

Design and Access Statement
for
Angmering Flood Alleviation Scheme Phase 1
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for
West Sussex Lead Local Flood Authority
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Application to Arun District Council for the installation of Phase 1 of a Flood Alleviation Scheme and flood attenuation storage on the Black Ditch floodplain to the north east of Angmering

Introduction & Purpose

This Design and Access statement has been prepared by the West Sussex Lead Local Flood Authority (LLFA). It supports a planning application for a flood alleviation scheme to help protect people and property in Angmering from flooding associated with the Black Ditch (grid reference: 507466 104719).

This document outlines:

- a) The design principles and concepts that have been applied to the production of the proposed flood alleviation;
- b) The steps taken to appraise the context of the development and how the design of the development takes that context into account;
- c) How issues relating to access have been addressed;

This design access statement should be read in conjunction with the planning application, relevant drawings and local requirement documents as included.

Background and Physical Context

The Black Ditch runs from Patching Pond on the northern side of the A27 and it is predominantly groundwater fed from the South Downs. The pond discharges into the Black Ditch at restricted flows, then meanders alongside the A280 before entering the Water Lane twin culvert at Angmering. The main culvert is 500m long and 1.2m diameter and runs through the centre of Angmering. An additional high-level relief rectangular box culvert runs parallel to the main culvert for 380m before merging with the main culvert. The main culvert then drains back into open channel prior to meandering through a local golf course and joining the River Arun. The Black Ditch has a catchment of a little over 24km² extending into the downs to the North and East.

In 1980, 26 properties in Angmering flooded and a similar number again in 2012. The majority of these flooding incidents occurred along Water Lane, where the Black Ditch, designated as a main river, is culverted under the road and the capacity of the culverts is insufficient to carry prolonged heavy storms without surcharging. This flood risk has long been the focus of potential interventions to reduce the frequency / severity of flooding where the standard of protection is estimated as 5 years in the Environment Agency, Options Modelling Report (Reference A).

The design principles and concepts applied

Initial analysis suggested the natural topography of the flood plain as modified by the A280 embankment provided significant capacity to attenuate additional storm water in the catchment upstream of Angmering. Most of this land is in agricultural use predominantly as grazing pasture and is relatively poor in both diversity and agricultural value.

The proposed action to reduce flooding is to create upstream attenuation of storm water flows by holding water back by weirs, thereby reducing the likelihood of the Water Lane culverts and downstream drainage surcharging. Attenuated water can drain down at a slower rate once the peak of the storm has passed.

Combined 1D / 2D hydraulic modelling has been used to support design of the Flood Alleviation scheme and this has demonstrated that implementation of the full scheme will result in no net increase in flood risk and the potential to reduce the frequency of fluvial flood risk in Water Lane to between a 2% and 1% annual exceedance probability (AEP).



Plate 1: Example of flooding in centre of Angmering; Water Lane can be seen in the background.

This Design and Access Statement supports the first phase of wider flood alleviation scheme, focusing on restricting flows immediately upstream of the road access to the new Land South of Water Lane culvert.

The positive effects of the scheme are quite limited for this initial phase of the Flood Alleviation scheme but it represents a key component of the wider flood alleviation scheme that will yield benefits in terms of reduced flood risk for Angmering, particularly for higher frequency storm events that regularly flood the town every year. Exceedance in the capacity of the Water Lane culvert is one primary source of flooding in Angmering but coincidence of this with run-off from the urban catchments is also a contributory factor. Thus, while Phase 1 of the Angmering FAS will yield some benefit, more significant storms e.g. 5% AEP or 2% AEP will exceed the capacity of weir and will contribute to storm run-off in the centre of Angmering to cause flooding. A further phase 2 will attenuate water upstream of Ecclesden Farm track to allow an overall attenuation in the catchment to significantly reduce flooding in the village.

Social and Environmental Context

Throughout the design, consultation has taken place with: the community, principally through the auspices of the Angmering Advisory Group; the two local landowners affected; the Environment Agency; Natural England; Sussex Biodiversity Records Centre; Adur District Council; and the highways

authority among others to devise a scheme that would deliver a significant reduction in flood risk to the community while minimising the impacts upon biodiversity, agricultural activity and addressing other specific concerns that emerged from stakeholders in the consultation process.

Notable instances of how the design has responded to the social and environmental context include:

- Reduction in the number of flow restrictions from five to two as it was identified that, under extreme storm conditions, the initial design would increase flood water on the A280.
- Minimising the impact upon arable agricultural land;
- Phasing the project to allow earlier progress to be made on the downstream attenuation at Land South of Water Lane pending resolution of design issues associated with the upstream attenuation so as to minimise disruption to agricultural activity.
- Amendment to the landscape strategy to ensure compatibility between the FAS and the proposed landscaping of the new development and negotiating the incorporation of a hedgerow to minimise the risk of tree debris entering the watercourse or blocking the weir.

Site Access Arrangements:

The preferred strategy for the construction phase is to commission the works to be undertaken by the same contractor that BDW has contracted to undertake construction of the road access and culvert for the Land South of Water Lane development. Subject to this planning application being approved at the October 2021 Development Management Committee, it should be possible for the construction of the weir to proceed immediately after completion of the main culvert that will mean that no additional / separate mobilisation is required for the Phase 1 FAS.

In the event that this cannot be achieved then access would probably need to be secured via the south end of the culverted embankment for the road access to Land South of Water Lane.

Access to the FAS Weir

The exact configuration for access to the weir will be determined at detailed design but the point of access will be at the northwest end as shown in Drawing No: ANG-WSP-XX-ZZ-DR-D-00.

Maintenance:

As noted above, the Flood Alleviation Scheme Phase 1 has been specifically designed to minimise blockage and maintenance. Once constructed the weir and Flood Storage Area will not require frequent maintenance.

The weir itself will be adopted by West Sussex Highways and will be inspected five yearly for structural integrity.

The water course and flood alleviation area upstream as far as the upstream Water Lane culvert falls within the riparian responsibility of the Land South of Water Lane development. The Guide to the Management of Landscape and Ecological Areas of Land at Water Lane, Angmering, West Sussex dated Nov 20 (Reference A) schedules all required maintenance, regimes and works necessary for the satisfactory management of the landscape in perpetuity. Section 4.4 covers the existing stream, i.e. the Black Ditch, the management objectives of which include:

- To maintain adequate flow of water along the stream.

- To provide a seasonal habitat for wildlife and enhance biodiversity. To protect the habitat around the stream in accordance with ecological recommendations while ensuring a safe environment.

The following maintenance regime will be applied:

- Annual maintenance will be undertaken in the autumn to remove fallen leaves and debris and allow free flow of water. Patches of marginal vegetation will be cleared each autumn in rotation so that there is always a succession developing from bare mud. Remaining vegetation will be managed to maintain water flow and create potential wildlife habitats. Headwalls and outlets will be checked to remove any litter and debris and to ensure that no obstructions are present that would restrict the flow of water.
- Occasional works (undertaken on an irregular or cyclical basis)
 - Monitor the extent of marginal planting. If plants start spreading into the centre of the stream, clear vegetation from its 'invading front' on the inner or waterside of the margin, leaving the landward side as undisturbed habitat. Retain a solid margin of vegetation to discourage access;
 - Ensure there are sufficient areas of habitat (e.g. stones and rough vegetation at the ditch edge) especially during winter when these will be used as hibernation sites by frogs newts and others;
 - Ensure vegetation (trees and scrub do not shade or substantially overhand the ditches, stream or swales.

References:

- A. Environment Agency (2018) Angmering Flood Alleviation Scheme Options Modelling Report.
- B. Guide to the Management of Landscape and Ecological Areas of Land at Water Lane, Angmering, West Sussex dated Nov 20.