters

- Excavations and/or changes in ground level interrupting groundwater flow paths

Degradation of watercourses, or their partial or complete loss is now common throughout the country (13% of freshwater and wetland species are threatened with extinction from Great Britain) (Hayhow DB et al. (2016) State of Nature 2016. The State of Nature partnership.)

In addition, rising temperatures, and changes in precipitation patterns as a result of climate change could be very harmful to the health of the Vale's watercourses and the species which rely on them. Protecting and enhancing watercourses and their corridors through development will increase resilience to future climatic changes.

Development has a significant role to play in ensuring further deterioration does not occur and restoring degraded watercourses.

1.4 Opportunities for developments with watercourses

Buckinghamshire Council will ensure all opportunities are taken to protect, restore and enhance watercourses and their associated corridors for the built environment, people and nature.

Opportunities for the built environment include:

- Creating attractive places where people want to live, work and play through integration of water and green spaces in the built environment
- Cost-effective infrastructure that uses fewer natural resources and has a smaller whole-life carbon footprint
- Creation of developments that are more able to cope with changes in climate
- Protecting people and property from erosion and increased flood risk from climate change

Opportunities for people include:

- Better human health and well-being through leisure and recreation
- Areas of natural beauty and places of tranquillity
- Access to green space, including cycling and pedestrian routes
- Providing society with a valuable supply of water

Opportunities for nature include:

- Natural habitat and features which provide a home for wildlife
- Increased biodiversity supporting a vast range of rare and protected species
- Important wildlife corridors which increase connectivity between natural habitats and allow unrestricted passage to wildlife
- Increased resilience to climate change and associated pressures
- Areas free from disturbance with clean, pollution free water

Development can positively impact on watercourses and their associated corridors. Careful design of the built environment will greatly improve the value of a development for both people and nature. This document details how this can be achieved.

Photo 1: River Thame at Cuddington Bridge – a watercourse within Aylesbury Vale with ‘moderate’ ecological status. The aim is to get this to a ‘good’ rating. Image: Doug Kennedy

2 Legislation and Policy

2.1 Planning Policy

KEY PRINCIPLE 2: Developments should be in accordance with the development plan and planning policies relevant to watercourses and the natural environment

The National Planning Policy Framework (2021). (National Planning Policy Framework (https://www.gov.uk/government/publications/national-planning-policy-framework--2) sets out the government's planning policies and how these are expected to be applied. The local plan sets out planning policies for the Aylesbury Vale area and is the background against which planning decisions are made. The Vale of Aylesbury Local Plan 2013-2033 provides advice on the design of development proposals and reference should be made to Section 9 'Natural Environment' and its policies 'NE1 Biodiversity and Geodiversity' and 'NE2 Rivers and Stream Corridors' and Section 11 'Detailed Infrastructure' and Policy I4 Flooding.

The Aylesbury Vale Green Infrastructure Strategy (Buckinghamshire Council (2011 and 2014 update). https://www.aylesburyvaledc.gov.uk/green-infrastructure-strategy) forms part of the 'evidence base' of the local plan. It sets out principles for the management and creation of accessible green infrastructure in the district. The strategy includes watercourse corridors and sets out the vision and key aims, as well as focusing on flagship projects and the benefits they offer.

2.2 Water Framework Directive

KEY PRINCIPLE 3: Developments should contribute towards a waterbody achieving 'good' ecological status and must not cause a deterioration of, or prevent a waterbody from achieving this

The Water Framework Directive (WFD) 2000 aims to improve the state of Europe's waters and was transposed into UK legislation by the Water Environment (Water Framework Directive) Regulations 2003.

The north of the Vale falls within the Anglian River Basin District and the south is within the Thames River Basin District. Each River Basin District has a River Basin Management Plan which identifies WFD waterbodies and their ecological status.

All waterbodies in the UK must reach 'good' ecological status by 2027. Catchment partnerships support the delivery of WFD targets within each river catchment. The Catchment Data Explorer https://environment.data.gov.uk/catchment-planning/ provides more information on catchment partnerships and WFD maps.

2.3 Environmental Net Gain and Biodiversity Net Gain

KEY PRINICIPLE 4: Developments should deliver Biodiversity Net Gains

The government's 25 Year Environment Plan (HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment (Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf) supports the requirement for Environmental Net Gain (ENG) in all developments, into planning policy. This will be a matter for the Local Plan For Buckinghamshire to consider as the emerging local plan. The adopted local plan covering the

former Aylesbury Vale area is the Vale of Aylesbury Local Plan 2021 and this sets out how Biodiversity Net Gain should be provided for in line with the 2012 version of the NPPF.

Biodiversity Net Gain (BNG) is an approach to development that leaves biodiversity in a better state than before, and it is a component of wider ENG. The Environment Act 2021 (Available at: https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted) will bring into UK law environmental protections and recovery of the natural environment. The bill introduces mandatory biodiversity net gains to ensure that new developments enhance biodiversity and help deliver thriving natural spaces for communities. Policy 'NE1 Biodiversity and Geodiversity' in the Local Plan and the forthcoming Buckinghamshire Biodiversity Accounting Supplementary Planning Document (due 2022) will provide more information.

2.4 Protected Sites

KEY PRINCIPLE 5: Developments must be compliant with all necessary legislation covering protected sites, habitats and species

The Conservation of Habitats and Species Regulations 2017 (as amended) and Wildlife and Countryside Act 1981 (as amended) protects statutory designated sites such as Sites of Special Scientific Interest (SSSI). Local Authority Plans protect non-statutory designated sites such as Local Wildlife Sites (Box 1). Policy 'NE1 Biodiversity and Geodiversity' in the Local Plan provides more information.

There are restrictions on activities and developments that might affect a protected site. The government provides Guidance on Construction near Protected Areas and Wildlife (Natural England and Department for Environment and Rural Affairs (2018) Guidance: Construction near protected areas and wildlife. Available at: https://www.gov.uk/guidance/construction-near-protected-areas-and-wildlife) including how to avoid harming protected areas during development work.

More information on Protected Sites in your area is provided by the Buckinghamshire and Milton Keynes Environmental Records Centre (BMERC).

BOX 1: LOCAL WILDLIFE SITES

Local Wildlife Sites (LWS) are places that have been recognised for their wildlife value or for containing rare or threatened habitats and species. LWSs (formerly known as County Wildlife Sites and Biological Notification Sites) receive protection through the planning system. Approximately 180 LWSs have been identified in Aylesbury Vale

Photo 2: Upper Ray Meadows LWS – an example of a Local Wildlife Site with watercourses in Aylesbury Vale. Image: Berkshire Buckinghamshire and Oxfordshire Wildlife Trust

2.5 Protected Habitats

KEY PRINCIPLE 5: Developments must be compliant with all necessary legislation covering protected sites, habitats and species

The Natural Environment and Communities Act 2006 (NERC Act) lists ‘priority habitats’ that are most threatened and require conservation action, including watercourse habitats such as rivers, lakes, ponds, grazing marsh, fens,

reedbed and bogs. More information on Priority Habitats generally is provided by the Joint Nature Conservation Committee (JNCC) and information of habitats in your area by BMERC.

The Buckinghamshire and Milton Keynes Biodiversity Action Plan (BAP) (Natural Environment Partnership (2021) Forward to 2030 (https://bucksmknep.co.uk/forward-to-2030/) identifies the key principles and goals that planning decisions must consider. The BAP aims to retain, protect and where possible enhance biodiversity, beyond protected sites and sites managed for wildlife. Biodiversity Opportunity Areas (Box 2) are the key areas in Buckinghamshire and Milton Keynes for the restoration and creation of priority habitat.

More information on Biodiversity Opportunity Areas is provided by the Buckinghamshire and Milton Keynes Biodiversity Partnership.

BOX 2: BIODIVERSITY OPPORTUNITY AREAS

Biodiversity Opportunity Areas (BOAs) are important areas for biodiversity on a county or regional scale where habitat restoration and creation could have the most positive impacts on biodiversity. Several BOAs have been identified in Aylesbury Vale; The North Bucks Fens, the Thame Valley and the Claydon and Padbury streams which are known for their freshwater habitats.

2.6 Protected Species

The Conservation of Habitats and Species Regulations 2017 (as amended) and the Wildlife and Countryside Act 1981 (as amended) lists ‘European Protected Species’ and other protected species. The otter and great crested newt are two protected species that are widespread in Aylesbury Vale.

There are restrictions on activities and developments that might affect protected species. The government provides guidance on construction near protected areas and wildlife (Natural England and Department for Environment and Rural Affairs (2018) (https://www.gov.uk/guidance/construction-near-

protected-areas-and-wildlife) including how to avoid harming protected species during development work.

The Natural Environment and Communities Act 2006 (NERC Act) lists 'priority species' that are most threatened and require conservation action. A full List of Priority Species is provided by the Joint Nature Conservation Committee (JNCC).

More information on Protected and Priority Species in your area is provided by BMERC.

BOX 3: DISTRICT LICENSING FOR GREAT CRESTED NEWTS

The Great Crested Newt (GCN) is a European Protected Species that breeds in ponds in spring and spends the rest of the year on land. If you have a pond on or near your development, you need to check if there are GCN present, and you may need to get a licence from Natural England before you undertake development. An alternative approach to GCN licensing is available within Aylesbury Vale. Developers can apply to work under a district licence, rather than having to apply for their own separate licence. More information on District Licensing is provided by the NatureSpace Partnership https://naturespaceuk.com/ .

Photo 3: Great Crested Newt – a European Protected Species found within waterbodies in Aylesbury Vale. Image: Sam Knowles

2.7 Invasive Species

KEY PRINCIPLE 6: Developments must take precautions to ensure that no invasive species are introduced, and if already present ensure they are not allowed to spread

Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) currently lists species for which it is an offence to introduce or cause to establish in the wild.

An Invasive Non-Native Species (INNS) is any non-native animal or plant that can spread causing damage to the environment, economy, our health and the way we live. In 2015, it was estimated that these species cost the UK economy at least £1.7 billion per year (DEFRA(2015) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/455526/gb-non-native-species-strategy-pb14324.pdf). Watercourses provide corridors along which INNS can spread quickly and once established they can be very costly or often impossible to completely remove.

If you are proposing to develop land that may have INNS present, you are advised to contact the Local Planning Authority at an early stage to discuss land contamination issues before submitting a planning application. Where planning consent is granted for a site in which the presence of INNS is known or suspected, an advisory note may be attached to the planning permission informing the applicant(s) that the responsibility for the safe development of the site rests with the developer.

More information on Invasive Species is provided by the GB Non-native Species Secretariat https://uk-scape.ceh.ac.uk/our-science/projects/GBNNSIP.

Photo 4: Himalayan Balsam - an invasive non-native plant found within watercourses in Aylesbury Vale. Image: River Thame Conservation Trust

3 Permits and Consents

KEY PRINCIPLE 7: Developments must have the necessary permits and consents for works, on or near watercourses from the consenting body

All rivers, streams and ditches are classified as either 'main rivers' or 'ordinary watercourses'. In addition to planning permission, you are likely to need a Permit or Consent to do any work on or near watercourses. There are three different consenting bodies in Buckinghamshire. Who you apply to depends on the classification of the watercourse you are working on.

To check the classification of the watercourse you are working on and to find out which organisation to apply to, please use the 'Identify Type of Watercourse' Map available on the Lead Local Flood Authority website https://www.buckscc.gov.uk/services/environment/flooding/apply-for-land-drainage-consent/.

3.1 Main Rivers and 'Environmental Permits'

Main rivers are usually larger rivers, streams and ditches that are considered strategic in managing flood risk see this link Statutory Main River Map. Works to a main river are covered by Environmental Permitting (England and Wales) Regulations 2016, which are administered by the Environment Agency.

If working on or near a main river, on or near a flood defence structure, or in a flood plain an Environmental Permit is required. Details of the Environment Agency's byelaws can be found for the EA Thames Region at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/297294/geth0907bndj-e-e.pdf and for the EA Anglian Region at https://www.gov.uk/government/publications/land-drainage-and-sea-defence-byelaws-anglian-region. Guidance on how to apply for an Environmental Permit is provided by the Environment Agency (see https://www.gov.uk/topic/environmental-management/environmental-permits).

3.2 Ordinary Watercourses and 'Land Drainage Consents'

An ordinary watercourse is one that is not considered to be a main typically all small streams and ditches and can include drains, mills, dams, culverts, and weirs.

In order to undertake works on ordinary watercourses Land Drainage Consent is required (for the Council's role here see https://www.buckscc.gov.uk/services/environment/flooding/apply-for-land-drainage-consent/). In areas within the Internal Drainage Board (see IDB byelaws at https://www.idbs.org.uk/information/byelaws/) this must be sought from Buckingham and River Ouzel Internal Drainage Board (IDB). More information is on how to Apply for Land Drainage Consent in these areas is provided by the IDB.

In the remaining areas of the Vale, this is the responsibility of the Lead Local Flood Authority (LLFA), in this case Buckinghamshire Council. More information on how to Apply for Land Drainage Consent in these areas is provided by the LLFA Apply for land drainage consent | Buckinghamshire Council.

3.3 Other Permits and Consents

Development may need further permits and consents: a Discharge Permit for discharges either into the river, or into the ground; a Permit or a Waste Exemption for the recovery and disposal of waste resulting from works; an Abstraction licence if water is being removed from groundwater or a watercourse, and/or being diverted around an obstruction. Contact the Environment Agency (see first https://www.gov.uk/guidance/flood-risk-activities-environmental-permits) for the most up to date Permitting regulations.

4 Good Design

Most watercourses have been altered in some way by either straightening the channel, replacing natural banks with hard engineering, dredging and widening. These changes over time have led to the loss of natural features such as bankside habitats, gravel riffles, pools and meanders, and in many cases, banks have been increased in height, disconnecting the watercourse with its floodplain.

Developments which contain or are adjacent to watercourses offer an opportunity to provide ecological buffers, restore bankside and in-stream habitats, create pond complexes and natural floodplains. Carefully designed developments along watercourses can greatly increase the ecological and biodiversity value of the features within them, and the value of the overall development.

4.1 Ecological Buffer Zones

KEY PRINCIPLE 8: Developments shall provide a minimum 10m Ecological Buffer Zone to watercourses unless existing physical constraints prevent. A long-term landscape and ecological management plan is required for this buffer. Development proposals adjacent to or containing a watercourse shall provide or retain an Ecological Buffer Zone (EBZ). EBZs conserve, enhance and protect the water environment. They are protective zones of vegetation which may consist of trees, wetland, scrub or grassland which offer habitat for a range of plants, animals and insects. They protect water quality by trapping sediments and breaking down pollutants before they reach the watercourse. They also offer amenity and recreation opportunities nearby, enable bank stabilisation through vegetation establishment and make space for water in a flood event and protect natural floodplains.

The effectiveness of EBZs is determined by their width and connectivity. In accordance with Local Plan Policy ‘NE2 Rivers and Stream Corridors’ the EBZ shall measure a minimum of 10m from the top of the riverbank to the development for all watercourses affected by the development. Generally, the

wider the EBZ the more beneficial it is for wildlife, the exact size will depend on the site situation, what wildlife already exists at that location, how land and existing vegetation is currently managed and any links to the wider countryside or other buffer zones. Buffers that provide a natural transition between the watercourse and development, and are continuous along the length of the watercourse, are more effective than fragmented buffers.

The EBZ should be designed and managed to enhance its value for biodiversity. The development, which includes buildings, hard standing, formal footpaths, cycle paths, lighting, gardens and formal landscaping, should be located outside of the EBZ, set back from watercourse by a minimum of 10 metres. In addition to the built form, buildings should not cast shade in to the EBZ.

In accordance with Local Plan Policy 'NE2 Rivers and Stream Corridors' the EBZ requires a long-term Landscape and Ecological Management Plan (LEMP). EBZs can easily be delineated through the provision of open fencing separating the watercourse from adjacent land uses, particularly grazing livestock and human activities causing disturbance. Fencing needs to be open in design to allow wildlife movement and continued flow paths. Fencing of the EBZ may be needed but it is not a requirement as access can be discouraged through a planting scheme. Low bollards can be used to offer a visual separation from more heavily managed areas or when the buffer is close to a road or footpath to prevent encroachment.

More information on the management of buffer zones is provided within Section 4.1 of the Riparian Vegetation Management Good Practice Guide. (See SEPA Engineering in the Water Environment Good Practice Guide: Riparian Vegetation Management Second Edition, June 2009 https://www.sepa.org.uk/media/151010/wat_sg_44.pdf).

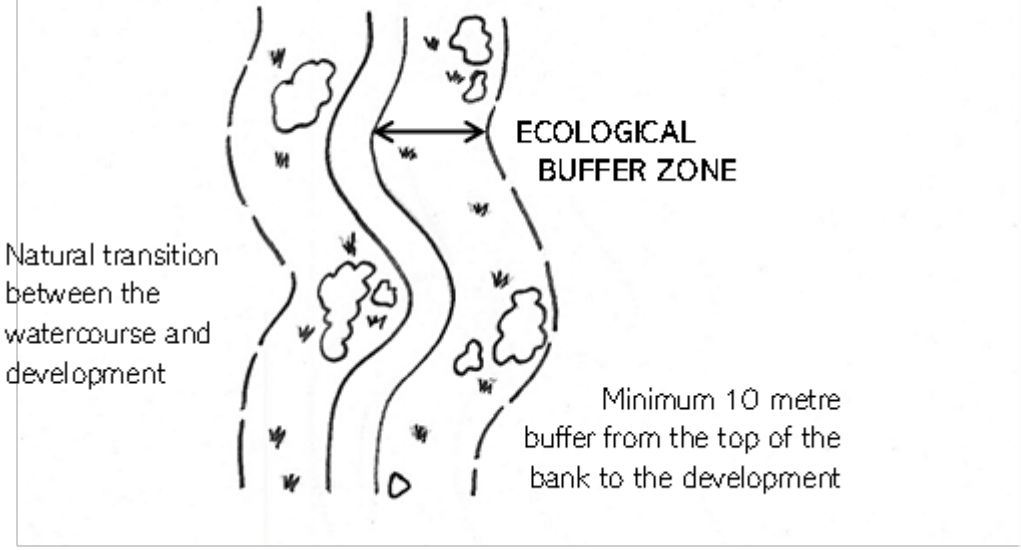


Diagram 1. Diagram showing an Ecological Buffer Zone along either side of a watercourse. The watercourse is buffered by a minimum 10metre buffer from the top of the bank with a natural transition between the watercourse and development.

4.2 Bankside and In-stream Habitats

KEY PRINCIPLE 9: Developments should seek opportunities to re-naturalise the river channel and restore bankside and instream habitats

Restoring meanders and enhancing straightened watercourses

Many watercourses have been historically straightened or deepened. Re-meandering straightened watercourses can increase flow diversity and provide more natural conditions and better-quality habitats for fish and invertebrates, as well as increasing water storage within the channel.

Straightened watercourse channels can also be enhanced through the creation of stone riffles and introduction of gravels to naturalise the channel.

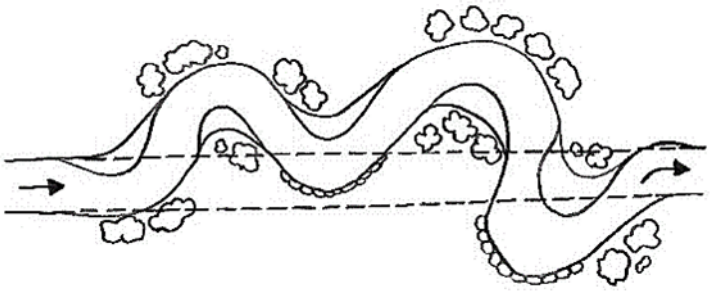


Diagram 2. Diagram showing enhancement of a straightened watercourse channels by restoring meanders, creating stone rifles and gravels.

Revetting and supporting watercourse banks

Growth of marginal and riparian vegetation can be encouraged by re-profiling banks to be gently sloping, which will in turn provide a diversity of plants and bank stability. If a tree is identified for removal, the root system should remain intact if it is providing bank stability.

Hard bank protection such as sheet piling should be removed and replaced by soft engineering techniques such as faggoting, willow spiling and mattresses, coir matting and rolls, to enhance bank stability.

Erosion points along the bank caused by dogs entering the water can be formalised to reduce further bank erosion and sedimentation. Formalised ‘dog dips’ can be created by either using local stone or by creating ‘steps’ into the channel. Creating these features can relieve pressure from other more sensitive reaches of the bank and water access can be discouraged from other areas by making access more difficult.

Photo 5: Willow spilling is an example of a soft engineering technique to support and improve watercourse bank stability. Photo credit: River Thame Conservation Trust.

Photo 6: A formalised ‘dog dip’ created within an Aylesbury Vale area watercourse by using stone into the channel. Photo credit: River Thame Conservation Trust.

Modifying bed levels, water levels and flows

If the channel width has been artificially increased, the creation of a two-stage channel can provide a low flow channel whilst not compromising on channel capacity and improve habitat diversity.

Consent may be required for making any changes to a main river or ordinary watercourse and advice should be sought from the Environment Agency or Lead Local Authority as to whether consent is needed for the designs proposed as described under Section 3.

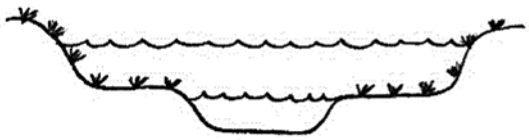


Diagram 3. Diagram showing two-stage channel providing a low flow channel whilst not compromising on capacity of the channel and improving habitat diversity

Flow deflectors and berms can be used create in-stream flow and habitat variation. Existing natural features including fallen trees should be retained where possible. This can also be achieved by the installation of course or large woody debris. The Environment Agency can advise further as to whether this is desirable.

Where the natural bed has been removed by historical management and/or dredging, it can be replaced and restored. The appropriate bed substrate will depend on local conditions and area Environment Agency Fisheries, Biodiversity and Geomorphology (FBG) staff will be able to advise.

In urban areas, rivers may often have concrete banks or bed, and it is not always feasible to make space for large-scale river restoration. Reinstating some natural processes within the river channel can be the next best option. This involves introducing some form of roughness in-channel, such as woody material, reworking gravels or creating berms to create flow diversity, new habitats and areas of refuge. More information can be found in Section 3 of the RRC Manual of Techniques . https://www.therrc.co.uk/manual-river-restoration-techniques

Enhancements for protected species

Creation of an artificial holt for otters: Carefully sited and constructed artificial holts may encourage otters to recolonise and breed within the watercourse, especially where watercourse management practises have been responsible for the loss of natural features. Above ground holts can also offer habitat for many different species of small mammals and invertebrates.

Creation of an artificial bank for sand martins: Sand martins nest colonially usually in the sheer faces that develop naturally on river meanders. Bedding 1m lengths of 4-10cm polythene pipe into a bank constructed from sand and gravel can create safe and long-lasting artificial sites. The lowest row of pipes should be 1m above summer water level, sloping slightly down towards the entrance, with rows 0.3m apart and pipes at 0.2m spacings.

Creation of an artificial bank/nest site for kingfishers: Kingfishers breed beside still or slow flowing freshwater, typically nesting within a vertical or steep earth bank at or very close to the water's edge. Where no suitable natural bank exists an artificial one can be created and/or artificial nest boxes installed. The nest box entrance must be at least 1 metre above the maximum water level and should be completely buried so that only the nest entrance is visible. The tunnel should slope down from the nest at an angle of 10 or 20 degrees for drainage, with a layer of dry soil placed in the nest chamber and a small nest cup made to keep the eggs together.

4.3 Culverts, Crossings and Barriers

KEY PRINCIPLE 10: Developments must not involve the culverting of watercourses and should actively pursue de-culverting opportunities.

Culverts

Culverts are artificial water channels. They vary considerably from narrow pipes through to large-square sided channels which encase a watercourse underground. Culverting watercourses leads to the loss or damage of plants,

animals and their habitats, and creates a barrier to the movement of fish and other wildlife. Culverts increases flood risk due to the risk of blockages. They can also complicate maintenance due to small spaces and items becoming tangled in trash screens.

Where culverting of a watercourse or channel diversion is both necessary and the only reasonable and practicable alternative the development will need to demonstrate that it will not have a detrimental effect on flood risk and the habitat(s) and species present, or that mitigation measures can be put in place to reduce these effects. The Permit issuing organisation should be consulted at the earliest opportunity so that advice can be provided (see Section 3 'Permits and Consents'). It should be noted that the development will be required to show no net loss of channel length or ecological value. Please also see the Council's culvert policy (2019)
https://www.buckscc.gov.uk/media/4514317/culvert-policy.pdf

Alternatives including crossings

In accordance with Local Plan Policy 'NE2 Rivers and Stream Corridors' culverting of watercourses must be avoided and opportunities to de-culvert watercourses sought. Alternatives to culverts include using clear span crossings, constructing parts of the development elsewhere and as a last resort, diverting the watercourse elsewhere:

- Crossings should be clear span in design with abutments set back from the top of the bank to enable bank habitat to be maintained. There should be no in-stream supports within the watercourse channel in order to maintain the natural riverbed – in-stream supports are only appropriate where they are necessary to ensure structural integrity (i.e., very wide rivers).
- Crossings should be located perpendicular to a watercourse, on a straight stable section where there is no evidence of active erosion or deposition.
- Any raised surfaces created to reach the bridge should be made from natural materials, be short in length and have a natural surface.

- For footbridge or cycleway crossings, fencing may be required to stop a pinch point of dog activity at the bridge.
- Fords should not be created and where these occur within a development boundary, the banks should be repaired and a formal crossing installed as fords lead to river-widening, increased risk of pollution, bed and bank erosion.
- For larger crossings, ledges (approximately 500mm wide, 300mm above the normal water level, with minimum 600mm headroom) are required to allow for the passage of mammals. These should link to the banks upstream and downstream of the crossing. These structures can also incorporate features to encourage bat roosting and bird nesting as appropriate. More information is provided within the Standards for Highways Works (Design Manual for Roads and Bridges LD 118 - Biodiversity design (2020 update) https://www.standardsforhighways.co.uk/dmrb/search/9317652b-4cb8-4aaf-be57-b96d324c8965

De-culverting Opportunities

Restoring culverted watercourses can provide valuable wetland/aquatic habitats, offers amenity and recreation opportunities, reduces maintenance and construction costs, reduces flood risk and gives a place a sense of identity.

For large culverts with no adjacent development the watercourse should be returned to a more naturally functioning form. For channel/box culverts with adjacent development the culvert should be opened, and the bed returned to a natural state. Where this is not possible, enhancement or mitigation work should be implemented elsewhere on the watercourse (Chartered Institution of Water and Environmental Management ‘De-culverting of watercourses’ Available at: https://www.ciwem.org/assets/pdf/Policy/Policy%20Position%20Statement/Deculverting-of-water-courses.pdf).

4.4 Ponds

KEY PRINICIPLE 11: Developments providing pond complexes to achieve biodiversity net gain or enhancements or that are creating sustainable drainage systems should utilise best practice guidance (The Pond Creation Toolkit).

Ponds are a critical habitat for freshwater plants and animals and are often the source of the cleanest water. To create clean water ponds, find a place with a clean water source, leave the pond to colonise naturally and make sure the pond is protected from damaging impacts during its lifetime.

Pond design is important to maximise biodiversity benefit as follows:

- Create pond complexes or multiple pools including both permanent and seasonal ponds of varying areas and depths, rather than a single waterbody.
- Make broad, undulating drawdown zones
- Make sure that most pond slopes are shallow (less than 1:5)
- Create underwater bars and shoals to benefit aquatic plants
- Design according to your landuse and site management (e.g., grazed or ungrazed meadow) and think about how the site will develop in the longer term
- Use design to minimise future problems – think about how the pond will be used by people and animals.

For more information on how to design high-quality wildlife pond complexes refer to and follow the Freshwater Habitats Trust Pond Creation Tool Kit (Freshwater Habitats Trust (2011) Freshwater Habitats Trust Pond Creation Tool Kit. [online] Available at: https://freshwaterhabitats.org.uk/projects/million-ponds/pond-creation-toolkit/) best practice guidelines.

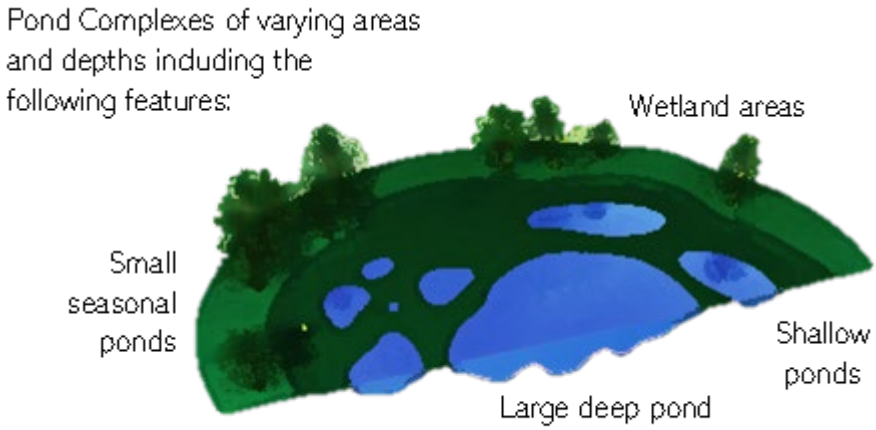


Diagram 4. Example of good pond complex design with varying areas and depths. A large deep pond and shallower ponds are created. Small seasonal ponds are also present within wetland areas. Diagram adaptation from Freshwater Habitats Trust Pond Creation Tool Kit.

4.5 Floodplain reconnection and wetlands

KEY PRINICIPLE 12: Developments should reconnect rivers with their floodplains and where biodiversity net gains or enhancement is required, create habitats such as wetlands, scrapes and backwaters Naturally functioning floodplains can be hugely diverse and can support an array of different habitat types such as wet grassland/meadows, wetlands and wet woodlands. Rivers have been disconnected from their floodplains due to agricultural intensification and urban development and as a result these floodplain habitats are now very rare in lowland areas (Stephen Addy et al, (2016) River Restoration and Biodiversity: Nature-based solutions for restoring rivers in the UK and Republic of Ireland. Available at: https://portals.iucn.org/library/sites/library/files/documents/2016-064.pdf).

The restoration or creation of floodplain habitats can have huge biodiversity benefits as well as naturally reduce flood risk (Box 4).

Wetlands

Wetlands such as fen, carr (wet woodland), marsh, swamp and reedbeds develop anywhere where water remains at or near the surface year-round. A wetland meadow does not have standing water except for a few brief periods during the growing season. These habitats can be found on river floodplains and vary in character depending on the type of flooding, source of water and land management.

The floodplain can be reconnected by removing or lowering river embankments to reconnect with the river channel. Wetlands are created when an area of the floodplain as it is allowed to flood or deliberately flooded for flood management purposes.

Changing land use can improve soil infiltration and reduce surface run-off, for example through arable reversion to grassland, or re-forestation of the floodplain and woodland creation.

Scrapes

Scrapes are shallow depressions (c. 30cm below and 10cm above normal water levels) with gently sloping edges which seasonally hold water (between March through to the end of June) which are ideally located within large, open, lower lying areas such as flood plains. They can be either be non-connected or connected to a water source such as a ditch, spring or watercourse. Once created open muddy margins should be maintained either by extensive livestock grazing/poaching or annual mowing.

Scrapes support a wide variety of wetland invertebrates and provide feeding areas for wading birds, such as snipe and lapwing, and their chicks. The scrapes offer additional floodwater storage within the floodplain.

For more information on how to design scrapes refer to and follow the RSPB Scrape Creation for Wildlife guidelines. https://www.rspb.org.uk/globalassets/downloads/documents/farming-advice/scrapecreationforwildlife_tcm9-255102.pdf or contact the RSBP at https://www.rspb.org.uk/our-work/conservation/conservation-and-sustainability/

Backwaters

Backwaters are wet areas that are connected to the main river channel but with little or no flow. They may be seasonally or permanently inundated. The backwaters offer below surface level flood storage and are connected to the river by a low bund or overflow pipe. Redundant river channels can be enhanced by backwater creation.

Backwaters provide important habitat for a range of aquatic flora and fauna including invertebrates and fish. The warmer conditions and shallow refugia are ideal areas for juvenile fish during times of flood and invertebrates, such as dragonflies and damselflies, which rely on still unpolluted waters.

Photo 7 A newly established backwater connected to the main river channel providing new habitat for invertebrates and fish. Photo credit: River Thame Conservation Trust.

BOX 4. NATURAL FLOOD MANAGEMENT

Natural flood management (NFM) is the alteration or restoration of natural processes to reduce flood risk. An example of such a scheme is at Leckhamptead, Bucks. Floodplains are essential components of a river corridor, and their natural role is to store and slow down flood water. Floodplain restoration is an example of NFM and can increase flood water storage and reduce flooding downstream, whilst supporting a unique community of plants and insects. Further guidance on NFM is provided within The Natural Flood Management Toolbox documents **at** https://catchmentbasedapproach.org/learn/natural-flood-management-toolbox-a-7-step-guide-to-developing-a-nfm-scheme/.

4.6 Sustainable Drainage Systems

Sustainable Drainage Systems (SuDS) are used as an alternative to conventional ways of managing surface water. The main purpose of SuDS is to mimic the natural drainage of the site before development. This is achieved by capturing rainfall and allowing as much as possible to evaporate or soak into the ground close to where it fell or through designed storage areas. The rest is directed to the nearest watercourse to be released at the same rate and volumes as before development.

SuDS can provide some natural removal of pollutants and sediments, as well as promoting aquifer recharge and enhancing biodiversity, which all provide environmental benefits. They can also be designed to add aesthetic value and offer attractive natural amenities for the local community.

If the SuDS is within a river corridor then refer to Adopted Vale of Aylesbury Local Plan Policy NE2 (see Appendix 1) and Buckinghamshire Council SUDS developer pack Available at: https://www.buckscc.gov.uk/services/environment/flooding/sustainable-drainage-suds/guidance-documents/

The drainage aspects of a planning application will be considered by the SuDS team at the Lead Local Flood Authority (Buckinghamshire Council) as part of their statutory duties.

Pre-application advice prior to submitting a planning application is encouraged. Early engagement ensures the full benefits of sustainable drainage systems are recognised on developments. More information on the SuDS Pre-application advice service is provided by the LLFA.

Further guidance on sustainable drainage is provided within the CIRIA Guidance on the construction of SuDS document https://www.ciria.org/ItemDetail?iProductcode=C768&Category=BOOK

4.7 Public access

Many riverside areas are currently inaccessible to the public because they fall within private ownership. In-line with the Aylesbury Vale Green Infrastructure Strategy and Local Plan Policy ‘I1’, the Council expect opportunities for increasing appropriate informal public access to rivers to be taken, providing that this would not result in conflicts with other Local Plan Policies and key interests such as the value of that habitat for conservation purposes.

5 Preventing pollution

KEY PRINCIPLE 13: Developments should avoid pollution by incorporating mitigation or design solutions during and after construction. Consult the Environment Agency for advice on measures necessary to prevent pollution of surface and ground water.

5.1 Oil, Silt and Sediment

Pollution can come from a range of sources and should be considered during all phases of a development, design, construction and lifetime. Practical ‘how to’ measures to reduce and avoid water pollution during construction and on completed sites include:

- Bund oil tanks and other potential pollutants
- Store oils, chemicals and other potential pollutants away from water bodies and surface water drains
- Avoid silt and sediments entering freshwater habitats as they can damage habitat and wildlife – for example, smothering fish eggs and aquatic insects
- Site compounds away from watercourses and out of the floodplain

  Further guidance on controlling sediments during construction can be found within the CIRIA Contaminated sediments: a guide for risk assessment and management document. (Dennis, I, Challinor, S, Page, C, Walentek, M (2019). Contaminated sediments: a guide for risk assessment and management (C781), CIRIA).

5.2 Septic Tanks

Septic tanks and small sewage treatment plants are likely to be a major and underestimated source of pollution. Systems are often located in unsuitable areas, on unsuitable soils and are often improperly managed. (Withers, P. et al (2013)., 'Do septic tank systems pose a hidden threat to water quality?'. Front Ecol Environ. 12(2): 123–130, doi:10.1890/130131) Poorly performing systems can release raw sewage and pollute ground water, rivers and streams. It is advised to:

- Connect to the main sewer network where possible.
- If it is not possible to connect to the main sewer network, consider using a central combined sewage treatment system for multiple housing developments.
- Ensure homeowners are left with full details on the make and size of their sewage treatment system, and instructions on how best to maintain it.
- Ensure newly installed sewage treatment systems have spare capacity to deal with future extensions to the new build.

Further guidance can be found within the governments General Binding Rules for small sewage discharge to a surface water (Environment Agency (2020) (https://www.gov.uk/guidance/general-binding-rules-small-sewage-discharge-to-a-surface-water) and RTCT Septic Tanks Guidance. (Dennis, I, Challinor, S, Page, C, Walentek, M (2019). Contaminated sediments: a guide for risk assessment and management (C781), CIRIA.)

6 Appendices

Appendix 1 – VALP Policy NE2 River and Stream Corridors

9.17 The river network of Aylesbury Vale has considerable ecological and amenity value, and the Local Plan should include policy to ensure the protection and enhancement of its watercourses (see Forward to 2020 Buckinghamshire and Milton Keynes Biodiversity Action Plan, 2014).

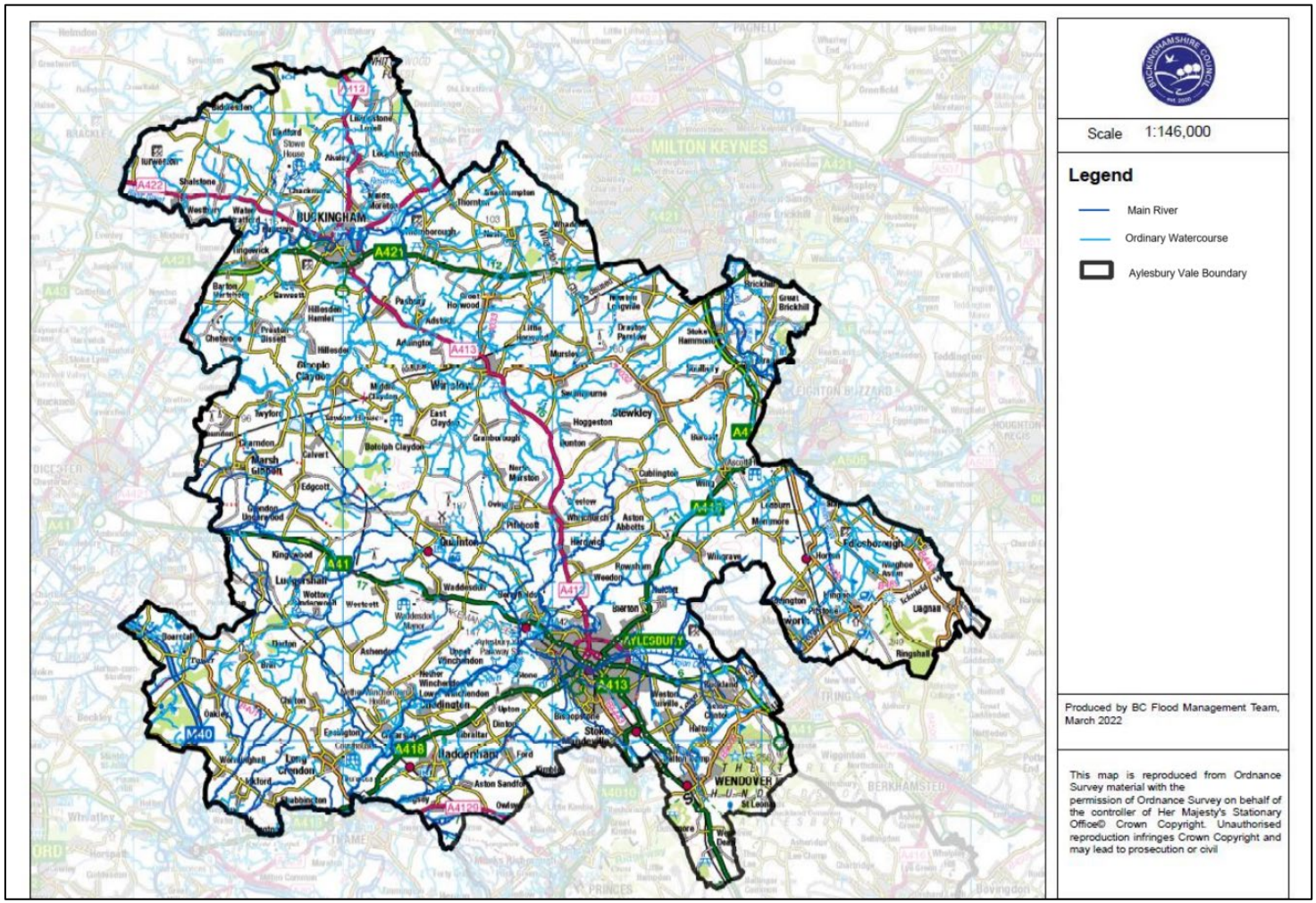
9.18 A watercourse advice note for Aylesbury Vale is in the process of being produced by a partnership of organisations including, amongst others, Buckinghamshire Council and the Environment Agency. The advice note will guide planning applications in line with the following policy.

NE2 River and stream corridors

Development proposals must not have an adverse impact on the functions and setting of any watercourse and its associated corridor. They should conserve and enhance the biodiversity, landscape and consider the recreational value of the watercourse and its corridor through good design. Opportunities for de-culverting of watercourses should be actively pursued. Planning permission will only be granted for proposals which do not involve the culverting of watercourses and which do not prejudice future opportunities for de-culverting. Development proposals adjacent to or containing a watercourse shall provide or retain a 10m ecological buffer (unless existing physical constraints prevent) from the top of the watercourse bank and the development, and include a long-term landscape and ecological management plan for this buffer.

Appendix 2: Map of Watercourses in the Aylesbury Vale Area of Buckinghamshire (2022)

For an interactive map showing main river and ordinary watercourses go to the following Council website page
https://www.buckscc.gov.uk/services/environment/flooding/apply-for-land-drainage-consent/



Watercourse Advice Note - Aylesbury Vale Area

Note for Planners, Designers and Developers