West Sussex County Council (WSCC)

Lead Local Flood Authority (LLFA)

Culvert Policy

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1. Introduction

This policy has been produced by West Sussex County Council (WSCC), the Lead Local Flood Authority (LLFA), for use by anyone seeking to install, alter, or remove a **culvert** on an ordinary watercourse.

A **culvert** is a structure (typically a circular pipe, rectangular box section or brick arch) that allows a watercourse to flow below the surface of the ground, under a road, railway, footpath, bridleway, track, or above ground obstruction.

This document provides detailed good practice guidance, regarding the culverting of **ordinary watercourses**, and should be used as a reference document for design purposes.

Under UK "flood risk management" and "drainage" legislation there are two main types of "watercourses":

- **Designated Statutory Main Rivers:** These are strategically important drainage features that are all mapped and can be found on the national main river map.
- **Ordinary Watercourses:** Section 72 of the Land Drainage Act 1991 defines an ordinary watercourse as a watercourse that does not form part of a main river. The term "watercourse" includes all other rivers and streams and all ditches, drains, cuts, culverts, dikes, sluices, sewers (other than public sewers within the meaning of the Water Industry Act 1991) and passages, through which water flows.

This culvert guidance document applies to ordinary watercourses only; the Environment Agency should be contacted for guidance on the culverting of, or the undertaking of other works to, or near, 'designated statutory main rivers'.

This culvert guidance document replaces the previous "West Sussex County Council LLFA Culvert Policy" document.

2. Ordinary Watercourse Consent

The culverting of an ordinary watercourse, or the alteration of an existing ordinary watercourse, requires 'ordinary watercourse consent' under Section 23 of the Land Drainage Act 1991 (as amended). WSCC, as the LLFA, are responsible for processing 'ordinary watercourse consent' applications. P lease be fully aware that 'Ordinary Watercourse Consent' must be sought and formally granted in writing **prior to the commencement of** any of the following works/activities:

- The installation of a culvert in any ordinary watercourse.
- The removal of a culvert from an ordinary watercourse.
- The alteration of a culvert in a manner that could potentially obstruct the flow of the ordinary watercourse.
- The installation of a structure within the flow channel of an ordinary watercourse that could potentially obstruct the flow.
- The diversion or infilling of any ordinary watercourse.
- The construction of any mill, dam, weir, or other similar obstruction to the flow of any ordinary watercourse or raising or otherwise altering any such obstruction.

The above list should not be considered exhaustive. If you are not sure if the work you are proposing requires consent, then please contact the LLFA at owc@westsussex.gov.uk.

The ordinary watercourse consent application form, along with guidance on how to apply is available on the West Sussex Lead Local Flood Authority (LLFA) website.

Landowners and developers are strongly encouraged to seek advice as early as possible when considering a culverting proposal. A pre-application advice service is offered by the LLFA. Early engagement helps ensure sufficient time for review and reduces the risk of overall programme delays.

Please note: If consent for a new culvert is granted the work must be carried out in strict accordance with the approved design, particularly as consent usually comes with a condition that requires verification of compliance with the approved designs/drawings.

3. Planning Permission

The requirement to obtain ordinary watercourse consent is independent of planning permission. The granting of planning permission does not imply or guarantee that land drainage consent will be approved and the granting of ordinary watercourse consent does not imply or guarantee that planning permission will be granted.

- Anyone wishing to construct a new culvert or remove an existing culvert is responsible for establishing if planning permission is required for the work.
- Applicants must ensure compliance with all relevant planning conditions attached to their permission.
- Any work must comply with any local council land drainage byelaws, where applicable.

4. The LLFA's General Opposition to Culverting

Watercourses fulfil many roles in today's environment. They provide drainage for developed and agricultural land and are vital drainage assets. They are also key features of the landscape and provide habitats for a wide variety of wildlife. It is therefore important that watercourses and their associated habitats are protected and enhanced for the benefit of future generations, which is why **the LLFA maintains a general opposition to the culverting of ordinary watercourses because of the potential for adverse effect on flood risk and ecology**. This position is a result of the legal requirements of the Water Framework Directive (2003) which states that the quality of a watercourse should not be reduced and the fact that culverting often results in detrimental effects, such as:

Increased Flood Risk:

- Culverting can reduce the conveyance capacity of a watercourse; this can lead to the overwhelming of the culvert entrance which can result in flooding.
- Culverting can reduce the flood water storage capacity of the watercourse and therefore can increase flood risk.
- Culverting presents a barrier to overland run-off (and/or flood water) from entering the watercourse along the length of the culverted section, increasing flood risk associated with this run-off.
- Culverts, due to their confined nature, have an increased risk of blockage compared to open watercourses. Plus, due to the enclosed nature of culverts, those blockages are more difficult to observe and therefore less likely to be resolved before they cause flooding.
- Culvert screens can become blinded and result in flooding.
- Culverts deteriorate over time and defects in the structure of a culvert, such as misaligned joints, cracked and deformed sections of pipe, are hidden from view and difficult to repair. Therefore, such defects are less likely to be resolved before they deteriorate, which can cause blockages/flooding.
- It is more difficult to create a new surface water drainage connection to a culvert than an open watercourse.

Detrimental Ecological Effects:

- Culverts are virtually ecologically sterile when compared to open watercourses (that usually offer a rich ecological habitat).
- Culverting results in a loss of the continuity of the watercourse's habitat corridor, which causes an adverse impact on the ecological value of the watercourse and is known to inhibit the migration of some species.

Maintenance and Health and Safety Implications:

- Culverts are more difficult to inspect and maintain than open watercourses; specialist equipment is often required (CCTV surveys/jetting/suction tankers).
- Culverts often need more frequent inspections and maintenance interventions than open watercourses.
- Culverts can cause entrapment, and they are considered a confined space making any cleansing and maintenance tasks requiring human entry dangerous, difficult, and expensive.

Increased likelihood of problems in the future:

- Culverts conceal the presence of a watercourse which can lead to inappropriate land use over, or near to, the watercourse which can lead to the structural failure of the culvert, or major problems when future access for repair or replacement work is required.
- Culverts in urban areas are susceptible to pollution as a result of hidden misconnected foul drains.

Increased Erosion Risk:

- Culverts change the dynamics of flow within a watercourse; this often leads to an increase in erosion to the banks and beds of a watercourse adjacent to a culvert entrance or exit. This can result in new repair and maintenance obligations that did not exist prior to culverting.

Due to the reasons detailed above the LLFA maintains a precautionary principle and only approves an application to culvert an ordinary watercourse if there is no reasonably practicable alternative, or if the potential negative impact of culverting would be so minor that they would not justify a more costly alternative. This means that the required consent for a proposed culvert will not be forthcoming unless alternatives to culverting have been considered, such as:

- Clear span bridges.
- The revision of site layouts to facilitate the retention of open watercourses.
- The diversion of the open watercourse without loss of its hydraulic flow characteristics.

Consent will only be granted for new culverts where evidence is provided that the above, less harmful alternatives to culverting, are unviable. In all cases and where the proposed works will result in the loss of watercourse capacity and habitat, compensatory capacity and habitat must be provided elsewhere.

5. Acceptable and Unacceptable Reasons for Culverting

Due to the potential adverse effects of culverting on both flood risk and habitat/ecology, consent for culverting will only be granted where there is a genuine requirement for the construction of a new culvert, such as:

- A need for a crossing point over a watercourse where alternative crossing arrangements, which do not involve culverting, have been shown to be unfeasible.
- Genuine health and safety reasons that cannot be overcome by other interventions that do not involve the culverting of the watercourse (such as fencing or barriers).

Consent for a new culvert will not be granted where there is no genuine requirement for a culvert, such as:

- To provide access where other crossing types that do not involve culverting are feasible.
- Health and safety reasons that could be mitigated via other interventions that do not involve culverting.
- To increase usable garden area or to alter garden aesthetics.
- To increase the developable area of a development site, or where culverting is proposed to facilitate the construction of structures/buildings over a watercourse.

6. Culvert Design Guidance

Where culverting is deemed unavoidable, **prior to the commencement** of the works formal written Ordinary Watercourse Consent must be obtained from the Lead Local Flood Authority. Applicants must demonstrate that all reasonable steps have been taken to minimise flood risk and mitigate environmental harm, through good design practice. Detailed design guidance is available in the "Culvert, Screen and Outfall Manual: CIRIA C786" (2019).

Points to consider before submitting an ordinary watercourse consent application to the LLFA:

- A full detailed design must accompany the formal application, including justification for the size/capacity of the culvert.
    - Hydraulic calculations are likely to be required for larger and more complex culverts.
- Culvert levels must be informed by a topographical survey that established existing watercourse silt levels, hard bed levels, and bank top levels.
    - Culverts should be installed so that both the inlet and outlet align with the hard bed level of the watercourse to maintain flow and minimise ecological harm.
- The environmental impact of the culverting will need to be considered and mitigated where harm is identified.
- To minimise adverse effects, culverts must be designed to be as short as possible to fulfil their function.
- Culverts should not be smaller than 450mm in diameter, unless evidence is provided as to why this is not possible and that the diameter that is proposed will not increase flood risk.
- Designs must not increase flood risk to property.
    - Alternative flow paths that will arise if the culvert becomes blocked should be considered and shown to be acceptable.
- Culverts must be of robust design to withstand the loadings they will be subjected to and should have an appropriate design life.
- Culverts must be designed to have a consistent cross-section throughout.
- All culverts must have appropriately designed robust headwalls at the inlet and outlet to control erosion. Headwalls should be flush with the bed and banks and be appropriate to the local conditions.
- Culvert design must comply with all relevant 'Health and Safety' legislation.

- Culverts should be designed to be easily maintainable.
- The justification for the inclusion of any trash screens must be supported by the findings of a trash screen assessment in accordance with CIRIA C786 – Culvert, screen, and outfall manual. If trash screens are deemed appropriate:
    - Cranked/angled screens should be specified at upstream ends.
    - Either "no screen" should be specified on the downstream end (for better hydraulic performance, and reduced risk of debris accumulation) or a "vertical, single-plane screen aligned perpendicular to flow", if a downstream end screen is deemed necessary.
- Single large diameter culverts are preferable to multiple parallel small-diameter culverts.
- Syphon arrangements are unlikely to be acceptable due to their operational complexities and an increased risk of failure.
- Where watercourses are susceptible to siltation, consideration should be given to installing silt traps upstream of the culvert to reduce sediment build-up and blockage risk.
- Utility services must not intrude into the cross-sectional area (flow channel) of the culvert, as this can obstruct flow and complicate maintenance.
- Environmental mitigation measures must be considered as part of the design process to reduce the impact on the natural environment. Increasing the culvert diameter slightly beyond what is required for design flow, and positioning the invert level at, or slightly below, the natural bed level of the watercourse will allow natural bed features to develop over time, supporting ecological enhancement.
- In larger culverts, ledges above the water level should be included to facilitate the movement of wildlife. Installing animal underpasses adjacent to any structure would also be acceptable.
- The structure must not obstruct fish movement. Designs should maintain continuity of flow and avoid significant vertical drops or increase in turbulence.
- Culverting proposals that also seek to deliver enhancements will be viewed more favourably, such as:
    - The removal of existing culverts that are no longer required to mitigate for the construction of new culverts.
    - Improving existing open watercourse segments subject to local constraints.

    - Creating new ponds, marshy areas, or backwater bays to increase diversity.
- The use of soft-engineering techniques or natural materials that complement the surrounding environment should be utilised where practicable, provided this does not compromise the structural integrity or design life of the structure.

7. De-culverting Guidance

The LLFA are generally supportive of the removal of existing culverts as such works usually offers a range of environmental and practical benefits, including:

- The creation of valuable watercourse habitat.
- Increased flood storage capacity.
- Reduced maintenance complexity and costs.
- Improved access for inspection and monitoring.

Ordinary Watercourse Consent is required for any de-culverting activity, as removing a culvert may alter flow dynamics and potentially increase downstream flood risk and/or erosion risk.

Depending upon the size, length, and nature of the culvert to be removed, any application to remove a culvert may require supporting evidence in the form of hydraulic modelling (to demonstrate that the proposed works will not result in adverse flood impacts) and an ecological appraisal (to ensure any adverse impacts on biodiversity are fully understood and mitigated).

The Council actively encourages the removal of culverts where:

- Physical removal is feasible and will not result in ecological or heritage harm.
- Flood risk may be reduced and a more natural flow regime restored.
- The local environment would be significantly enhanced.

8. Enforcement

Where unconsented culverting (or de-culverting) works have been undertaken and have been found to be in contravention of the Land Drainage Act, enforcement action will be considered. The process may typically involve:

- Site investigations and attempts to resolve the matter informally.
- If informal attempts are unsuccessful in remedying the matter, a legal notice may be served.
- Failure to comply with the legal notice may result in the initiation of further legal proceedings.
- The Council may exercise their powers to carry out the necessary works and seek to recover all associated costs.

9. Sources of Further Information

- CIRIA C786 – Culvert, screen, and outfall manual
- Land Drainage Act 1991 (LDA)
- The Flood and Water Management Act 2010 (FWMA)
- Water Framework Directive 2000 (WFD)
- Water Resources Act 1991 (WRA)