



# Dartmoor Headwaters Natural Flood Management Reverse Auction

# **GUIDANCE NOTE**



### The NFM Reverse Auction at a glance

#### **PURPOSE:**

The NFM Reverse Auction has been designed to provide the necessary funding to help support landowners and farmers within the projects priority catchments to alter their land and water management practices in order to slow the flow of water and reduce flood risk to downstream communities.

#### WHAT CAN BE FUNDED?

The NFM measures that are eligible for funding through the scheme can be divided into seven categories:

- 1. Soil management options
- 2. Over winter cover options
- 3. In field water retention options
- 4. In channel water retention options
- 5. Trackway options
- 6. Tree planting options
- 7. Landowner innovation options

# Note this is a competitive process and therefore funding is not guaranteed to all applicants.

#### **FUNDING CRITERIA:**

The following rules apply to applications:

- 1. Proposed NFM measures **MUST** be on land within one of the four priority catchments.
- 2. The application **MUST** be made by the landowner, or by a consultant or tenant acting on their behalf.
- 3. The application **MUST** be for NFM measures detailed within this guide.
- 4. The applicant **MUST** demonstrate best value for money has been achieved.
- 5. There is no lower limit on the size of the funding.
- 6. Each capital item must have a **minimum design life of at least 5 years**. Items NFM01, NFM02, NFM03, NFM04 (case dependant) are excluded from this requirement.
- 7. Work must comply with all relevant health and safety legislation and British Standards (BS) or equivalent.
- 8. Applicants must **obtain the relevant consents** where appropriate. The Project Team will apply, and pay, for Land Drainage Consent from Devon County Council.
- 9. Applicant **MUST** provide a quote for items NFM11, NFM12, NFM13, NFM14 and NFM15.
- 10. The applicant **MUST** meet the minimum monitoring requirements.

Please note that this funding cannot be awarded if funding has already been received from another source for completing this work. This includes match funding from another grant e.g. Countryside Stewardship Scheme.



## Contents

1.	Ger	neral Guidance
1	.1.	What is the NFM Reverse Auction?
1	.2.	Who is eligible for the NFM Reverse Auction?
1	.3.	What NFM measures can be funded?
1	.4.	Who can carry out the work?
1	.5.	Maintenance requirements
1	.6.	Value Added Tax
1	.7.	How do I apply?
1	.8.	Rules of NFM Reverse Auction
1	.9.	Monitoring requirements
2.	Ass	essment criteria
3.	NFM	Reverse Auction item specifications
3	8.1	Soil Management Options
3	3.2	Over winter crop options
3	3.3	Infield water retention options
3	<b>3.4</b>	In-channel water retention options
3	8.5	Fencing options
3	8.6	Trackway options
3	8.7	Tree planting options
3	8.8	Landowner innovation options
4.	Ref	erences



### 1. General Guidance

#### 1.1. What is the NFM Reverse Auction?

The Natural Flood Management (NFM) Reverse Auction has been set up to achieve the objectives set out in the DEFRA funded Dartmoor Headwaters NFM Project:

- Reduce flood risk to local communities;
- Gather evidence and develop our knowledge around NFM where there are currently gaps;
- Engage communities around NFM and develop partnerships; and
- Deliver wider benefits, e.g. water quality, enhanced biodiversity, socio economic benefits.

The auction has been designed to provide the necessary funding to help implement NFM measures within the projects priority catchments (Figure 1). The auction will enable landowners and farmers to undertake land and water management techniques which will help slow down the flow of water, helping reduce flood risk to downstream communities. For example, funding from the auction will help pay for the construction of features such as leaky woody dams and attenuation basins, as well as offering a financial contributions for altering land management practices e.g. adopting better soil management practices such as subsoiling. Whilst NFM cannot completely prevent flooding, NFM measures can help reduce the frequency and severity of flood events, as well as providing multiple benefits e.g. habitat creation and improved water quality.



#### Figure 1 Dartmoor Headwaters NFM Project priority catchments

© Environment Agency copyright and / or database rights 2009. All rights reserved. © Crown Copyright and database right. All rights reserved. Environment Agency. 100028380, 2009. Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 08708 506 506 (Mon-Fri 8-6). Email: en quiries@environment-agency; qov.uk



#### **1.2. Who is eligible for the NFM Reverse Auction?**

The auction is available to anyone wishing to implement NFM within any of the priority catchments (Figure 1). The application MUST be made by the landowner or by a consultant or tenant acting on their behalf.

The applicant **MUST** meet the following criteria:

- 1. Proposed NFM measures **MUST** be on land within one of the four priority subcatchments (Figure 1).
- 2. The application **MUST** be made by the landowner, or by a consultant or tenant acting on their behalf.
- 3. The proposed NFM measures **MUST** meet the overall project objectives (see Section 2).
- 4. The application **MUST** be for NFM measures detailed within this guide (see Section 3).
- 5. The applicant **MUST** demonstrate best value for money has been achieved.

#### 1.3. What NFM measures can be funded?

Table 1 details the NFM measures which are available for funding through the NFM Reverse Auction. The Table also provides an indicative unit costs for each item. There is also scope for applicants to suggest alternative items/measures where there is a clear benefit to flood risk reduction and water quality improvement. Monies will be paid once proof of satisfactory construction has been established e.g. via a site visit or by submitting evidence.

The NFM measures can be sub-divided into seven categories:

- 1. Soil management options (NFM01, NFM02)
- 2. Over winter cover options (NFM03, NFM04)
- 3. In field water retention options (NFM05, NFM06, NFM07)
- 4. In channel water retention options (NFM08, NFM09)
- 5. Trackway options (NFM10)
- 6. Tree planting options (NFM11, NFM12)
- 7. Landowner innovation options (NFM13, NFM14, NFM15)

The technical specifications for items are outlined in Section 3.



#### Table 1 NFM Item Costs & Indicative Unit Costs

Item Code	Item	Indicative Unit Cost
NFM01	Grassland Aeration	£18.50/ha
NFM02	Arable Subsoiling	£58/ha
NFM03	Catch / Cover cropping	£120/ha
NFM04	Under sowing Maize	£87/ha
NFM05	Grass swales	£12/m <sup>2</sup>
NFM06	Sediment traps / Attenuation Ponds	£12/m <sup>2</sup>
NFM07	Earth bunds	£310/barrier
NFM08	In channel seepage barriers	£300/barrier
NFM09	Leaky Dams*	£25 to £400/dam
NFM10	Cross drains	£490/drain
NFM11	Tree Planting*	Dealt with on a case-by-case basis
NFM12	Hedge Planting*	Dealt with on a case-by-case basis
NMF13	Landowner Innovation	Dealt with on a case-by-case basis
NFM14	Wetland Habitat Creation	Dealt with on a case-by-case basis
NFM15	Channel Restoration	Dealt with on a case-by-case basis

#### Notes:

**Wetland habitat creation (NFM14)** – where possible wetland habitat creation should be encouraged as part of other NFM measures e.g. attenuation basins and swales. Advice with creating wetland areas can be given by the NFM Project Officer. Funding for native wetland plants will be discussed on a case-by-case basis.

**Leaky dams** – The size, design and construction techniques for leaky dams are site specific. This therefore affects the cost of installing each leaky dam. The value available for leaky dams will be dealt with on a case-by-case basis and ranges from  $\pounds 25$ /dam to  $\pounds 400$ /dam, with the average dam costing around  $\pounds 150$ /dam. Additional information, along with a quote detailing the costs associated with this item are required as part of the application for this item.



**Tree & Hedge planting (NFM11 & NFM12)** – Each application for tree or hedgerow planting will be dealt with on a case-by-case basis and therefore a specific item price has not been quoted. For more details, see the auction guidance note.

Landowner Innovation (NFM13) - We acknowledge that all farms/ areas of land operate differently and on a variety of landscapes. The list of items offered therefore may not be suitable for all situations. The 'Landowner Innovation' item offers applicants an opportunity to suggest alternative and innovative options to reduce erosion, infiltration issues and flood risk. Additional information, along with a quote detailing the costs associated with this item are required as part of the application for this item.

#### • Woodland Creation:

- Planting area(s) must total at least 0.5 ha (multiple sites applicable) or 1 ha if contract planted
- Only for planting areas of non-wooded land
- Minimum width of 9 metres (3 rows of trees)



#### 1.4. Who can carry out the work?

Works funded through the NFM Reverse Auction can either be conducted by the applicant, or the applicant can employ contractors to complete the work. It is essential that all works funded through the scheme are carried out in accordance with the specifications outlines in Section 3. It is the applicant's responsibility to ensure they follow appropriate health and safety procedures.

#### **1.5. Maintenance requirements**

Applicants are responsible for ensuring the NFM measures funded through this auction are maintained and kept in good condition. The applicant is responsible for carrying out any required repairs in a timely manner. The applicant should keep a record of any maintenance activities which they have conducted and the costs associated with this. This information will be used to help inform future NFM schemes.

Please note the following items are excluded from this requirement: NFM01 (Grassland aeration), NFM02 (Arable subsoiling), NFM03 (Catch/cover cropping), NFM04 (Under sewing maize) and NFM13 (landowner innovation – case dependant).

#### 1.6. Value Added Tax

Where the applicant is able to claim VAT funding will be paid at net. Where the applicant is unable to claim VAT then funding will be paid at gross.

#### 1.7. How do I apply?

To apply for funding through the NFM Reverse Auction, please start an application at: <u>www.naturebid.org.uk</u> and follow the process outlined on the website.

Applicants should first consider whether alternative funding is available for completing the works e.g. through the Countryside Stewardship Mid-Tier Scheme. Applicants should apply for these alternative funding sources in preference to the NFM Reverse Auction.

If you have any queries about the NFM Reverse Auction or alternative funding sources please contact the Dartmoor Headwaters NFM Project Officer.

All applications will be assessed against the criteria detailed in Section 2. A written decision letter regarding the success of the application will be issued within 6 weeks of the application being accepted. If successful, the applicant will be asked to sign the Terms and Conditions of funding.

Note, Dartmoor National Park Authority and/or the Environment Agency may request additional information to support the application. This information should be provided ASAP and the application will be put on hold until the required information is provided.



#### Table 2 Key contact details for the Dartmoor Headwaters NFM Project

Key Contacts	Details	Roles/Responsibilities
Dartmoor National Park Authority:	Kerry Smith	Proposal Enquiries &
NFM Project Officer	Tel: 01626 831027 (ext:1027)	Discussion. Oversee project delivery, attend
	Mobile: 07849 085339	site visits pre and post construction.
	Email: <u>ksmith@dartmoor.gov.uk</u>	
Environment Agency:	Tim Lee	
NFM Project Manager	Tel: 02030 252522	Enquiries with Online Auction Tool. Co-ordinate project delivery
	Mobile: 07342 056675	
	Email: <u>tim.lee@environment-</u> agency.gov.uk	
General Enquiries:	Email: DartmoorNFM@environment- agency.gov.uk	



#### 1.8. Rules of NFM Reverse Auction

The following rules apply to the NFM Reverse Auction:

- The application **must be for NFM work within one of the priority sub-catchments** (Figure 1).
- There is no lower limit on the size of the funding that can be awarded to each applicant.
- Each capital item must have a minimum **design life of at least 5 years.** Items NFM01, NFM02, NFM03, NFM04 and NFM13 (case dependent) are excluded from this requirement.
- Work must comply with all relevant health and safety legislation and British Standards (BS) or equivalent.
- Applicants must obtain the relevant consents where appropriate, including:

#### Flood Defence Consent (FDC)

Ordinary Watercourses - Flood Defence Consents are required for works affecting ordinary watercourses. The following items require FDC:

- NFM06 Sediment traps/ Attenuation ponds
- NFM08 In-channel seepage barriers
- NFM09 Leaky dams
- NFM13 Landowner innovation (case dependant)

# The Project Team will apply for, and cover the cost, of the ordinary watercourse FDC on behalf of the applicant.

Works on main rivers require consent from the Environment Agency. Applications involving such works will be dealt with on a case-by-case basis.

Main rivers can be identified using the following Environment Agency mapping website: <u>https://environment.maps.arcgis.com/apps/webappviewer/index.</u>

#### **Planning Permission**

This may be required for larger structures, and discussions should be held with the local planning authority (Dartmoor National Park Authority) about the proposed works. This will be dealt with on a case-by-case basis.

#### **Environment Impact Assessment (EIA)**

An EIA may be required for more than 2ha of woodland planting (<u>(https://www.gov.uk/guidance/assess-environmental-impact-before-you-create-new-woodland</u>). This will be dealt with on a case by case basis.



In some circumstances specialised consents may be required e.g. where the proposed works affects Scheduled Monuments, Sites of Special Scientific Interest (SSSI) or Public Rights of Way. This will be dealt with on a case by case basis.

#### Felling Licence

Felling licences will be dealt with on a case-by-case basis.

Please note that **funding cannot be awarded through this auction if funding has already been received from another source for completing this work**. This includes match funding from another grant e.g. Countryside Stewardship Scheme.

Once constructed the **landowner is responsible for the maintenance** of the NFM measures implemented through the reverse auction.

#### **1.9. Monitoring requirements**

To meet Defra's requirement to gather evidence and develop our knowledge of NFM, the following information will be collected and reported on through the NFM Reverse Auction application:

**Location, type and extent of NFM measures to be mapped** – This information will allow the spatial coverage of the project to be assessed and provide an understanding of how the measures have been implemented across the country.

**Cost of implementing NFM** – The cost of implementing the NFM measures will be collated within a project database, noting how the measure was funded. This information will help inform future decisions regarding NFM funding.

**Maintenance requirements** – NFM measures require little/ no maintenance, however we require that any maintenance conducted on the NFM measures, including any costs associated with this is recorded and reported back to the NFM Project Officer. This information will help inform future projects.

**Photographs** – Photographs of the land before and after the NFM measures are required to support this application. These photographs will help show the effects NFM measures have on the landscape and how the NFM measures change over time.

#### Note: This information is the minimum monitoring requirement.

The projects monitoring plan includes numerous other monitoring options e.g. fixed-point photography studies of NFM features, habitat surveys, multiple benefit assessments, river flow monitoring, assessments of changes to hydraulic roughness and studies on the changes to sediment movements. To assist with delivering this monitoring plan we are looking for volunteers to help capture the data and willing landowners to allow this additional monitoring to occur on their land. If you are interested in getting involved with this more detailed research, please speak to Dartmoor National Park's NFM Project Officer.



Please note applications that offer the opportunity for additional monitoring options, will be considered preferential by the NFM Reverse Auction review panel.



### 2. Assessment criteria

The NFM Reverse Auction is competitive and therefore funding is not guaranteed to all applicants. The panel may also decide to award funding for some of the items applied for and not others.

All applications will initially be assess to ensure they are eligible for funding (Section 1.2) and that they have submitted all required documentation. Compliant applications will then be assessed using the following criteria:

1. Does the application meet the objectives of the Dartmoor Headwaters NFM Project?



The NFM Reverse Auction review panel will assess each application against this criteria. The panel will meet at the end of the auction window to review applications. The review panel contains representatives from the following organisations:

Environment Agency Dartmoor National Park

Note, as the Dartmoor Headwaters NFM project is a pilot project, it is required to gather evidence on the effects and benefits of NFM measures. To meet this requirement, applications, which agree to have more than the minimal monitoring required, will be viewed preferentially.



### 3. NFM Reverse Auction item specifications

### 3.1 Soil Management Options

Table 3 Soil management options available

ltem Code	Description	Indicative Item Cost
NFM01	Grassland Aeration	£18.50/ha
NFM02	Arable Subsoiling	£58/ha

Table 3 details the soil management options available through the NFM Reverse Auction.

**Objective:** Compaction of fields from stock or machinery increases soil erosion, surface water runoff and increases the risk of soil, manure, nutrients and pesticides reaching watercourses. The cultivation of compacted soils will increase aeration and water infiltration rates which will reduce soil erosion and surface run-off.

**Specifications:** This item will assist to reduce soil compaction for improved grassland or cultivated fields where there is a risk of surface flow reaching a watercourse.

- A specialist soil husbandry advisory visit must be conducted in order to access this item, this can be provided free of charge by the Project Team.
- The type of machinery required depends on the soil type, texture and the depth of compaction, but is likely to include shallow spiking or sub-soiling.
- To maximise the benefit and avoid any further soil compaction, only use machinery when the soil is dry at the depth that is to be loosened. It is possible that this process may cause initial damage to the root system for grassland fields.
- Photographic evidence must be taken before and after subsoiling.
- Invoices must be kept if contractors are used or machinery is rented.
- The Environment Agency and Dartmoor National Park Authority are not responsible for any financial loss incurred from this action.

#### 3.2 Over winter crop options

 Table 4 Over winter crop options available

Item Code	Description	Indicative Item Cost
NFM03	Catch / Cover cropping	£120/ha
NFM04	Under sowing Maize	£87/ha

Table 4 details the over winter crop options available through the NFM Reverse Auction.

**Objective:** Establishing a cover crop during fallow periods improves infiltration rates by increasing root mass, reduces nutrient leaching during the autumn/winter and provides soil protection from wind and rain erosion.



Please take into account crops rotations when sowing cover crops. Cover crops can potentially lead to an increase in slug populations depending on weather and soil conditions.

#### **Specifications:**

- The cover crops must be established annually by 15<sup>th</sup> September.
- Under sowing of maize should take place in the month following drilling.
- Selected crop must give good ground cover.
- The crop must remain in situ from the date of sowing until at least the 31<sup>st</sup> January.
- Grazing of cover crops in surface water catchments is permitted but not until after 31<sup>st</sup> January.
- Ploughing is not permitted to establish the cover crops, the use of light cultivation techniques is recommended.
- It is recommended you discuss this option with an agronomist.
- Any crop sown created for Ecological Focus Area (EFA, CAP greening criteria) cannot be claimed through the Reverse Auction. Likewise any cover crops funded through Countryside Stewardship SW6 Option cannot receive double funding from the CGS.
- Cover crop mixes could include species such as Mustard, Oil Radish, Phacelia, Oats, Vetch.
- The location of the area selected for cover crops or under sowing must be clearly marked on a map submitted with your application.

#### 3.3 Infield water retention options

#### Table 5 Infield water retention options available

Item Code	Description	Indicative Item Cost
NFM05	Grass swales	£12/ m <sup>2</sup>
NFM06	Sediment traps / Attenuation ponds	£12/m <sup>2</sup>
NFM07	Earth bunds	£310/barrier

Table 5 details the infield water retention options available through the NFM Reverse Auction.

#### NFM05: Grass swales

**Objective:** Grassed swales are areas of grass which are designed to allow surface flow to collect and soak away.

**Specifications:** The item consists of site preparation and excavation of the swale. Please note that in calculating the area of the swale for the application, measurement should start at the inside edge of the created bank. A long swale allows additional time for water to soak away and for sediment to settle. Water management advice is recommended from a Adviser in order to access this item.

It is not suitable for run-off that contains slurry, manure, dirty yard runoff, or for run-off from a pesticide handling or wash-down area.



The following specifications should be met:

- The swale should be constructed on the contour or at a longitudinal slope of normally no greater than 2 degrees.
- The layout of the swale should be marked on the ground and excavated to a depth of 500 mm.
- Topsoil should be stockpiled separately and used in the bottom of the swale and on the graded slopes.
- Side slopes should be graded to no more than 1:3.
- The floor of the swale should be excavated for a further 150-250 mm and replaced with topsoil.
- A dense grass sward should be established on the sides and floor of the swale.
- The formation of a swale could be considered to be an engineering operation and may require planning permission. The Local Authority should be consulted before any work commences.
- This item can be used in conjunction with leaky dams (NFM09) to slow the flow of water.

For more information see 'Wildfowl and Wetlands' guide and Environment Agency link:

http://www.wwt.org.uk/uploads/documents/1429707026\_WWTConstructedFarmWetlands15 0422.pdf

#### NFM06: Sediment trap/ Attenuation pond

**Objective:** A sediment trap or attenuation pond will provide an area where muddy run-off from fields or tracks is allowed to pond so sediment will settle out. This will help reduce the risk of sediment and other pollutants entering a nearby watercourse. The sediment trap/ attenuation pond will also offer the potential for additional storage of flood waters, helping reduce peak flows and associated flood risk.

**Specifications:** Sediment traps/ attenuation ponds may take the form simple of dug-out pond, it is preferable to have a number of small ponds and traps around the farm rather than a single larger feature.

- Should only be used in conjunction with other options to reduce the cause of runoff, as this option only addresses the pathway not the source.
- Does not apply to already existing ponds, areas of existing archaeological or historic value.
- Size of pond/trap depends on soil type and runoff volumes that are to be intercepted. For large scale sediment ponds, advice from soil and water or civil engineer should be sought.
- Excavate to an appropriate depth, creating gently sloping banks. Excavated topsoil should be spread on top of embankments.
- Outflow pipes, where required, should be installed at a suitable location 750 mm below the top of the embankment to provide a freeboard.

Regular maintenance will be required on sediment ponds/traps. Removal of sediment from ponds/traps as required. EA may need to be contacted if site is contaminated.



Check for blockages regularly.

For more information see 'wildfowl and wetlands' guide:

http://www.wwt.org.uk/uploads/documents/1429707026\_WWTConstructedFarmWetlands15 0422.pdf

#### NFM07: Earth Bunds

**Objective:** An earth bank or soil bund can be used to:

- slow the movement of water, protecting streams and rivers from pollutants slow flows during high rainfall and reduce downstream flooding
- control water levels to aid raised water levels for habitat creation and restoration

**Specifications:** Position bunds or banks on land that can support damp, vegetated habitat. Ideally:

- below tracks
- below small, lightly contaminated yards
- below areas of hard standing
- the bottom of slopes
- below woodland channels
- below buffer strips channelling water in arable fields where water can be held in grassland fields

#### **Design and construction:**

- form infiltration basins into 'V', 'U' or 'C' shapes
- measure bunds in a continuous length of 100m per unit with up to a 250m<sup>2</sup> runoff store
- dig down 0.8m in depth
- grade side slopes to no more than 1 in 3
- ensure half the stored water can empty within 24 hours
- flatten the soil when damp to strengthen the structure
- plant tussocky grass species in banks that can withstand wet and dry conditions
- establish vegetation on the basin floor to reduce clogging
- build bay silt traps where soil erosion is high to stop the basin from clogging
- regularly remove excess sediment from banks and bunds, reapplying it back to the field (contact the Environment Agency to check if a waste exemption is required)

#### To enhance buffer strips

- place soil bunds at the field edge of buffer strips, to slow runoff
- build bunds 300mm to 500mm high by 600mm to 1000mm wide
- place larger bunds where complex field slopes divert runoff to pinch points



#### 3.4 In-channel water retention options

Item Code	Description	Indicative Item Cost
NFM08	In channel seepage barriers	£300/barrier
NFM09	Leaky Dams	£25-£400/dam

#### Table 6 In-channel water retention options available

Table 6 details the infield water retention options available through the NFM Reverse Auction.

#### NFM08: In channel seepage barriers

**Objective**: An in channel wetland barrier is a dam that allows the slow passage of water through it. By slowing down the flow, sediment can be deposited helping to remove nutrients and pesticides from the water.

**Specifications**: Advice and assistance from the Environment Agency may be required for this item. Email: <u>dartmoornfm@environment-agency.gov.uk</u>

- In channel wetland barriers should be located within field ditches, preferably where land on either side is owned by the applicant.
- They are best placed where the channel carries a fast flow of water during intensive rain events.
- The number of barriers in any one channel would depend on the gradient, with steep gradients benefiting from more structures.
- In channel wetland barriers must not be constructed on natural watercourses, or where there is a high risk to land or property if the structure was to cause local flooding.
- The in channel wetland barrier should be no more than 4 m wide and 1 m high.
- Wooden slats should be formed either vertically or horizontally (if less than 2 m wide) leaving 1-2 mm gap between each barrier. The slats must be of sufficient strength to resist the force of fast flowing water and be durable.
- Any purchased wood must not be treated with a chemical wood preservative product as these are toxic to aquatic life.
- Materials other than timber may be used for construction as long as they allow water to percolate through at a suitable speed.

#### NFM09: Leaky Dams

**Objective**: Leaky woody dams will slow the movement of water and help push flows onto the floodplain during floods. This will increase temporary storage of flood waters within water channels and out on to the floodplain, help delay the passage of flood water downstream, allow sediment to settle out, and reduce downstream flood risk.



The size, design and construction techniques for leaky dams are site specific. This therefore affects the cost of installing each leaky dam. The value available for leaky dams will be dealt with on a case-by-case basis and ranges from £25/ dam to £400/dam, with the average dam costing around £150/dam.

# Please note that additional information, along with a quote detailing the costs associated with this item MUST be submitted as part of this application.

Pictures of example leaky dams, which form part of the Stroud Rural Sustainable Drainage Project, are shown below. Site specific advice will be given to the applicant to determine the size and design of leaky dams which would be suitable at their site. Where possible locally sourced materials should be used to construct the leaky dams.

General design principles:

- The leaky dam should be 2 times the width of the channel.
- Construct the dam from logs large enough to span the water channel and out on to the floodplain to provide a stable and long-lasting structure.
- Align dams at right angles to channel banks to reduce bank scour.
- Build dams to allow low flows and fish to pass unimpeded at all times. Site dams on slow flowing reaches of the watercourse.
- Build dams to a height sufficient to encourage water to spread onto the floodplain upstream of the dam or hold water within the channel itself. Note it is not advised to build the dam higher than approximately 0.5 m.
- Steel pins can be used to secure the structure to the ground and create to a large mass of logs which is unlikely to move during high flows.
- Build dams in series (minimum 3 dams) at a spacing between dams of about 5-7 times the width of the channel.
- Make sure dams are not installed directly upstream of pinch points such as bridges or culverts that back up flows and are likely to swamp the dam.
- Check and maintain dams to keep the structure effective.

Flood Defence Consent is required for this item. The Project Team will apply for the ordinary watercourse FDC on behalf of the applicant. Works on main rivers require consent from the Environment Agency. Applications involving such works will be dealt with on a case-by-case basis.



Figure 3 Example leaky dams: Stroud Rural Sustainable Drainage Project



#### 3.6 Trackway options

Table 8 Trackway options available

ltem Code	Description	Indicative Item Cost
NFM10	Cross drains	£490

Table 8 details the trackway options available through the NFM Reverse Auction.

**Objective:** Cross drains intercept surface water flow paths, helping conduct water away from tracks and other assets. The drains will also help reduce the risk of sediment and other pollutants entering the watercourse.

#### **Specification:**

- Cross drains should be positioned at intervals across sloping tracks. They should divert water flowing from uphill areas into specifically created temporary water holding areas.
- The number of cross drains required on a track will depend on the steepness of the slope.
- The distance between cross drains will need to be considered on a case-by-case basis. The cross drains must be capable of collecting heavy flows of water.



Two methods of constructing the cross drain:

- Open Channel Construction:
  - Excavate channel across the whole width of the track. The channel should be at least 100 mm deep and between 100 mm and 250 mm wide.
  - The channel should be lined with concrete with a gridded top which is at least 150 mm wide.
- Raised Hump Construction:
  - Excavate a foundation trench across the whole width of the track to a depth of at least 300m.
  - Fill trench with concrete.
  - Install kerbstone across the trench, ensuring they project 60mm to 100mm above the surrounding surface.

The temporary water holding area located at the outfall of the cross drains should allow water to infiltrate into the ground, slowing the flow of water reaching the watercourse. By allowing water to settle and infiltrate, the temporary water storage area will also help reduce water quality issues.

- Sediment and other material which may clog the drains should be removed from the cross drain and the outfall area.
- Relevant British Standards must be followed when constructing cross drains.
- To prevent the cross drain causing damage, the applicant must ensure that the outflow from the cross drain does not flow into areas of biological, historical or archaeological value. Polluted water should not be allowed to convey via the cross drains into watercourses or ponds.

#### 3.7 Tree planting options

#### Table 9 Tree planting options available

Item Code	Description			
NFM11	Tree Planting	Applications will be dealt with on a case-by-case basis.		
NFM12	Hedge Planting			

Table 9 details the tree planting options available through the NFM Reverse Auction.

**Objective:** Tree and hedge planting helps to reduce soil erosion and runoff.



#### NFM11: Tree planting

#### Benefits of tree planting funding:

- Land doesn't need to be registered
- Limited bureaucracy / form-filling / red tape
- All stock UK sourced and grown
- Flexibility on species choice / planting density
- Savings from bulk buying passed straight on to applicant

#### NFM12: Planting new hedgerows

#### Specifications of hedgerow creation:

- Carry out work between 1 November and 31 March
- Prevent livestock and grazing animals from damaging the hedge by setting fencing at least 1.2m from the centre of the hedge, or, if there is a bank, as close to the base of the bank as possible.

#### Woodland Trust Ancient Woodland management advice

If you require advice on managing your existing woodland(s), please contact the Dartmoor Headwaters NFM Project Officer will put you in contact with the Woodland Trust's ancient woodland advisor. They will check your wood to see if it is on the ancient woodland inventory map and discuss its history and appearance which could indicate if it is of ecological importance.

## For woodlands that we think are ancient (or potentially ancient), the Woodland Trust is able to offer:

• Free site visit(s) and a woodland report detailing ancient woodland features and management recommendations. This will be confidential between owner and the Woodland Trust and there will be no commitment for owners to act on any content of the report. Should owners wish to implement recommendations further advice can be given on regulations and appointing contractors.

#### 3.8 Innovation options

 Table 10 Inovation options available

Item Code	Description	Indicative Item Cost
NFM13	Landowner Innovation	Up to £2,000
NFM14	Wetland Habitat Creation	Applications will be dealt with on a case-by-case
		basis.
NFM15	Channel Restoration	Applications will be dealt
		with on a case-by-case
		Dasis.



Table 10 details the landowner innovation options available through the NFM Reverse Auction.

#### NFM13: Landowner Innovation

**Objective**: We acknowledge that all farms/ areas of land operate differently and on a variety of landscapes. The list of items offered therefore may not be suitable for all situations. The 'Landowner Innovation' item offers applicants an opportunity to suggest alternative and innovative options to reduce erosion, infiltration issues and flood risk.

**Specifications:** Innovation Applications can only be submitted with endorsement from the Dartmoor Headwaters NFM Project Officer, who should be consulted prior to making the application. We will not fund any infrastructure directly linked to regulatory requirements.

General conditions for applications to be considered:

- All Landowner Innovation applications **MUST** be accompanied with quotes or costings for the proposed works/items, maps and timings. Where this includes your own time, an estimate must be provided.
- All supporting information must be submitted at the time of application. Applications without necessary information will not be considered until this is received.
- The water quantity benefit of the work must be explained in the application form. Applications without this will not be considered.
- Should the value of completed work be less than that originally specified in the acceptance letter, the value will be reduced proportionately.

Examples of Items NOT eligible for funding:

- 1. Clearing/re-digging of ditches
- 2. To comply with regulatory requirements
- 3. Replacement or maintenance of items/infrastructure
- 4. Machinery and farm activity with no direct improvement of water quantity

#### NFM14: Wetland Habitat Creation

**Objective:** Wetland habitat can be restored or created to store large volumes of water for flood risk and ecological benefits. Wetlands are dynamic and changing habitats that include: fens, dune slacks, grazing marsh and swamp, upland and lowland peat bog, reedbed and saltmarsh, wet woodland, wet grassland and wet heathland. Restoring or creating wetlands can reduce or delay flood peaks and attenuate high frequency, low return period floods.

**Specifications:** Wetland Habitat Creation applications can only be submitted with endorsement from the Dartmoor Headwaters NFM Project Officer, who should be consulted prior to making the application.

General conditions for applications to be considered:

- All Landowner Innovation applications **MUST** be accompanied with quotes or costings for the proposed works/items, maps and timings. Where this includes your own time, an estimate must be provided.
- Wetlands should be self-sustaining and require limited maintenance.
- Management may be needed to hold back natural succession in restored wetlands.



#### **NFM15: Channel Restoration**

**Objective:** Channel Restoration can be defined as the reinstatement of the natural physical process and features that are characteristics of a river. Restoring hydraulic and sediment transport processes directly or indirectly by reinstating the physical form of a channel may help a river adjust towards a more natural form. River restoration can take many forms: in some cases, very little effort is needed whereas on other cases more extensive engineering and earthworks are needed. Channel Restoration can increase hydraulic roughness and morphological complexity, which can reduce water velocities and help to reconnect rivers to their floodplains creating temporary water storage. It can also slow flood flows through the reintroduction of features such as meanders.

**Specifications:** Channel Restoration applications can only be submitted with endorsement from the Dartmoor Headwaters NFM Project Officer, who should be consulted prior to making the application.

General conditions for applications to be considered:

- All Channel Restoration applications **MUST** be accompanied with quotes or costings for the proposed works/items, maps and timings. Where this includes your own time, an estimate must be provided.
- All supporting information must be submitted at the time of application. Applications without necessary information will not be considered until this is received.
- The water quantity benefit of the work must be explained in the application form. Applications without this will not be considered.
- Should the value of completed work be less than that originally specified in the acceptance letter, the value will be reduced proportionately.

Author	Date	Details
Natural England	2019	Countryside Stewardship, Mid-Tier Manual. Available at: https://www.gov.uk/government/publications/countryside- stewardship-mid-tier-including-water-quality-capital-items- manual
Natural England	2019	Countryside Stewardship, Higher Tier Manual. Available at: https://www.gov.uk/government/publications/countryside- stewardship-higher-tier-manual
Wildfowl & Wetlands Trust	2015	Constructed Farm Wetlands. Treating agricultural water pollution and enhancing biodiversity - A guide for farmers and farm advisers in England. Available at: http://www.wwt.org.uk/uploads/documents/1429707026_W WTConstructedFarmWetlands150422.pdf

### 4. References