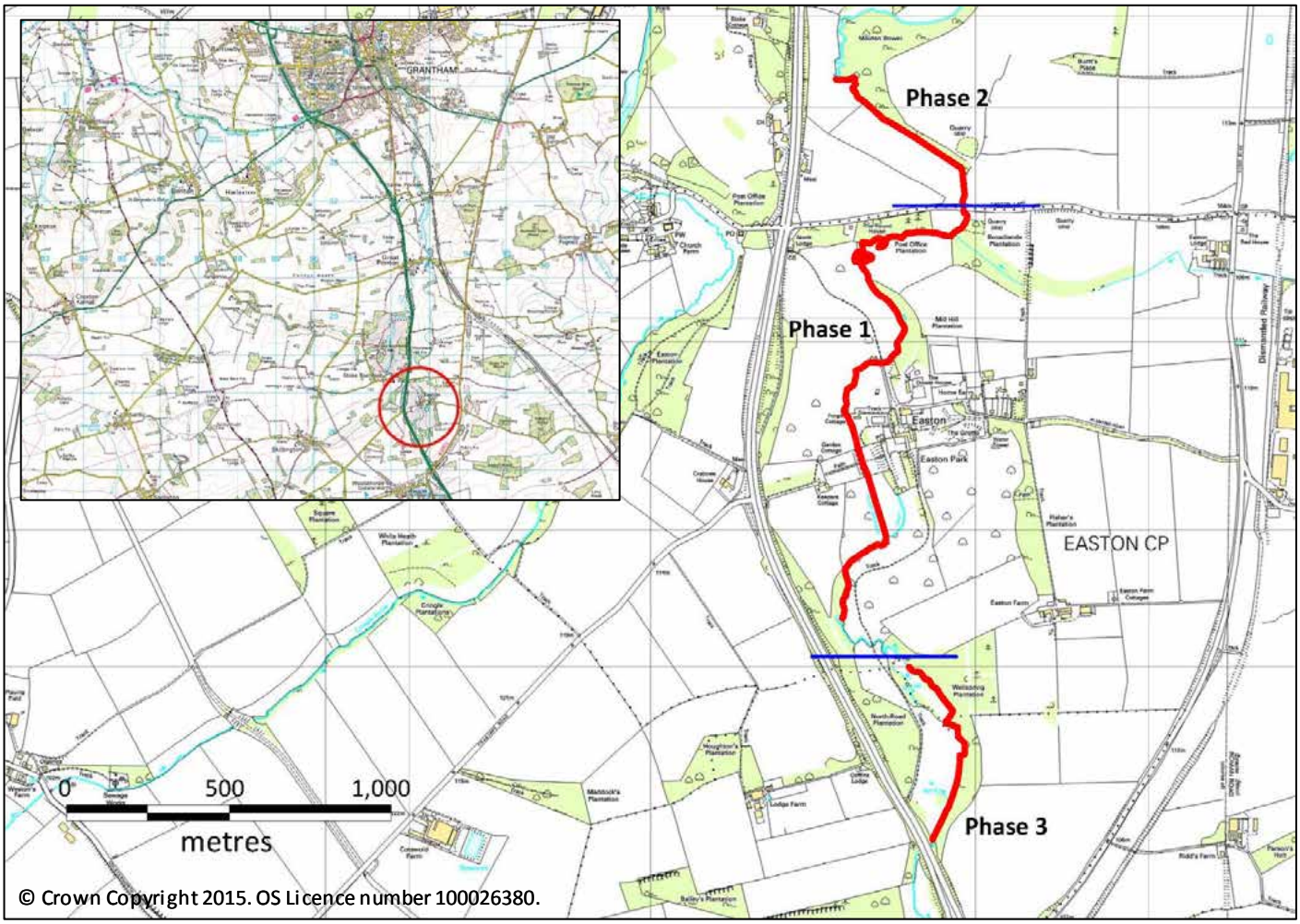
# Upper River Witham: Easton

Version 2 (22.04.15)

| | |
|---|---|
| **Location:** | Easton, Lincolnshire (c7km south of Grantham) |
| **Upstream Grid Ref:** | Phase 1: SK92592614; Phase 2: SK92962741; Phase 3: SK92862546 |
| **Length:** | Phase 1: c2km; Phase 2: 630m; Phase 3: 660m |
| **Completion Date:** | Phase 1: October 2013; Phase 2: July 2014; Phase 3: February 2015 |
| **Cost:** | Phase 1: £45K; Phase 2: £10K; Phase 3: £2K (with voluntary assistance from GAAFFS) |
| **Partners:** | Phases 1 and 3 were implemented with the co-operation and agreement of Easton Estate and their farm tenants; Phase 2 was implemented with the co-operation and agreement of Stoke Rochford Estates. Phase 1 was implemented by the Environment Agency (EA) following an earlier advisory visit by the Wild Trout Trust (WTT). Phase 2 was designed and implemented by the EA and Phase 3 was designed and implemented on behalf of Easton Estate by WTT assisted by the Grantham Angling Association Fly Fishing Section (GAAFFS). |

**Summary of Techniques:** Weir removal to restore bed gradient; channel narrowing and flow deflection to create flow variation and beneficial bed scour using log flow deflectors (vanes), open and enclosed log/faggot and brushwood mattresses (silt-traps) and earth, turf and silt filled log- or faggot-fronted enclosures; creation of sections of 2-stage channel and enhancing marginal wetland habitat by reprofiling eroded banks; excavation of pools in the river bed; increasing in-stream woody habitat by securing existing deadwood and hinging and pinning (layering) live riverside trees; and fencing to prevent bank erosion by livestock.

## Location Map




## Background

**The Upper River Witham rises west of South Witham and flows for more than 65 km northwards through Colsterworth, Great Ponton, Grantham, Long Bennington, Bassingham and North Hykeham towards Lincoln. More than 165 km of river and tributary streams drain the c573 km$^2$ catchment.**

**The landscape of the catchment is varied in character, ranging from the livestock-dominated limestone valleys upstream from Grantham, through the mixed farming terrain of the middle reaches, to the flat-lying arable farmlands downstream from Long Bennington. Over recent centuries, and particularly the last 100 years, the once naturally meandering river channels have been straightened, deepened, widened, impounded and embanked to reduce flood risk and improve land drainage. These modifications, together with catchment land management practices, have contributed to a decline in river corridor habitat quality.**

**The Upper Witham and its tributaries are divided into 19 separate waterbodies for Water Framework Directive assessment and only 3 are assessed as having Good Ecological Status. The section of the Upper Witham which includes the Easton reach is currently assessed as "Moderate" due to high phosphate levels, excessive algae (diatoms) and poor fish populations. The enhancement works at Easton, which have been completed in three phases, seek to address these issues as part of the wider *Upper Witham River Corridor Habitat Plan.***

## Pre-project Surveys

The River Witham enhancement scheme at Easton has been developed over a number of years, starting with a Wild Trout Trust Advisory visit in 2009, by the Environment Agency, the Wild Trout Trust and the Grantham Angling Association Fly Fishing Section (GAAFFS) in partnership with Easton Estate. For scheme design and implementation purposes the reach has been divided in to 3 sections: the upper section immediately downstream of the A1; the middle section which includes the Easton Walled Garden; and lower section downstream of Easton Lane.

Several walkover surveys have been undertaken to identify the issues that are affecting the river, its associated habitats and species, and to design the enhancement scheme. Fixed photographic survey points were also established. No specific ecological survey work was undertaken prior to the works, but native white-clawed crayfish are known to be present in the reach and fish are surveyed annually in the section downstream of the Walled Garden.

Easton Park, through which the Witham flows, is a *Grade II Listed Historic Park and Garden*, so a detailed desk-based survey was carried out to assess the potential impact of the scheme on the cultural heritage of the area. This identified a number of listed features within the park, including the Walled Garden itself, bridges crossing the river, estate cottages and an area of potential medieval earthworks. In the light of the assessment, the habitat enhancement strategy was to ensure that all the material remains of the historic garden would be protected and that soft engineering techniques would be used within the Walled Garden to minimise the aesthetic impact on the garden design. An archaeological watching brief would also be carried where bank reprofiling was planned. As a result no archaeological or culturally sensitive remains were damaged during the course of the works.

## Project Objectives

The pre-project surveys and assessments led to the identification of the following objectives for the enhancement scheme:

- Reduce the impact of sediment inputs as a result of erosion caused by livestock.
- Repair eroded banks and protect them from erosion in the future.
- Trap sediment already in the system.
- Improve flows and natural cleansing of spawning gravels.
- Improve light levels in over-shaded sections.
- Improve habitat for trout, coarse fish and native white-clawed crayfish.
- Ensure that historic features within the Grade II Listed Historic Park and Garden are protected.

Three separate schemes based on these objectives were prepared.

## Consultation and Consents

An internal Environment Agency application for Flood Defence Consent to undertake the first phase of enhancement (the middle reach including the Walled Garden) was prepared and consent was issued on 6th August 2013 (Internal Consent no L/002769/13). GAAFFS was granted Flood Defence Consent to undertake the second phase (downstream of Easton Lane) on 5th August 2013 (Consent No. L/002772/13) and consent to undertaken Phase 3 was issued to the Easton Estate on 8th August 2014 (Consent No. ANG_N-L_2014_3012).

## The Enhancement Scheme

The scheme was completed in 3 phases. The first phase commenced in September 2013 and the third and final phase was completed in February 2015. Phase 1 was through Easton Park and the Walled Garden, Phase 2 was downstream of Easton Lane and Phase 3 started immediately downstream of the A1. The drawings in Annex 1 show the locations of all the elements of the completed phases and the techniques used are described below.

### *Tree Management*

Several sections, particularly the reaches below Easton Lane (Phase 2) and downstream of the A1 (Phase 3), were heavily shaded by riverside trees. An important element of the enhancement works was to increase light levels to encourage the growth of emergent vegetation on the fine sediment that is accumulating at the channel margins - the growth of vegetation consolidates the silt as well as providing a trap for fine sediments mobilised during high flows. Riverside trees were either coppiced to open up the channel and generate woody material which was used to create channel narrowing structures (see below); hinged and pinned into the channel to create live flow deflectors; or felled secured in-stream (using wire bindings or by wedging between multi-stemmed riverside trees) to deflect the flow and provide additional deadwood habitat. Some existing instream deadwood was also secured. In addition to narrowing the channel and increasing flow variation the branches and twigs provide important refuges for juvenile fish and invertebrates.

*Fig 1. Hinged and pinned live sycamore. (Phase 2)*

*Fig 2. Secured large deadwood. (Phase 2)*

*Fig 3. Riverside tree felled into the channel and secured with wire bindings. (Phase 2)*

*Fig 4. Felled tree and brash flow deflectors extending from high on the bank and secured by hooking around or wedging between multi-stemmed riverside trees. (Phase 3)*

### *Channel Narrowing Structures*

A variety of channel narrowing techniques, including the hinged trees and secured deadwood described above, were employed to repair erosion and increase flow diversity. Many of the constructed channel narrowing structures utilised woody material generated on site. The following techniques were used:

### Open (unenclosed) brushwood mattresses

Small branches firmly secured with posts and wire bindings to create a mattress.

*Fig 5. A series of offset brushwood mattress creating a narrow, sinuous channel. (Phase 2)*

*Fig 6. Brushwood mattress. (Phase 1)*

### Infilled brushwood mattresses

As above, but adjacent to sections of reprofiled eroded bank the brushwood mattress were infilled with excavated soils.

*Fig 7. Channel narrowing using infilled brushwood mattresses, (a) before and (b) after. The right bank was reprofiled to create a 2-stage channel and excavated material was used to cover the adjacent brushwood mattresses and seeded. (Phase 1)*

### Log/Faggot-faced mattresses and enclosures

Several variations of the log and faggot-faced enclosure were installed. Some were left open, whilst others were infilled variously with brushwood, earth, turves and silt. In some instances logs or faggots was used to create a new bank toe and the adjacent eroding bank was reprofiled in to the enclosure to create a 2-stage channel. Of the earth-filled enclosures constructed during Phase 1 all but one was grass seeded and some were also planted with clumps of native wetland plants translocated from the Walled Garden section of the river.

*Fig 8. Narrowing using faggots infilled with brash and silt in the Walled Garden section (above before, below after). (Phase 1)*

*Fig 9. Log-faced enclosure infilled with earth and turfs. (Phase1)*

*Fig 10. Log-faced brushwood mattress. (Phase2)*

### Log-fronted mattresses

Brushwood mattresses partially enclosed by secured logs leaving the downstream end open to create a "backwater" which provides a valuable fish/fry refuge.

*Fig 11. Offset log-fronted brushwood mattresses created by felling trees into the channel and infilling with brash. (Phase2)*

*Fig 12. A series of log-fronted brushwood mattresses creating a narrower, more sinuous channel. (Phase2)*

### *Two-stage Channel Creation*

During Phase 1, immediately upstream of the Walled Garden, a number of the channel narrowing techniques described above were combined to narrow the river and create a long section of 2-stage channel. Once completed the section was fenced to prevent further bank erosion by grazing sheep. 2-stage channels contain typical flows within a narrow primary channel, but as flows increase and the water levels rise the flood flows are carried in the wider second stage channel, emulating the operation of a natural floodplain.

*Fig 13. (a) The 2-stagechannel creation in progress and (b) the completed works, which include turf-filled faggot-faced enclosures, prior to fencing being erected at the top of the reprofiled slopes. (Phase 1)*

*Fig 14. (a) before and (b) after, showing the extent of channel narrowing upstream of the Walled Garden. (Phase 1)*

### *Meander Bend Reprofiling*

Towards the bottom of the middle (Phase 1) reach there is a short series of very sharp, deeply-incised meanders. Here the gradient of the steeply sloping banks on the inside of two meanders bends was reduced to reconnect the river with its floodplain and prevent further incising. Excavated soils were spread thinly at the top of the bank and seeded.

*Fig 15. The two reprofiled meander bends. (Phase 1)*

### *Log Flow Deflectors/Vanes*

Logs derived from riverside tree management were used to construct flow deflectors and vanes in Phase 1 and 2 of the enhancement work. Flow deflectors are partially exposed above the water level, but slope down at a very shallow angle towards the centre of the channel, and are designed to deflect the flow during typical flow conditions, effectively narrowing the channel. Vanes, however, are permanently submerged. Deflectors and vanes create localised flow variation, helping trap and retain gravels; improve flows over/through gravel beds to keep them free from fine sediment; and improve the bed structure through scouring. Both types of structure, either in pairs or singles, are normally angled upstream to direct the flow towards the centre of the channel and minimise the potential for bank erosion. In addition to vanes and deflectors keyed into the bank, paired "micro-vanes" were also installed mid-channel to create more complex flow variation and bed scour.

*Fig 16. Offset log flow deflectors. (Phase1)*

*Fig 17. A single log flow deflector. (Phase 1)*

*Fig 18. Examples of paired micro-vanes. (Phase 2)*

### *Pool creation*

*Fig 19. New pools showing the locations of excavated material which narrows the channel and encourages scour. (Phase 1)*

During Phase 1 several pools were excavated in the stream bed and the excavated material was deposited either immediately upstream or adjacent to the excavation. The channel narrowing created by the deposited bed material will create scour and should ensure that the pools do not suffer from siltation in the future.

### *Riverside Fencing*

The riverside pastures and parkland, apart from the section through Easton Walled Garden, are all sheep grazed. Prior to the works most of the banks were unfenced allowing the sheep unrestricted access to the river channel which resulted in some sections of steep, eroded bank. Extensive runs of new fencing (post and wire netting with a barbed top wire) were erected during Phase 1. Sections of fencing that were in poor condition were also replaced. At the suggestion of the gamekeeper the stock netting has been reversed, so that the larger mesh is at the bottom, to allow better access for pheasants (see Fig 20). Hand gates have been installed at both ends of long fencing runs to provide access for the riverbank to be grazed when conditions are suitable.

*Fig 20. A newly-erected section of stock fencing. (Phase 1)*

*Fig 21. A hand gate installed at the end of a long run of fencing. Note the reversed stock netting with the larger mesh at the bottom to allow better access for pheasants. (Phase 1)*

### Weir removal

The main element of Phase 3 was the removal of part of a redundant weir, approximately 650m downstream of the A1, to restore the bed gradient to create a more natural flow and sediment regime and allow fish passage. The project was originally identified in 2009 when the weir was in poor condition, but still creating a significant impoundment. However, subsequently an adjacent bypass culvert had been unblocked, reducing the upstream impoundment and leading to some limited natural regrading of the river bed upstream. When unimpeded the culvert was the preferential flow pathway, although it was prone to blocking with debris, so a permanent solution was required. The removal of the old weir crest to below the base of the adjacent culvert in late 2014 provided this solution and permanently restored the flow to the river channel.

The removal of the weir produced a localised steepening of the channel bed (known as a knickpoint), which, if left unmanaged, could migrate upstream and promote bank instability. To address this issue, several hinged trees and brushwood mattress structures were installed into the channel between the weir site and the A1 culvert to slow the flow.

*Fig 22. Upstream view of the weir (February 2013).*

*Fig 23. The weir bypass culvert in April 2014 before the removal of the weir crest. The culvert is redundant now that the weir crest has been removed.*

*Fig 24. View upstream immediately flowing the removal of the central section of the weir which restored the flow to the main river channel (October 2014).*

*Fig 25. Subsequent high flows through the breached structure (February 2015.).*

## Monitoring

In addition to the established annual fish monitoring programme downstream of Easton Walled Garden and invertebrate sampling at Easton Lane Bridge, visual inspections of the enhanced reach will be undertaken, and the fixed point photographic record will be updated to monitor the integrity and performance of the in-stream enhancements and record any changes they are making to river morphology. Post-works redd (trout spawning nest) surveys were undertaken upstream and downstream of Easton Lane. 6 redds were located in the upstream (Easton Park) section, but none were located downstream. These surveys provide a baseline for future monitoring.

## Suppliers of Services

**Phase 1:**
**In-stream structures and tree works**
Woodland and Water Management Ltd. T. 01327 349073. E. dom@woodland-water.co.uk
**Machine works, including bank reprofiling and pool excavation, and additional tree works**
P&R Plant Hire. T. 01406 422669. W. www.pandrplanthire.co.uk

**Fencing:**
Burton Brothers. T. 01858 880805. E. burton532@btinternet.com

**Phase 2:** The tree works and construction of the in-stream structures were undertaken by the local Environment Agency Operations Field Team

**Phase 3:** The weir removal and associated habitat works were completed by volunteers from the Grantham Angling Association Fly Fishing Section (GAAFFS) under the supervision of the Wild Trout Trust.

## Further Information

**For further information about Phase 1 contact:**
Matt Parr, Technical Officer, Fisheries, Biodiversity and Geomorphology Team. Environment Agency, Lincoln.

**For further information about Phase 2 contact:**
Rob Pitkin, Technical Officer, Fisheries, Biodiversity and Geomorphology Team. Environment Agency, Lincoln.
T. 01522 785994. E. robert.pitkin@environment-agency.gov.uk

**For further information about Phase 3 contact:**
Gez Foster, Geomorphologist, Fisheries, Biodiversity and Geomorphology Team. Environment Agency, Lincoln.
T. 01522 785957. E. gez.foster@environment-agency.gov.uk
or
Tim Jacklin, Conservation Officer, Wild Trout Trust.
T. 07876 525457. E. tjacklin@wildtrout.org

## The Water Framework Directive

The Water Framework Directive (WFD) is a major area of work for the Environment Agency. The WFD aims to get all water bodies - lakes and groundwater aquifers as well as rivers - into 'good ecological status' - or better - by 2027, with a series of 'landmarks' (2015 and 2021) to check progress.

The Water Framework Directive became UK law in December 2003. It provides an opportunity for the Environment Agency to plan and deliver a better water environment with the focus on ecology.

The Water Framework Directive will help to protect and enhance the quality of: surface freshwater (including lakes, streams and rivers); groundwater; groundwater-dependent ecosystems; estuaries and coastal waters out to one mile from low water.

The Environment Agency is the lead authority in England and Wales to carry out:

- Improvements on inland and coastal waters through better land management and protect them from diffuse pollution in urban and rural areas
- Drive wiser, sustainable use of water as a natural resource
- Create better habitats for wildlife in and around water
- Create a better quality of life for everyone

The Environment Agency is the leading organisation for protecting and improving the environment in England and Wales. We are responsible for making sure that air, land and water are looked after by today's society, so that tomorrow's generations inherit a cleaner, healthier world.

## Glossary

**Berm:** A low, often wet, ledge or terrace at the edge of the stream that constricts the flow and allows a vegetated wetland margin to develop.

**Brash:** fine woody material including thin branches and twigs.

**Coppicing:** cutting of a tree just above ground level resulting in the regrowth of a number of shoots. The shoots are allowed grow to provide long straight poles which are re-coppiced on rotation.

**Faggot:** a bundle of brushwood (or brash) tied together into a cylindrical shape. Used as bank revetment; to form flow deflectors; and to promote the deposition of sediment in marginal areas.

**Fish pass:** Structure to enable fish to gain access past a weir, sluice or other structure that would otherwise be impassable.

**Flood Defence Consent:** consent issued by the Environment Agency to carry out works in, over, under or near a watercourse or flood defences. An application for Flood Defence Consent is needed to ensure that any works do not endanger life or property by increasing the risk of flooding or cause harm to the water environment.

**Floodplain:** Area of land bordering a river that is prone to flooding.

**Flow deflector (groyne):** a structure projecting in to the river which is designed to constrict water flow and promote scouring and deposition of sediment.

**Glide:** a section of stream characterised by moderately shallow water with an even flow that lacks pronounced turbulence. Although most frequently located immediately downstream of pools, glides are occasionally found in long, low gradient streams with stable banks and no major flow obstructions. The typical substrate is gravel and cobbles.

**Layering (also laying or pleaching):** A technique where a small tree is partially cut at the base leaving a narrow bark and sapwood hinge which enables the tree to be laid down. The tree remains alive and able to continue growing.

**Large Woody Material:** pieces of naturally derived timber generally held to have dimensions greater than 10cm in diameter and 1m in length.

**Left/right bank:** the left/right hand bank of a watercourse as observed whilst facing downstream.

**Meander:** a meander is a bend in a watercourse formed as water erodes the outer bank and deposits the eroded sediments on the inside of the bank.

**Poaching:** river bank damage caused by the hooves of livestock resulting in the loss of vegetation and soil erosion.

**Pollarding:** similar to coppicing, except that the tree is cut at approximately head height to prevent damage by grazing animals. Trees managed in this way are known as **pollards**.

**Pool**: a deep section of stream bed with very little surface flow, typically located at the outside of a bend.

**Redds:** brown trout spawning nests. The female (hen) trout excavates the nest in the gravel bed, usually between November and January, when the water is cold and carrying lots of oxygen.

**Revetment:** works to protect the bed or banks of a channel against erosion.

**Riffle**: a length of stream with a steep gravel, pebble and/or cobble dominated bed, a fast flow and a broken water surface, where the water flows swiftly over the completely or partially submerged substrate.

**Riparian:** along the banks of a watercourse.

**Run**: differs from a riffle in that, although the water surface is broken, the water depth is typically greater and the slope of the bed is less.

**Scour:** Erosion of the bed or banks of a watercourse by the action of moving water.

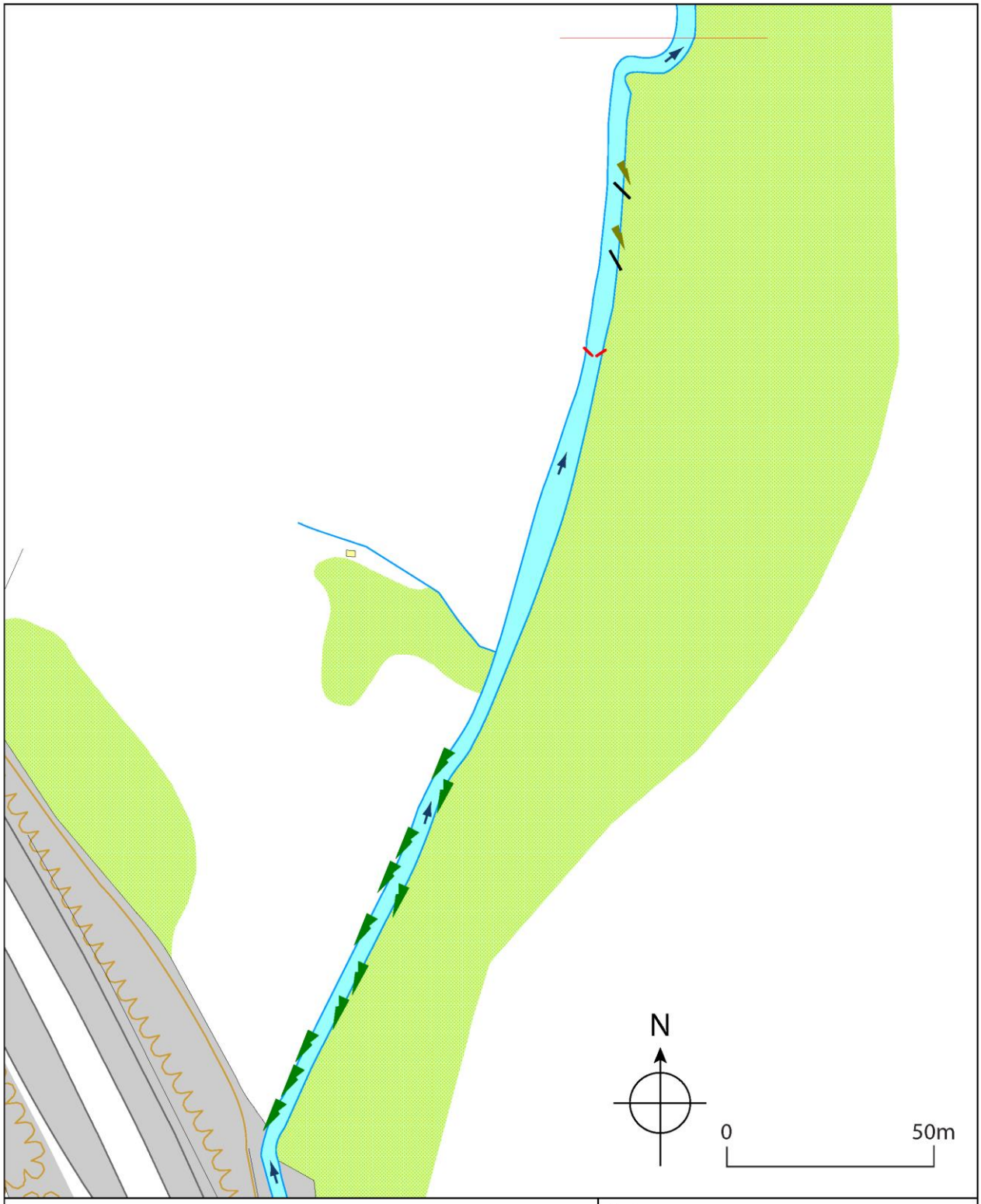
**Sediment:** material ranging from clay to gravel (or even larger) that is transported in flowing water and that settles as the flow slows down.

**Shoal:** sedimentation within or extending into a stream or other waterbody, typically composed of sand, silt and/or gravels.

**Spiling:** the use of thin branches to create a woven 'fence' that protects the bank from erosion.

**Toe** (of the riverbank): where the river bed meets the bank.

## ANNEX 1: The Completed Enhancement Scheme (mapping commences at the upstream extent)



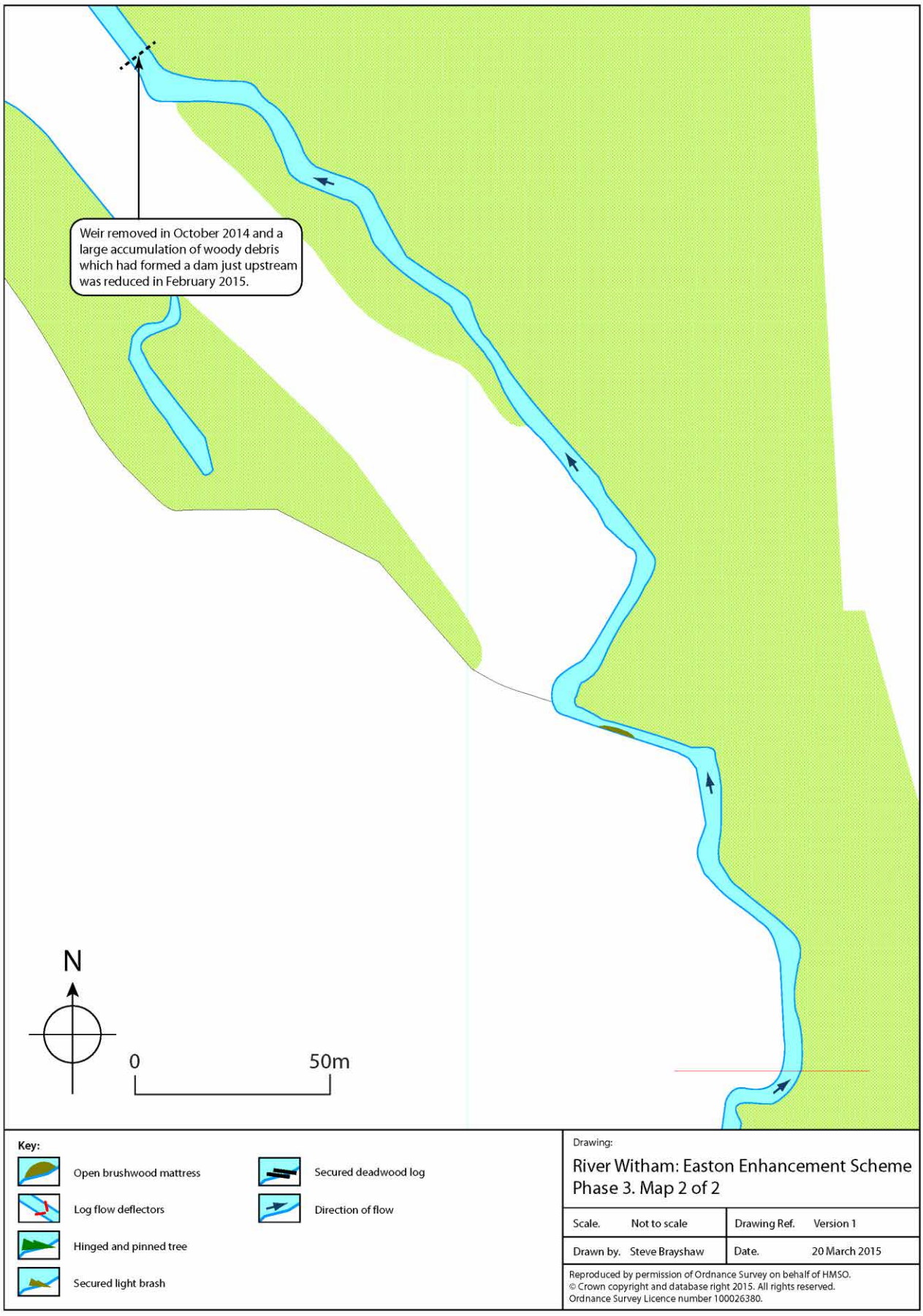

Key:

- Open brushwood mattress
- Log flow deflectors
- Hinged and pinned tree
- Secured light brash
- Secured deadwood log
- Direction of flow

Drawing:

River Witham: Easton Enhancement Scheme
Phase 3. Map 1 of 2

| | |
|---|---|
| Scale. Not to scale | Drawing Ref. Version 1 |
| Drawn by. Steve Brayshaw | Date. 20 March 2015 |



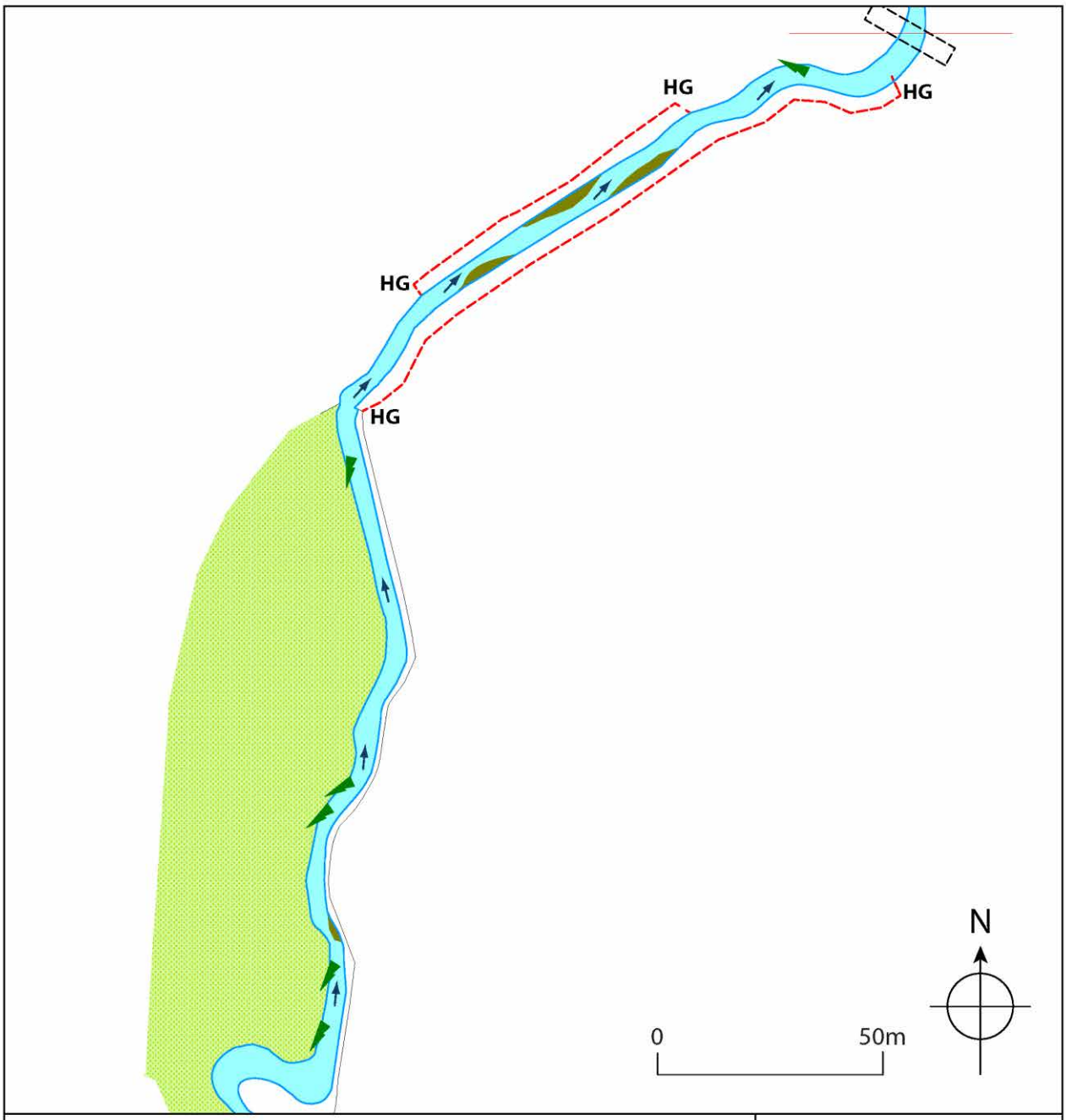

Key:

- Open brushwood mattress
- Log flow deflectors
- Hinged and pinned tree
- Secured light brash
- Secured deadwood log
- Direction of flow

Drawing:

River Witham: Easton Enhancement Scheme Phase 3. Map 2 of 2

| Scale. Not to scale | Drawing Ref. Version 1 |
|---|---|
| Drawn by. Steve Brayshaw | Date. 20 March 2015 |



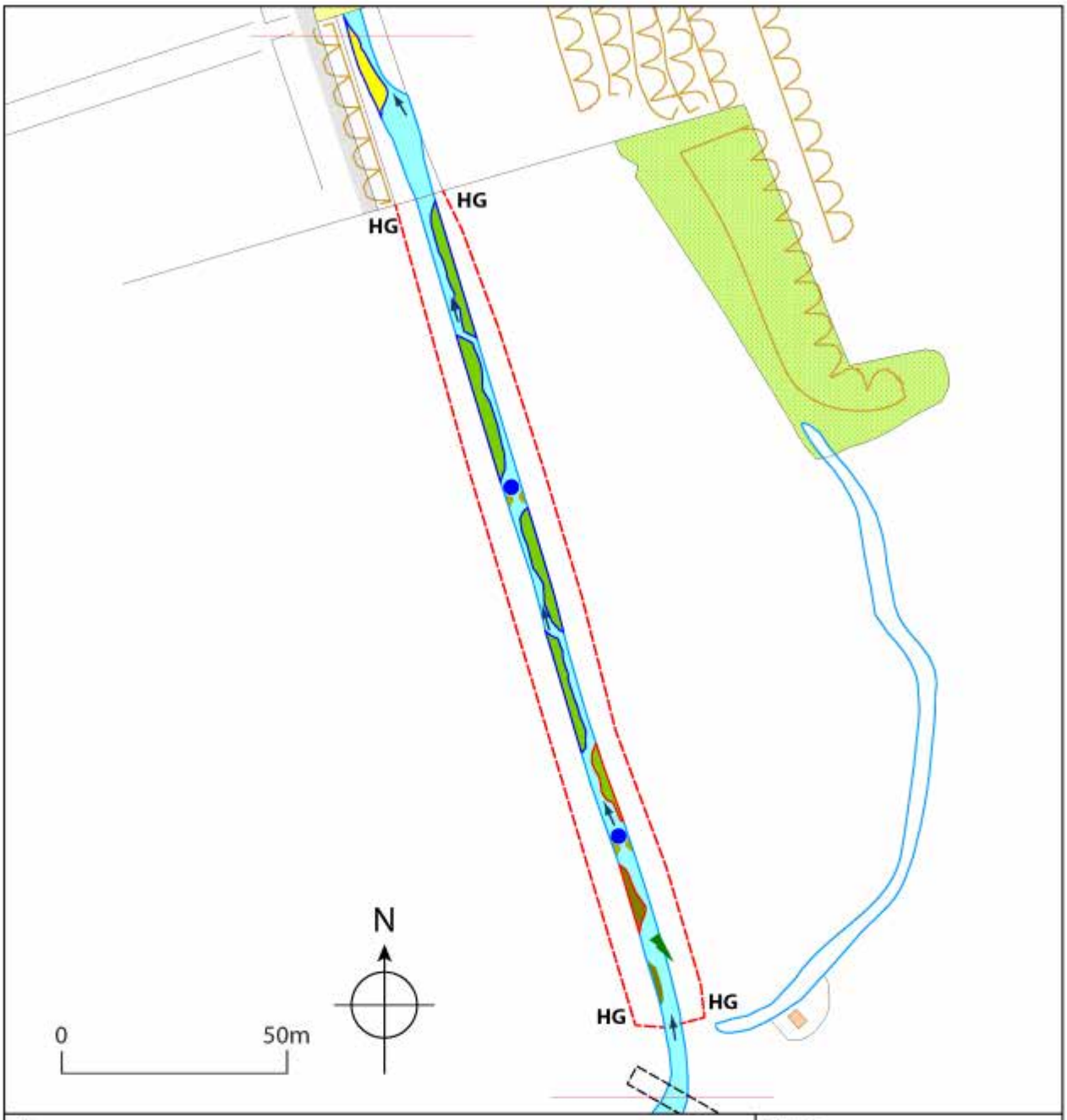

Key:

| | |
|---|---|
| FG | New field gate |
| HG | New hand gate |
| | New stock net fencing |
| | Existing stock fencing |
| | Excavated pool and placed excavated material |
| | Log flow deflectors |
| | Hinged and pinned tree/bush |
| | Flow direction |
| | Open brushwood mattress |
| | Brushwood mattress infilled with earth and seeded |
| | Log-faced brushwood mattress |
| | Log-faced enclosure infilled with earth and turves |
| | Faggot enclosure (not infilled) |
| | Faggot-faced brushwood mattress |
| | Faggot-faced enclosure infilled with earth and seeded |
| | Faggot-faced enclosure infilled with earth and turves |
| | Faggot-faced brushwood mattress infilled with silt |
| | Faggot-faced enclosure infilled with earth (not seeded) |

Drawing:
River Witham: Easton Enhancement Scheme Phase 1. Map 1 of 6

Partners:
Easton Estate, Environment Agency & Wild Trout Trust

| | |
|---|---|
| Scale. | Not to scale |
| Drawing Ref. | Version 2 |
| Date. | 19 March 2015 |
| Drawn by. | Steve Brayshaw |



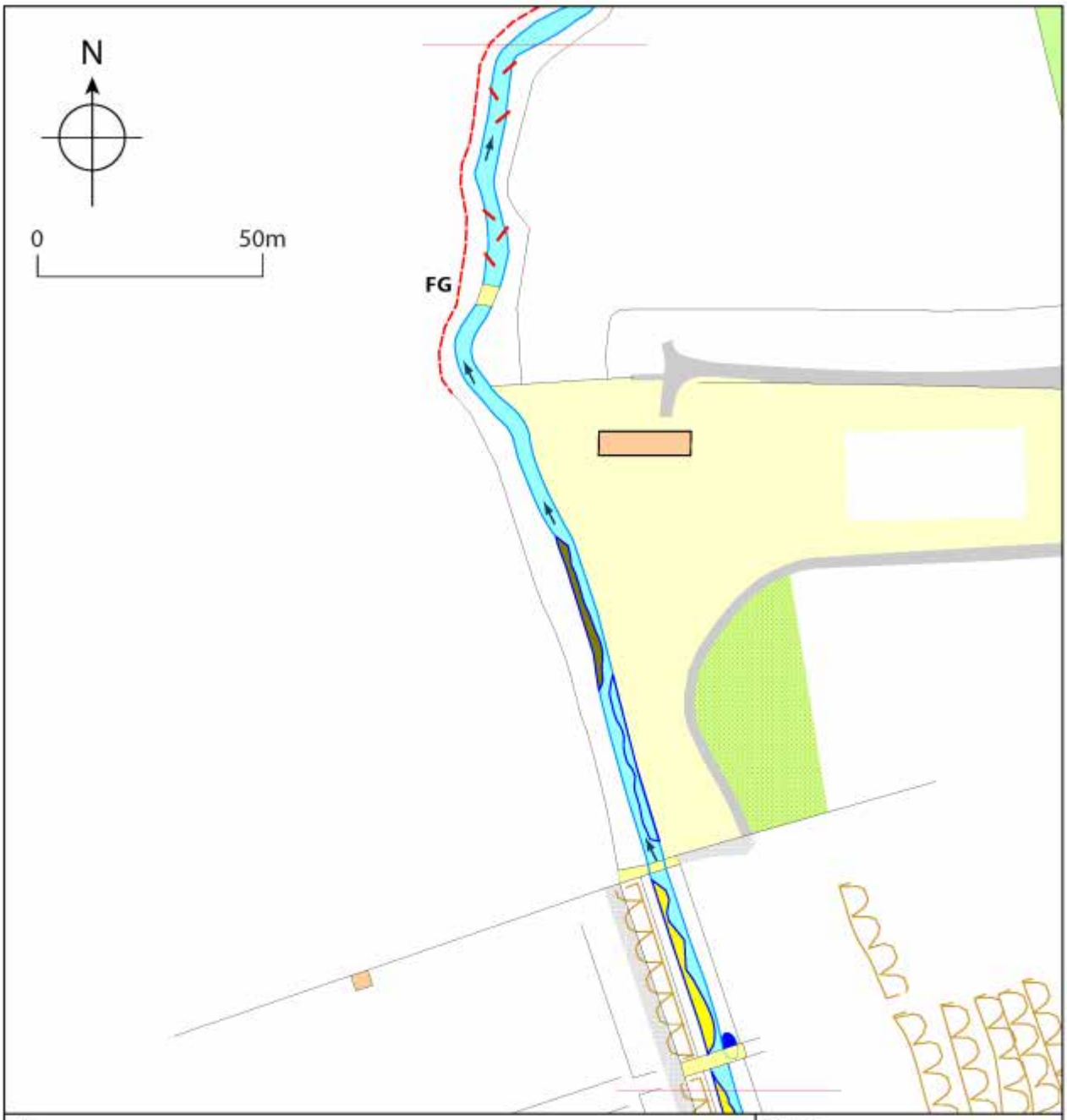

Key:

- FG — New field gate
- HG — New hand gate
- New stock net fencing
- Existing stock fencing
- Excavated pool and placed excavated material
- Log flow deflectors
- Hinged and pinned tree/bush
- Flow direction
- Open brushwood mattress
- Brushwood mattress infilled with earth and seeded
- Log-faced brushwood mattress
- Log-faced enclosure infilled with earth and turves
- Faggot enclosure (not infilled)
- Faggot-faced brushwood mattress
- Faggot-faced enclosure infilled with earth and seeded
- Faggot-faced enclosure infilled with earth and turves
- Faggot-faced brushwood mattress infilled with silt
- Faggot-faced enclosure infilled with earth (not seeded)

Drawing:
River Witham: Easton Enhancement Scheme Phase 1. Map 2 of 6

Partners:
Easton Estate, Environment Agency & Wild Trout Trust

| | |
|---|---|
| Scale. | Not to scale |
| Drawing Ref. | Version 2 |
| Date. | 19 March 2015 |
| Drawn by. | Steve Brayshaw |



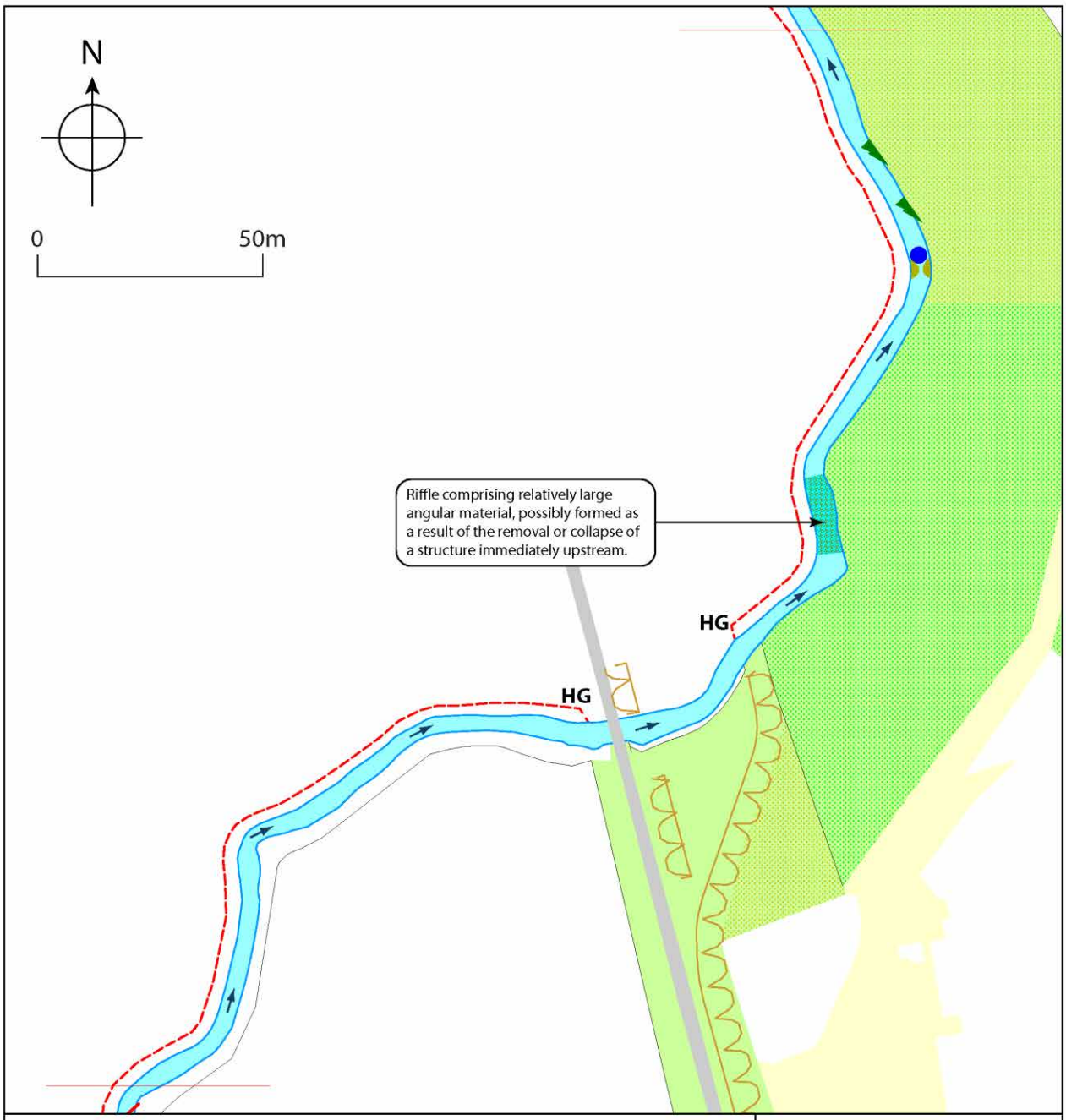

Key:

- FG — New field gate
- HG — New hand gate
- New stock net fencing
- Existing stock fencing
- Excavated pool and placed excavated material
- Log flow deflectors
- Hinged and pinned tree/bush
- Flow direction
- Open brushwood mattress
- Brushwood mattress infilled with earth and seeded
- Log-faced brushwood mattress
- Log-faced enclosure infilled with earth and turves
- Faggot enclosure (not infilled)
- Faggot-faced brushwood mattress
- Faggot-faced enclosure infilled with earth and seeded
- Faggot-faced enclosure infilled with earth and turves
- Faggot-faced brushwood mattress infilled with silt
- Faggot-faced enclosure infilled with earth (not seeded)

Drawing:
River Witham: Easton Enhancement Scheme Phase 1. Map 3 of 6

Partners:
Easton Estate, Environment Agency & Wild Trout Trust

| | |
|---|---|
| Scale. | Not to scale |
| Drawing Ref. | Version 2 |
| Date. | 19 March 2015 |
| Drawn by. | Steve Brayshaw |



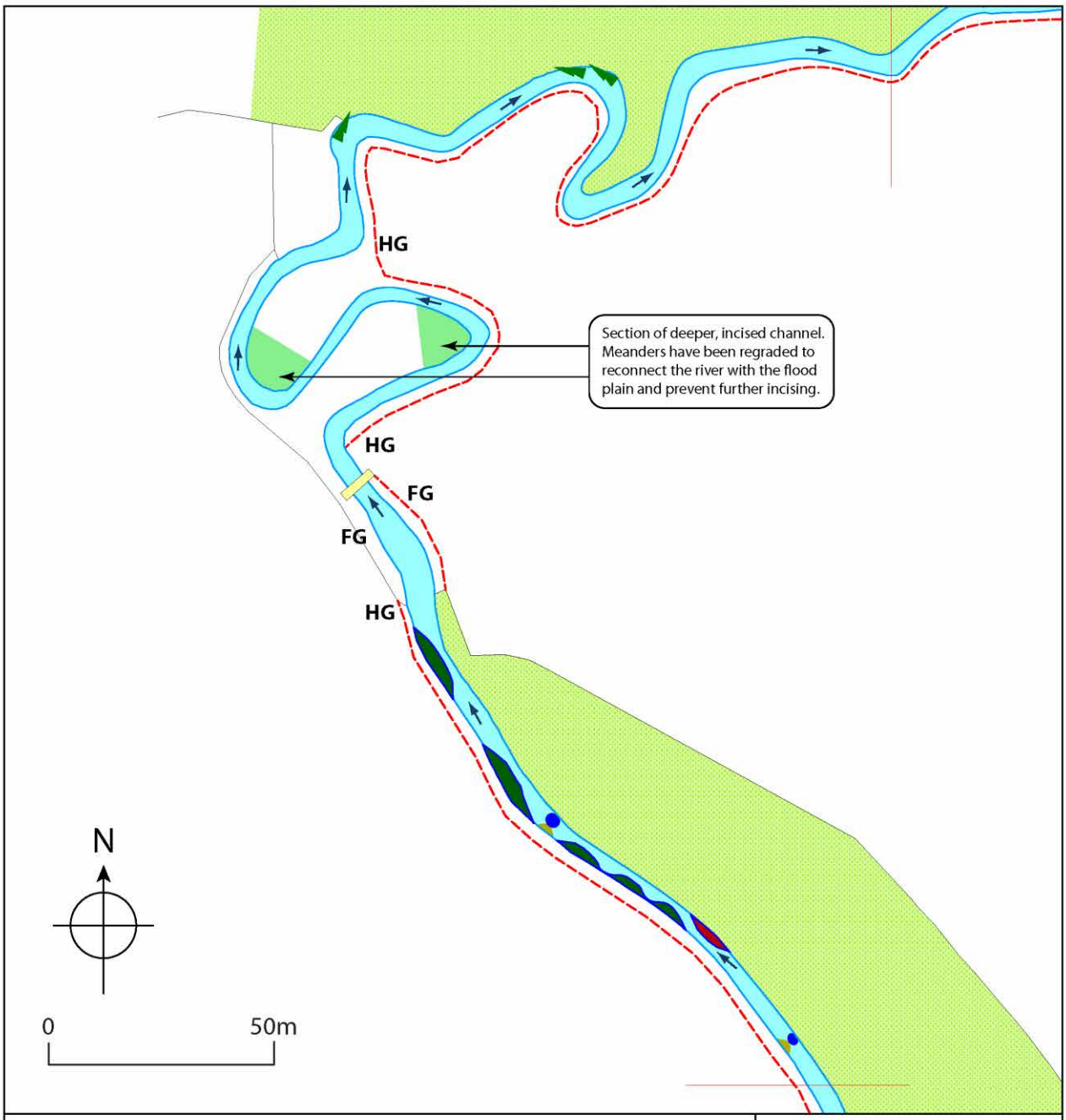

Key:

- FG — New field gate
- HG — New hand gate
- New stock net fencing
- Existing stock fencing
- Excavated pool and placed excavated material
- Log flow deflectors
- Hinged and pinned tree/bush
- Flow direction
- Open brushwood mattress
- Brushwood mattress infilled with earth and seeded
- Log-faced brushwood mattress
- Log-faced enclosure infilled with earth and turves
- Faggot enclosure (not infilled)
- Faggot-faced brushwood mattress
- Faggot-faced enclosure infilled with earth and seeded
- Faggot-faced enclosure infilled with earth and turves
- Faggot-faced brushwood mattress infilled with silt
- Faggot-faced enclosure infilled with earth (not seeded)

Drawing:
River Witham: Easton Enhancement Scheme Phase 1. Map 4 of 6

Partners:
Easton Estate, Environment Agency & Wild Trout Trust

| | |
|---|---|
| Scale. | Not to scale |
| Drawing Ref. | Version 2 |
| Date. | 19 March 2015 |
| Drawn by. | Steve Brayshaw |



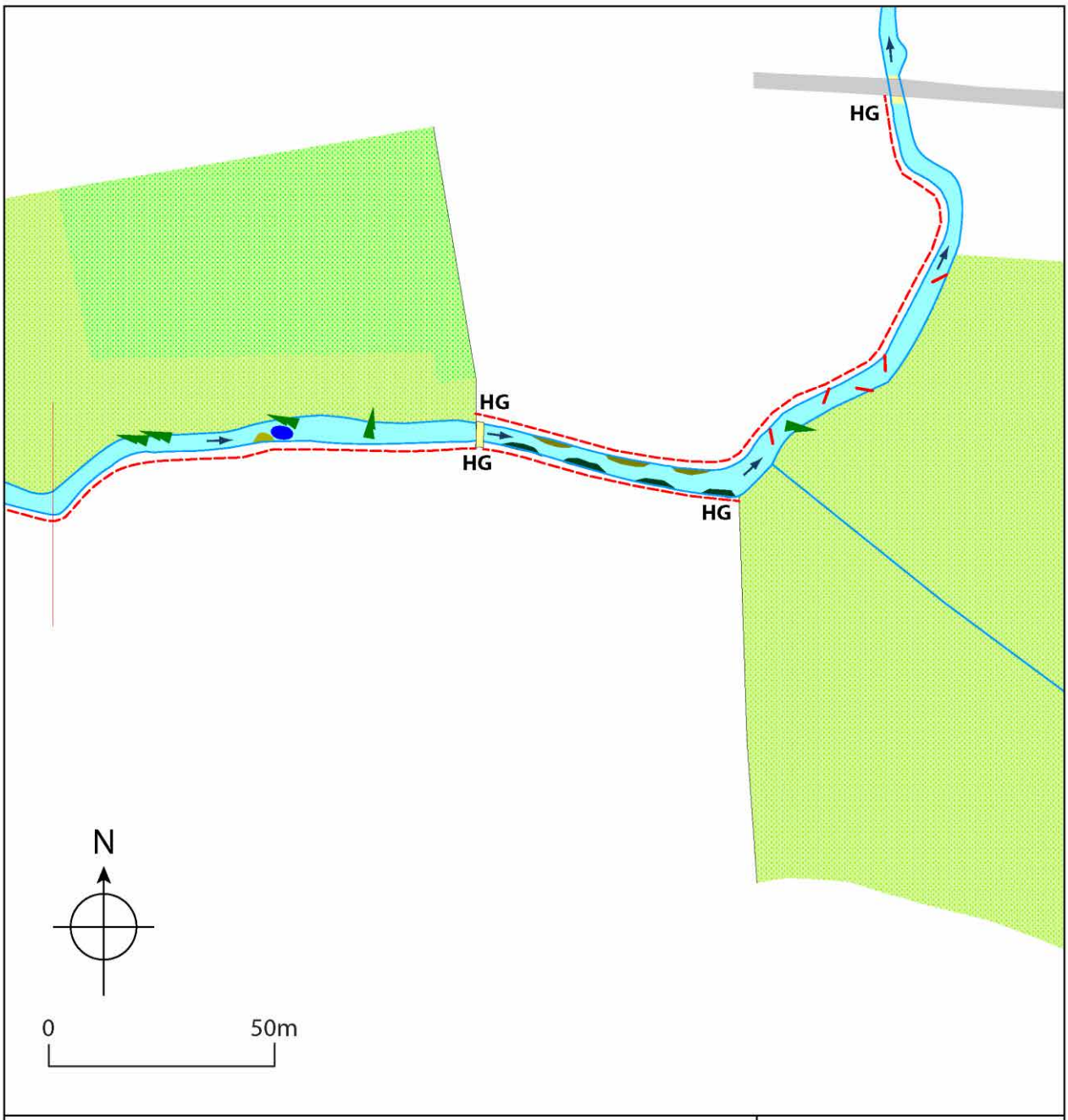

Key:

- FG — New field gate
- HG — New hand gate
- New stock net fencing
- Existing stock fencing
- Excavated pool and placed excavated material
- Log flow deflectors
- Hinged and pinned tree/bush
- Flow direction
- Open brushwood mattress
- Brushwood mattress infilled with earth and seeded
- Log-faced brushwood mattress
- Log-faced enclosure infilled with earth and turves
- Faggot enclosure (not infilled)
- Faggot-faced brushwood mattress
- Faggot-faced enclosure infilled with earth and seeded
- Faggot-faced enclosure infilled with earth and turves
- Faggot-faced brushwood mattress infilled with silt
- Faggot-faced enclosure infilled with earth (not seeded)

Drawing:
River Witham: Easton Enhancement Scheme Phase 1. Map 5 of 6

Partners:
Easton Estate, Environment Agency & Wild Trout Trust

| | |
|---|---|
| Scale. | Not to scale |
| Drawing Ref. | Version 2 |
| Date. | 19 March 2015 |
| Drawn by. | Steve Brayshaw |



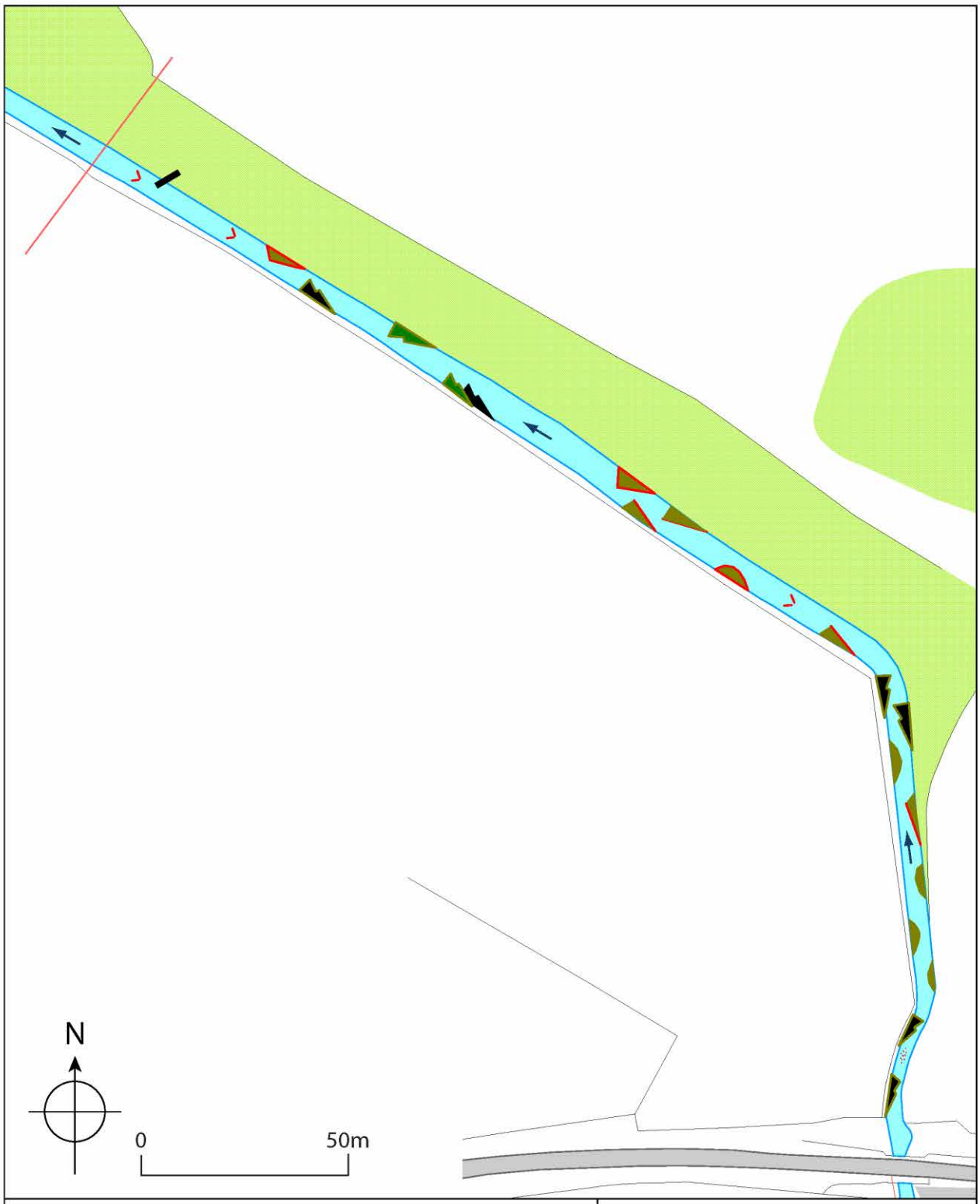

Key:

- FG — New field gate
- HG — New hand gate
- New stock net fencing
- Existing stock fencing
- Excavated pool and placed excavated material
- Log flow deflectors
- Hinged and pinned tree/bush
- Flow direction
- Open brushwood mattress
- Brushwood mattress infilled with earth and seeded
- Log-faced brushwood mattress
- Log-faced enclosure infilled with earth and turves
- Faggot enclosure (not infilled)
- Faggot-faced brushwood mattress
- Faggot-faced enclosure infilled with earth and seeded
- Faggot-faced enclosure infilled with earth and turves
- Faggot-faced brushwood mattress infilled with silt
- Faggot-faced enclosure infilled with earth (not seeded)

Drawing:
River Witham: Easton Enhancement Scheme Phase 1. Map 6 of 6

Partners:
Easton Estate, Environment Agency & Wild Trout Trust

| | |
|---|---|
| Scale. | Not to scale |
| Drawing Ref. | Version 2 |
| Date. | 19 March 2015 |
| Drawn by. | Steve Brayshaw |



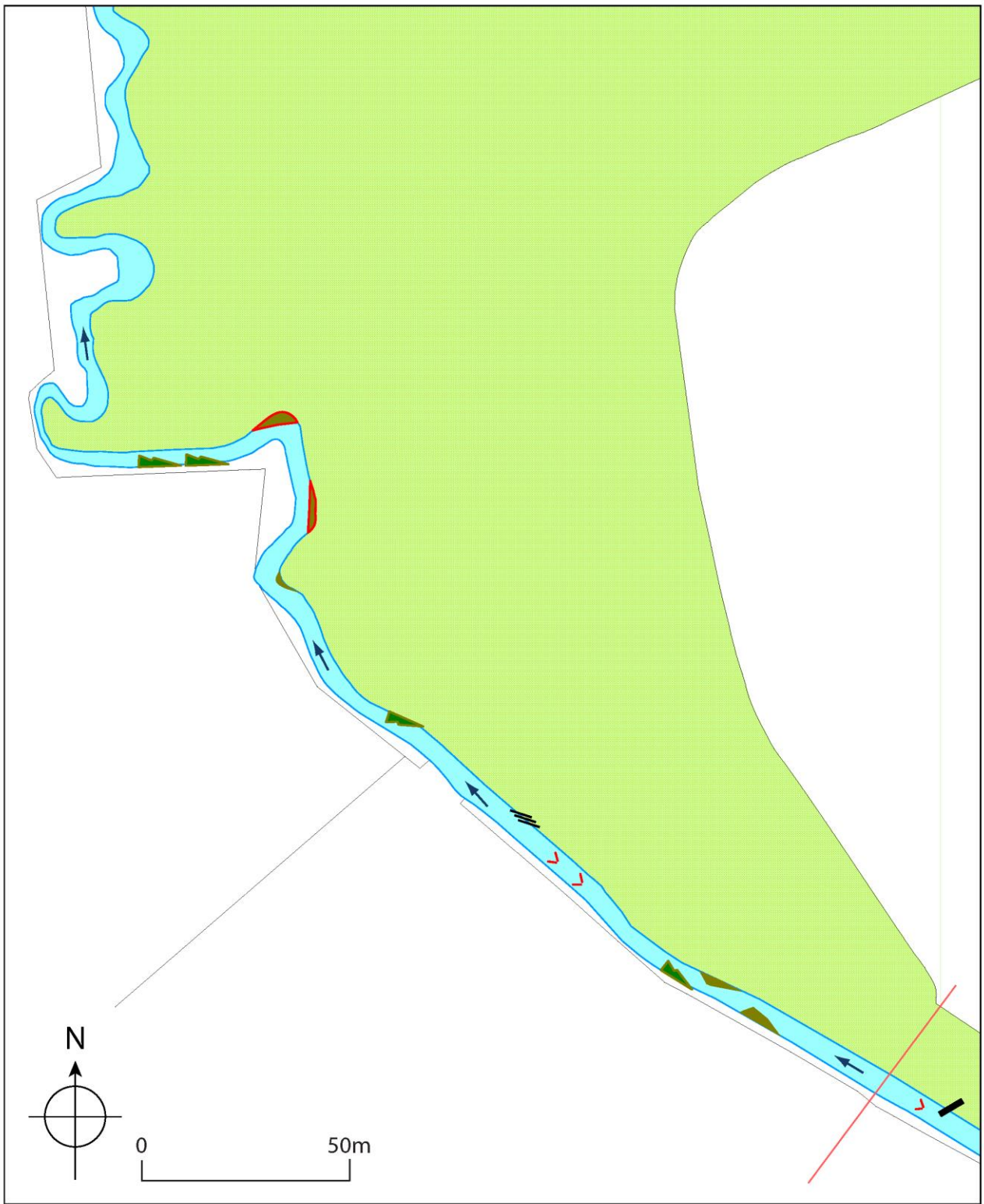

Key:

- Open brushwood mattress
- Log-fronted brushwood mattress
- Log-faced brushwood mattress
- Secured deadwood
- Hinged and pinned tree and brushwood mattress
- Felled and pinned tree
- Felled and pinned tree and brushwood mattress
- Paired log "micro-vane" deflector

Drawing:

River Witham: Easton Enhancement Scheme
Phase 2: Map 1 of 2

| | |
|---|---|
| Scale. Not to scale | Drawing Ref. Version 2 |
| Drawn by. Steve Brayshaw | Date. 19 March 2015 |




Key:

- Open brushwood mattress
- Log-fronted brushwood mattress
- Log-faced brushwood mattress
- Secured deadwood
- Hinged and pinned tree and brushwood mattress
- Felled and pinned tree
- Felled and pinned tree and brushwood mattress
- Paired log "micro-vane" deflector

Drawing:

River Witham: Easton Enhancement Scheme Phase 2. Map 1 of 2

| | |
|---|---|
| Scale. Not to scale | Drawing Ref. Version 2 |
| Drawn by. Steve Brayshaw | Date. 19 March 2015 |