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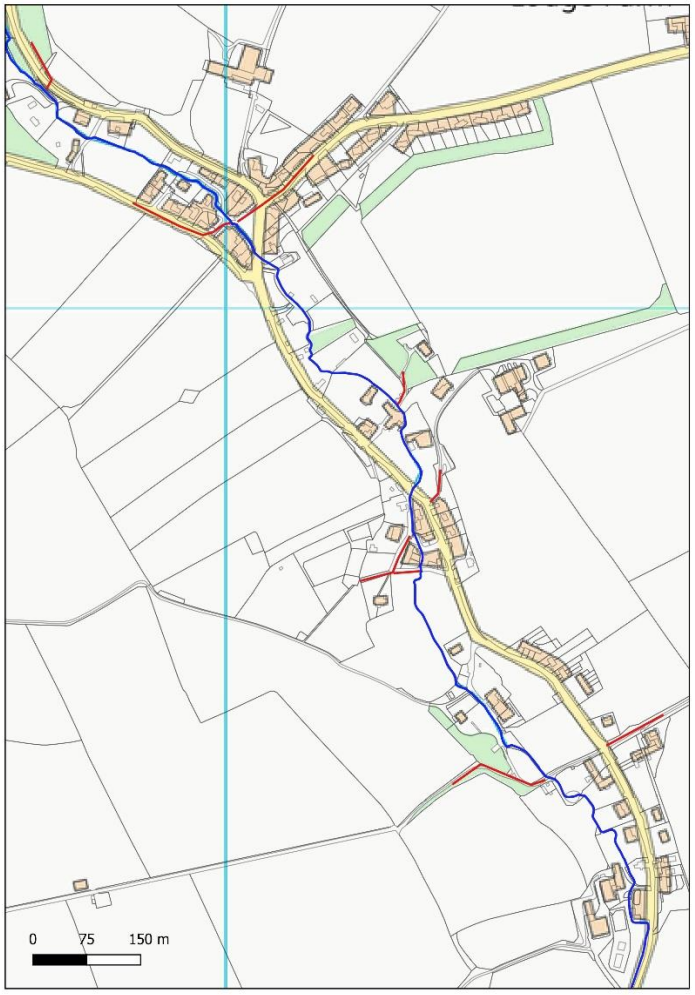
Cheselbourne Village Nuisance Flooding



Catchment Management Options

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contents

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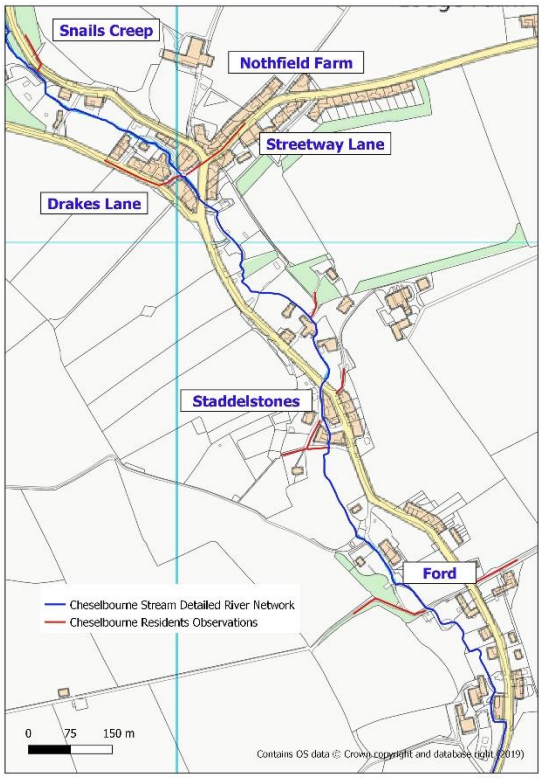
1. Introduction



The flood risk to Cheselbourne Village is from a complex mix of sources derived from groundwater level fluctuations resulting in spring flow, fluvial spate related events within the Cheselbourne tributary of the Devils Brook and surface water runoff derived from catchment slopes draining to the stream. Detailed assessment of the flow and habitat of the Cheselbourne stream have previously been carried out and are recorded in:

- Wild Trout Trust report following an Advisory Visit on 6 November 2019 (Theo Pike 2019)
- The hydrology of the Cheselbourne – why is it a winterbourne (Wessex Water)

Further investigation is required to understand connectivity to the stream from catchment slope sources which result in localised surface water nuisance flooding to property in the village. A number of pathways of runoff have been identified by local residents and are identified in Figure 1 (red lines). The investigation is intended to inform mitigation measures to reduce surface runoff.

Figure 1 Location and surface flow pathways observed to cause nuisance flooding

1.1. Site Visit

A site visit was undertaken by Dr Peter Stone and Nicola Hopkins of FWAG SW on 21st January 2020 which walked the local catchment area draining to the village and covered the observations noted by local residents.

The primary aim of the walkover was to attempt to identify the source of runoff but also the pathway which connects the runoff to the downstream receptor and the stream. Understanding the connecting pathway is particularly important, and observations were recorded of both natural and modified drainage. Locations of recorded observations are shown in Figure 2.

The site visit is a snapshot of conditions on the day of the visit, and whilst undertaken after a period of wet weather, did not take place when runoff was flowing.

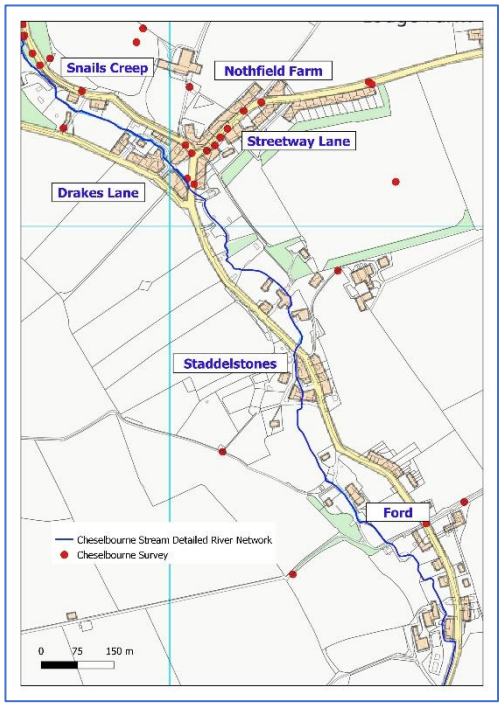


Figure 2 Observations recorded during walkover survey

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2. Sources, Pathways and Measures

The locations of known issues of concern have been highlighted in Figure 1. These are now discussed in detail.

2.1. Snails Creep

A concentration of road runoff occurs at the driveway entrance to Snails Creep and Aspen Barn properties (Figure 3). The runoff is largely derived from the north along the road itself and there is no evidence of connectivity to adjacent catchment slopes or fields joining the road, suggesting flow is sourced from direct runoff on the hard surface and slope of the road. One exception is a possible source from a track in the woodland to the north-west of the concentration point which joins the road (pathway from woods marked on map).

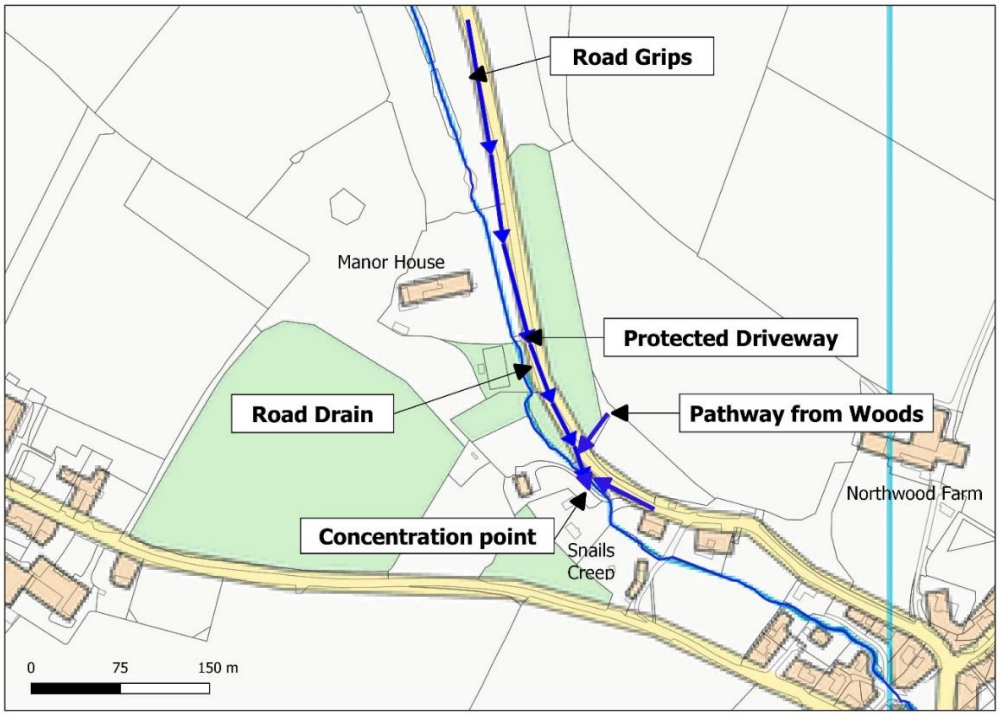

Figure 3 Surface runoff concentrating towards Snails Creep property

The surface runoff along the road is currently being managed by:

- Cutting grips in the western road verge;
- Highways road drains/gully pots; and
- Bunded protection of Manor House drive to retain runoff along the road.

No further measures are proposed to manage the road runoff but **maintenance of the existing measures is required** to ensure the effective functioning. Specifically, the road grips that have been cut are currently ineffective where material is blocking the entrance to the grip and retaining flow along the road. It is likely the blockage occurs from mud displaced when traffic erodes the road margin. Clearance

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of the grip opening to ensure the level is below the road surface is required to restore functioning.

Road drains should also be maintained to ensure debris/leaves does not gather on top of the grill and prevent drainage.

In addition to maintenance of road drainage, the potential source from the woodland area close to the point of concentration could be managed by addition of a log/tree trunk place perpendicular across the slope along the pathway to divert any runoff into the (lower level) adjacent woodland to the north.

Recommendations:

- Maintain road grips to remove blockage and ensure the entrance is below road surface
- Keep road drain gills clear of debris
- Divert flow from along the wood pathway

2.2. Northfield Farm

A source of runoff has been observed flowing along a newly concreted drive from Northfield Farm (Figure 4). Following initial construction of the drive surface in 2020, loose material was washed down the drive and onto the downstream road, and the hardstanding surface is an ongoing pathway for runoff. The drive provides a connected pathway down slope to the road (Figure 4), and subsequently to the Cheselbourne stream. Property at the lowest point on the road is at risk from surface water flooding.

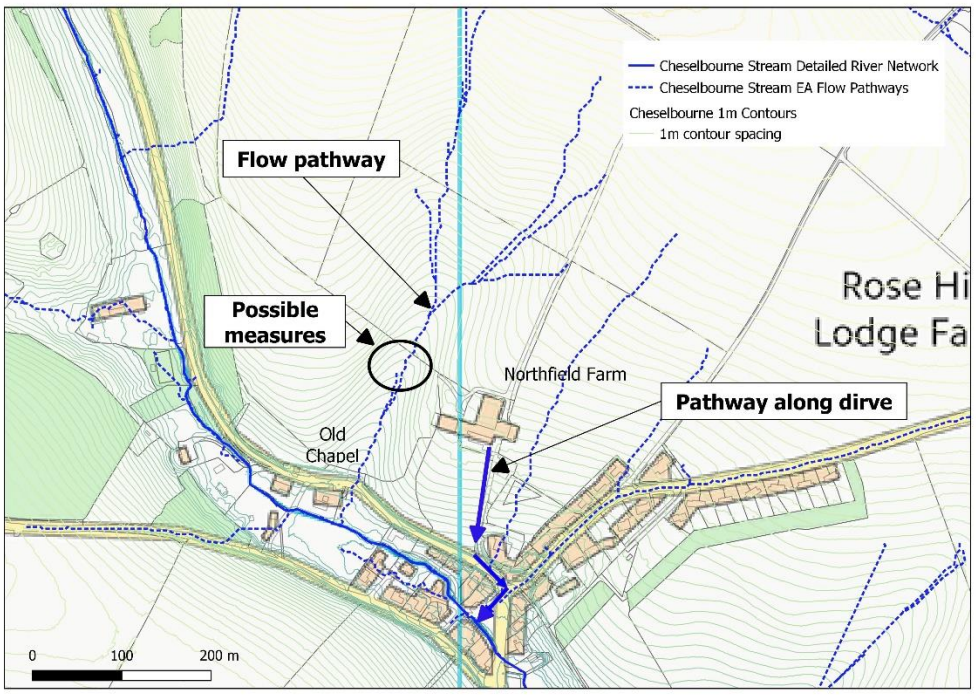

Figure 4 Surface runoff pathways at Northfield Farm

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Measures have been identified to address the source of runoff generated along the farm drive. The farm is applying to Countryside Stewardship this year to remediate the problem with measures being considered including:

- Divert and collect clean water from yards;
- Installing grips to diverting water off the track;
- Woodland planting and reducing arable area through a woodland creation grant.

The walkover survey did not identify any further actions to address the driveway runoff.

An additional flow pathway is however identified from desk-based study which could connect to the road at The Old Chapel (blue dotted line in Figure 4). Addition of a buffer such as a hedge between fields (black circle in figure) would add a disruption to the continuity of the potential runoff pathway.

2.3. Streetway Lane

Road runoff generated along Streetway Lane flows down the road hill, crossing the road through Cheselbourne and passing Northfield House before joining the Cheselbourne stream (Figure 5). The runoff is generated approximately 700m up hill from the road junction with some of the source derived from Rose Hill Lodge Farm along with direct runoff along the road surface.

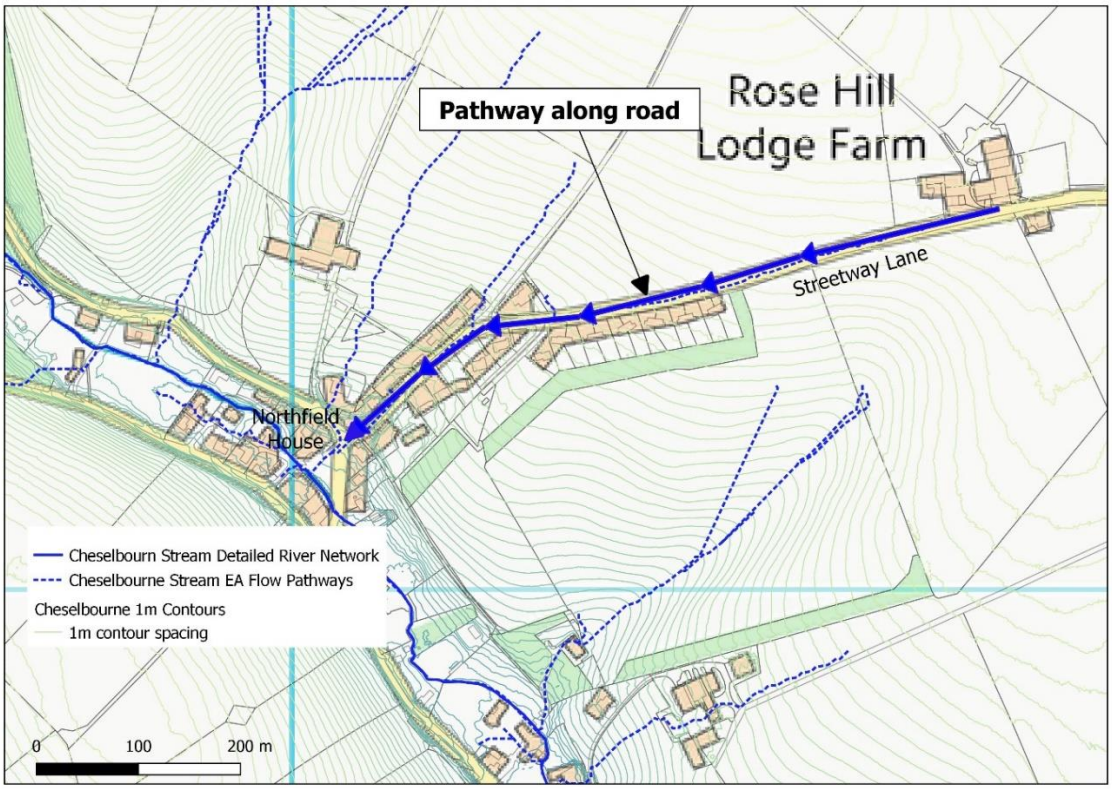

Figure 5 Surface road runoff generated along Streetway Lane

The road drainage along the road is currently managed with 7 road drains. During the walkover survey, most of the drains were clear although some had debris and mud surrounding them that will reduce their effectiveness. The gully pots in most of the drains contained sediment, with some

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pots filled. No further measures are proposed to manage the road runoff but **maintenance of the existing road drain measures is required** to ensure the effective functioning. Notably, road verge erosion and mud washed along the road are likely to block the grills of the drains. **The grills of the drains should be kept clear as regularly as possible.**

Drainage management of the farm yard at Rose Hill Lodge Farm can be improved to reduce direct connectivity to the road. Runoff and sediment generated at the farm is currently washed on to the road and transported down slope.

No further connectivity was identified from fields adjacent to the road.

Recommendations:

- Keep road drain gills clear of debris;
- Reduce connectivity of farm yard drainage to the road.

2.4. Drakes Lane

Road runoff generated along Drake's Lane, in the vicinity of Manor Farm, flows down the road slope towards Cheselbourne village and diverts off the road along a track behind the village school towards Northfield House (Figure 6). Flooding has previously occurred where the runoff is unable to drain into the Cheselbourne Brook.

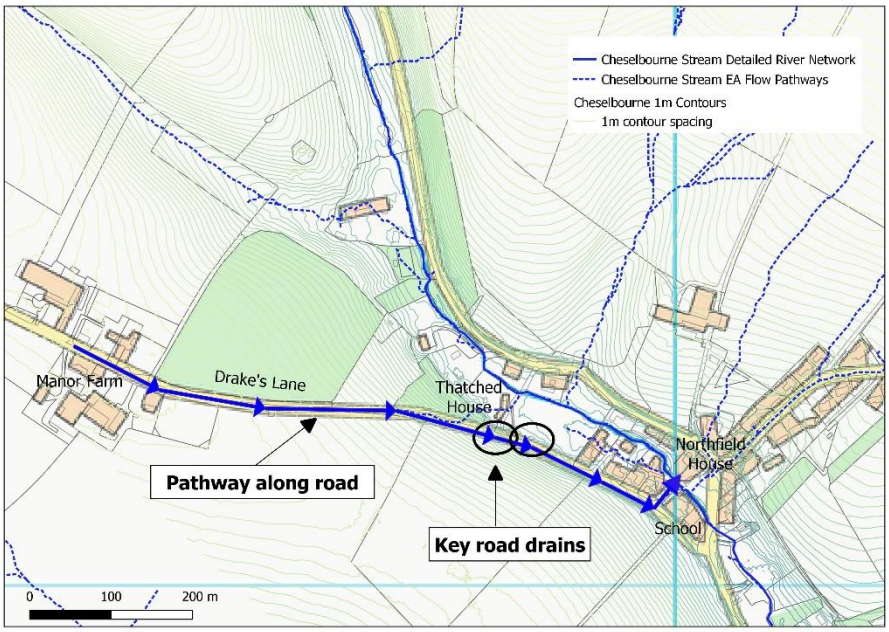

Figure 6 Road runoff generated along Drake's Lane

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The runoff does not appear to be generated from the upstream farm and there is no evidence of connectivity of flow from adjacent fields joining to the road. The runoff represents surface water concentrated along the hard surface which is confined along the pathway of the road. Erosion of the roadside verge from traffic at the margins of the road is adding mud and sediment to the fringes, which is in turn washed down slope in the runoff.

Two key road drains at the entrance driveway to the Thatched Cottage are key to intercepting the runoff. The upslope road drain is correctly located within the runoff pathway and clearly traps silt washed along the road; during the site visit on 21st January the gully pot was full with trapped sediment. The **grill of the drain is kept clear** by volunteers and needs ongoing maintenance. The drains downslope of the drive are functioning but material eroded from the roadside verge immediately before the drain has **potential to deflect runoff flow away from the drain**.

Further downslope measures to protect property in the runoff pathway have included bunding entrances to property drives to retain runoff on the road, and raising the base of the property fence at Northfield House to allow water to flow underneath the fence and into the Cheselbourne Stream.

Recommendations:

- Continue to keep the gill of the road drain upstream of the Thatched Cottage drive clear of debris;
- Maintain connectivity of the downstream road drain by clearing back material eroded onto the road.

2.5. Staddelstones

Surface runoff generated from catchment slopes to the west of St Martins Church is concentrated into a pathway that runs along a public footpath which follows to the stream by Staddelstones (Figure 7). There are signs of runoff erosion along the footpath which concentrates flow downslope towards Staddelstones property.

No obvious connectivity or source of runoff was identified during the site visit which links to specific field or farming practices. The tracks and footpaths are likely to provide pathways for runoff to generate.

Two options to break the flow pathway are proposed; installation of a **shallow bund** at the top of the footpath to divert flow along the track (and cutting grips into the field behind the church if necessary), or **relocation of the footpath**.

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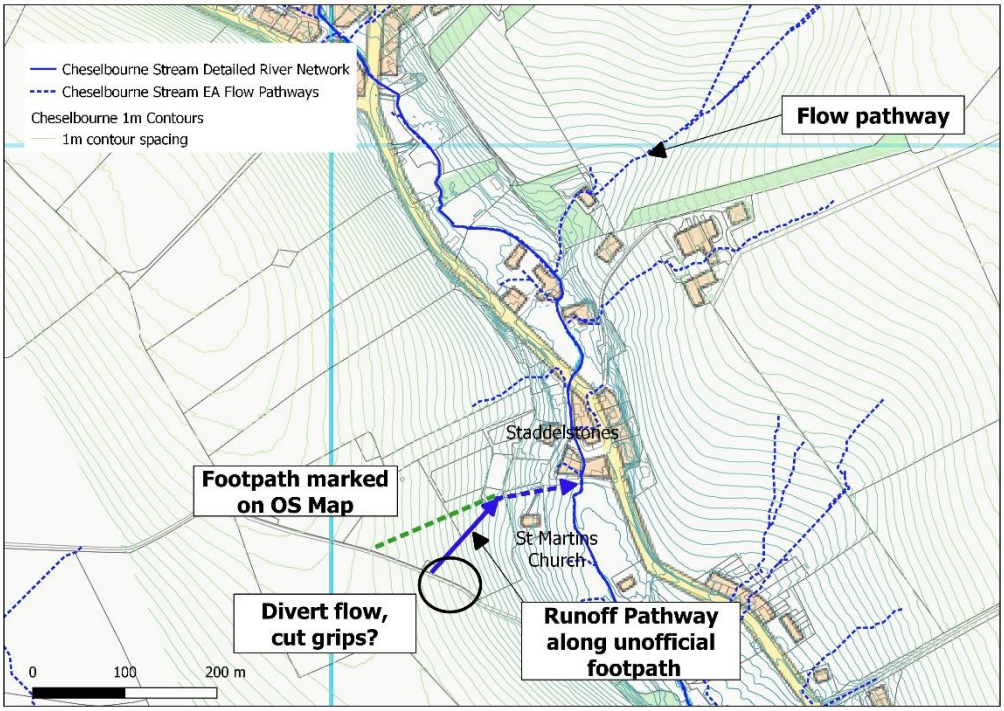

Figure 7 Surface runoff from catchment slopes concentrating towards Staddelstones

The Ordnance Survey map may be out of date, but the footpath from the Church up slope appears located centrally through fields, rather than along the boundary. **Reinstating the path** to a diffuse route through the field rather than a concentrated narrow passage will help to reduce concentration of flow.

Separately, runoff flowing along the track behind the Old Rectory is likely concentrated from a pasture field to the east where topography naturally concentrates rainfall. Whilst a pathway is generated and there is a contribution to flow at the ford, it was unclear at the time of visit whether there is a risk to property so measures were not considered further.

Recommendations:

- Disrupt the flow pathway on the slopes above the Church by shallow bunding the top entrance to the footpath or diverting the footpath.

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2.6. Ford

Two pathways of runoff have been observed in the south of Cheselbourne village, both draining to a ford crossing of the Cheselbourne stream (Figure 8). The western pathway is along a track/footpath and flows through an incised passageway over bedrock. There do not appear to be any connected fields which are sources of runoff and it is concluded that surface water from direct rainfall concentrates along the hard surface with no opportunity for drainage or diffusion. No obvious mitigation measures were identified to reduce the runoff.

Runoff generated along the track to the east flows along a concentrated pathway in a track, down a steep slope and crosses the road. Road drains on the downslope side of the road intercept some runoff which then flows in a buried pipe towards the Cheselbourne stream. Anecdotal evidence suggests the pipe may get blocked (with sediment) such that a manhole cover along the pipe route surcharges.

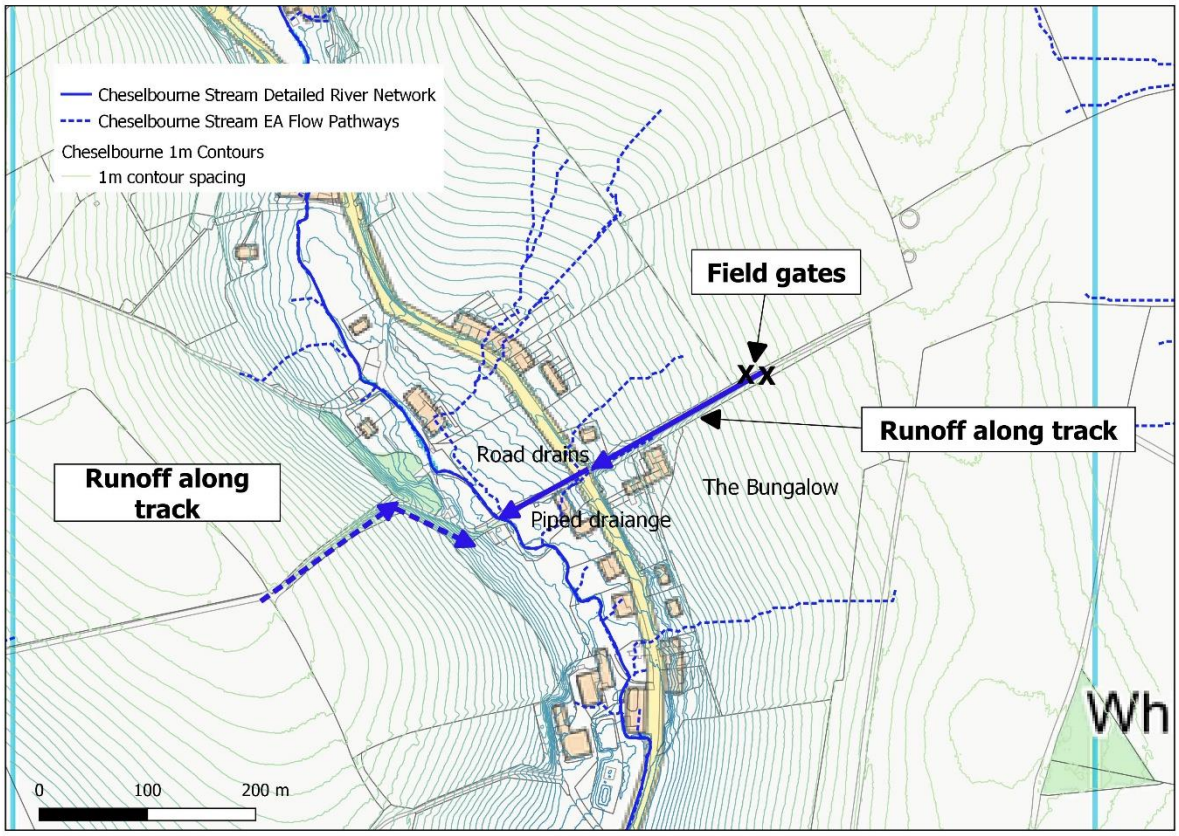

Figure 8 Flow pathways at the ford location in the south of Cheselbourne village

Runoff from two arable fields adjacent to the eastern track appears to be connected to the track through gateways which are accessed from the track on either side. It is likely that runoff and sediment generated from the fields is transported towards the Cheselbourne stream. Measures to address the pathway of runoff from the fields are likely to reduce the impact on the road and stream.

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Within field, runoff that is to gates adjacent to the track is likely to follow the direction of the arrows shown in Figure 9. There are areas within each of the fields that concentrate flow from the field slopes towards the current location of the field gates (fine dotted line in the figure). To reduce the runoff along the track and break the connectivity from the source fields, it is proposed to **move the field gates** to the top of the slope where they will capture less flow from within the field. Operationally for farming there appears to be sufficient space and width along the track to access both fields at a point up slope. It is however noted that there is a change in surface along the track up slope from the current gate locations and confirmation will be required that the track surface is suitable for farm machinery.

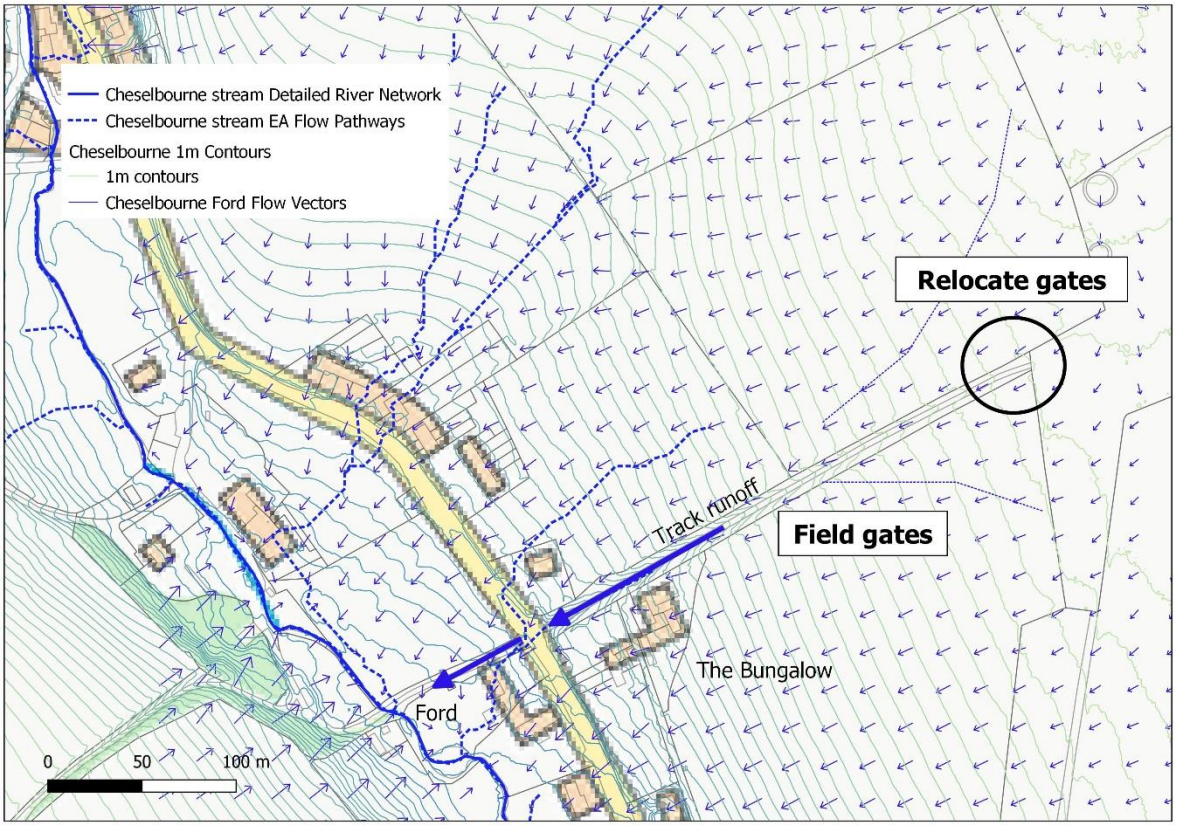

Figure 9 Runoff flow directions generated in fields draining to the ford.

Recommendations:

- Move field entrance gateways to the top of the slope to disrupt connectivity for runoff and sediment generated within the fields.

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2.7. Other observations

It was noted that there are a number of piped culverts along the route of the Cheselbourne stream through the village. These piped culverts are often of low capacity or diameter and are likely easily blocked by natural debris that floats down the channel combined with consolidation with sediment. Maintenance of the pipe entrances is necessary to ensure passage of flow and minimise backing up of flow and associated out of bank flooding during spate events.

It is likely that there will be an initial flush of material accumulated during the summer at the start of the winter when flow builds up in the channel as groundwater levels rise. However, material will be transported throughout the winter, and checks and maintenance should be carried out as frequently as possible.