Appendix 1

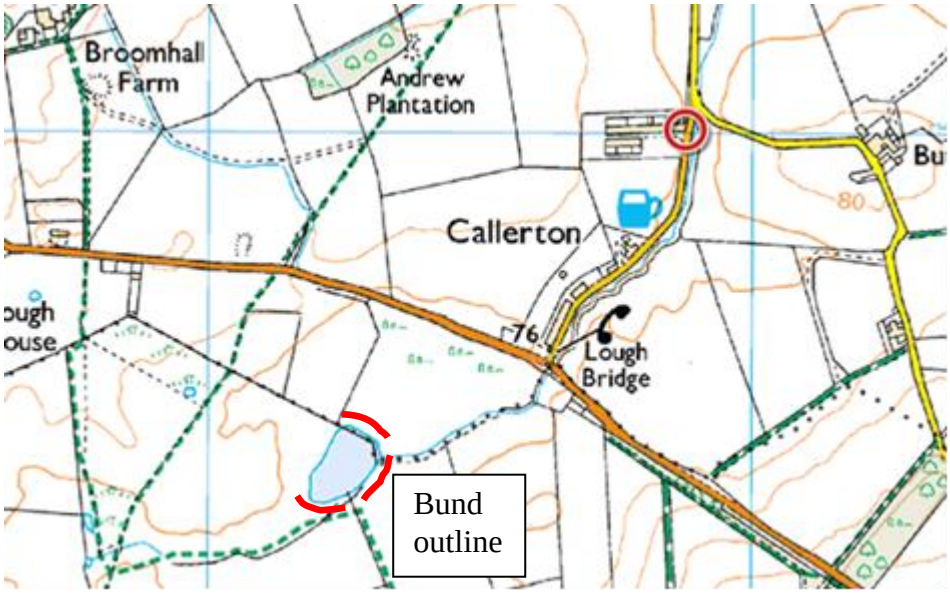
OUSEBURN RUNOFF ATTENUATION FEATURES

Ouseburn flood storage feature: Number 1
Site Name: The Callerton 'nature reserve'

Location Map **OS** Grid Ref: NZ172683

Farmer name: Unknown

Location description: South west of the hamlet of Callerton lies a wetland/pond area. This area is near the source of the Ouseburn.



Feature Description

This feature builds on the existing pond. It is possible to construct a one metre high bund around the current pond to increase capacity for flood storage. At the outlet a large pipe would be installed at the current water level in the pond.

Impact of feature

Design Specifications

- **Soil bund: constructed by digger from importing soil.**
- **Contractor needed to construct**
- **Length of bund ~200m. Maximum height of bund 1m. Maximum width of bund 6m.**
- **Storage = approximately 10000m^3**
- **Outlet pipe/culvert should be a reasonable size (12-24") with screen.**
- **An armoured spillway is required. This could be constructed next to the outlet culvert.**

Comments

- **Feature is an ONLINE flood storage solution. It is building on an existing pond**
- **This feature has benefits to water quality as it will act as a good wetland.**

Ouseburn flood storage feature: Number 2
Site Name: The Callerton village blocks

Location Map

OS Grid Ref: 1) NZ178688

Farmer name: Unknown

Location description: Located in the Ouseburn beside the hamlet of Callerton. This feature is a mix of woody debris dams and a storage feature

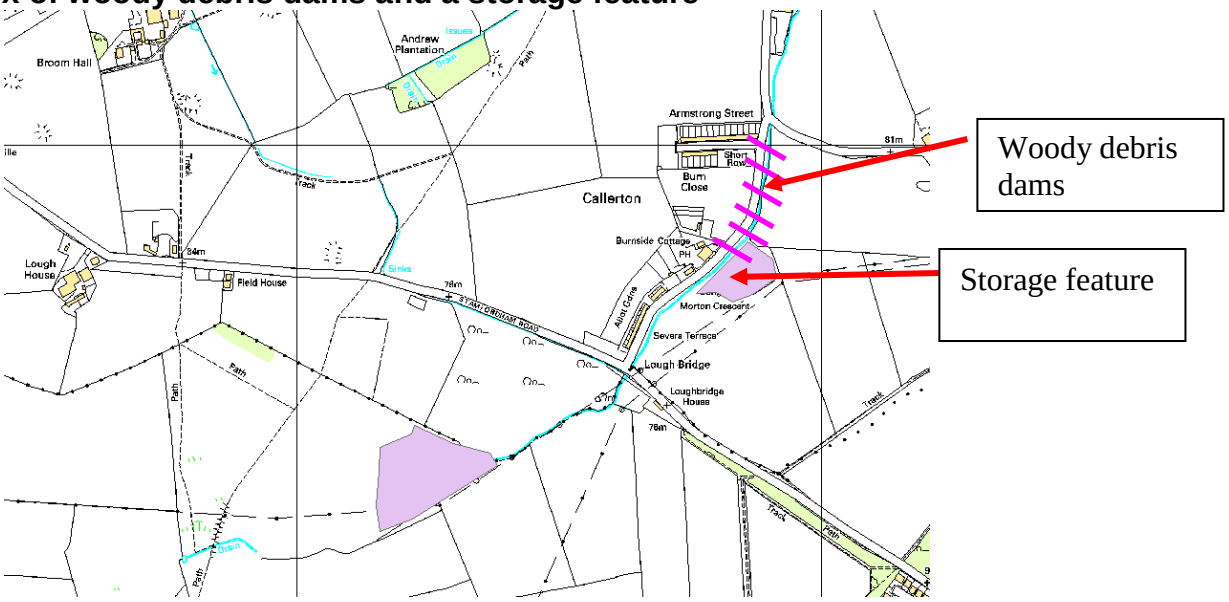
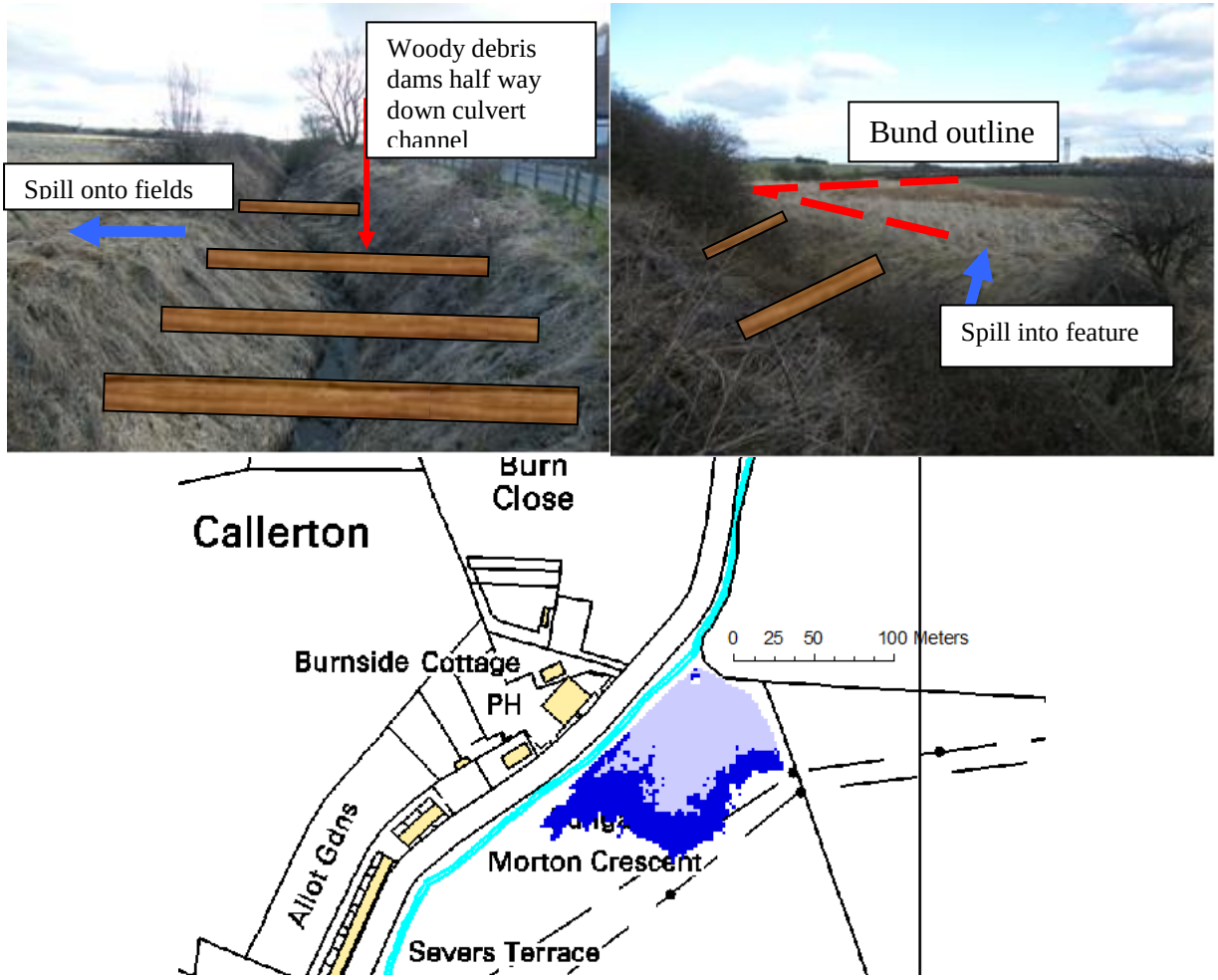


Photo of site (Before)

Feature Description

The feature has two parts: the first is a series of woody debris dams which will be sunk into the banks of the Ouseburn beside the village of Callerton. These debris dams will be halfway down the channel. This will cause flood water to back-up and spill onto the field (left picture; left hand side of channel). Upstream of the debris dams will be a storage feature which will be constructed on buffer strip land of a field. This bund could be formed by scraping as the land is scrubby. The bund would form an L shape in the field and water spilling from the debris dams would be stored within the feature.

Impact of feature



Light blue is spill area with a bund of 50cm high, dark blue is the spill area with a bund of 1m.

Design Specifications

- **Soil bund: Maximum height of bund would be 1m; length of bund would be approximately 200m; max width of 6m**
- **Storage = approximately 3500 m^3**
- **Soil bund could be formed by scraping on site otherwise soil would need to be imported.**
- **Bank would need to be lowered slightly upstream of bund**
- **Up to 8 woody debris dams placed in stream.**

Comments

- **Feature is a mixture of online and offline flood storage. However, the channel here is very small compared to further downstream so an online approach would be beneficial**

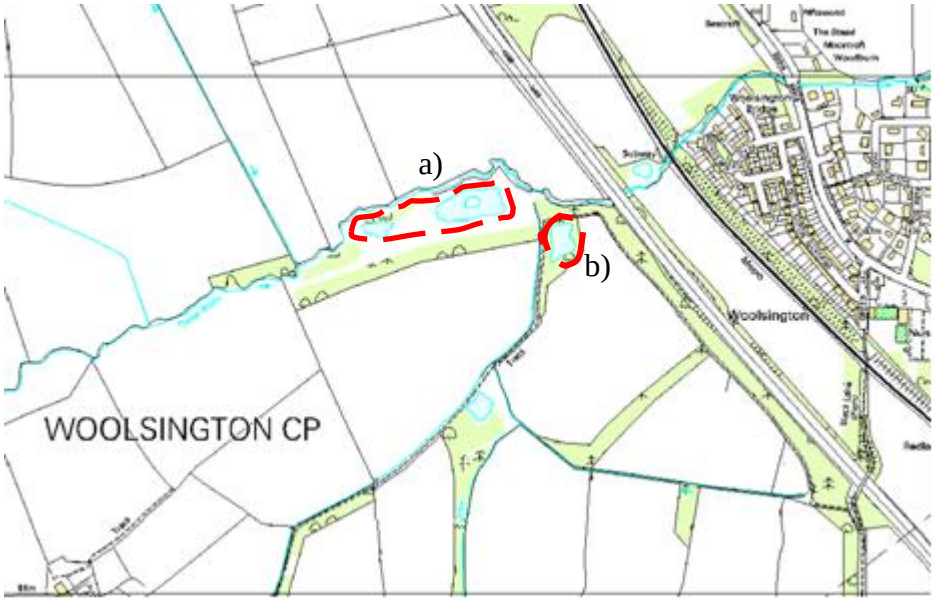
Ouseburn flood storage feature: Number 3
Site Name: Callerton pond expansion

Location Map

OS Grid Ref: NZ189697

Farmer name: Unknown

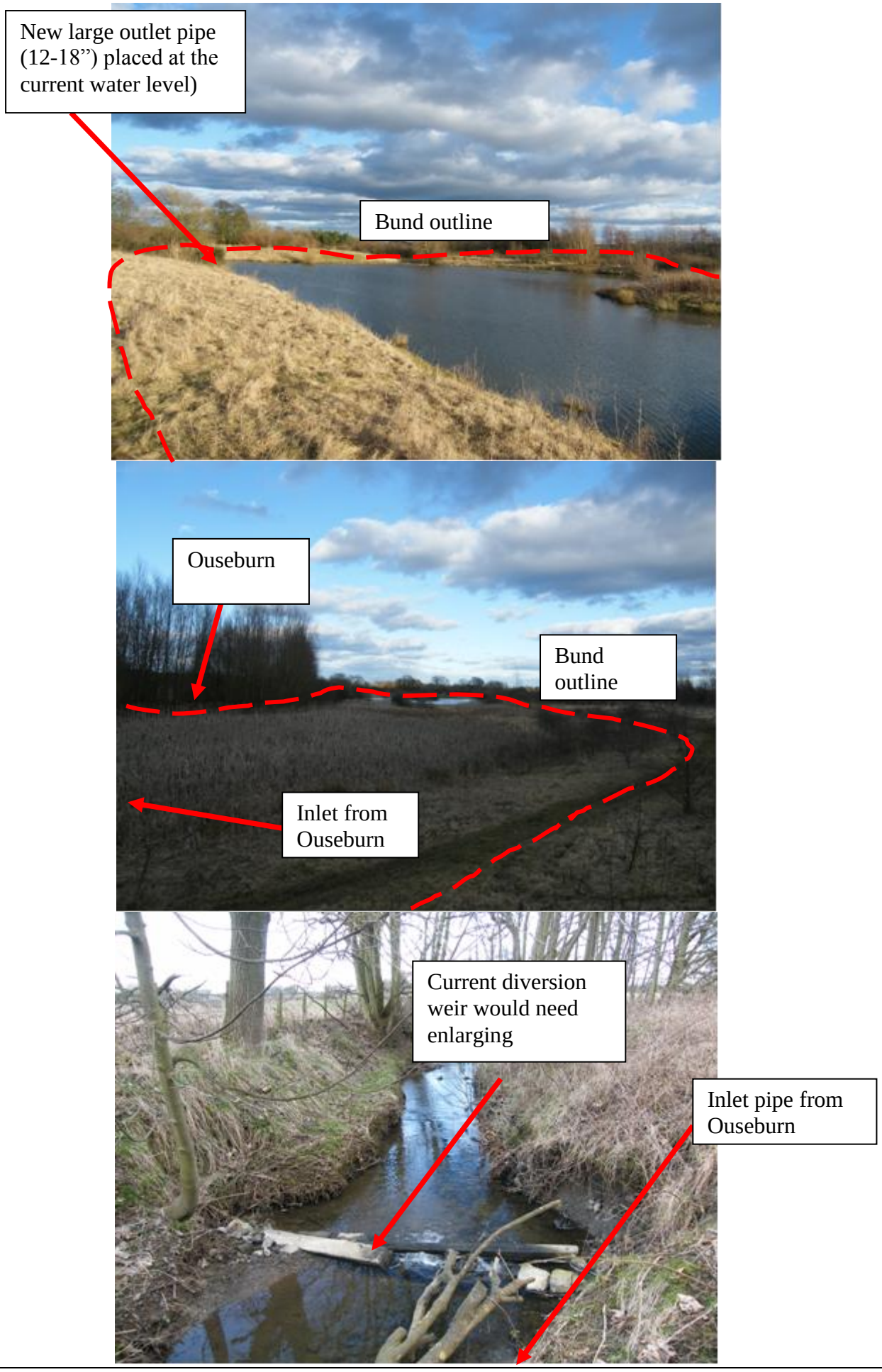
Location description: Located to the west of the village of Woolsington are a series of ponds.



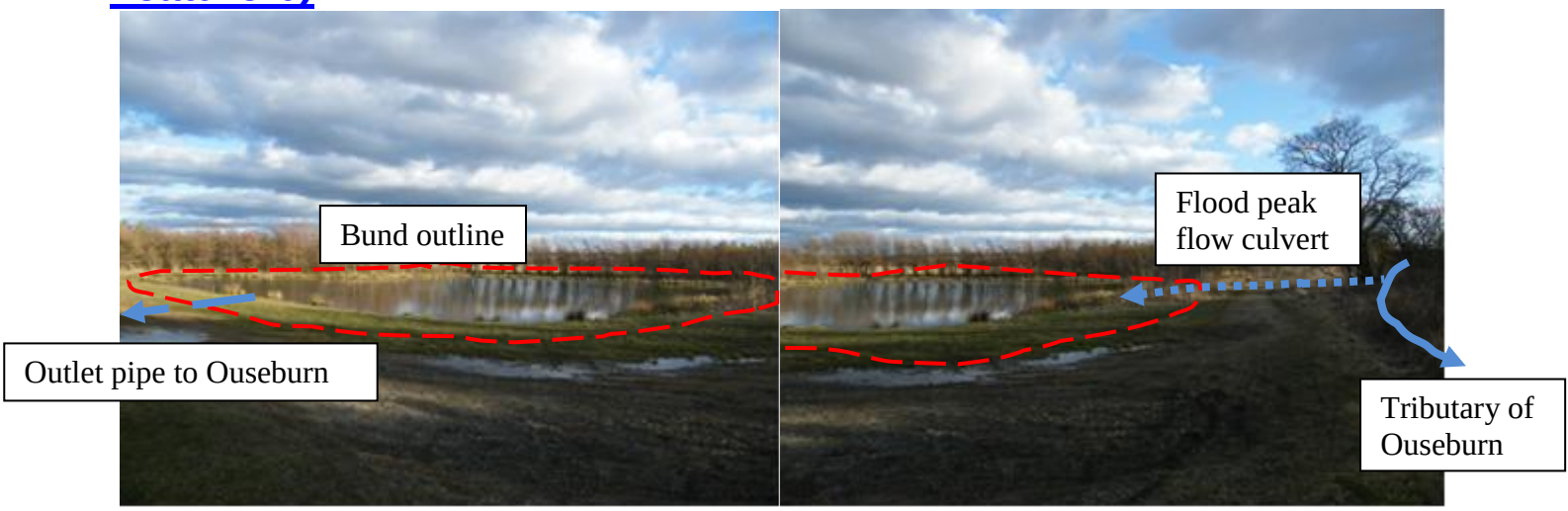
Feature Description

This feature builds on two existing ponds located in this area. Similar to the Callerton nature reserve, with a simple bund placed around the ponds the flood storage capacity could be increased. Two sites are identified above. A 1m bund could be placed around the existing ponds to increase the flood storage capacity significantly. A new inlet diversion structure would be required at both sites along with outlet pipes.

Impact of feature


New large outlet pipe (12-18”) placed at the current water level)
Bund outline
Ouseburn
Bund outline
Inlet from Ouseburn
Current diversion weir would need enlarging
Inlet pipe from Ouseburn

Feature b)



Design Specifications

- **Soil bund: placed around both pond areas to hold flood flow in times of high flow. This bund would be up to a 1m high.**
- **The flood storage capacity would be large. A site a) it could be up to 15,000m^3 and at site b) it could be around 4000m^3**
- **The bund would need to be constructed with imported soil.**
- **The bund would only be a max of 1m high. Some points the bund would level out.**
- **New inlet culvert and pipe would need to be constructed; this would have to be screened.**

Comments

- **Feature is an OFFLINE flood storage solution.**

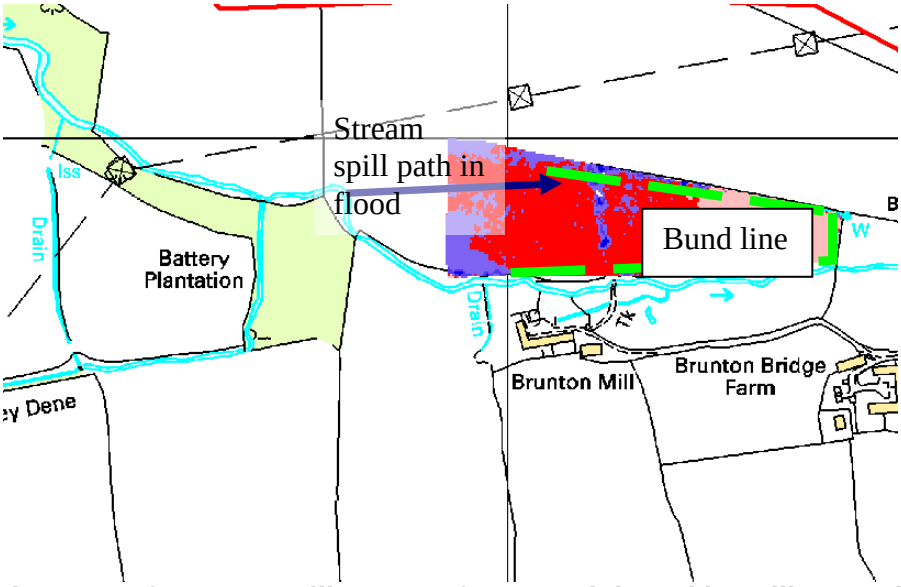
Ouseburn flood storage feature: Number 4a
Site Name: Brunton Mill storage pond

Location Map

OS Grid Ref: NZ212699

Farmer name: Mr P.R & M Arthur, Brunton Mill Farm, Brunton Bridge, Newcastle Upon Tyne, Tyne and Wear NE13 7AL. Tel: 0191 2869359

Location description: Over the stream north of Brunton mill is a large area of flat land (flood plain) beside the Ouseburn. This is currently a flood plain in the largest flood events but with a small bund could hold back more water.



Farm PLOT tool output of Brunton Mill storage feature. Light red is spill area with a maximum 50cm high bund and dark red the further spill area with a 1m high bund.

Photo of site (Before)

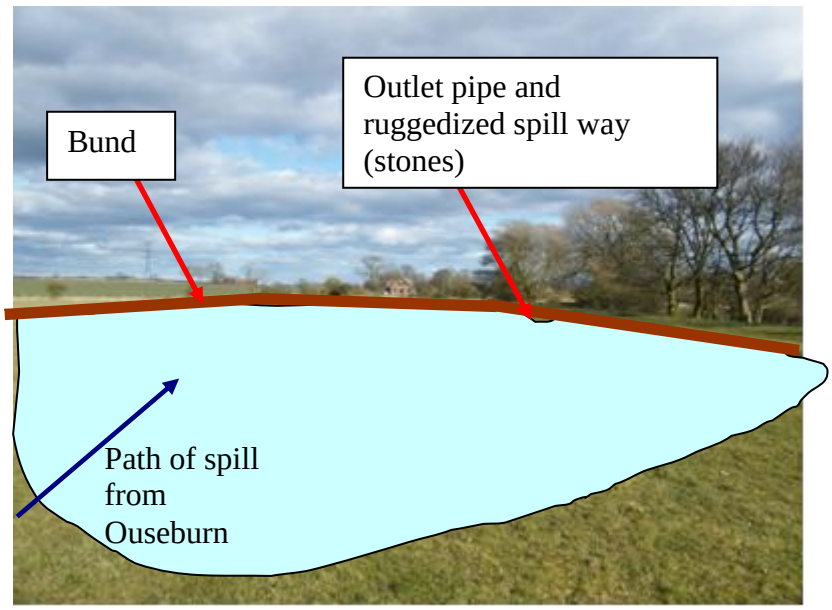
A large flat area beside Ouseburn

Feature Description

The feature will be created by placing a long bund around the field highlighted in the PLOT tool above. The bund would be either created by importing soil or excavating soil on site to create the feature. In excavating the soil the capacity of the feature would be increased. This is the preferred option. The bund would be 250m long for a 1m high (at tallest point) bund. The bund would have three sides around the field. Maximum capacity of the feature could be up to 20000m^3 with a 1m high bund and 4000 m^3 with a 50cm high bund. Owing to the Reservoirs Act, a 50-80cm

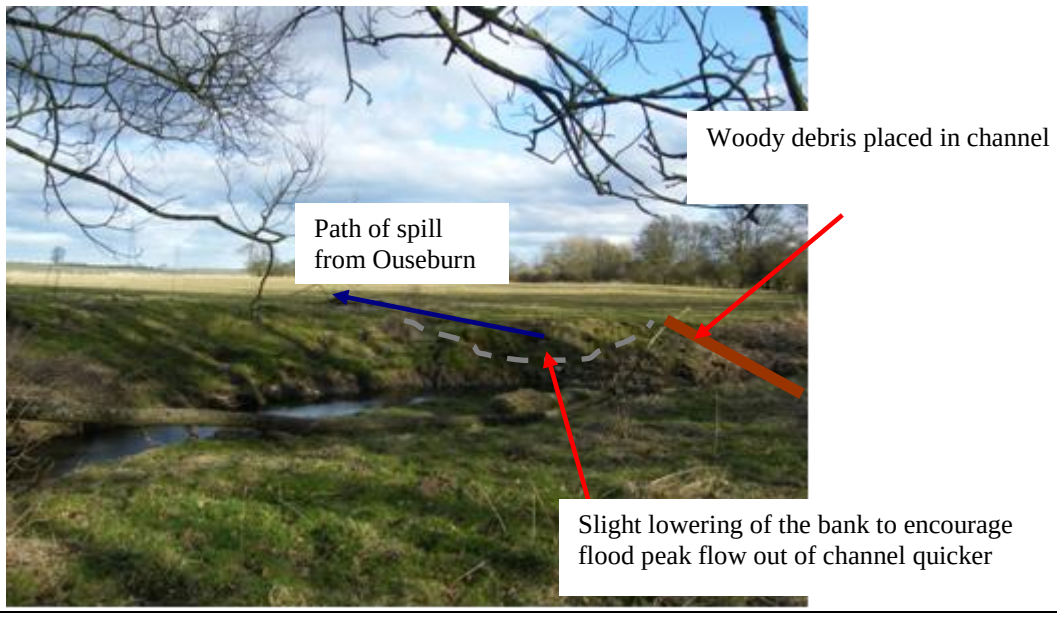
high bund is recommended. Water will be spilt from the stream in the largest flood events by woody debris dams that would force the water onto the flood plain more efficiently.

Impact of feature



Looking East towards Brunton Bridge

Looking west



Design Specifications

- **Soil bund: created by either scraping (increasing capacity) or importing soil.**
- **If a 50cm high bund is used then the dimensions of the bund would be ~200m long and up to 4 m wide.**
- **Outlet pipe required. Preferably a 12”-18” pipe. Ruggedized spillway located near to stream in far corner.**
- **Woody debris dams required to force flood peak onto flood plain and lead it into the feature.**
- **Potential Storage: 3000-4000m^3**

Comments

- **Feature is an OFFLINE flood storage solution**
- **Large contractor needed to construct owing to large scale of feature**
- **Feature would act as a sediment settling pond during flood events – helping water quality.**
- **Large storage potential. Reservoirs act would need to be considered.**

Ouseburn flood storage feature: Number 4b
Site Name: Battery plantation RAF

Location Map

OS Grid Ref: NZ207698

Farmer name: Mr P.R & M Arthur, Brunton Mill Farm, Brunton Bridge, Newcastle Upon Tyne, Tyne and Wear NE13 7AL. Tel: 0191 2869359

Location description: East of South Lodge Plantation flows the small channel Harey Dene. Beside Harey Dene is an arable field in which a Runoff Attenuation Feature could be constructed which would take the high flow peak from Harey Dean.

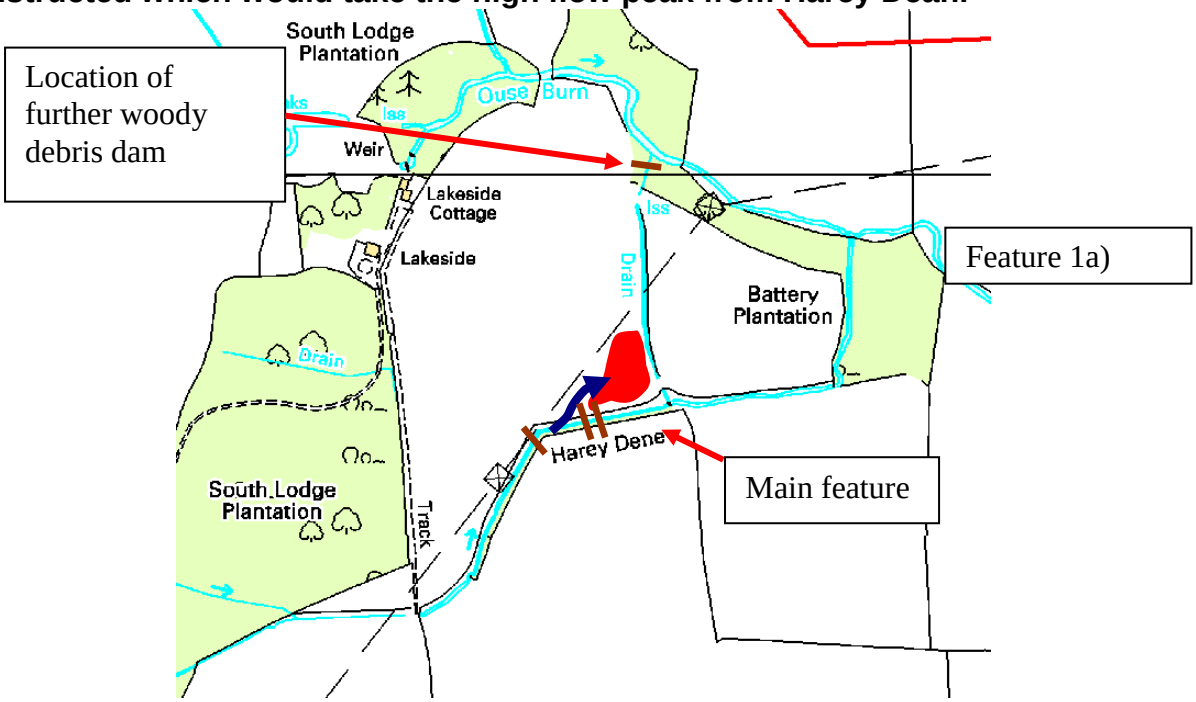
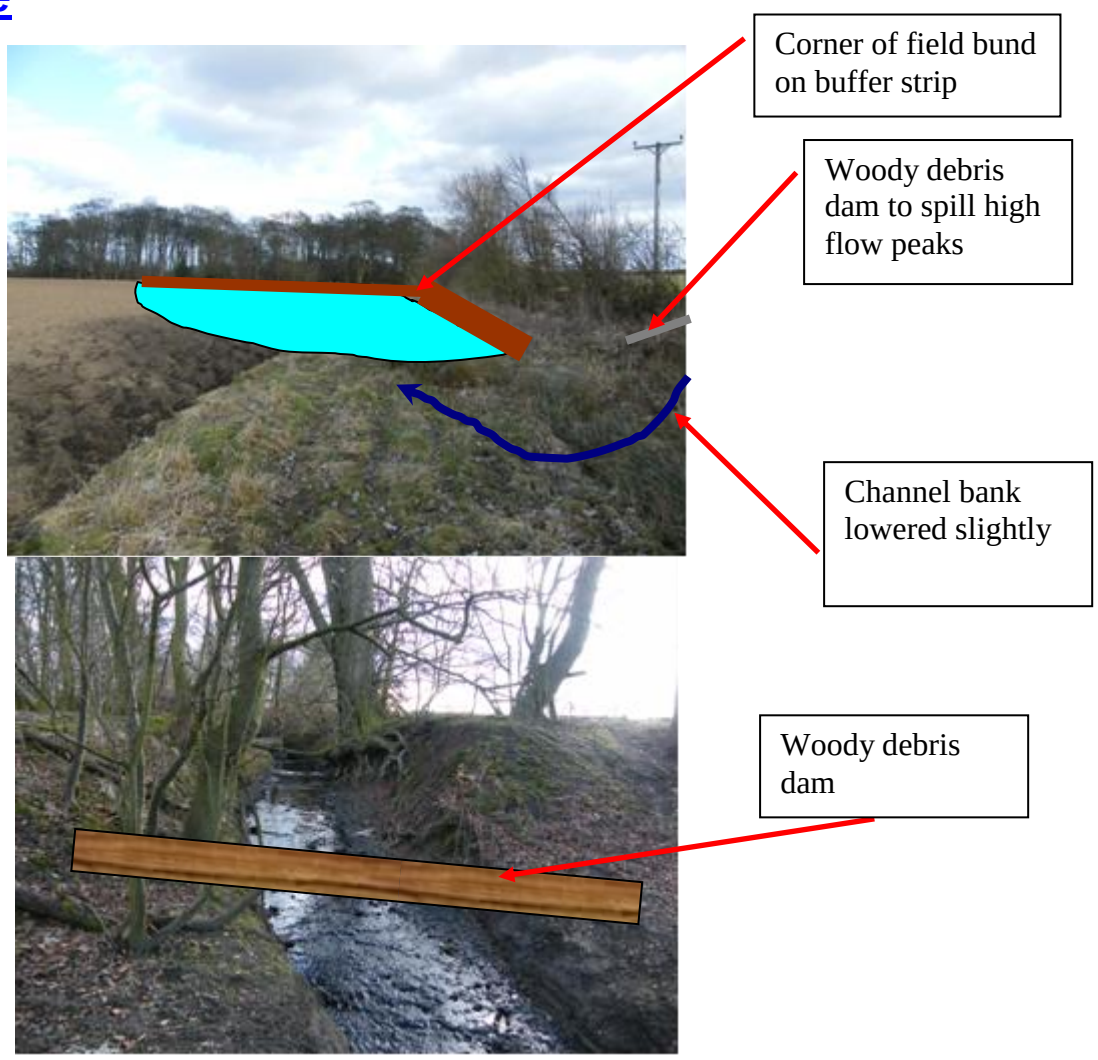


Photo of site (Before)

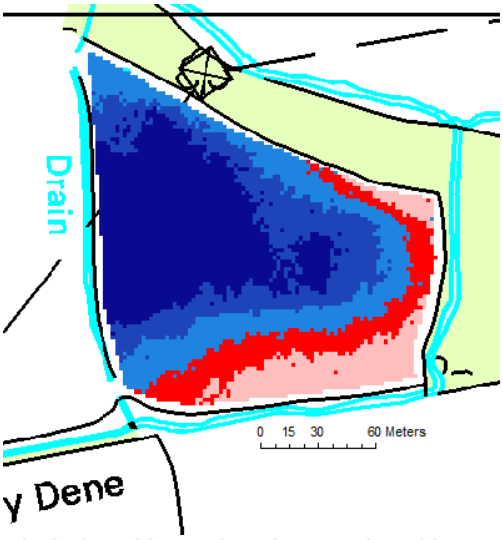
Feature Description

This is a classic example of how fields in the upper Ouseburn catchment could be managed to disconnect flow pathways along with taking high flow water from small tributaries of the Ouseburn.
This feature consists of a soil bund that would be 1m high at the highest point which would be built around the corner of the field at the lowest point. The shape of this bund forms an 'L'. The length of the bund is approximately 150m. The bund would be located on land designated as buffer strips. It is likely, owing to the good quality nature of the soil that soil would need to be brought to site. Upstream of the feature, a flow control structure or woody debris is placed in the channel to divert flood peaks into the feature.

Impact of feature



(Further downstream of Harey Dean)



Light red is spill area with 50cm bund, dark red is 1m bund. 50cm bund is suggested to allow flood flow to spill at suggested point.

Design Specifications

- **Soil bund: constructed by digger from onsite scraping or imported soil**
- **Bund located on buffer strip. No loss of land to farmer if buffer strip is permanent.**
- **Bund length ~ 150m long. 0.5m maximum height of bund. 4m max width**
- **Storage = 600m^3**
- **6" outlet pipe required.**
- **Spillway at side of bund (far left of diagram).**
- **Woody debris placed in small channel to divert flood peak into storage pond**

Further down Harey dean more woody debris can be placed in the channel to slow down the flood peak flow (see map and above diagram).

Ouseburn flood storage feature: Reserve feature
Site Name: Black Callerton

Location Map

OS Grid Ref: NZ176699

Farmer name: G.N Potts & Son, West Farm, Black Callerton, Westerhope, Newcastle upon Tyne, Tyne and Wear NE5 1NS. Tel: 01661 824411|

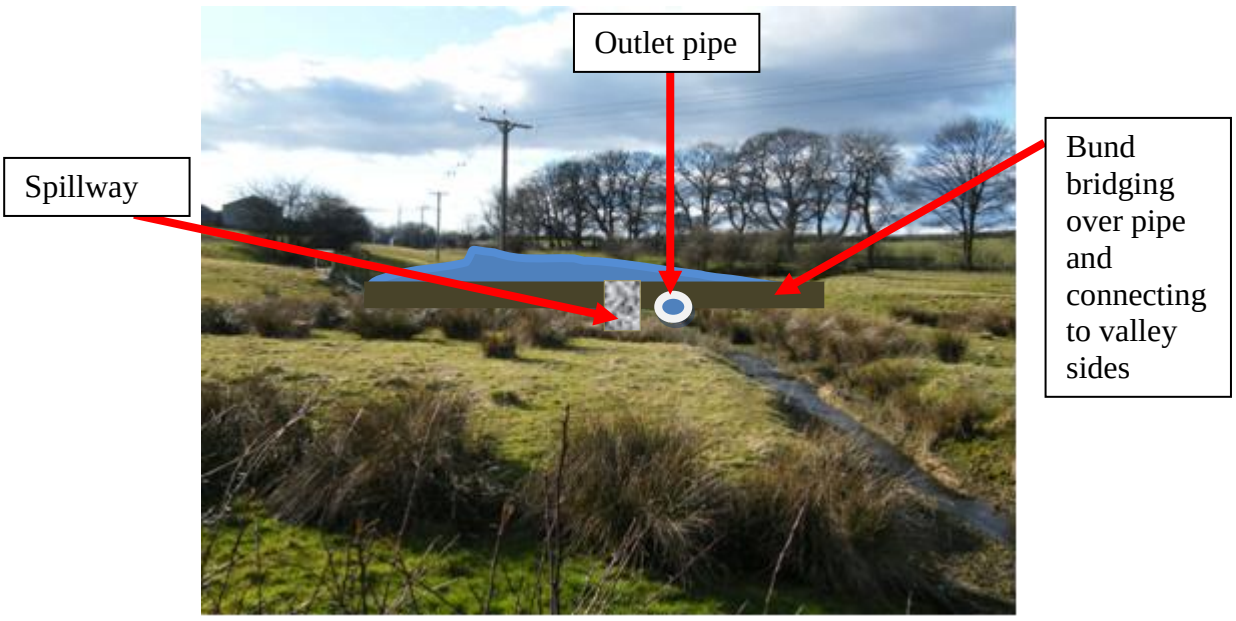
Location description: Just north of Black Callerton hamlet

Photo of site (Before)

Feature Description

This feature would consist of a large pipe being placed in the Burn and a soil bund being built across it connecting with two valley sides. This would effectively make a small reservoir in times of flood. There would need to be a ruggedized spillway as well. The flat valley stream upstream would hold a large capacity of flood flow.

Impact of feature



Design Specifications

- **Soil bund: constructed by digger from onsite scraping or importing soil**
- **Max length of bund = 70m**
- **Max height of bund = 1m**
- **Max width of bund = 10m**
- **A large outlet pipe is needed to allow only the largest flows to be stored. Preferably a 60-80cm culvert pipe**
- **Ruggedized spillway is essential**

Comments

- **Feature is an ONLINE – therefore should be considered as a reserve**