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New Forest Wetland Restoration Projects:

Summary Information on Completed Projects

Compiled by the Forestry Commission
October 2014

Planning & EIA
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Landscape Planning
Landscape Management
Ecology
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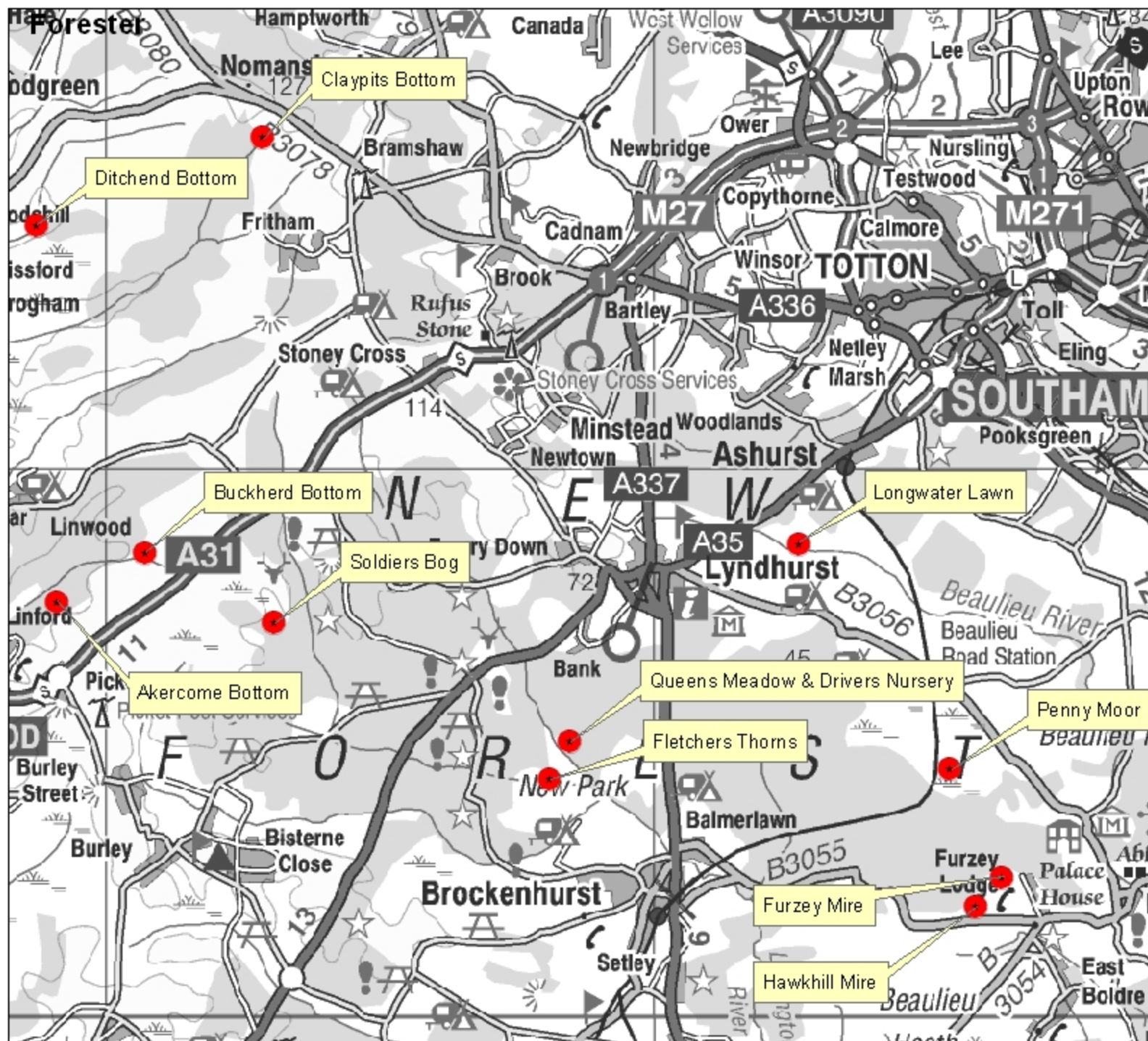
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Forestry Commission
England

NEW FOREST HLS
Wetland Restoration
Sites
2010-2013

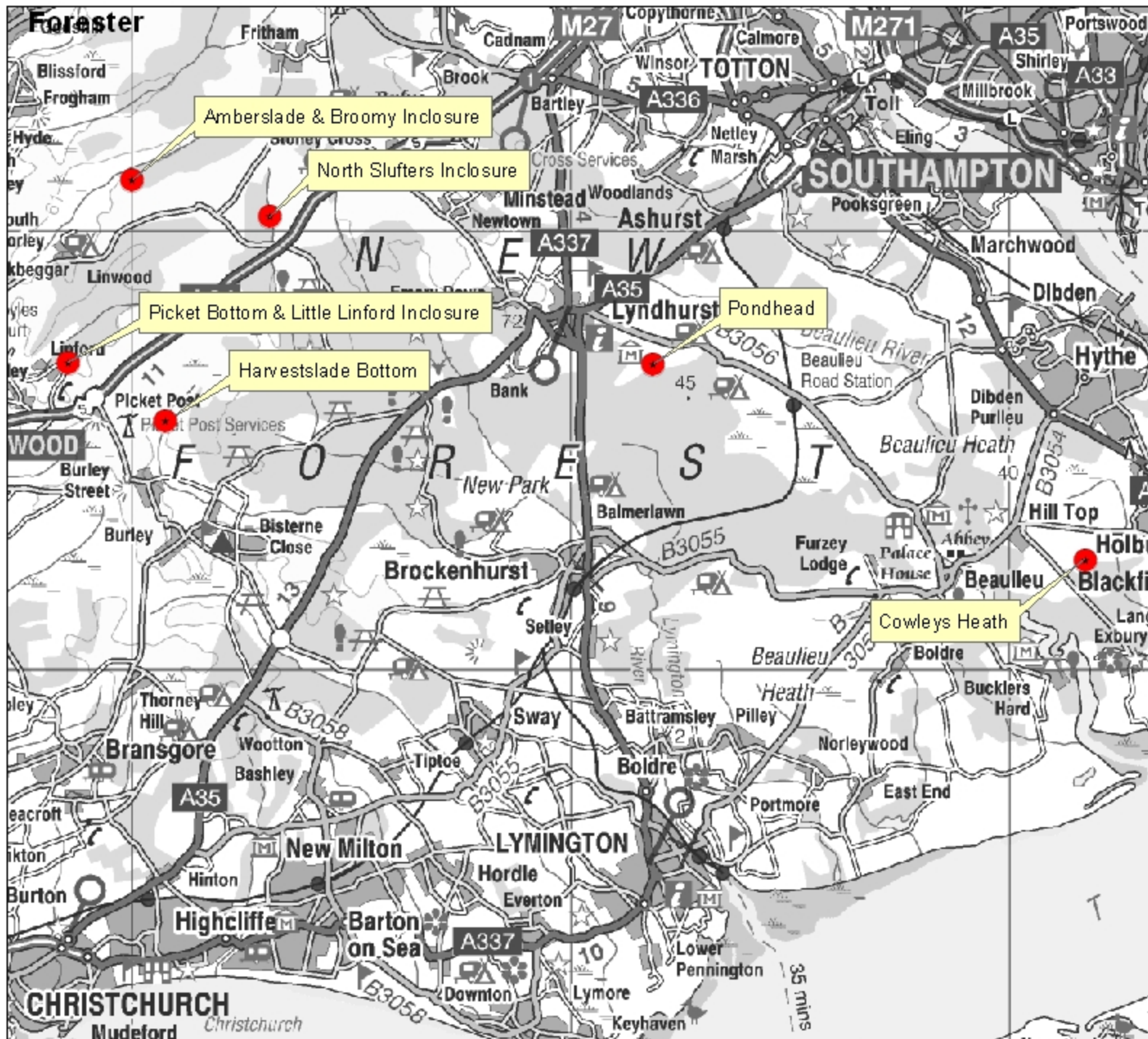


0 1 2 4 Kilometers



Forestry Commission
England

NEW FOREST HLS
Planned Wetland
Restoration Sites
2014-15



0 1 2 4 Kilometers



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Site Name: Akercome Bottom
Year Restored: 2010
Grid Reference: SU18900762

Reason for restoration:

- Artificial drainage had resulted in a deep straight drain through the mire, wet heath and woodland habitats, with stretches of incised channel through parts of the lawn habitat.
- From 1976 to 2005 this erosion had widened the stream in this area by over 300% (from an initial 1.2 metres) and deepened the stream by 50% (from an initial 0.6m; Grosvenor 2005)
- Increased erosion within the woodland and mire habitats had resulted in gravel deposition on parts of the lawn.
- As a result of this incised channel and its associated spoil banks, there was no seasonal inundation of the woodland habitats, and inconsistent interaction with the floodplain throughout.

Summary of restoration:

- The bed level of the artificial channel through the mire was raised using staked heather bales, with mire vegetation reinstated over the top.
- The original meandering watercourse was restored where evident, and the redundant straightened (drain) channel was then infilled.
- The gravel ford crossing at the eastern end of the lawn was repaired.
- The work also cleared an area of old, leggy scrub within the woodland to open up lawn habitat and provide a more varied age structure within the scrub habitat.

Maintenance requirements:

- Fenced off restored mire section at upstream end to prevent stock poaching on an area of mire repaired with heather bales (2011).
- Restored an additional meander (not originally incorporated) at the downstream end of the woodland to rectify an eroding nick point – this has now stabilised (2011).
- Created an additional gravel ford stock crossing on the lawn at the request of the CDA (2012).

Key Benefits:

- The shallower restored meander profile compared to the overdeepened artificial drainage channel allows the stream to interact more naturally with its floodplain.

- The reduced in-channel erosion means that gravels are no longer deposited on the lawn habitat downstream.
- The stream has been in a stable state since the restoration, with limited incision and lateral bank erosion.
- The channel length is increased, with greater in-channel habitat diversity (pools, riffles, marginal and in-stream vegetation).



Photo 1 – Akercome Bottom, August 2010
Eroded artificial drain with limited seasonal inundation.

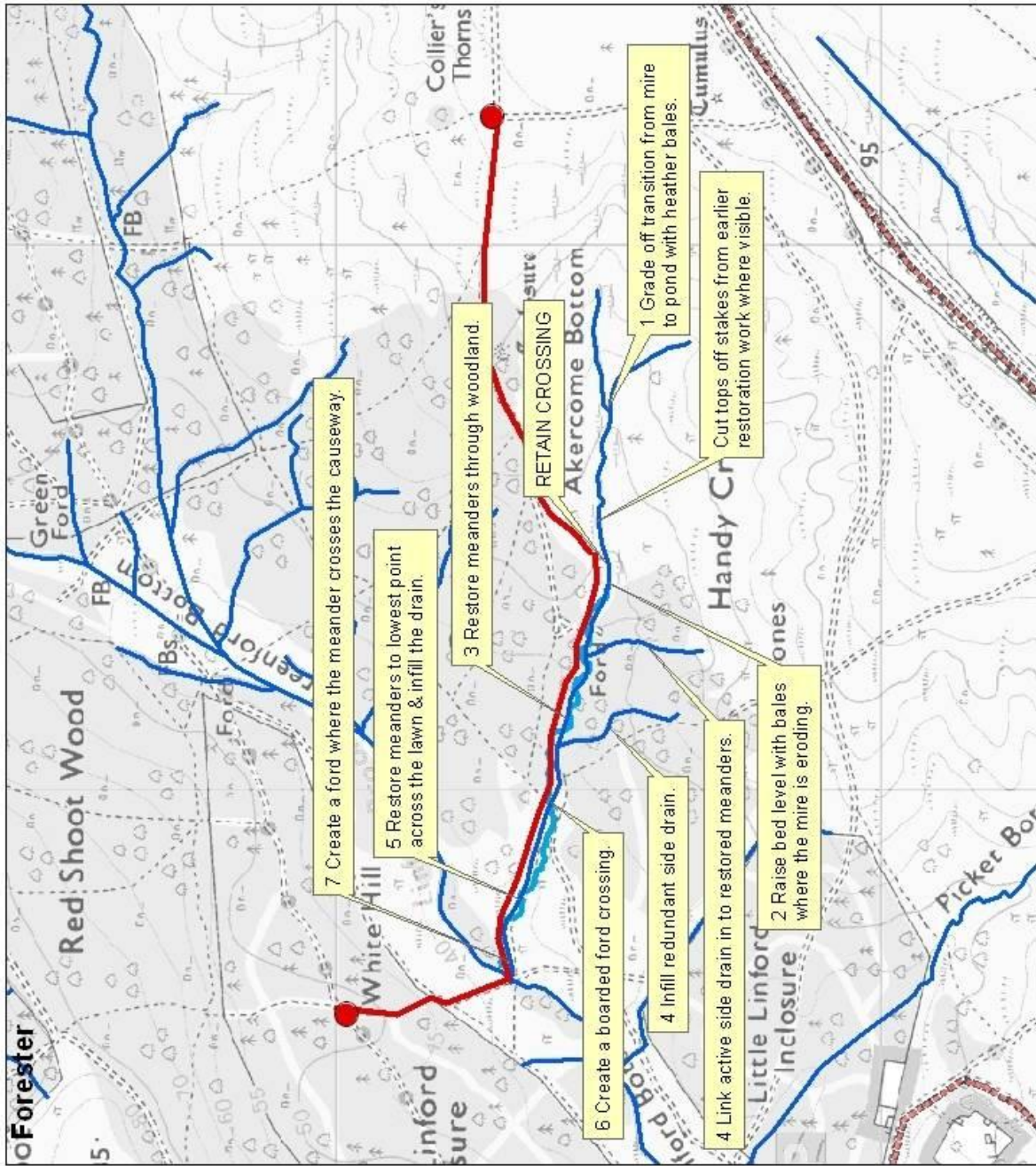


Photo 2 – Akercome Bottom, October 2014
Restored meander with in-channel vegetation, connectivity with floodplain habitats restored. No erosion or gravel deposition on the lawn.



Photo 3 – Akercome Bottom, October 2014
Water still present in the system, following driest September on record.

AKERCOME BOTTOM
Restoration Plan
September 2009



Site Name: Buckherd Bottom
Year Restored: 2013
Grid Reference: SU20700851

Reason for 2013 restoration:

- Artificial drainage (probably originally related to drainage within Roe Inclosure) had resulted in a wide, deep gully through pasture woodland, heathland and mire habitats.
- Previous restoration work in 2008 to restore the mire habitats on the Open Forest had left a steep gradient at the transition to the eroded stream channel that continues into Roe Inclosure. This was unstable and had started to erode back up towards the mires.
- As a result of this deep, wide channel there was still no seasonal inundation of the woodland habitat.

Summary of restoration:

- Where evident, additional original meanders were restored to reduce the steepness of the gradient through the mire and woodland habitats by increasing the overall length of the watercourse.
- Redundant sections of channel were subsequently infilled.
- The bed level of the channel through the woodland was raised using staked heather bales, and narrowed using hoggin with organic material reinstated over the top.
- A concrete culvert was removed and replaced with a gravel ford.
- Inside the fenceline of Roe Inclosure, several large debris dam structures were installed to support the restored bed levels on the Open Forest.
- An excavation of an area of archaeological interest within the site was undertaken at the request of the New Forest National Park Authority's Archaeologist.

Maintenance requirements:

- Localised erosion at three clay plugs was repaired using staked heather bale ramps, topped with translocated bed gravels and larger cobbles (2014).
- Larger gravels and cobbles were added to minor nick points to provide more stability during high flows (2014).

Key Benefits:

- Fragile mire habitats at the top of the catchment are stabilised and safeguarded from further erosion and loss of peat.
- The shallower restored watercourse compared to the deep, wide eroded channel allows the stream to interact more naturally with its floodplain.

- The channel length is increased, with greater in-channel habitat diversity (pools, riffles, marginal vegetation).

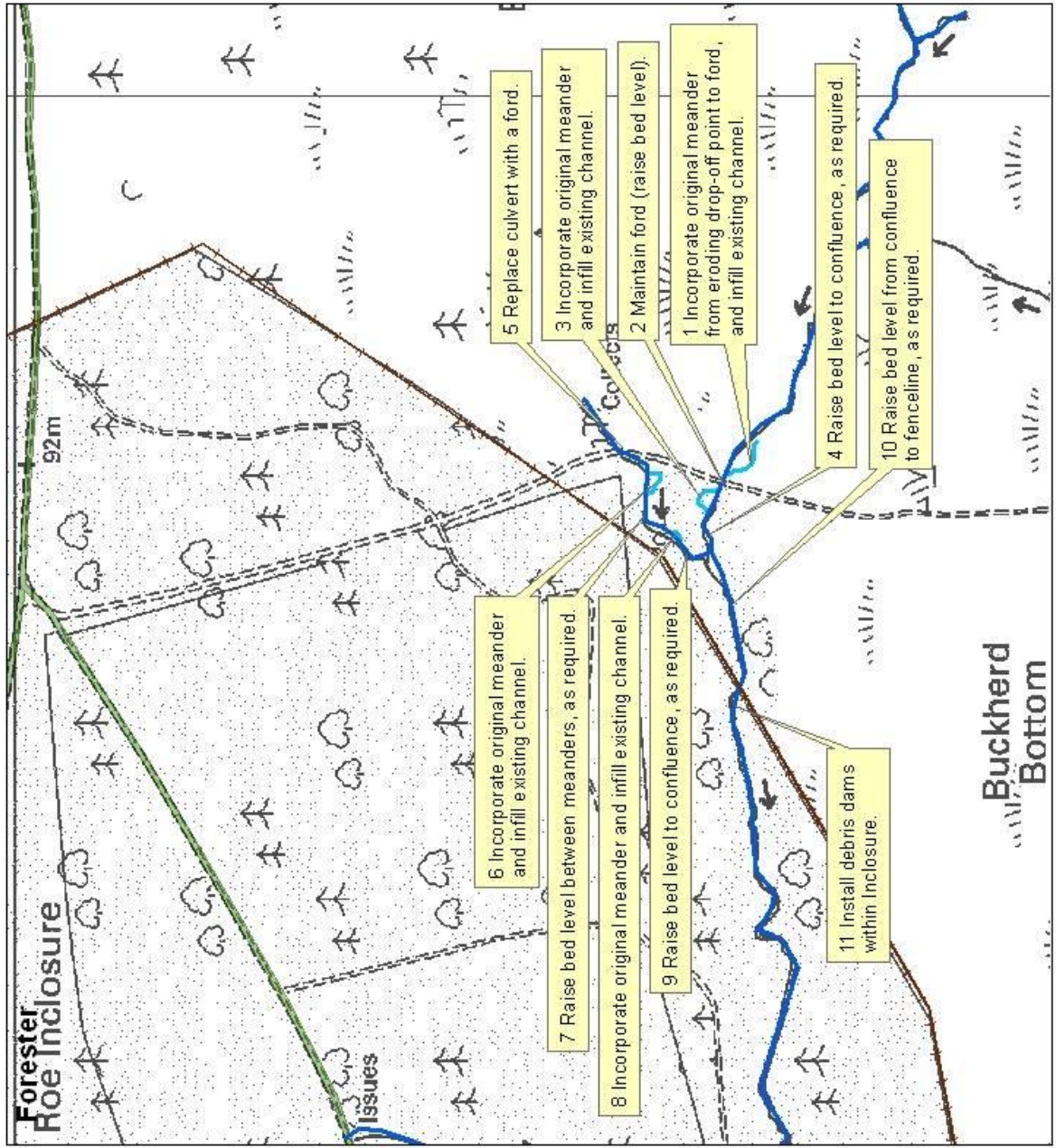


Photo 1 – Buckherd Bottom, March 2013
Eroded channel through pasture woodland, before restoration.



Photo 2 – Buckherd Bottom, September 2014.
Restored meander through pasture woodland, after restoration.

BUCKHERD BOTTOM
Restoration Plan
March 2013



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Site Name: Camel Green, Queens Meadow and Drivers Nursery
Year Restored: 2012
Grid Reference: SU28690506

Reason for restoration:

- Artificial drainage over 150 years ago had resulted in over deepened and widened straight drain channels. This was continuing to cause erosion of the river beds and limited in-channel habitat diversity.
- As a result of these incised channels, there was no seasonal inundation of the surrounding woodland and grassland, and no interaction with the floodplain.
- In contrast, Drivers Nursery remained permanently inundated due to the lack of flow through this area. As a result, many of the oaks here were dead or dying.

Summary of restoration:

- The original meandering course of the Highland Water was restored to flow through Camel Green, linking in additional meandering courses from the north (Wide Lawn) and west (following on from the Warwickslade Cutting restoration work in 2009), to then flow through Queens Meadow and Drivers Nursery.
- The redundant straightened drain channel through the woodland of Camel Green was then infilled, and the boundary ditch of Queens Meadow and Drivers Nursery was bed level raised and narrowed.
- The restoration plan also included felling work to clear scattered trees (mostly thorns and young oaks) that had colonised Wide Lawn.
- An additional vehicle bridge was installed on the gravel track between Queens Meadow and Drivers Nursery, to take the flow of the restored meander route.

Maintenance requirements:

- The reactivation of the Queens Meadow meanders has increased flooding across the gravel track between Queens Meadow and Drivers Nursery. Options are being modelled to ensure repairs to this track remain stable in the future.

Key Benefits:

- The shallower and narrower restored meander profiles compared to the overdeepened and overwidened artificial drainage channels allows the river to interact more naturally with its floodplain.
- The river itself has been in a stable state since the restoration, with limited incision and lateral bank erosion.

- Increased length of channel, with greater in-channel habitat diversity (pools, riffles, marginal and in-stream vegetation).
- Downstream average peak flows have reduced (flow data from EA Brockenhurst flow gauge 2014).
- Downstream average flows have marginally increased (flow data from EA Brockenhurst flow gauge 2014).
- Standing water levels in Drivers Nursery have been significantly reduced.

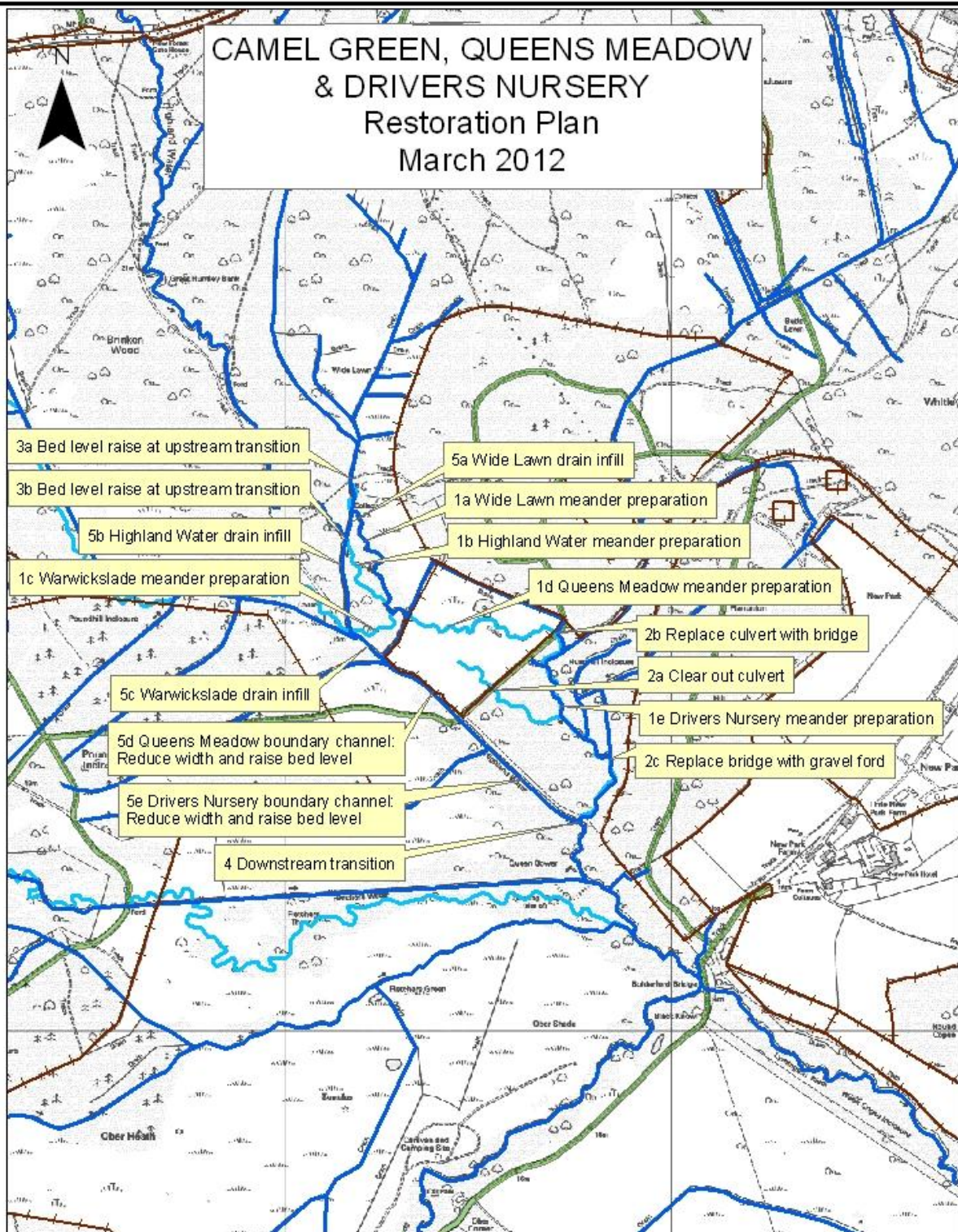


Photo 1 – Camel Green, July 2012
 Pre-restoration – the wide, straight artificial drain with little in-channel diversity.



Photo 2 – Camel Green, July 2012
 Pre-restoration – the unrestored sinuous meander course (with much smaller dimensions) evident on the ground.

CAMEL GREEN, QUEENS MEADOW & DRIVERS NURSERY Restoration Plan March 2012



Legend

- Fence line
- Existing watercourse
- Proposed watercourse route
- Forest roads

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Forestry Commission. 100025486 2012

Site Name: Claypits Bottom
Year Restored: 2010
Grid Reference: SU22811621

Reason for restoration:

- Artificial drainage had resulted in a wide, deep gully through heathland and lawn habitats.
- This channel was continuing to deepen and widen, resulting in a significant loss of material downstream (from 1970 to 2005 this had become over 50% wider towards the top of the section and over 130% wider and 90% deeper near the inclosure at the downstream end of the SSSI Unit; Grosvenor, 2005)
- As a result of the deep, wide channel, there was limited seasonal inundation of the heathland and lawn habitats

Summary of restoration:

- The bed level of the incised drainage channel was infilled to within 20cm of bank height.
- The lower portion of the site is also a geological SSSI. As a result, the bed level was ramped down to the eroded watercourse downstream with heather bales.
- A damaged bridge was replaced by a gravel ford crossing.

Maintenance requirements:

- Localised erosion up and downstream of the gravel ford was repaired using staked heather bales and larger gravels (2011)

Key Benefits:

- The shallower restored watercourse compared to the deep, wide eroded channel allows the stream to interact more naturally with its floodplain.
- Reduction in the loss of material downstream as erosion is reduced.



Photo 1- Claypits
Bottom, August
2010






Wide, eroded
channel through
heath and lawn
habitats, before
restoration.



Photo 2 - Claypits
Bottom, October
2014

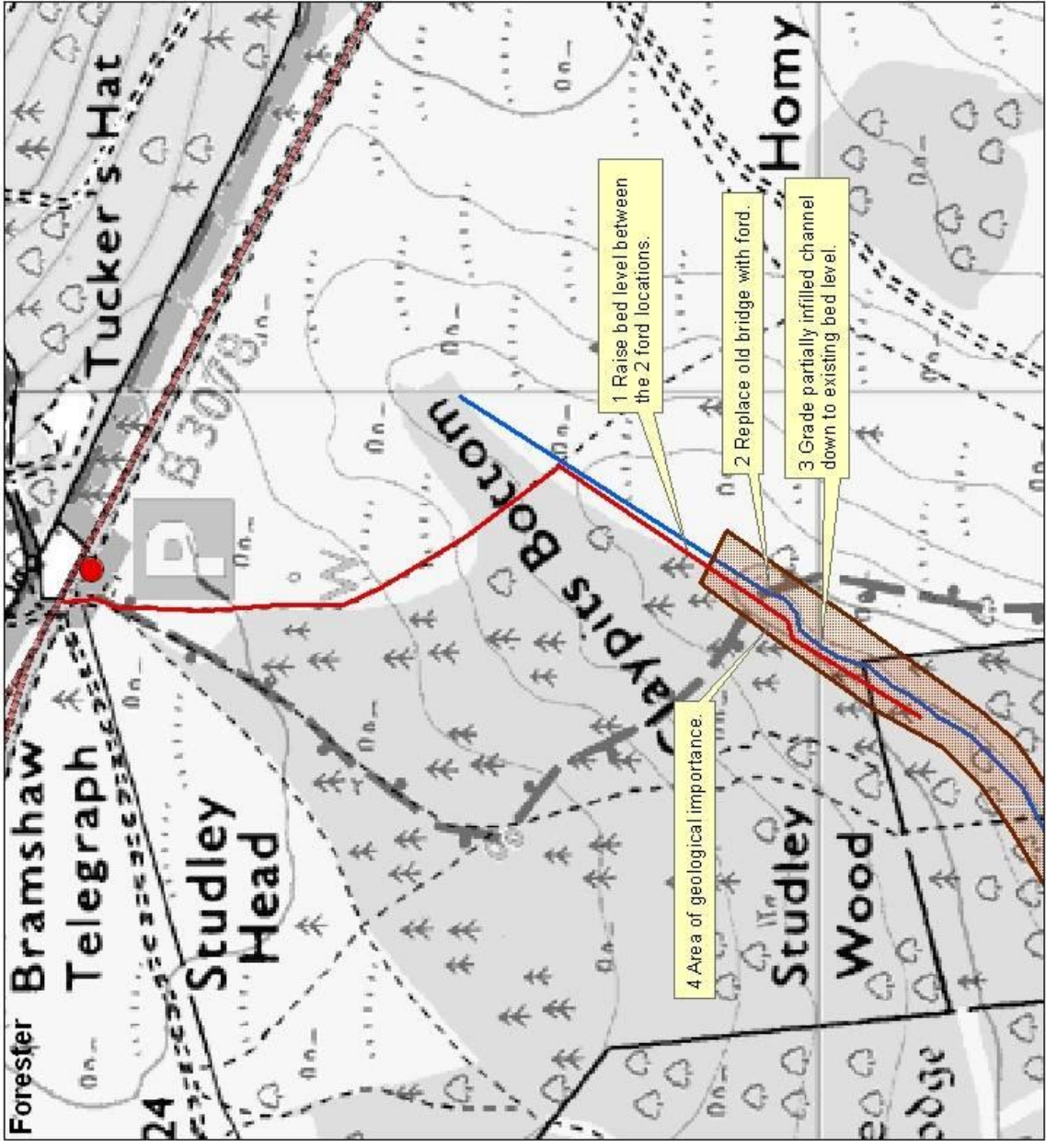
Restored shallow
channel through
heath and lawn
habitats.

CLAYPITS BOTTOM
Restoration Plan
April 2010

- Legend**
-  Potential materials storage areas
 -  Site access routes
 -  Existing watercourse
 -  Public roads
 -  SSSI_Geology



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Forestry Commission, 100025498, 2010



Site Name: Ditchend Bottom
Year Worked: 2011
Grid Reference: SU18661449

Reason for restoration:

- Artificial drainage (the Must Thorns drain) had resulted in an incised straight drain through the lawn habitat, with eroded gullies where stock attempted to cross.
- The Ditchend Brook was over-deepened and over-widened, causing continued erosion of the river bed, bankside instability and slumping, and limited in-channel habitat diversity.
- There was limited seasonal inundation of the floodplain in the vicinity of Ditchend Brook, with the effect that these adjacent habitats were negatively affected.

Summary of restoration:

- The original meandering course of the Ditchend Brook was restored and the redundant (drain) channel infilled.
- The straight drain line running through Must Thorns Bottom from Pitts Wood Inclosure was infilled, with the meandering course upstream linked in to natural drainage channels flowing through the dry heath to the south.
- As Ditchend Brook is situated within what was formerly the Ashley Walk Bombing Range, suitably qualified contractors were engaged to safely locate, clear and dispose of any remaining ordnance.

Maintenance requirements:

- Minor repairs in 2012 at erosion washout points involved 3 short bale stretches. These were installed at the same depth as the original restored course to hold the erosion in check to allow time for the system to settle.
- The wet winter of 2013/14 tested the system to the limit and on going monitoring showed that these nick points were again being eroded and extending downstream, as energy in the watercourse was excessively contained in the restored channel. Further repairs involved additional bed level raising to reduce the capacity of the watercourse channel along 150m (over three stretches) of the Ditchend Brook and a 360m length of the Must Thorns drain. If the channel's bed level is raised to promote floodplain inundation during times of high flows, the flow can be slowed to reduce the stream's ability to transport sediment. The larger stone cobbles used as bed substrate replicates the situation found in naturalised high energy stream locations, with the larger stones being less likely to be transported by the water.

Key Benefits:

- The erosion was reduced and localised, therefore protecting the bankside habitats.
- The water is now able to escape from the channel under high flows (thereby reducing energy).
- More frequent floodplain wetting will promote the local water table to be raised, improving the condition of the floodplain habitats and grazing.

Photo 1 & 2 – Ditchend Bottom (Must Thorns tributary), January 2011
Prior to restoration there was limited seasonal inundation of the floodplain. The eroded Ditchend drain was over five feet deep and the Must Thorns drain was up to three feet deep in places.

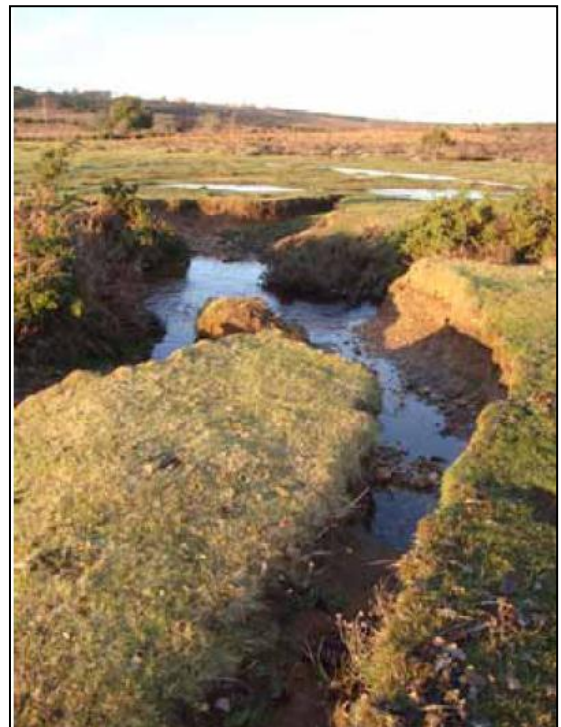


Photo 3 – Ditchend Bottom (Must Thorns tributary), July 2011
The meandering course upstream linked in to natural drainage channels flowing through the dry heath to the south (shown here in dry summer months).



Photo 4 – Ditchend Bottom (Must Thorns tributary), October 2011

In the autumn, after restoration, water returning to the stream at the gravel ford crossing.



Photo 5 – Ditchend Bottom, July 2014

Routine monitoring by the FC identified that sections of the Ditchend Brook/Must Thorns drain restoration were showing localised signs of instability and erosion (which had previously had minor maintenance completed in 2012).










Photo 6 – Ditchend Bottom (Must Thorns tributary), August 2014

The restored channel is now on average 14cm deep throughout the Must Thorns tributary, and 30cm deep on the Ditchend Brook to allow the water to spill out sooner and reduce the amount of energy in the channel. Larger cobbles have been used to replicate the type of substrate consistent with a high energy environment.

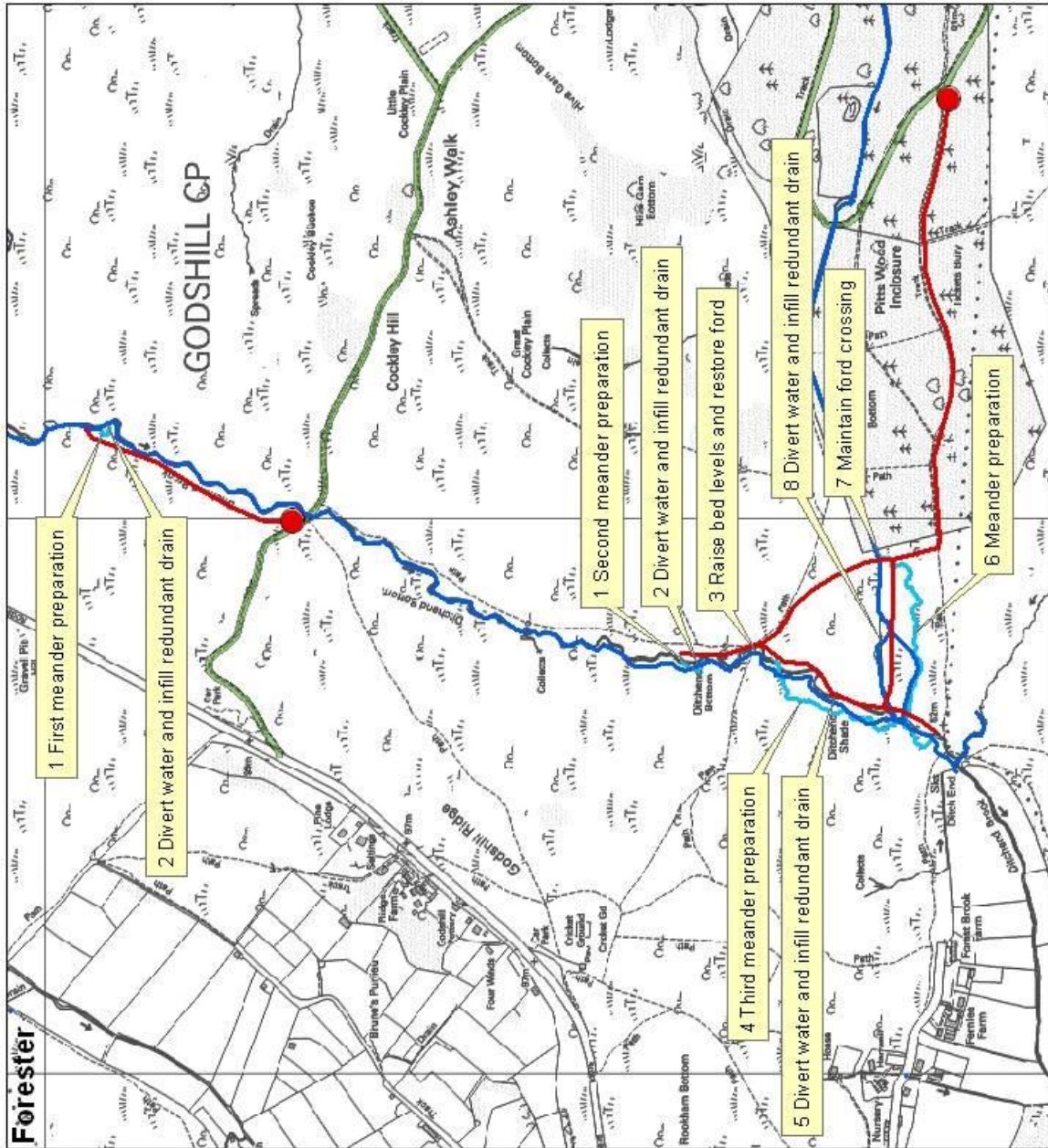
**DITCHEND
Restoration Plan
March 2011**

Legend

-  Materials storage areas
-  Site access routes
-  Existing watercourse
-  Meander route
-  Fenceline
-  Public roads
-  Forest roads



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Forestry Commission. 100025488 2011



Site Name: Fletchers Thorns
Year Restored: 2011
Grid Reference: SU27000429

Reason for restoration:

- Artificial drainage over 150 years ago had resulted in an over deepened and widened straight drain channel, which was continuing to cause erosion of the river bed and limited in-channel habitat diversity.
- As a result of this incised channel, there was limited seasonal inundation of the surrounding grassland, scrub and woodland habitats, and inconsistent interaction with the floodplain.

Summary of restoration:

- The original meandering watercourse was restored and the redundant straightened (drain) channel was then infilled.
- The last 100m of straightened channel cut through Queen Bower Scheduled Ancient Monument. The original meandering watercourse was restored to the south, and this section of the artificial drain was infilled in accordance with the conditions set out in the Scheduled Monument Clearance issued by English Heritage.
- The work also included scrub and secondary woodland clearance on Fletchers Thorns lawn.

Maintenance requirements:

- Minor reprofiling downstream of concrete ford on gravel track (ford bed level not raised, so some incision still evident immediately downstream – compromise due to constraints of access infrastructure) (2012).
- Minor side drain linkages improved in response to request from Beat Keeper (2012).
- Debris dam removal requested near Queen Bower (current).

Key Benefits:

- The shallower and narrower restored meander profile compared to the overdeepened and overwidened artificial drainage channel allows the stream to interact more naturally with its floodplain.
- The stream has been in a stable state since the restoration, with limited incision and lateral bank erosion.
- Increased length of channel, with greater in-channel habitat diversity (pools, riffles, marginal and in-stream vegetation).
- Downstream average peak flows have reduced (flow data from EA Brockenhurst flow gauge, 2014).
- Downstream average flows have marginally increased (flow data from EA Brockenhurst flow gauge, 2014).



Photo 1 - Fletchers Thorns, February 2011
Artificial straight, wide drain which was limiting floodplain inundation, with the erosive force constricted to the channel.



Photo 2 - Fletchers Thorns, March 2012
The stream can now interact more naturally with its floodplain and the flow is slower due to increased length of channel



Photo 3 - Fletchers Thorns, October 2014
In its current state, the restoration has had limited incision and erosion as well as contributing to more stable flows downstream

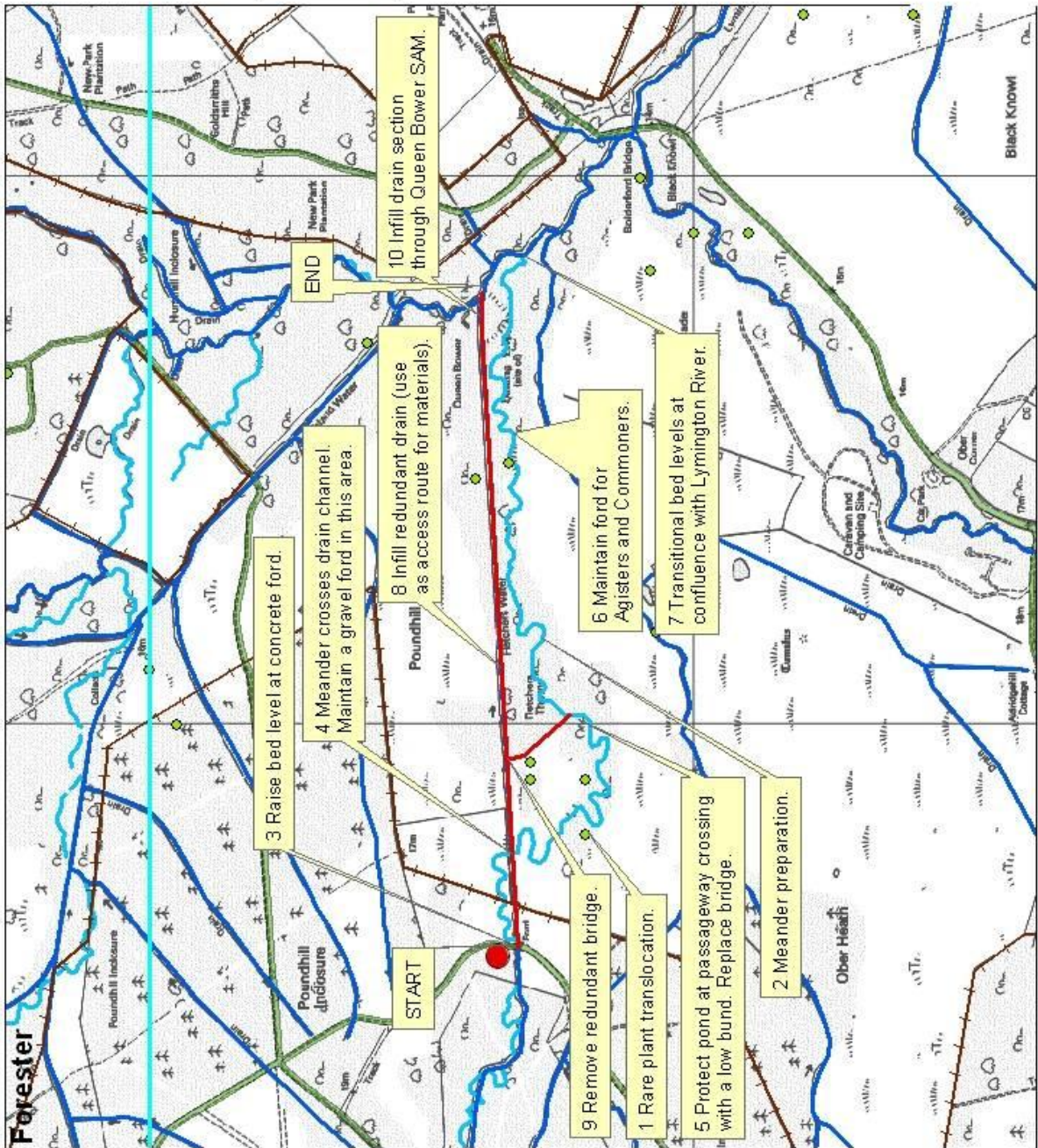
FLETCHERS THORNS
Restoration Plan
March 2011

Legend

- Materials storage areas
- Site access routes
- Rare plants
- Fence line
- Existing watercourse
- Proposed watercourse route
- Public roads
- Forest roads

0 125 250 500 Meters

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Forestry Commission. 100025498 2011



Site Name: Hawkhill Mire and Furzey Lodge

Year Restored: 2013

Grid Reference: SU35880211 and SU36410244

Reason for restoration:

- Artificial drainage channels within the mires were creating unstable eroding nick points, resulting in the loss of peat and mire vegetation.

Summary of restoration:

- Stretches of artificial drainage channel were infilled, to remove eroding nick points.
- The passageway and existing culverts along the Inclosure fenceline were repaired.
- Metal and timber debris left on site after earlier pipeline works were excavated and removed from the Open Forest.

Maintenance requirements:

- None at present.

Key Benefits:

- Fragile mire habitats are stabilised and safeguarded from further erosion and loss of peat.
- Access on the Open Forest is maintained.
- Dangerous materials were removed from the SSSI.



Photo 1 - Hawkhill Mire, March 2013
Artificial drainage channel in mire, before restoration.

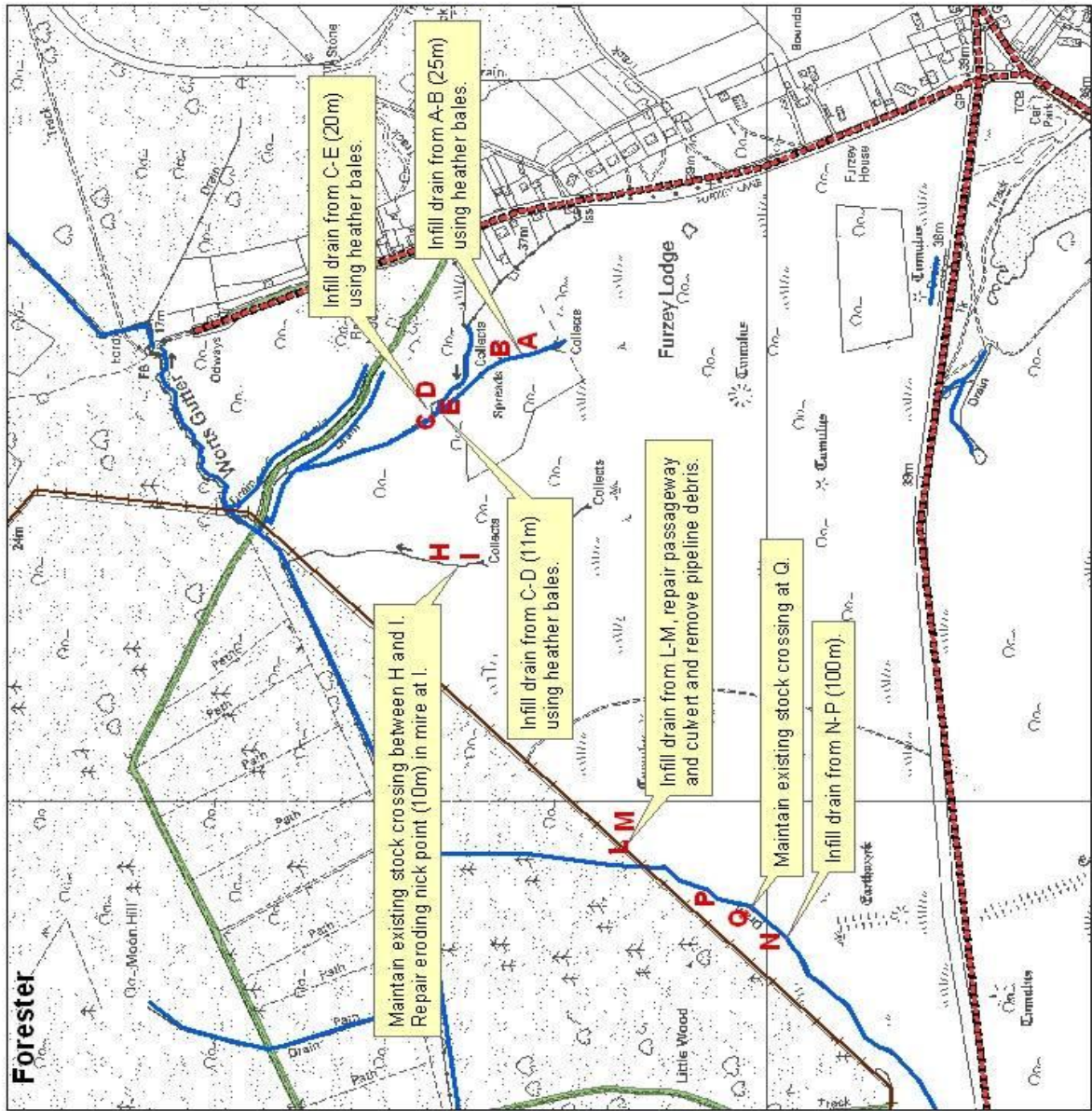


Photo 2 - Hawkhill Mire, October 2014
Eroding channel infilled upstream of passageway, after restoration.







Photo 3 - Furzey Mire, October 2014
Eroding channel infilled with heather bales, after restoration.

**HAWKHILL &
FURZEY LODGE MIRES**
Restoration Plan
June 2013



Legend

-  Existing watercourse
-  Fenceline
-  Forest roads
-  Public roads



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Site Name: Longwater Lawn
Year Restored: 2010
Grid Reference: SU32480863

Reason for restoration:

- Drainage works had been undertaken in the late 1960s across Longwater Lawn, where meanders were blocked off and short stretches of artificial channel were dug to straighten the line of the channel. This created increased gradients and flow rate, resulting in ongoing erosion and in-channel instability along the line of the straightened channel.
- In Mallard Wood to the west, the river's course was diverted at an earlier date to flow around the field boundary of Keepers Mead. This had created a deep, incised channel which was eroding the stream bed.
- There were three deep drains in the wet heath around Row Hill, and one across Foxhill Moor. These were lowering the water table in the wet heath and creating potential erosion problems. In addition, their presence in dense heathland vegetation made them a hazard for stock and humans.

Summary of restoration:

- The remnant meanders across the lawn were reconnected to increase the length, habitat diversity and naturalness of the watercourse, as well as reducing stream bed and bank erosion. The stretches of artificial channel were then infilled.
- In Mallard Wood, the watercourse was diverted onto its earlier course through the woodland and into Keepers Mead.
- Upstream of Keepers Mead the artificial drain channel through the woodland was infilled. The drain channel along the boundary bank was raised and narrowed, but retained to maintain a boundary channel.
- The deep drains in the wet heath around Row Hill were infilled using a combination of existing spoil and heather bales. The deep drain across Foxhill Moor was completely infilled at the top, grading into partial infill where it links in to the lawn at the bottom.

Maintenance requirements:

- A number of clay plugs across Longwater Lawn were temporarily fenced off to protect them from poaching and allow vegetation recovery in 2011. These were removed in 2012 and 2014.
- Removal of projecting wooden stakes from heather bales in Row Hill and Foxhill Moor drains – Keeper request (2014).
- Reprofilng of side drain linkage and reconnection to restored watercourse beside Mallard Wood – CDA request (2014).

Key Benefits:

- The shallower restored meander profile compared to the straighter, deeper artificial drainage channel across the lawn allows the stream to interact more naturally with its floodplain.
- Reduced in-channel erosion.
- The stream has been in a stable state since the restoration, with limited incision and lateral bank erosion.
- The channel length is increased, with greater in-channel habitat diversity (pools, riffles, marginal and in-stream vegetation).
- The raised water table in the vicinity of Row Hill and Foxhill Moor will improve the condition of the wet heath habitat.



Photo 1 -
Longwater Lawn,
July 2010
Deeply incised
channel and
remnant
meander.



Photo 2 - Longwater
Lawn, September
2010

Shallower reinstated meander on lawn slowing flow. This clay plug was subsequently fenced to encourage revegetation.








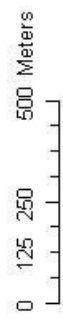
Photo 3 - Longwater
Lawn, October 2014

Diverse meandering channel with slow flow allowing in channel vegetation to develop.

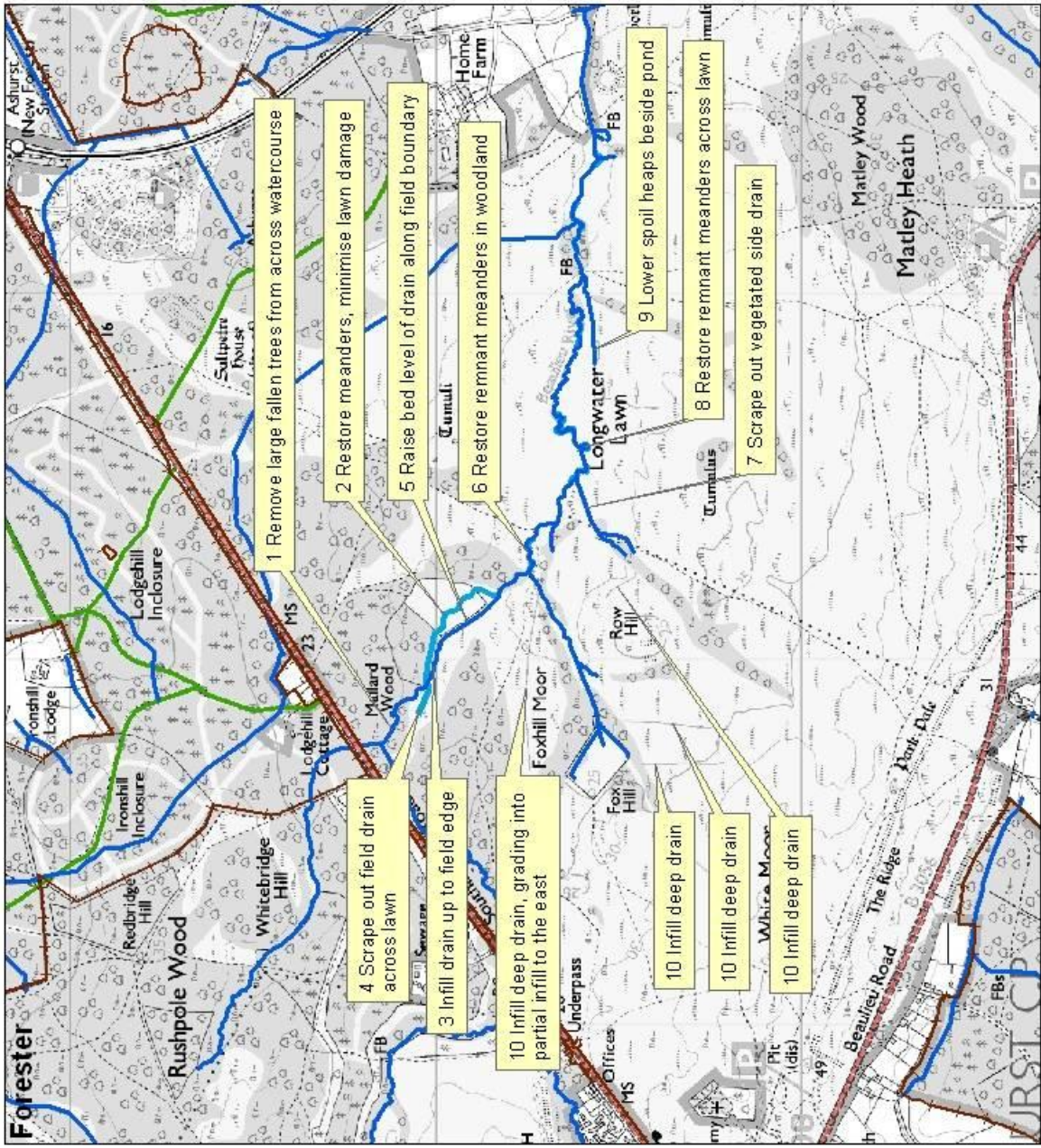
LONGWATER LAWN
Restoration Plan
July 2009

Legend

-  Fence line
-  Existing watercourse
-  Proposed watercourse route
-  Public roads
-  Forest roads



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Forestry Commission. 100025488 2010



Site Name: Penny Moor
Year Restored: 2012
Grid Reference: SU36130464

Reason for restoration:

- Artificial drainage had resulted in an overdeepened and widened straight drain channel running alongside the woodland at the eastern end of the site. This was continuing to cause erosion of the river bed and limited in-channel habitat diversity.
- Across Penny Moor, the artificial drain was negatively affecting the water levels in the adjacent Denny Bog mire system, resulting in bankside slumping, loss of mire habitat and a lowering of the water table.
- To the western end of Penny Moor, the artificial drain was densely vegetated and silted up, and as a result the surrounding lawn habitat was almost permanently inundated with water which was unable to return to the drain. Spoil banks beside the drain further impeded the natural interaction of the water with the floodplain.

Summary of restoration:

- The original meandering course of the Shepton Water was restored through the riverine woodland at the eastern end of the site, and the redundant drain channel subsequently infilled.
- Colonising secondary birch woodland was felled to restore riverine woodland, wet heathland and lawn habitats, as well as facilitating meander restoration, spoil bank removal and drain infill in this area.
- Across Penny Moor, a compromise was agreed with stakeholders to maintain a drain channel, to keep the lawn habitat to the south separate from the mire to the north.
- Along the edge of Denny Bog, a vegetated bund was created to support the adjacent mire habitat and restore the water table.
- Existing crossings were upgrade and relocated over the restored channel.

Maintenance requirements:

Part of the scheme was suspended temporarily in 2012 when a community of rare plants was discovered in the thickly vegetated stretch of artificial drain to the western end of the site. Following consultation with Natural England, in 2013 a new scheme was devised for this section maintaining slow-moving water in this vegetated drain, while diverting the majority of the flow through restored meanders to the north.

Key Benefits:

- The shallower restored meander profile compared to the overdeepened and overwidened artificial drainage channel allows the stream to interact more naturally with its floodplain at both the eastern and western ends of the site.
- In these locations the stream has been in a stable state since the restoration, with limited incision and lateral bank erosion.
- The adjacent mire habitat of Denny Bog is protected from further loss of peat due to slumping.
- The retained vegetated drain section has remained stable since the 2013 restoration and the rare plant communities have been retained.
- The restored meanders at the eastern end now allow the water to interact with the floodplain correctly, returning to the channel in normal flows and reducing permanent inundation of the lawn habitat.



Photo 1 – Penny Moor, March 2012
Remnant meanders evident in riverine woodland at the eastern end of the site.

Photo 2 – Penny Moor, March 2012
Artificial drain at the eastern end of the site. Colonising birch felled to restore wet heath and lawn habitat.





Photo 3 – Penny Moor, October 2014
Restored meander in the riverine woodland at the eastern end of the site.

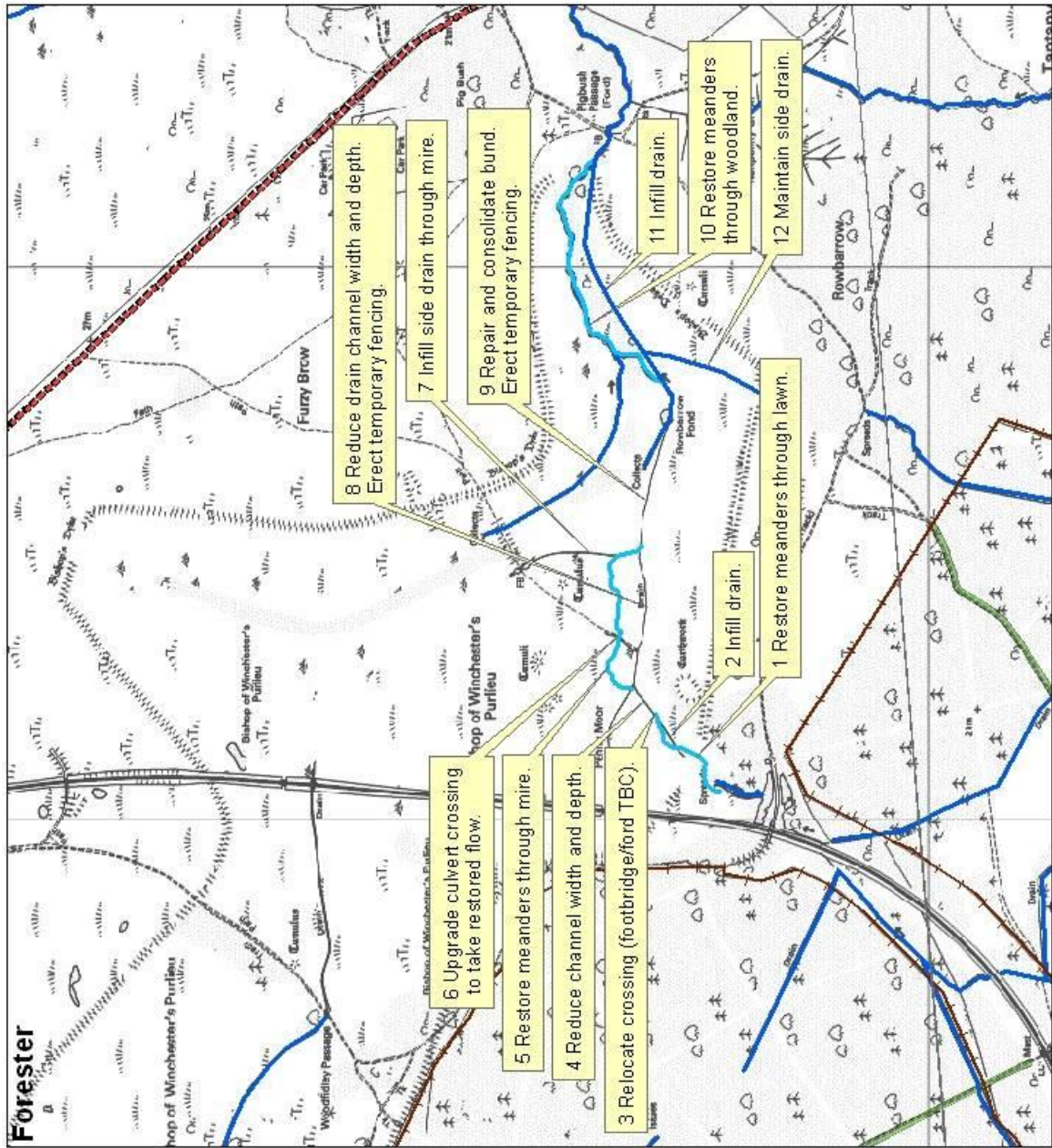


Photo 4 – Penny Moor, October 2014
Infilled drain line at the eastern end of the site.



Photo 5 – Penny Moor, October 2014
Restored meander at the western end of the site.

PENNY MOOR
Restoration Plan
June 2012



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Forestry Commission. 100025468 2012

Site Name: Picket Bottom
Year Restored: 2014
Grid Reference: SU18700690

Reason for restoration:

- Artificial drainage had resulted in a wide, deep gully through pasture woodland, heathland and mire habitats.
- Previous restoration work in 2008, to restore the mire habitats on the Open Forest, had left a steep gradient at the transition to the eroded stream channel that continues into Little Linford Inclosure. This was at the request of commoners who wished to retain the concrete bridge on the Open Forest. This end point had become unstable and had started to erode back up towards the mire.
- As a result of the deep, wide channel downstream of the bridge, there was still no seasonal inundation of the pasture woodland habitat and limited interaction with the floodplain within the Inclosure.

Summary of restoration:

- On the Open Forest, the concrete bridge was replaced with a gravel ford.
- The bed level of the mire-stream channel transition was raised, and this shallower, narrower channel was continued on into Little Linford Inclosure.
- In Little Linford Inclosure, where evident, original meanders were restored to reduce the steepness of the gradient and increase the overall length of the watercourse.
- Restored meanders were linked with stretches of bed level raising.
- A concrete culvert within the Inclosure was to be replaced with a gravel ford to maintain a consistent bed level throughout.
- A small debris dam was created inside the Inclosure fenceline at the downstream end of the site, to support the upstream restoration work.

Maintenance requirements:

- None at present.

Key Benefits:

- Fragile mire habitats at the top of the catchment are stabilised and safeguarded from further erosion and loss of peat.
- The shallower restored watercourse compared to the deep, wide eroded channel allows the stream to interact more naturally with its floodplain.

- The channel length is increased, with greater potential for in-channel habitat diversity (pools, riffles, marginal vegetation) as it establishes itself.



Photo 1- Picket Bottom, May 2014
Eroding end point of earlier mire restoration, taken from the bridge, before restoration.



Photo 2 - Little Linford Inclosure, May 2014.
Eroded artificial drain, before restoration.



Photo 3 - Picket Bottom, October 2014

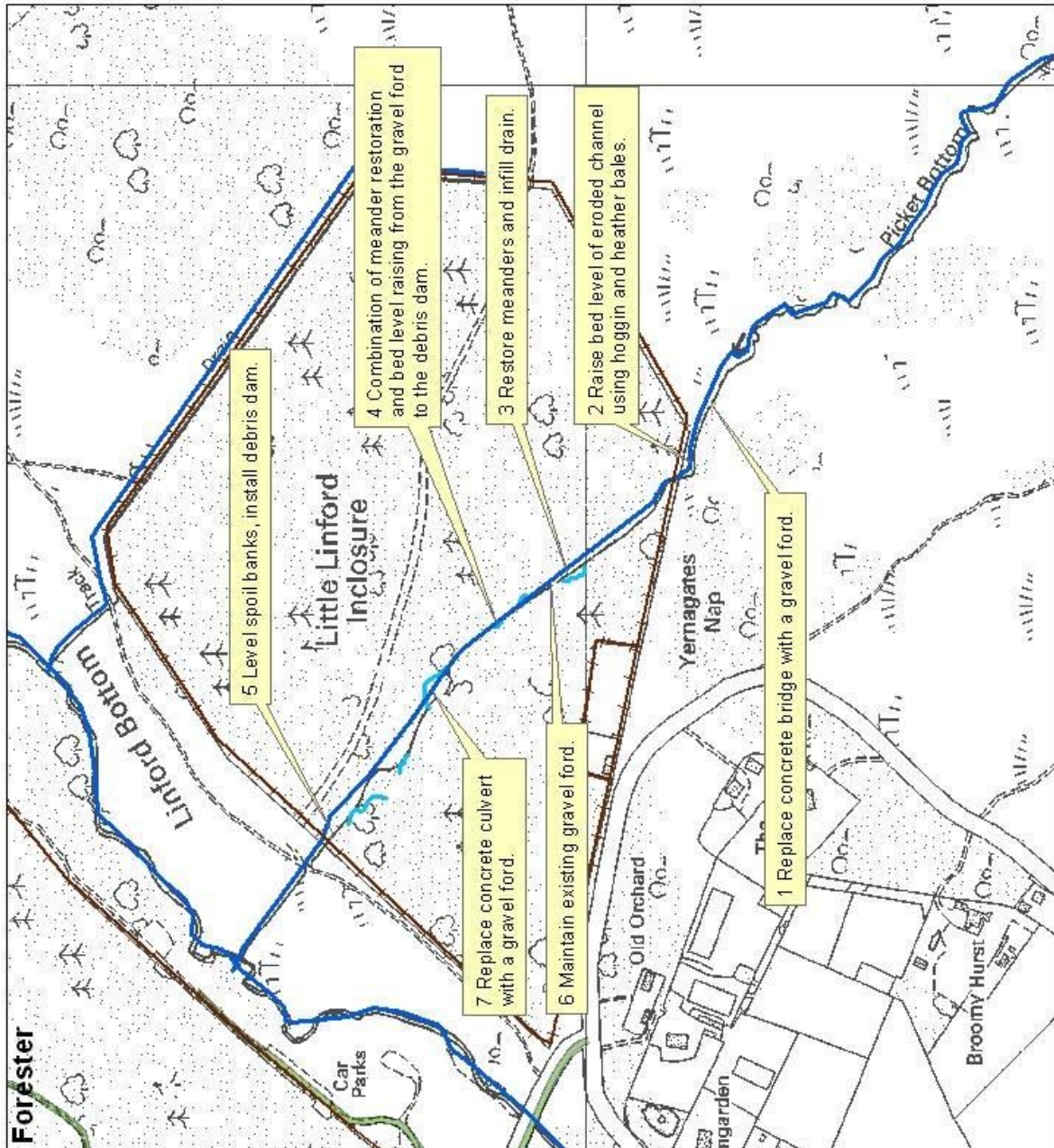
Concrete bridge on the Open Forest has been replaced with a gravel ford, bed level raised and channel narrowed, three months after restoration.







Photo 4 - Little Linford Inclosure, October 2014.

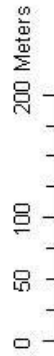
Restored meanders, three months after restoration.

PICKET BOTTOM
Restoration Plan
June 2013



Legend

-  Existing watercourse
-  Proposed watercourse route
-  Fence line
-  Forest roads



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Site Name: Soldiers Bog
Year Restored: 2013
Grid Reference: SU23070709

Reason for restoration:

- Artificial drainage in Soldiers Bog and downstream into North Oakley Inclosure had resulted in an incised channel upstream in the mire, which became a wide, deep gully as it flowed through lawn, pasture woodland and heathland habitats, and on into the Inclosure.
- Previous restoration work in 2004 by the Environment Agency as part of the Life III project had not raised bed levels enough to restore effective interaction with the floodplain, which had subsequently resulted in localised erosion. This was unstable and had started to erode back up towards the mire.
- The erosion nick points in the mire were eroding peat and lowering the water table at the top of the catchment.
- As a result of the deep, wide channel there was no seasonal inundation of the pasture woodland and heathland habitats.

Summary of restoration:

- The incised channel within the mire was infilled, with a gradual transition to a shallow stream as it emerges into wet heath.
- Where evident, additional palaeo meanders were restored to reduce the steepness of the gradient through the wet heath, lawn and pasture woodland habitats by increasing the overall length of the watercourse. Redundant sections of artificial drain channel were subsequently infilled.
- Restored meanders were linked with stretches of bed level raising.
- A wooden footbridge was relocated over the restored watercourse route, and two vehicle fords were maintained.
- A short stretch of localised erosion was also repaired on a second watercourse which arises in Blackensford Bottom to the west.

Maintenance requirements:

- Larger gravels and cobbles were added to minor nick points to provide more stability during high flows (2014).

Key Benefits:

- Fragile mire habitats at the top of the catchment are stabilised and safeguarded from further erosion and loss of peat.
- The shallower restored watercourse compared to the deep, wide eroded channel allows the stream to interact more naturally with its floodplain.

- The channel length is increased, with greater in-channel habitat diversity (pools, riffles, marginal vegetation).



Photo 1 - Soldiers Bog, April 2013
Eroded channel with poor in-channel diversity and unstable gravel shoals, before restoration.

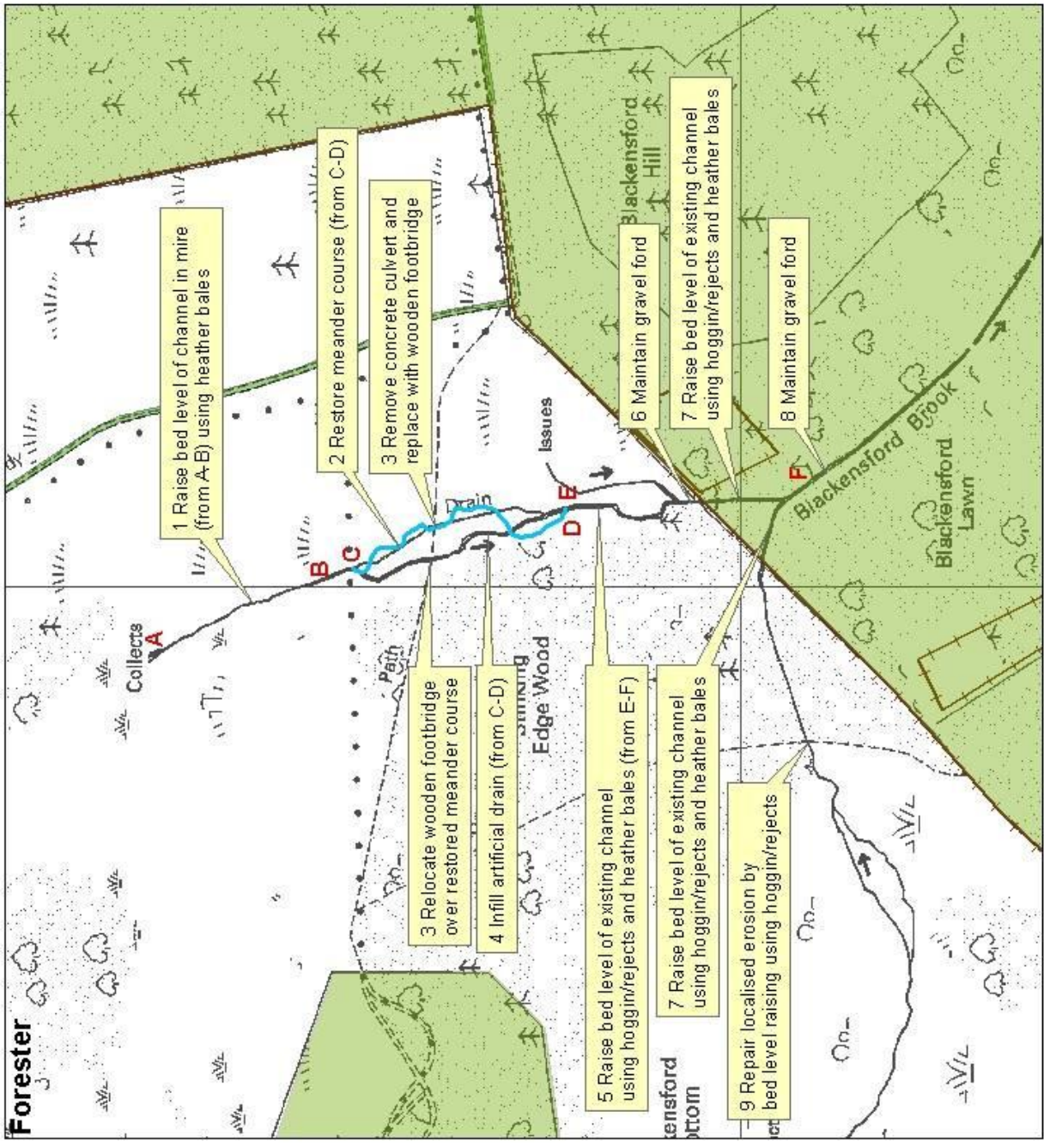


Photo 2 - Soldiers Bog, October 2014.
Restored meanders through wet heath, after restoration.







Photo 3 - Soldiers Bog, October 2014.
Restored meander through lawn, after restoration.

SOLDIERS BOG
Restoration Plan
April 2012



Legend

-  Proposed watercourse route
 -  Fenceline
 -  Forest roads
 -  Inclosures
- 0 50 100 200 Meters

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Forestry Commission, 100025408, 2012

Site Name: Markway
Year Restored: 2006 (pre-HLS)
Grid Reference: SU24940382

Reason for restoration:

- This section of river had been channelised for land drainage since at least 1870. This drainage meant that flows were restricted to the channel, resulting in increased in-channel and bankside erosion.
- This erosion and subsequent sediment transportation led to deposition of large amounts of gravel on the lawn habitat downstream. This was having a detrimental impact on the commoning practices and Special Area of Conservation (SAC) lawn habitats downstream.

Summary of restoration:

- The original meandering channel on the edge of the heath was restored, and linked in to the channelised drain upstream of the A35 road bridge. This required the felling of some willow and removal of organic material which had accumulated in the historic channel to reveal the original gravel substrate.
- A clay plug was installed upstream of the drainage channel to divert the flow into the restored channel and to prevent overtopping into the straightened channel. At this time the redundant straightened drain channel was not infilled.
- Downstream of the A35, a short section of new channel was excavated to connect the lower floodplain.
- Scrub was cleared to open up the lawn and formalise a downstream channel.

Maintenance requirements:

- In subsequent years the original clay plugs became eroded, and in high flows water began to revert to the channelised drain. The channelised drain was completely infilled to ensure the flow continued along the route of the restored meanders.

Key Benefits:

- A reduction in amount of gravels being eroded from upstream of the A35 and deposited on the downstream lawns.
- Increased in-channel habitat diversity.
- Floodplain connection has been stabilised and out of bank flows are more likely.



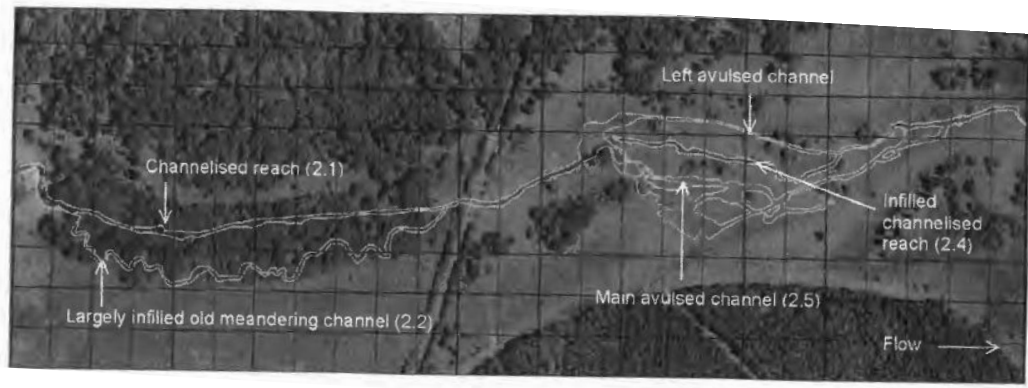
Photo 1 – Markway, July 2006
Artificial straightened drain which was limiting floodplain inundation and with the erosive force constricted to the channel. Significant deposition of upstream material is shown here.



Photo 2 – Markway, December 2006
Restored meander connected to floodplain, with limited erosion and deposition.

Photos 3 and 4 – Markway, December 2006 (Left) and October 2014 (Right)
No erosion as water seeps back into the restored meander from the connected floodplain. The system has been stabilised as demonstrated by the lack of a nick point from the same seepage point 8 years later.





Markway Restoration Plan (New Forest Wetland Management Plan 2006-2016)