



Waveney,
Lower Yare &
Lothingland
Drainage Board

Standard Maintenance Operations Policy Document

Waveney, Lower Yare and Lothingland Internal Drainage Board

Version 1.0

Training and Revision Register

Date	Revision Details	Version Number

TABLE OF CONTENTS

1.0	Introduction.....	1
2.0	Legislation.....	2
2.1	International Legislation	3
2.2	National Legislation	3
2.3	Protected Species and Habitats and Other Considerations	4
2.4	Non Native Invasive Species and Biosecurity.....	4
2.5	Conservation Sites – Statutory and Non-Statutory	5
2.6	Emergency Works	5
2.7	Cultural and Heritage Sites.....	6
3.0	The Maintenance Requirements of Different types of Watercourses	7
3.1	Meeting Good Ecological Potential or Status in Gravitational Watercourses	7
3.1.1	Pools and Riffles	8
3.1.2	Bends and Meanders	8
3.1.3	Backwaters.....	8
3.1.4	Natural Marginal Berms and Islands	8
3.1.5	Installation or Maintenance of Woody Debris	9
3.1.6	Channel Narrowing.....	9
3.1.7	Channel Capacity	9
3.1.8	Riverbank	9
3.2	Meeting Good Ecological Potential in Pumped Watercourses.....	10
4.0	The Targeted Maintenance Approach	10
4.1	How the Standard Maintenance Operations will work in practice.....	11
5.0	The Environmental Options	12
5.1	Mowing of Bankside Vegetation	12
5.1.1	Environmental Option M5.....	15

5.1.2 Environmental Option M4	15
5.2 Emergent and Instream Weed Control	16
5.2.1 Instream Weed Control in Pumped Catchment drains	16
5.2.1.1 Pumped Catchment - drains less than 2m wet width	17
5.2.1.2 Pumped Catchment - drains greater than 2m wet width - Leave opposite margin .	19
5.2.1.3 Pumped Catchment - drains greater than 2m wet width - Leave opposite and nearside margin	21
5.3 Weedcutting in a Gravity Catchment.....	23
5.3.1 Gravity Catchment - Environmental Option W7	23
5.3.2 Gravity Catchment - Environmental Option W3	25
5.3.3 Gravity Catchment - Environmental Option W2	27
5.3.4 Gravity Catchment - Environmental Option W1	29
5.4 Tree and Bush Management	31
5.4.1 Environmental Option TB4	33
5.4.2 Environmental Option TB3	35
5.4.3 Environmental Option TB2	37
5.4.4 Environmental Option TB1	39
6.0 Instream Silt Removal	41
6.1 Desilting in Pumped Catchment drains	43
6.1.1 Desilting drains less than 2m wet width – Narrow drains.....	43
6.1.2 In drains greater than 2m wet width - Leave opposite margin	45
6.1.3 In drains greater than 2m wet width - Leave opposite and nearside margin	47
6.2 Desilting in Gravity Catchment drains	49
6.2.1 Selection of Desilting Options	49
6.3 The important difference between desilting and dredging:.....	52
7.0 Herbicide Use for Weed Control	53

8.0	Bank Reprofiling.....	54
9.0	Culvert Installation or Repair	54
10.0	References	55
11.0	Appendix	56
11.1	Table 1: Maintenance works that trigger WFD Assessments	56
11.2	Table 2: Schedule 5 Species and other protected groups present in WLYLIDB	57
11.3	Table 3: Maintenance and protected species	62

Standard Maintenance Operations Policy Document

1.0 Introduction

The Waveney, Lower Yare and Lothingland IDB (WLYLIDB) catchment area sits within a mix of landscape character areas, the Suffolk Coasts and Heaths Area of Outstanding Natural beauty to the south, the Broads to the north and the South Norfolk and High Suffolk Claylands to the west, demonstrating a mosaic of estuaries, saltmarsh, intertidal mudflats, grazing marsh, reedbed, river valleys, arable, heath and woodland, with string coastal shingle spits and ridges resulting from longshore drift. In terms of nature conservation, the area also includes several national and internationally designated wildlife sites of outstanding importance.

The Waveney, Lower Yare and Lothingland Internal Drainage Board manages the water levels in agricultural and residential areas, across a variety of gravity drained and pumped watercourses. The water levels are controlled by various water control structures, tidal flap valves and water control structures. The WLYLIDB operates in an estimated catchment area of 15,109 Hectares. This area is serviced by 20 pumping stations. There are an estimated 620 Hectares of National and Internationally designated wildlife sites within the catchment.

Maintenance of the drainage infrastructure has always been achieved by the regular weedcutting of stretches of watercourses. Some desilting has always had a place in the maintenance schedule, to allow for the capacity of drains to be retained. The aim of this document is to allow a uniform maintenance procedure to be carried out to a consistently high standard in designated wildlife sites and in Board-maintained ordinary watercourses alike.

The drains within the WLYLIDB catchments are a combination of that of artificial or heavily modified watercourses draining toward their respective pumping station and gravitational streams, particularly in the upland.

The WLYLIDB Standard Maintenance Operations Policy document sets out our aim to achieve sustainable targeted maintenance and restoration of watercourses, taking account of our legal duty to maintain or help reach good ecological status / potential as defined within the Water Framework Directive.

WLYLIDB actions will play an important role in helping the UK Governments commitment to achieving goals set within its 25-year Plan.

The Board Recognises the need to take heed of growing evidence of climate change predictions and how this has the potential to adversely impact on future operations. The Board are taking a risk-based approach to this. Outputs help identify pressure points requiring targeted maintenance works, whilst at the same time identifying opportunities for watercourse restoration. This evidence-based approach enables officers form robust works schedules; striking a balance of business need, flood risk management and wider environmental health within the catchment served. The Board also embraces the industry move toward utilising natural environmental systems and Natural Flood Management (NFM) to manage water level changes, high flows and provide flood resilience to the catchment. This approach is adaptable and increases resistance to climate extremes of drought and flash flooding. A well-designed NFM scheme can save time and money in maintenance costs over time and may enhance biodiversity interests.

This document is consistent with the Environment Agency's suite of environmental options, which have been assessed for compatibility with the requirements of the Water Framework Directive.

2.0 Legislation

As a Statutory Risk Management Authority, the WLYLIDB has various National and International legislative duties to comply with, regarding the aquatic environment, biodiversity and wildlife sites within the WLYL Internal Drainage District. It should be noted that failure to comply with any of these statutory obligations, has the potential to result in both Personal and Corporate Liability being brought about to both individual Board Members and the Board, by the Enforcement Body. As a result, the Court may issue a fine dependent on the severity of the offence and insist on restorative works being carried out and paid for by the offender; some fines of which may be unlimited. Furthermore, some offences may attract a custodial sentence.

The main legislative drivers are as follows:

2.1 International Legislation

- The Water Framework Directive (2017) – a statutory duty to ensure that reasonable actions are taken to improve the physical and chemical nature of the waterbodies under their management, with the aim of achieving good ecological status or potential of surface waters by 2021. This can be achieved by putting in place environmental improvements or mitigation measures where applicable and undertaking sensitive management of watercourses.
- The Conservation of Habitats and Species Regulations (2017) - a statutory duty in the exercise of any functions, to have regard to this EC Habitats Directive which provides for the designation and protection of 'European sites', the protection of 'European protected species', and the adaptation of planning and other controls for the protection of European Sites.

2.2 National Legislation

- Wildlife and Countryside Act (WCA Act) (1981) imposes a statutory duty to protect native species (especially those at threat), control the release of non-native species and protect SSSIs.
- The Countryside and Rights of Way Act (CROW Act) (2000) – this act amends the WCA Act and enforces a duty for Statutory Authorities to be responsible for conservation and enhancement of SSSIs. It also enhances Natural England's enforcement power.
- Natural Environment and Rural Communities Act (NERC) Act (2006) - a statutory duty to maintain and enhance the natural environment (Habitats and Species set down in Section 41 of the NERC Act (2006)) when carrying out flood risk management activities and meet objectives and targets set out in the WLYL IDB Biodiversity Action Plan.
- Environment Act (2021) – sets clear statutory targets to improve air and water quality, tackle waste, improve biodiversity and make other environmental improvements. The act imposes a statutory duty on Statutory Authorities to enhance biodiversity whilst discharging their duties.

2.3 Protected Species and Habitats and Other Considerations

There are networks of protected species and habits across the UK. Some of these species such as water voles, breeding birds, otters and bats are given full protection under the law for both the individual species and their habitats. Some habitats and species are identified in Section 41 of the NERC Act (2006) and classified as Habitats and Species of Principal Importance, which require specific consideration by public bodies to ensure these habitats or species are maintained or enhanced by the IDB, whilst carrying out our duties as a public body.

Some habitats and species are covered by separate and specific legislation; such as the Badgers Act (1992), the Salmon and Freshwater Fisheries Act (1975), Hedgerow Regulations (1997) and Tree Preservation Orders. We need to ensure that this legislation is considered and complied with when undertaking our works.

2.4 Non Native Invasive Species and Biosecurity

The spread of Non-Native Invasive Species has the potential to cost the WLYLIDB dearly, both in economic terms and in the loss of biodiversity interests. The spread of non-native species e.g. Japanese Knotweed, Signal Crayfish, is illegal under Schedule 9 of the Wildlife and Countryside Act (1981) (as amended). It is therefore unlawful to cause these species to spread as a result of any IDB operational activity.

Biosecurity is key to preventing the spread of these organisms into the WLYLIDB watercourses. The WLYLIDB staff currently do all they can to help prevent the spread of non-native invasive species whilst undertaking operations. When the IDB drains are scoped by the Engineer and Environmental Officer, non-native species locations are recorded and is possible a plan to eradicate or control them is put into action. Staff have undergone training on Non-Native Species and sightings are reported to the Norfolk and Suffolk Records Centres. Training is reviewed and undertaken regularly, and a Biosecurity Policy has been adopted by the Board.

2.5 Conservation Sites – Statutory and Non-Statutory

Where operational activities are to be carried out within or adjacent to statutory designated conservation sites such as SSSIs, SACs, RAMSARs or SPAs permission is required from Natural England before any work can start.

Prior to undertaking an operation which may affect a SSSI, the IDB is required to give formal notice to Natural England under section 28H of the Wildlife and Countryside Act 1981 (as amended).

Prior to undertaking an operation in or adjacent to a site of international importance (SAC, SPA, Ramsar), then under the Conservation of Habitats and Species Regulations 2017 (as amended) the IDB must carry out a Habitat Regulations Assessment (HRA) or where necessary an Appropriate Assessment prior to undertaking an operation. This is carried out in consultation with Natural England. The burden of proof is on the proposer (i.e. the WLYLIDB) to determine that no significant effect will take place on any of the features of interest of the protected site and where an appropriate assessment has been undertaken, then there should be no adverse effect on any of the features of interest.

Some sites which may or may not be designated SPA, could have wintering birds on or close to the working area (i.e. on grazing marshes or near salt marshes). Prior to undertaking works on or near these sites the Environmental Officer will need to assess the time of year (preferably no works will happen during wintering bird season between November and February), and the presence or absence of wintering birds and applying for Natural England assent where applicable.

Non-statutory sites such as County Wildlife Sites (CWS) do not require any formal written permission; however, these sites are noted for their habitats and species, some of which may be protected. These sites have a significant value within the county and it is within everybody's interest to ensure that work does not impact on these sites. Where WLYLIDB are required to work on or near CWS, then the WLYLIDB will liaise with the Suffolk Wildlife Trust and Norfolk Wildlife Trusts prior to starting works.

2.6 Emergency Works

Emergency works may be required to be carried out during exceptional or unmitigated circumstances, such as during periods of extreme weather

conditions or a flood event. In many of these circumstances, third parties and their property may be put at risk. In these, or similar events, it may be necessary to undertake Emergency Works to protect people and their property within the WLYLIDB catchment area. However, these emergency procedures may have the potential to impact on a SSSI or European Protected site. In an emergency situation, it is reasonable to carry out operations in or near the protected site. However, Natural England should be informed of the operation as soon as practicable.

Reporting the emergency operation to Natural England is key to determining a satisfactory outcome to the emergency situation and prevents the deterioration of the site and the wellbeing of species therein. Reporting the operation is fundamental to prevent legal action being taken against the Board for carrying out an illegal operation in a designated site.

2.7 Cultural and Heritage Sites

Landscape, cultural and heritage sites may be present within work areas or adjacent land, some of these such as Scheduled Ancient Monuments and Conservation areas require permission to undertake work on or adjacent to them.

3.0 The Maintenance Requirements of Different types of Watercourses

The WLYLIDB catchment demonstrates a combination of naturally formed but often historically heavily modified gravity streams flowing from the upland as well as low lying highly modified and artificial watercourses lying below mean sea level and relying on one of the 20 pumping stations to regulate water levels and flows.

The gravity watercourses are often varied hydro-dynamic environments, and many exhibit a variety of hydro morphological features ranging from artificial or heavily modified watercourses, through to much more natural and physically diverse headwater streams.

The two types of watercourses, gravitational and pumped need to be considered differently in terms of maintenance:

3.1 Meeting Good Ecological Potential or Status in Gravitational Watercourses

Flowing watercourses have different ecological and physical characteristics to artificially created systems. They are extremely important for wildlife, particularly fish, and are very sensitive to inappropriate management. In addition, the management undertaken on the headwater tributaries has implications for the whole river further down the system.

In general, the more diverse the physical structure of a river then the more diverse and richer the plant and animal community will be within the aquatic environment as a result. It is important that these features and habitats should be retained to preserve the plants and animals they support. The quantity and location of the physical features to be retained will vary from site to site depending on the nature of the watercourse.

Sensitive, targeted maintenance or restoration of a watercourse will be beneficial for wildlife, whilst achieving an appropriate habitat mosaic for the watercourse and will have wider benefits for other species and communities within the river system

The objective of restoration or sensitive management is to maintain or re-create a self-sustaining system using natural processes. However, planning and monitoring of this management is essential if maximum benefit is to be obtained from the operations to inform for future management opportunities.

Physical features will be conserved where they are found in situ and the Board will seek opportunities to liaise with landowners to undertake restoration of natural features and investigate Natural Flood Management opportunities where appropriate. The following important physical features of rivers should be considered during maintenance to enhance or restore:

3.1.1 Pools and Riffles

Pools and riffles are natural formations in gravel-bedded channels. They are dynamic, changing form in response to flood events and are valuable features for the conservation interest of a river. The riffle sections oxygenate the water and provide a spawning habitat for various fish species.

3.1.2 Bends and Meanders

Bends and meanders slow the river down and can be used to help the river spill out onto a natural flood plain and deposit its silt loading in high flow events. Where flood alleviation is required then they can be used in conjunction with the creation of flood relief channels (backwaters) to improve conveyance.

3.1.3 Backwaters

Backwaters are important features in rivers as they provide a wide range of different habitats. Backwaters in continuous connection with the main flow are valuable, particularly as nursery habitat for fish fry. They can act as a flood bypass channel at times of high flow and provide refuge for fish in times of flood or other adverse conditions.

3.1.4 Natural Marginal Berms and Islands

Marginal berms and natural islands help create the natural habitat mosaic for a variety of species and are formed by natural sediment transport processes in the channel bed. Both berms and island are dynamic and change in size and form in response to flood events. These natural structures add diversity to the river and

will cause an increase in the current velocity around them, so creating silt free zones.

3.1.5 Installation or Maintenance of Woody Debris

Woody debris is an important mechanism for increasing diversity of flow and habitat and as such is an essential element of watercourse ecology. Possible options for leaving, repositioning or reintroducing woody debris in a water course will be considered on a site-by-site basis and adopted where practical and appropriate to do so.

3.1.6 Channel Narrowing

The practice of channel narrowing within a stream or river increases velocity, oxygenates the water and improves the diversity of flow along a watercourse. A narrowed channel naturally restores a cleansing dynamic to the watercourse and should thereby reduce maintenance requirements into the future.

3.1.7 Channel Capacity

Flowing watercourses will not be deepened. A deepened channel changes the natural fluvial processes of a watercourse, increases siltation and destroys the hydrological connectivity of a river to its floodplain. Where the necessity for increased channel capacity is required, then the installation of a two stage channel to increase in bank capacity during flood events should be considered.

3.1.8 Riverbank

Straight batters within a watercourse are not encouraged. The preferred approach is to encourage natural processes and diversity. A variety of features can be encouraged or created particularly in the margins such as low level berms, holes, ledges, variations in height and slope etc., together with the natural vegetation. These variations in water depth and cover offer niches to a variety of plant and animal species, increasing biodiversity.

The Board will look to conserve the physical features of the waterbodies it manages and seek opportunities to restore or enhance them elsewhere where appropriate.

3.2 Meeting Good Ecological Potential in Pumped Watercourses

Meeting good ecological potential within the eastern watercourses is a key goal for the WLYLIDB. The legislation and key political drivers have recognised the need to ensure the sustainable management of their watercourses as natural resources within all catchments. This document hopes to strike the balance between helping the drainage infrastructure to meet the overall good ecological potential required of artificial and heavily modified channels under the remit of the Water Framework Directive but also to ensure sufficient conveyance of water to the pumps, particularly during extreme weather events and periods of high flow.

Much of the WLYLIDB catchment lies below sea level and relies on water being conveyed to a pumping station, from where the water is evacuated to a higher level, river, estuary or out to sea. As such, the majority of the WLYLIDB watercourses have historically been artificially created or heavily modified, with the purpose of moving water to a pumping station in times of high flow. The pumped watercourses are not dynamic or fast flowing like those of a gravitational system. Therefore, their purpose needs to be recognised first and foremost and prior to undertaking opportunities to improve their ecological potential. These watercourses should be considered in a similar way to that of a fenland or broadland watercourse.

The appropriate balance between conveyance and good ecological potential must be met. However, the Board will look for opportunities to conserve or enhance the physical and ecological parameters of the watercourses where this is achievable without inhibiting the dedicated function of the watercourse.

The ADA and Environment Agency , “Guide to Management Strategies and Mitigation Measures for Achieving Good Ecological Potential in Fenland Waterbodies” and the Anglian River Basin Management Plan and the EAs Catchment Data Explorer <https://environment.data.gov.uk/catchment-planning/> should also be looked to on a case by case basis for guidance on determining mitigation for WFD designated waterbodies in pumped catchments.

4.0 The Targeted Maintenance Approach

The retention or restoration of the diverse physical nature of the watercourses is key to the requirement of the Water Framework Directive and the biodiversity of

the aquatic environment. These Standard Maintenance Operations aim to provide guidance by way of a series of **Environmental Options** on the appropriate standards to be achieved where restoration cannot be achieved or where maintenance is critical. The watercourse itself, site specific Health and safety and environmental (protected sites and species) implications will all need to be considered when choosing the appropriate targeted maintenance activity from this document. Targeted maintenance works can then be carried out sympathetically with biodiversity interests, the physical nature of the watercourse and opportunities to enhance a watercourse, kept firmly in mind.

Those **Environmental Options** highlighted in **red** have the greatest environmental impact, whereas those highlighted in **green** have the least impact. There is a selection of **red**, **amber** and **green** options to choose from. Where possible and where flood risk allows, the option with the least environmental impact should be selected.

4.1 How the Standard Maintenance Operations will work in practice

This document will be called the Standard Maintenance Operations Policy Document and will be used to inform outside bodies of the way in which the WLYLIDB intend to carry out all future maintenance practices and will act as the basis from which all maintenance practice will initiate. The document will be subject to review on a regular basis. Version control will allow any changes to be recorded.

All Operatives, Contractors, Surveyors and Supervisors asked to carry out maintenance for WLYLIDB will undertake a Training session based on the Standard Maintenance Operations Policy Document. Training needs will be reviewed regularly, in line with any amendments made to the Standard Maintenance Operations Policy Document.

Prior to initiating any Maintenance job, operatives and contractors will receive a job specific toolbox talk. All watercourse maintenance will receive close supervision by a trained Supervisor, Surveyor, Engineer or a member of the Environmental Team.

5.0 The Environmental Options

5.1 Mowing of Bankside Vegetation

The aim of mowing is threefold:

1. It allows unimpeded visibility for the driver.
2. It improves the conveyance of a watercourse.
3. It prevents the establishment of trees and scrub along the nearside water's edge.

Mowing of the bankside vegetation will be carried out by a tractor and flail or a side mounted flail on a 360° hydraulic machine. In some areas where access cannot be achieved or is considered inappropriate for a machine, then strimmer's and hand tools will be utilised.

At many sites in WLYLIDB, mowing does not need to take place due to the size of the machine (>15 tonnes). This is because the driver has good visibility over the vegetation from a raised machine, and even when flailing needs to take place, around 50cm of vegetation height is left leaving good bank cover for wildlife.

Mowing of bankside vegetation will be undertaken throughout the year, though in bird breeding season works will only take place where necessary in low-risk environmental areas. However, prework checks will take place between March to September to ensure nesting birds are not present, prior to maintenance and at all times consider the Boards statutory responsibilities set out in the Wildlife and Countryside Act 1981 (as amended). Prework checks will be recorded on the operator's time sheet.

Where protected species or breeding birds are found then effective mitigation will be put in place to ensure compliance with the law. This may mean delaying works depending on what is found or leaving an appropriate buffer zone on either side of a nest. The length of the buffer zone will be species specific.

The flail height should be set to 150mm minimum to ensure water vole are not disturbed or displaced by the mowing activity (*as per Annex B Management Activities IDB Water Vole Class Licence*).

5.1.1 Environmental Option M5

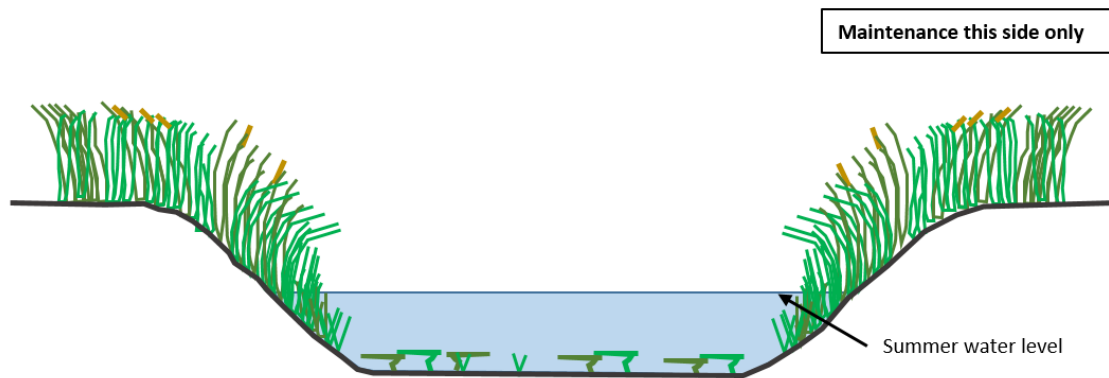
Visibility for the driver is crucial in being able to carry out targeted maintenance. However, appropriate visibility to carry out operations may be achieved by applying a, “Health and Safety Cut” to the batter and bank top.

- A 1m vegetated zone above the watercourse is left uncut but the remaining batter and one cut is taken from the nearside banktop, to determine the edge of the watercourse and help prevent the machine from falling in the water. The flail height will be set to 150 mm.
- Where there is less freeboard and the batter is less than 1m, the remaining vegetated zone will be left and one cut will be taken along the bank top. The flail height will be set to 150 mm.

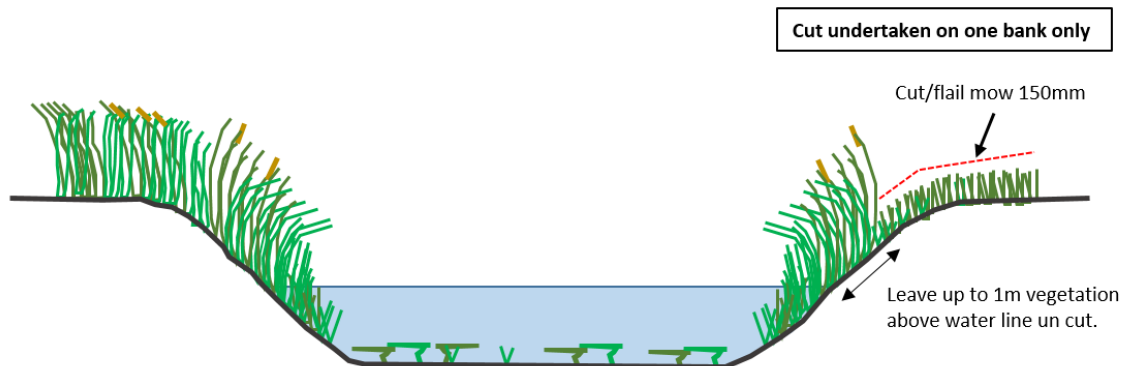
No WFD assessment required prior to instigating this method.

M5 Grass Control

Before Operation



After Operation



5.1.2 Environmental Option M4

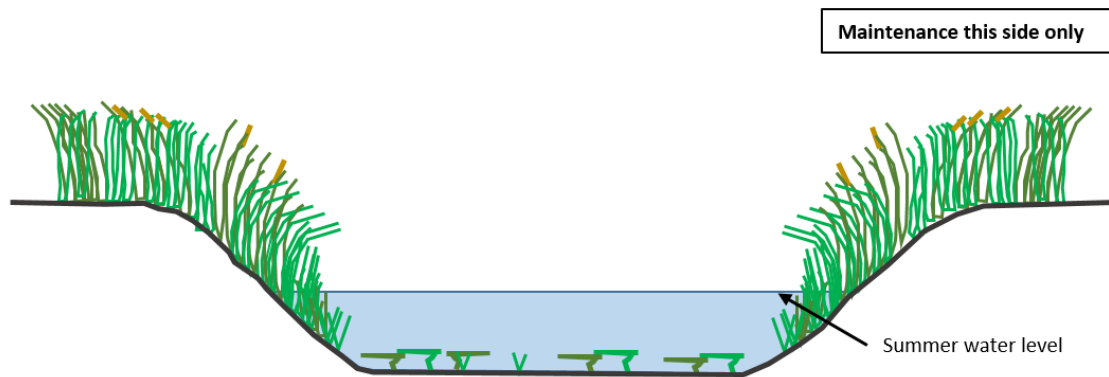
Where Environmental Option M5 is deemed inappropriate due to access issues, flood risk or more serious site based Health and Safety factors then mowing should take place down the nearside batter only to the waters edge and one cut along the nearside bank top.

The flail height will be set to 150mm.

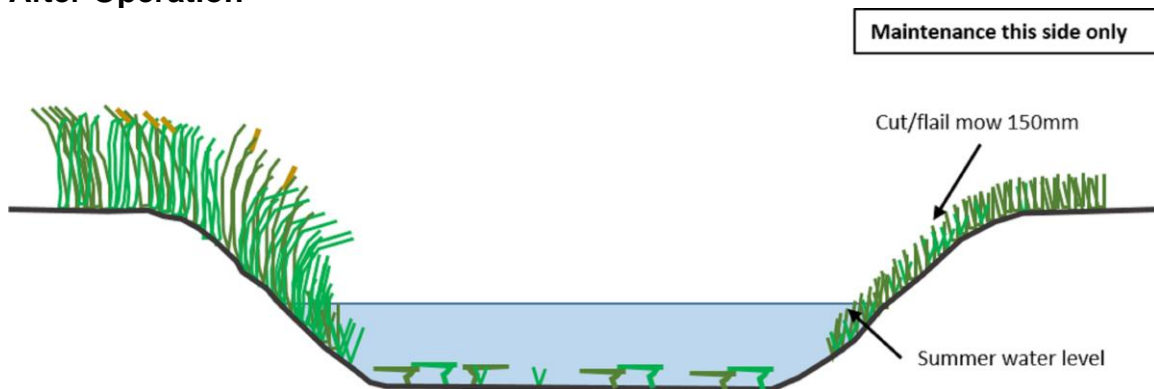
No WFD assessment required prior to instigating this method.

M4 Grass Control

Before Operation



After Operation



5.2 Emergent and Instream Weed Control

The Board removes vegetation from watercourses mechanically, using a weed cutting basket attached to a 360° hydraulic machine. Where this is not practical, due to the size of the watercourse or impeded access, then manual clearance is employed using hand tools, such as a chrome.

Emergent and instream vegetation clearance will be undertaken throughout the year, though in bird breeding season works will only take place where necessary in low-risk environmental areas. However, prework checks will take place between March to September to ensure nesting birds are not present, prior to maintenance and at all times consider the Board's statutory duties set out in the Wildlife and Countryside Act (1981) (as amended).

No work will take place in designated sites during bird breeding season under normal environmental conditions. Work should not be planned during bird breeding season or between November and February during overwintering bird season. However, under unusual environmental conditions, consultations will take place and appropriate planning of such works will be undertaken on a case by case basis.

5.2.1 Instream Weed Control in Pumped Catchment drains

The main aim of emergent and instream weed control is to allow unimpeded water flow within the banks of the watercourse and improve conveyance. Weed cutting will take place cyclically as part of a regular rolling programme. In addition, drain maintenance is required to conserve the various stages of colonisation of the drains for their designated features and prevent succession taking place.

To accommodate access to growing crops and to satisfy conservation interests, wherever possible alternate banks will be maintained from one clearing cycle to the next. Some important pumped drains may require maintenance more than once in one year. Wherever possible the work will be carried out on one side of the drain in any one year cycle.

The weeding basket should always be set to ensure no deepening of the watercourse occurs during the process of weed cutting. In most instances in

drains greater than 2m, a margin of emergent vegetation will be left uncut at the waters edge as wide as it is practical to do so.

Instream weed control will work in conjunction with the mowing regime specified in Section 5.1. Weedcutting will be carried out using one of a series of options:

5.2.1.1 Pumped Catchment - drains less than 2m wet width

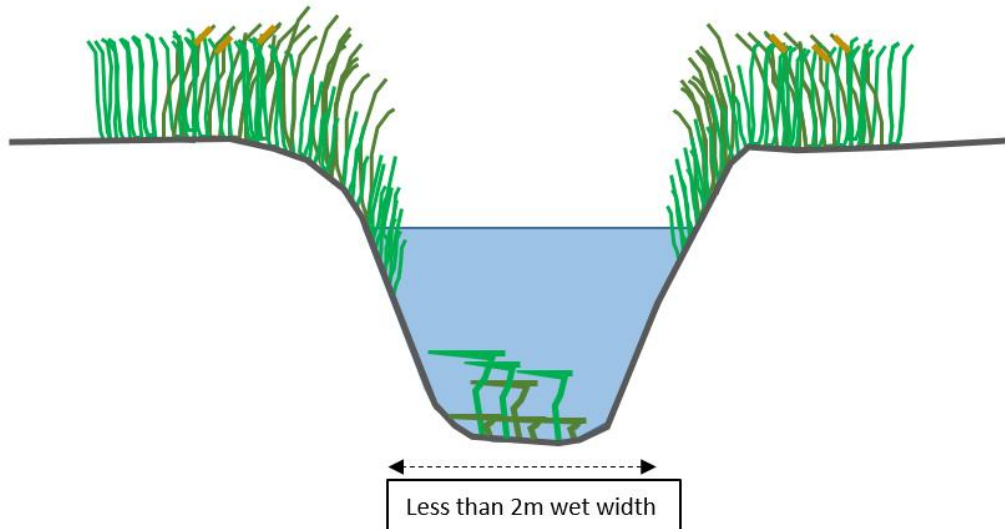
In narrow drains all instream emergent vegetation will be removed, and no fringe will be left. Cut material should be set back behind the machine as far as possible or placed on the opposite bank top. Care will be taken not to place material on floristically rich areas, wet flushes or block grips. No wet vegetation or mud should be allowed to slip down the bank face.

No WFD assessment will be undertaken prior to this operation.

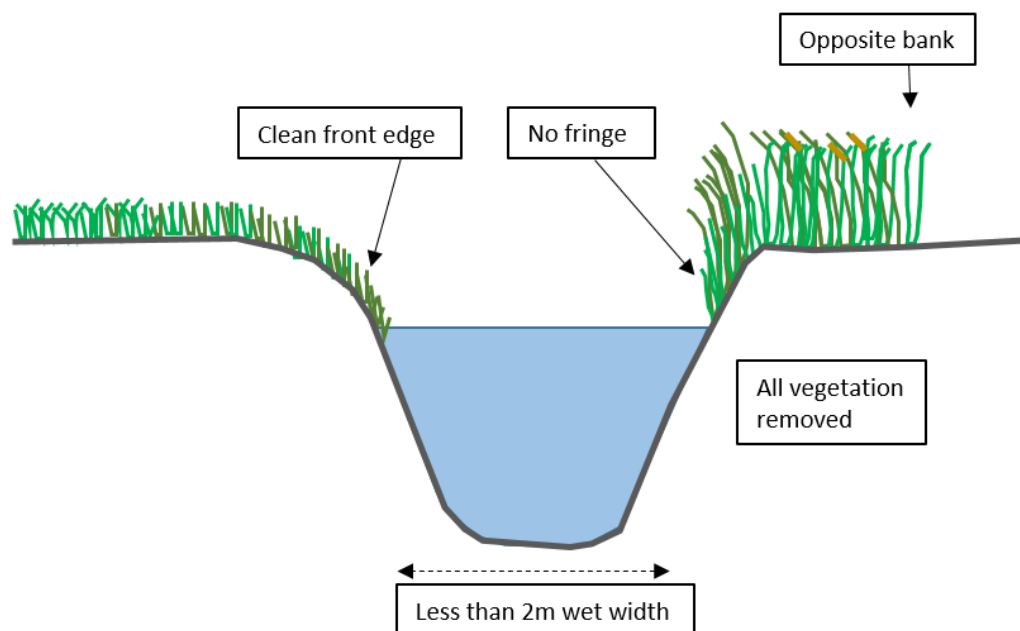
Weedcutting Instream Vegetation

Pumped Catchment - drains less than 2m wet width

Before Operations



After Operations



5.2.1.2 Pumped Catchment - drains greater than 2m wet width – Leave opposite margin

This practice allows for a margin to be created on the opposite bank. The margin consists of leaving as much wet width vegetation *in situ*, as far as is practicable for the size of drain (Approx 10-20% remaining.) The nearside toe will not be exposed or touched by the weedcutting basket.

Cut material should be set back behind the machine as far as possible or placed on the opposite bank top. Care will be taken not to place material on floristically rich areas, wet flushes or block grips No wet vegetation or mud should be allowed to slip down the bank face.

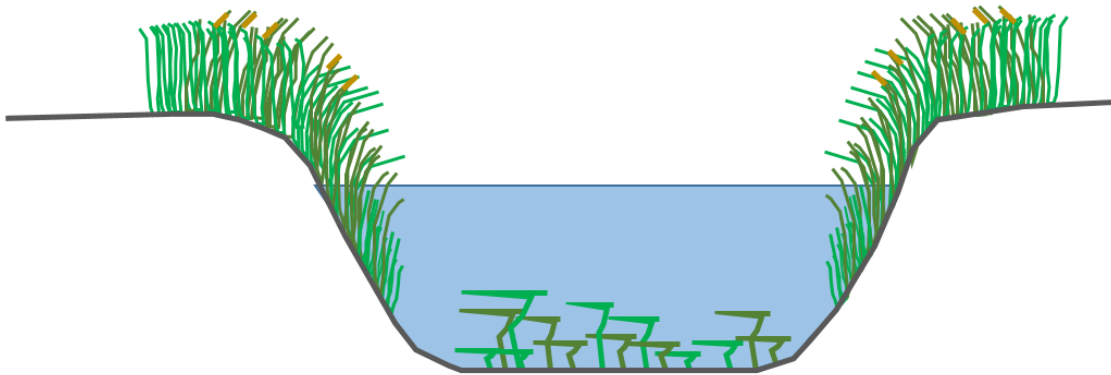
The weed cutting basket should be set to ensure that no deepening of the section takes place.

No WFD assessment will be undertaken prior to instigating this method.

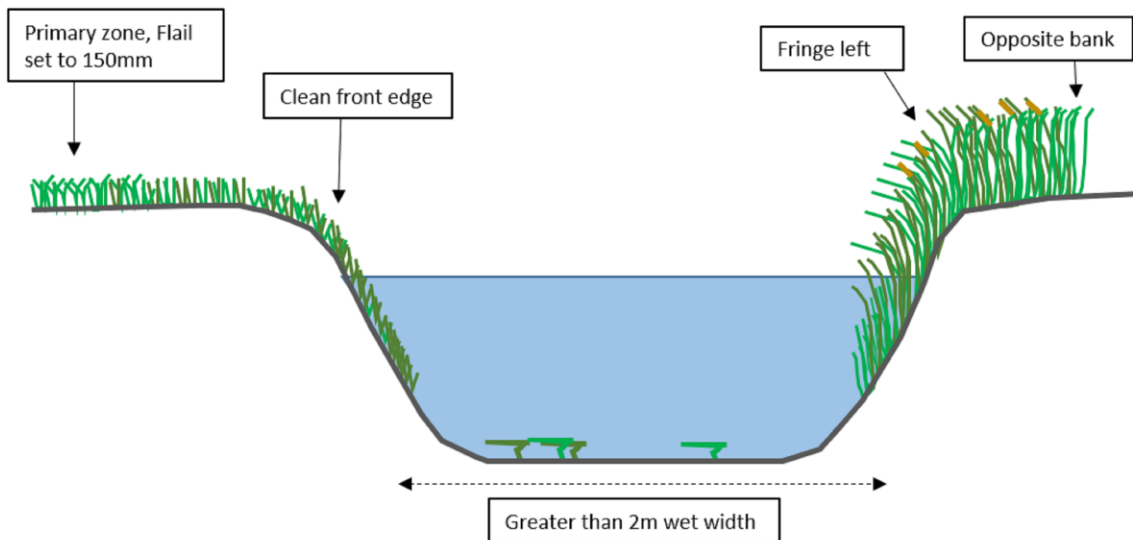
Weedcutting Instream Vegetation

Pumped Catchment- drains greater than 2m wet width - Leave opposite margin

Before Operations



After Operations



5.2.1.3 Pumped Catchment - drains greater than 2m wet width – Leave opposite and nearside margin

This practice allows for a margin to be created on the opposite bank and between 60-80% of the instream vegetation to be removed centrally. The margin consists of leaving as much wet width vegetation as far as is practicable for the size of the drain *in situ* (20-40%). The nearside toe should not be exposed or touched by the weedcutting basket.

Cut material should be set back behind the machine as far as possible or placed on the opposite bank top. Care will be taken not to place material on floristically rich areas, wet flushes or block grips. No wet vegetation or mud should be allowed to slip down the bank face.

The weed cutting basket should be set to ensure that no deepening of the section takes place.

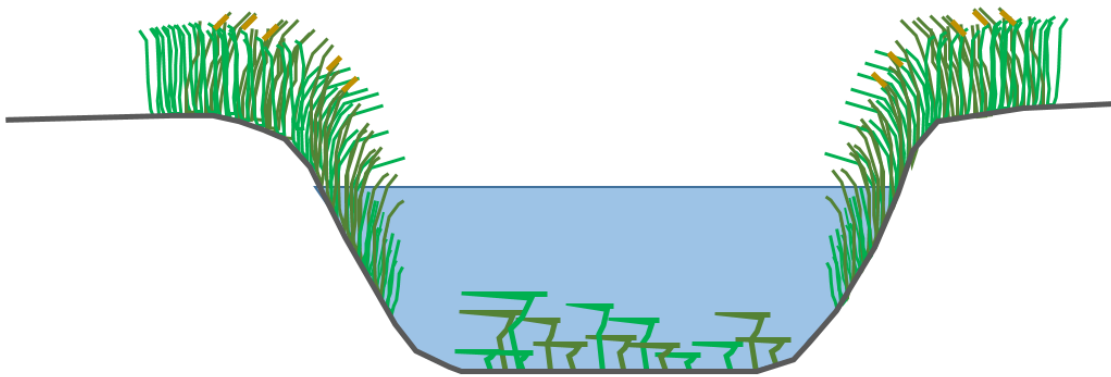
No WFD assessment will be undertaken prior to instigating this method.

Weedcutting Instream Vegetation

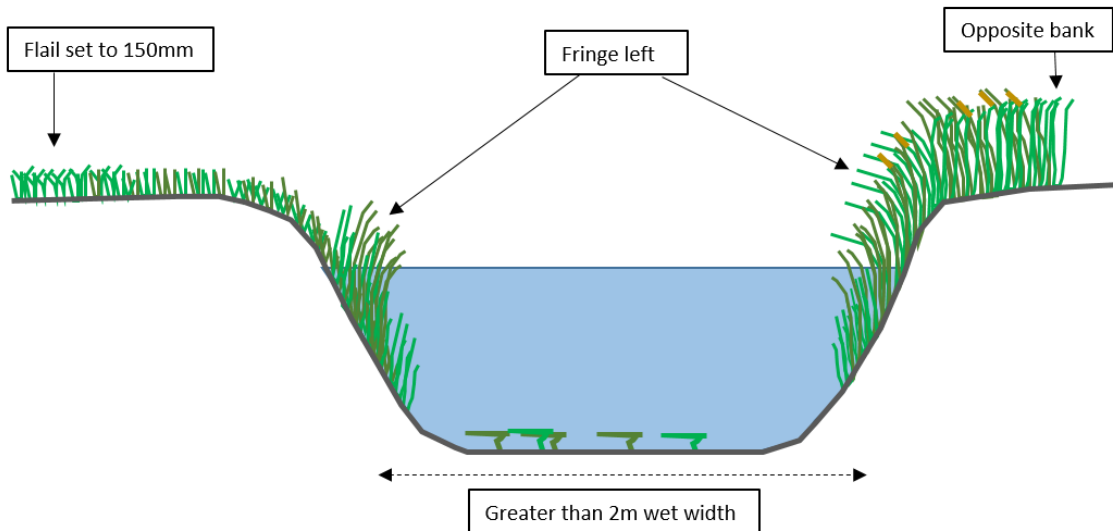
Pumped Catchment- drains greater than 2m wet width – Leave opposite and nearside margin

Leave opposite margin

Before Operations



After Operations



5.3 Weedcutting in a Gravity Catchment

Weedcutting maintenance should be undertaken in a sympathetic manner by means of sustainable targeted maintenance.

The flows of the watercourse should be enhanced by various means, such as cutting a sinusoidal pattern through the weed, mimicking the rivers natural flow pattern, enhancing natural berm creation or reading the instream flows to allow water to be deflected from side to side to enhance instream flow dynamics.

Each site must be considered on a case by case basis. Various options are illustrated below:

5.3.1 Gravity Catchment - Environmental Option W7

This option allows an uneven margin to be created on the opposite bank, leaving at least 10% of the wet width vegetation left in situ in gravity watercourse less than 10m wet width.

In watercourses greater than 10m wet width, a minimum of 20% vegetation should be left on the opposite bank. Where instream vegetation allows, the nearside margin will have patches of vegetation left in a uneven manner. The nearside toe should not be exposed or touched by the weedcutting basket.

Cut material should be set back behind the machine with care being taken not to place on wet flushes or block grips. Material should ideally be placed on the historic spoil bank. Wet vegetation should not be let slip down bank face.

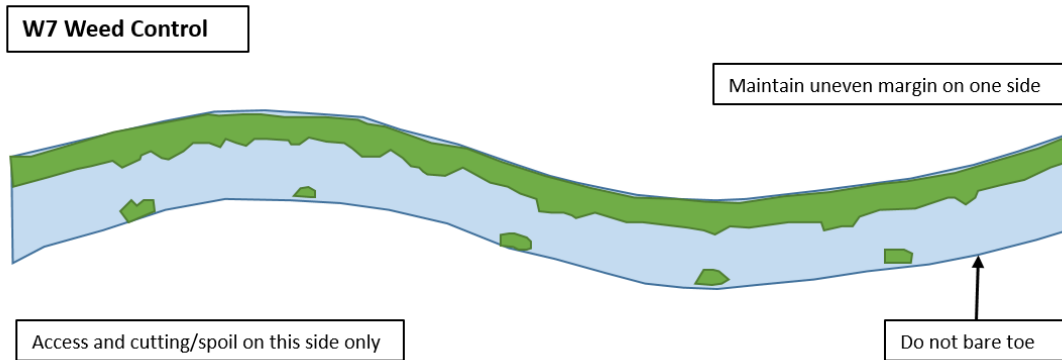
The weed cutting basket should be set to ensure that no gravels are removed from the watercourse and that no deepening of the section takes place.

No WFD assessment required prior to instigating this method.

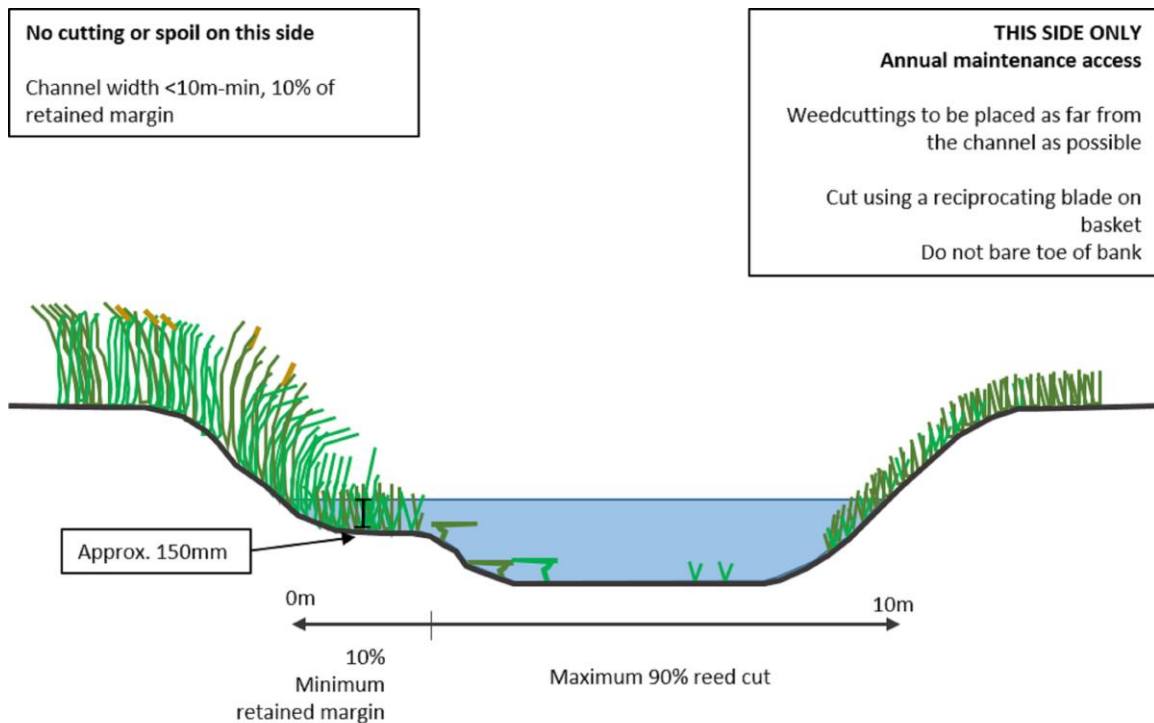
Gravitational Watercourse

W7 Weed Control

Aerial View of Operation



Profile View of Operation



5.3.2 Gravity Catchment -Environmental Option W3

This option allows for 50% of the instream vegetation to be removed centrally, in a sinusoidal manner to allow instream diversity to be maintained and allow silt deposition to occur to encourage narrowing and berm formation. The nearside toe should not be exposed or touched by the weedcutting basket.

Cut material should be set back behind the machine with care being taken not to place on wet flushes or block grips. Material should ideally be placed on the historic spoil bank. Wet vegetation should not be let slip down bank face.

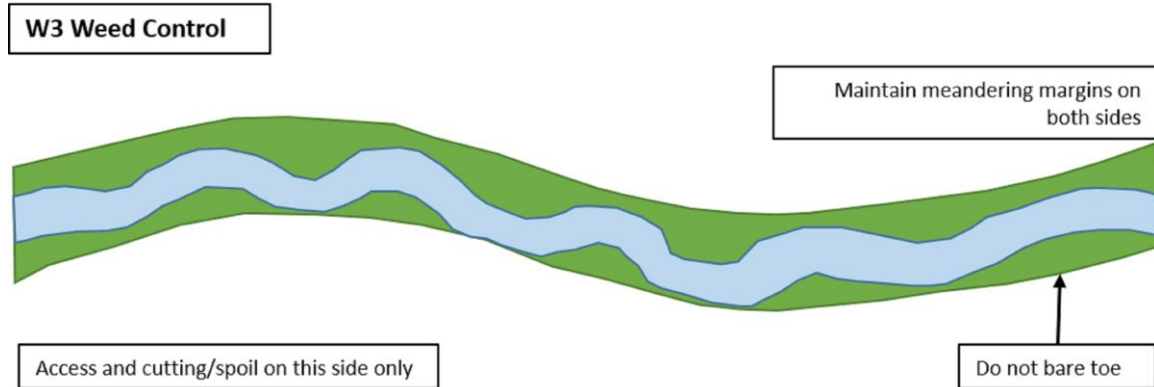
The weed cutting basket should be set to ensure that no gravels are removed from the watercourse and that no deepening of the section takes place.

No WFD assessment required prior to instigating this method.

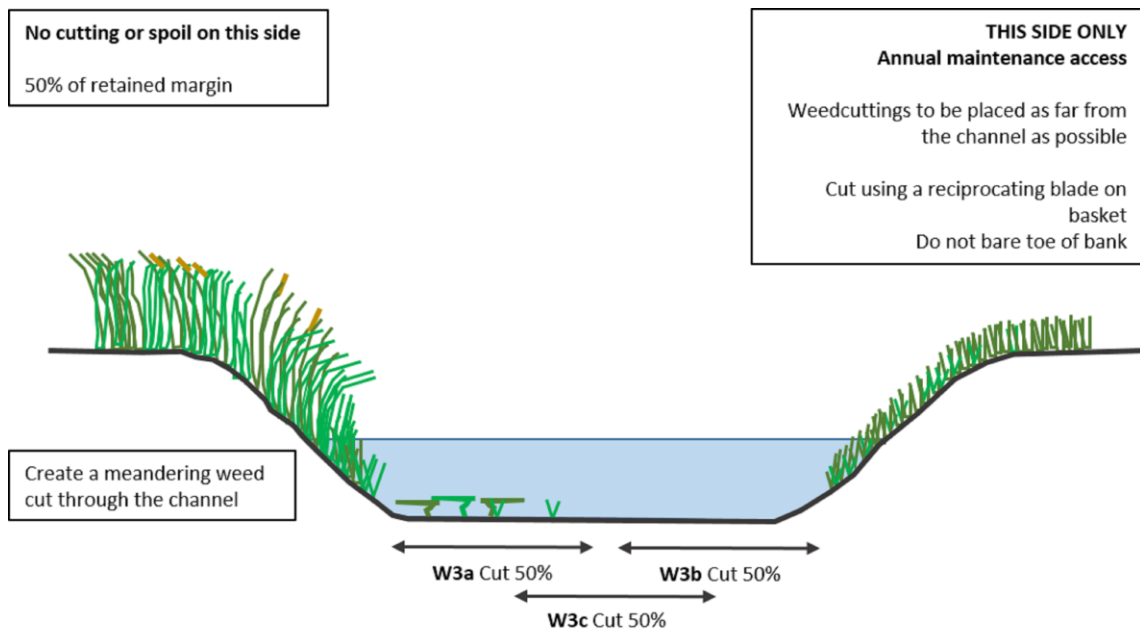
Gravitational Watercourse

W3 Weed Control

Aerial View of Operation



Profile View of Operation



5.3.3 Gravity Catchment - Environmental Option W2

This option allows for 80% of the instream vegetation to be removed centrally, in a sinusoidal manner to allow instream diversity to be maintained and allow silt deposition to occur to encourage narrowing and berm formation. The nearside toe should not be exposed or touched by the weedcutting basket.

Cut material should be set back behind the machine with care being taken not to place on wet flushes or block grips. Material should ideally be placed on the historic spoil bank. Wet vegetation should not be let slip down bank face.

The weed cutting basket should be set to ensure that no gravels are removed from the watercourse and that no deepening of the section takes place.

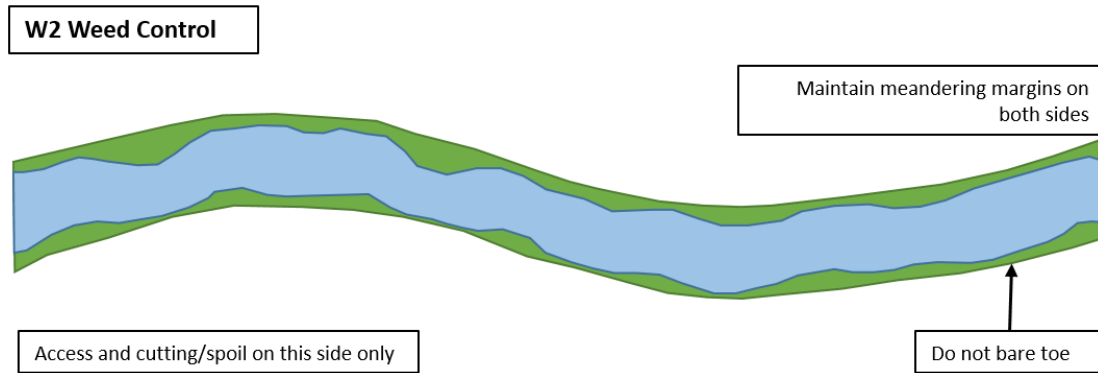
Where there is a flood risk need for this option to be considered, a WFD assessment will need to be undertaken prior to works.

A WFD assessment will be required prior to instigating this method.

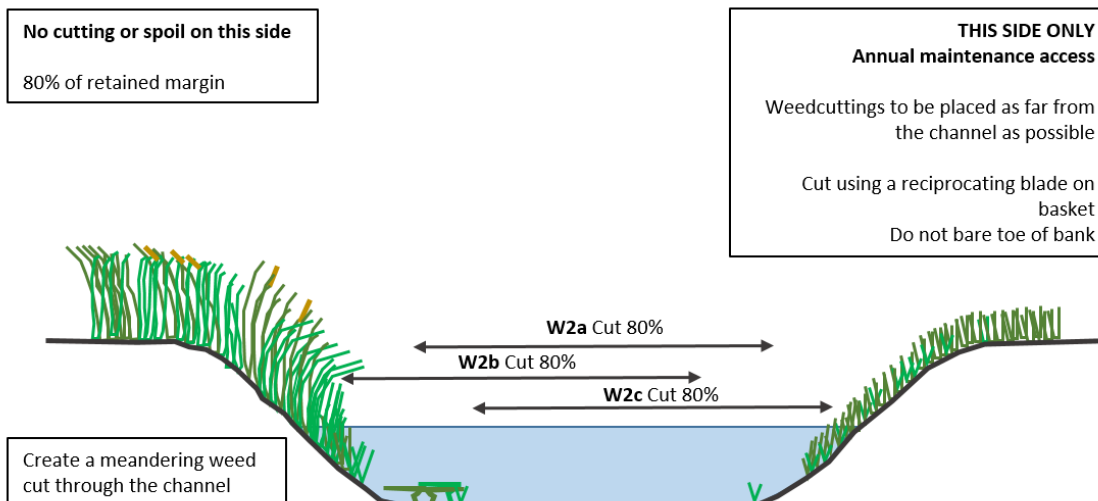
Gravitational Watercourse

W2 Weed Control

Aerial View of Operation



Profile View of Operation



5.3.4 Gravity Catchment - Environmental Option W1

This option allows for all the instream vegetation to be removed. The nearside toe should not be exposed or touched by the weedcutting basket.

Cut material should be set back behind the machine with care being taken not to place on wet flushes or block grips. Material should ideally be placed on the historic spoil bank. Wet vegetation should not be let slip down bank face.

The weed cutting basket should be set to ensure that no gravels are removed from the watercourse and that no deepening of the section takes place.

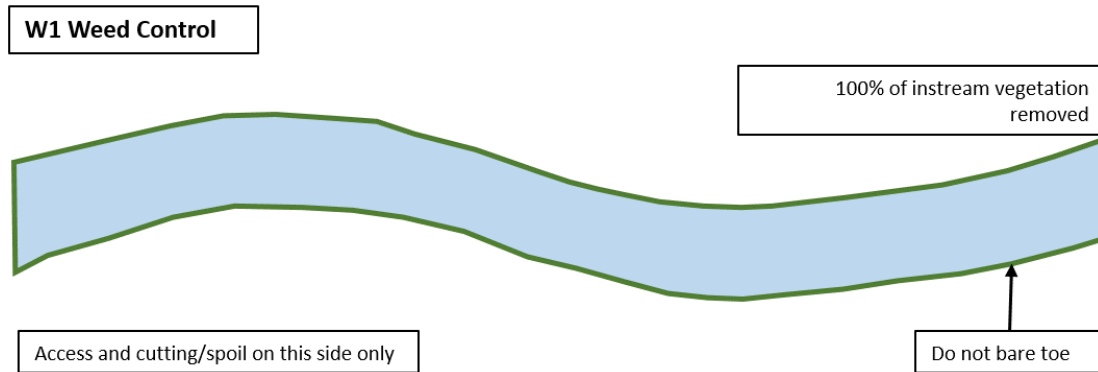
Where there is a flood risk need for this option to be considered, a WFD assessment will need to be undertaken prior to works.

A WFD assessment will be required prior to instigating this method.

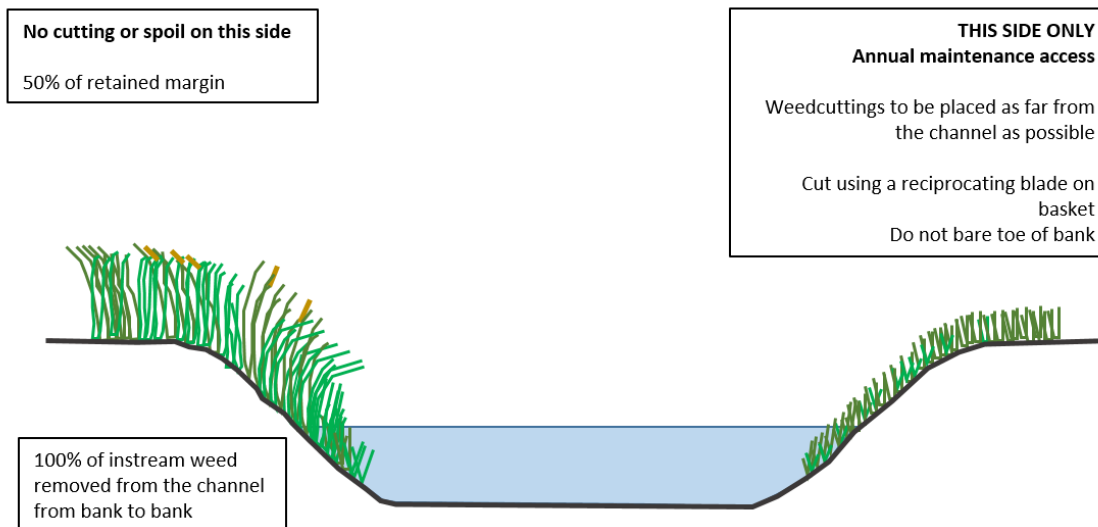
Gravitational Watercourse

W1 Weed Control

Aerial View of Operation



Profile view of Operation



5.4 Tree and Bush Management

Bankside trees and shrubs provide shade and keep water cool. Instream branches improve the ecology of the watercourse in watercourses by providing food and substrate for invertebrates and cover and food for fish. Over time, instream branches add natural diversity to the surrounding aquatic environment by altering the physical hydraulic function of the watercourse, which may result in scours and pool and shoal formation.

With the high ecological benefits attributed to the aquatic environment by trees, the first consideration prior to any tree, bush or branch removal should be, does it really need removing?

The aim of tree management is threefold:

1. To allow unimpeded access for machinery into a site and prevent damage to the machine e.g. Hydraulic pipework becoming caught up in branches.
2. To prevent the sides of watercourses becoming overgrown and, in some instances, over shaded.
3. To prevent instream blockages occurring in areas of high flood risk.

Tree and bush work can be undertaken between August – March. Prework checks are recommended between August to September and Mid-February to March to ensure nesting birds are not present, prior to maintenance. It is an offence under the Wildlife and Countryside Act (1981) to recklessly disturb a breeding bird or its nest during the bird breeding season and tree work during these seasons is not recommended. Any tree work required during bird breeding season may be undertaken only following consultation with and having had appropriate checks undertaken by the Environmental Team.

Veteran trees may be subject to a Tree Preservation Order or may provide roosting sites for bats. Fallen trees or root systems may also act as couches or holts for Otter. The root systems may provide cover for White Clawed Crayfish. It is crucial then those trees are not cleared without prior investigation by the Environmental Team as this may constitute an offence under the Conservation of Habitats and Species Regulations (2017).

Dead trees should be left in situ as ecologically they can provide niches for a rich diversity of species, ranging from invertebrates to birds and bats. These should

be left and not be touched without prior investigation by the Environmental Team as this may constitute an offence under the Conservation of Habitats and Species Regulations (2017).

Where board's operators have found it necessary to remove or trim overhanging trees or shrubs, then trees and bushes can be cut up as wood piles or left on the bank top to enhance the terrestrial habitat.

Waste timber may also be chipped and spread where the landowner is happy for this to occur and where no detriment will be caused to the surrounding environment. Alternatively, the chippings or waste timber can be removed from site.

Burning is not recommended, however where it is necessary to do so it should be carried out under an EA Waste Exemption licence, on high ground and / or away from species rich environments. No burning should take place on peat.

A choice of four **Environmental Options** can be employed:

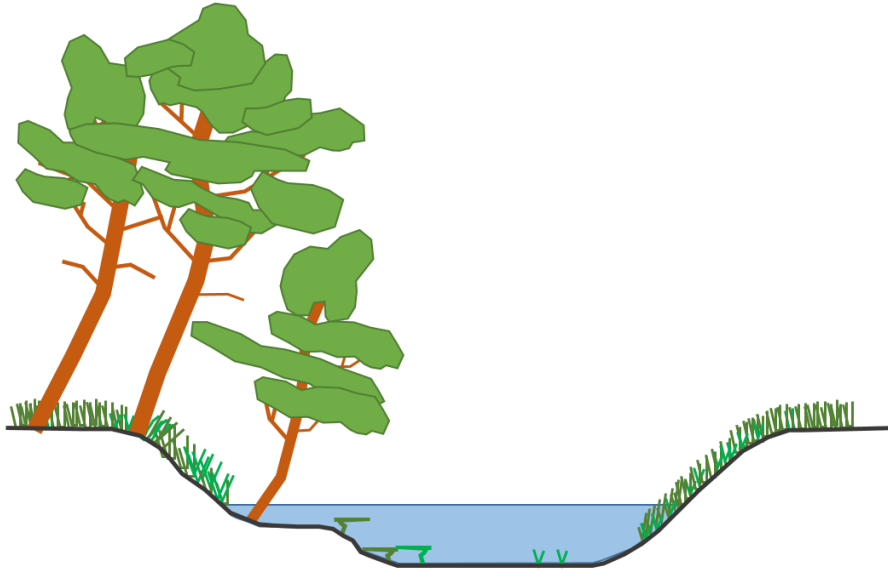
5.4.1 Environmental Option TB4

Where a tree or bush has a trunk only growing in the water and there are other trees behind, offering shade, then the tree can be removed where necessary. Cuttings should be removed from the channel.

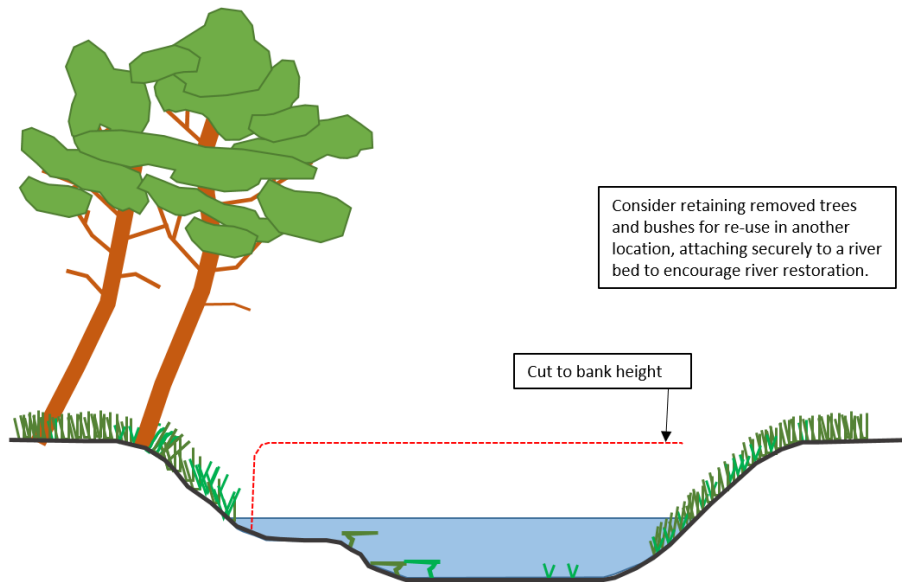
No WFD assessment required prior to instigating this method.

TB4 Tree and Bush Management

Before Operation



After Operation



Consider retaining removed trees and bushes for re-use in another location, attaching securely to a river bed to encourage river restoration.

Cut to bank height

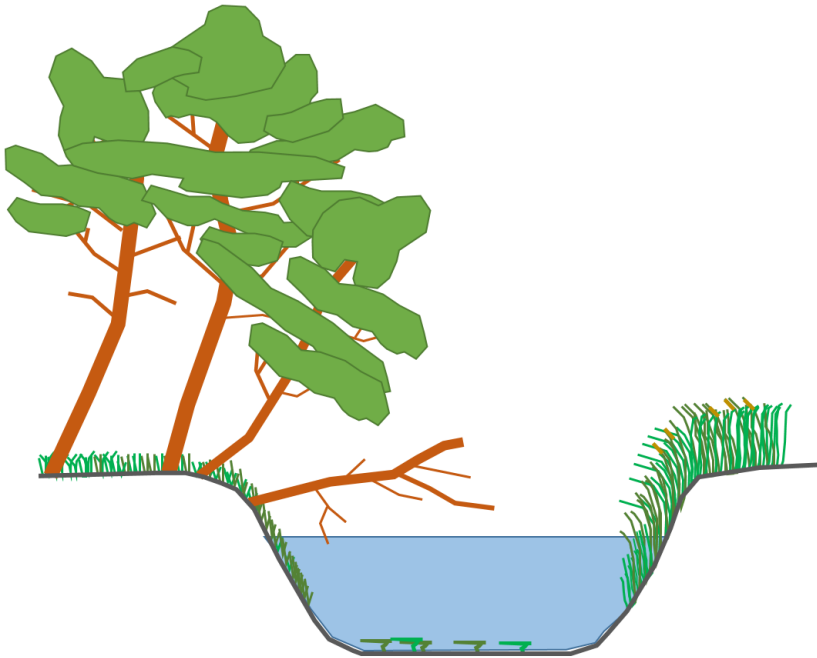
5.4.2 Environmental Option TB3

Where a tree or a bush has branches overhanging the watercourse but not actually within the water, then overhanging limbs can be removed up to the height of the bank top only. The remaining tree remains in situ.

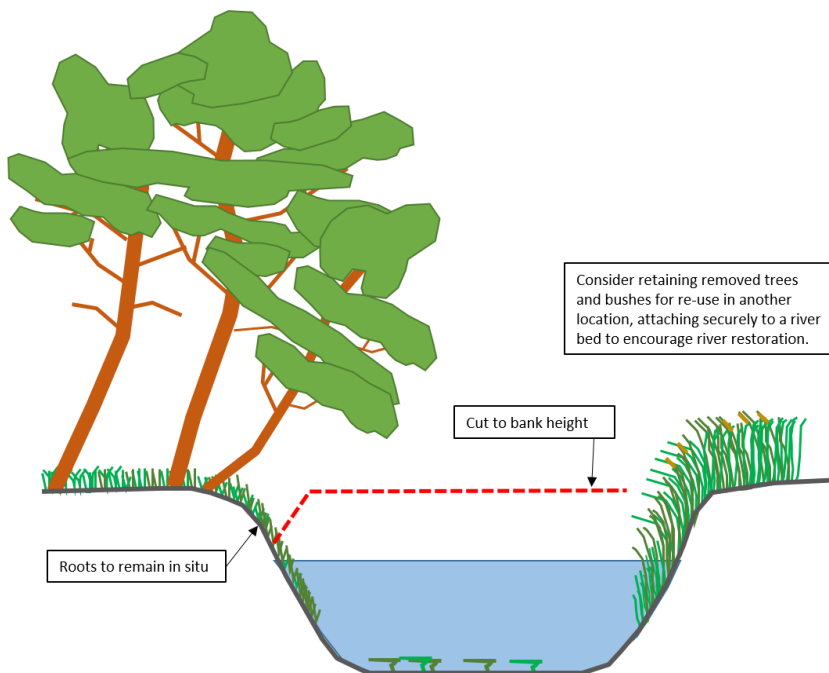
No WFD assessment required prior to instigating this method.

TB3 Tree and bush management

Before Operation



After Operation



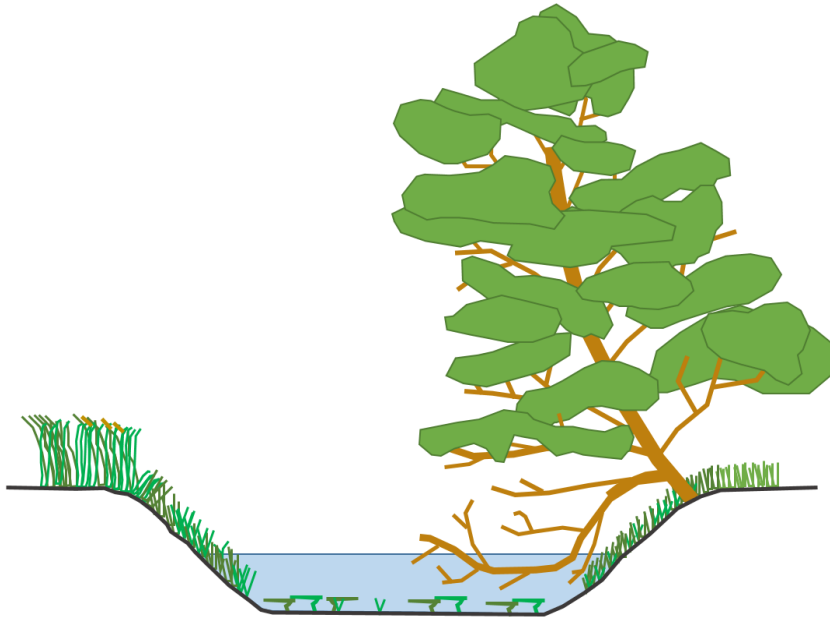
5.4.3 Environmental Option TB2

Where a tree or a bush has overhanging branches trailing in the water, then these can be removed up to bank height and the rest of the tree left in situ. It may then be possible to install the removed branches in a more appropriate position. This should be a consideration to lessen the ecological impact of removal. However, installing branches in a pumped drain will not be appropriate.

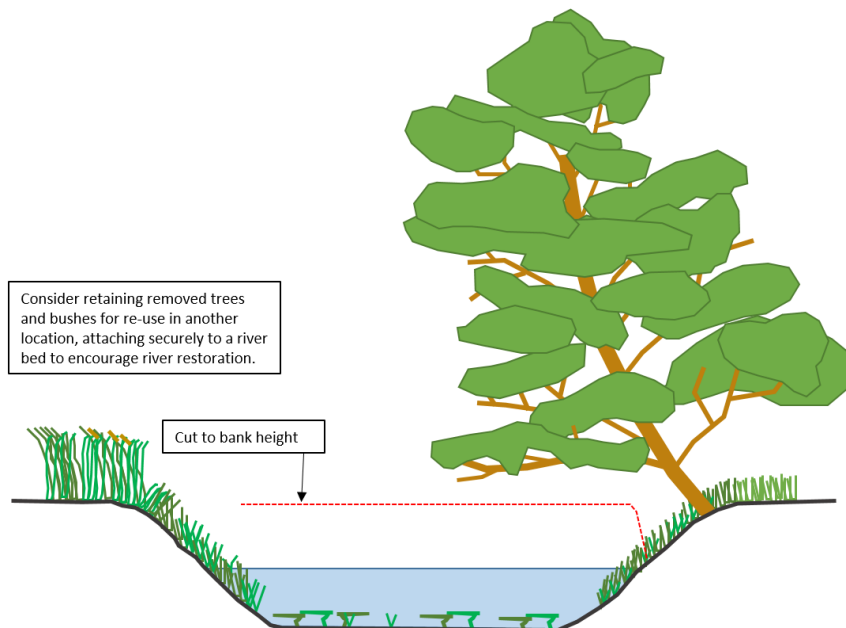
A WFD assessment will need to be undertaken prior to works.

TB2 Tree and bush management

Before Operation



After Operation



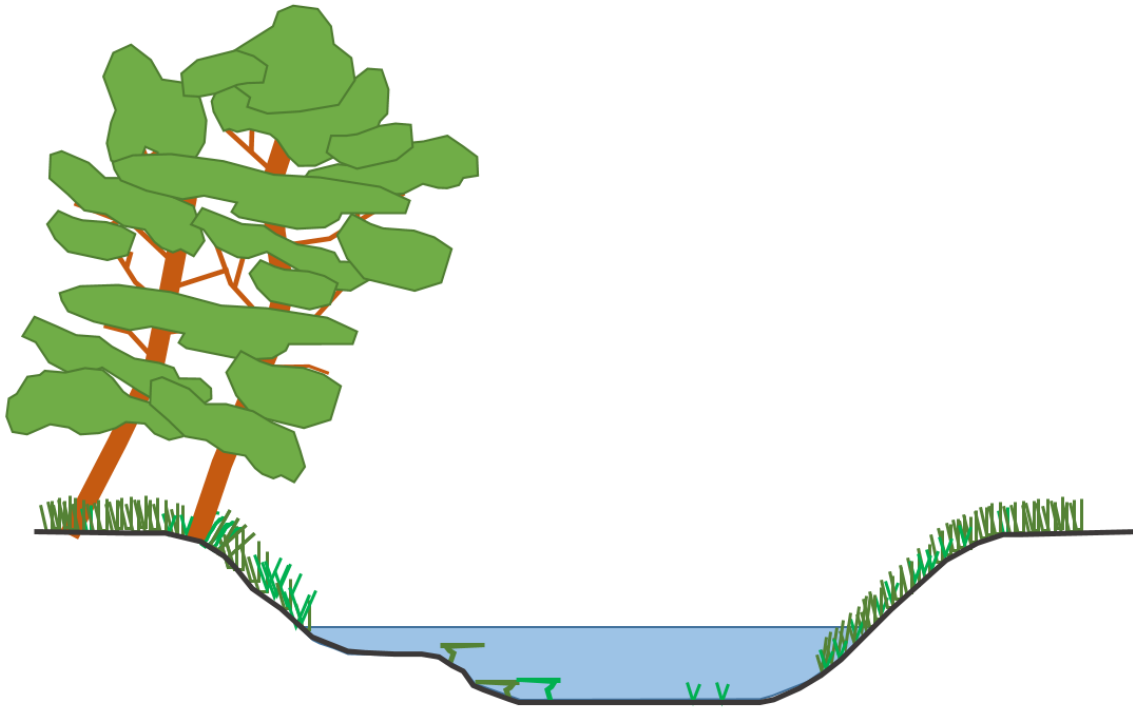
5.4.4 Environmental Option TB1

Where trees or bushes are standing away from the watercourse, but access is required or flood risk is an issue, then trees can be felled near the watercourse.

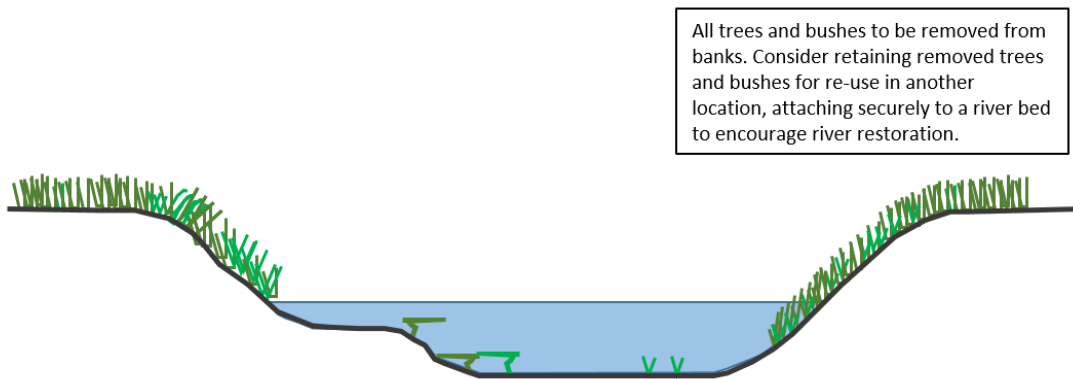
A WFD assessment will need to be undertaken prior to works.

TB1 Tree and bush management

Work to be phased over a number of years
Before Operation



After Operation



6.0 Instream Silt Removal

The low energy nature of the pumped system of the WLYLIDB catchments, makes it prone to having silts accrete within the system. The frequency of silt removal will depend upon the characteristics of the watercourse and surrounding land use. Some drains will therefore require attention more frequently than others. However, channels will usually be desilted, only when the depth of silt affects the hydraulic capacity and conveyance of the drain and where it affects pumping efficiency.

The environmental risk involved in silt removal in the WLYLIDB catchments, is deemed to be high, therefore each operation involving instream silt removal will be looked at carefully on a case by case basis. A WFD assessment will be required prior to all desilting operations taking place and mitigation measures will be put in place as required. Where there is the need to remove silts from the beds of watercourses the minimum of channel de-silting will be undertaken in order to promote good aquatic communities and look for opportunities to undertake ecological improvement.

The Board uses hydraulic excavators which can operate through 360° to desilt watercourses, a gridded bucket or desilting bucket is used to remove the silt but allows water to escape. The Board has powers under Section 15 of the Land Drainage Act, 1991 to deposit material arising from the maintenance of a watercourse on the banks and within 9m of the watercourse.

De-silting is a planned activity and as far as is practicable should be undertaken between October and February, when water temperatures are cool. However, where works are deemed necessary at other times of the year such as September and March, then a prior assessment of works by the Environmental Team will take place and regular dissolved oxygen monitoring will be undertaken prior to and during operations. Monitoring will ensure organic material within silt does not impact upon dissolved oxygen levels within the watercourse and cause fish kills. Where dissolved oxygen levels are deemed too low, work will be stopped.

Where protected species, wintering or breeding birds are found, prior to a planned programme of works, then effective mitigation will be put in place to

ensure compliance with the law. This may require delaying the works depending on what is found. Desilting operations will likely be carried out in conjunction with the mowing regime specified in Section 5.1.

No removal of any bed material (dredging) will take place during the desilting process as this will likely result in the deepening of a watercourse which will be detrimental to the hydro morphology and ecology of the watercourse (see section 6.1). Slubbing's will be placed well back behind the machine, preferentially on an historic spoil bank, to prevent spoil being washed back into the water and reduce further nutrient enrichment of the watercourse.

Leaving a fringe of marginal vegetation will serve to minimise risks of environmental harm, maintain the seed bank and leave cover and food for invertebrates and other aquatic animals. However, there may be situations where the watercourses are narrow, where a drain will need to be desilted from bank to bank, to maintain its land drainage function. All the options will be considered very carefully in relation to conveyance, prior to undertaking a desilting exercise.

In drains where maintenance is being undertaken on a greater than annual cycle, a check will be undertaken to ensure maintenance is not impacting on Wildlife and Countryside Act (1981) Schedule 5 species, please see Table 2: Schedule 5 Species and other protected groups present in WLYLIDB, Appendix 11.2, and Table 3: Maintenance and protected species, Appendix 11.3.

There are 3 possible options for desilting operations in pumped catchment drains and 4 possible options in gravity drains:

6.1 Desilting in Pumped Catchment drains

Desilting in a pumped catchment may be required from time to time to maintain conveyance in these slow moving or often still, linear watercourses. Silts washed in from farmland, roads or development can accumulate over time and can be particularly problematic around culverts, water control structures or in front of pumping stations. Desilting if undertaken sensitively can have a positive influence on drainage channels in allowing early coloniser plants such as stoneworts or pondweeds gaining a foothold where the seedbank has been disturbed. The Board has no wish to undertake desilting too regularly as it can be expensive and if undertaken too often or in an unsensitive manner, may denude a watercourse of instream macrophytes. Therefore appropriate land management is an important consideration for landowners or tenants to ensure catchment sensitive farming practices are in place to prevent diffuse pollution entering the watercourse in the first instance, which may cause conveyance problems to the Board as well as wider scale catchment eutrophication issues.

There are 3 options to drain desilting in a pumped catchment, determined by the width of the watercourse, flood risk and the ecological sensitivity of the watercourse:

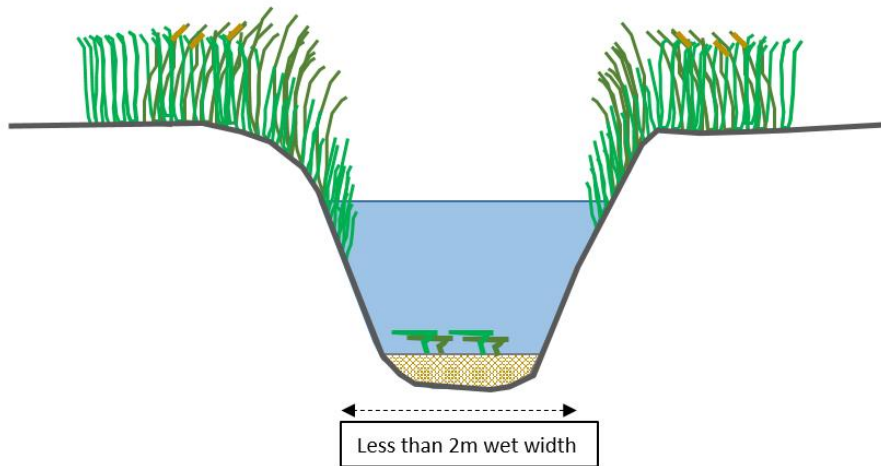
6.1.1 Desilting drains less than 2m wet width – Narrow drains

In narrow drains less than 2m wet width, all emergent vegetation and slubbings will be removed and no fringe will be left. All removed slubbings will be set back behind the machine, preferably on an historic deposition pile or where circumstances dictate, slubbings can be put across the drain as far as possible on the opposite bank top.

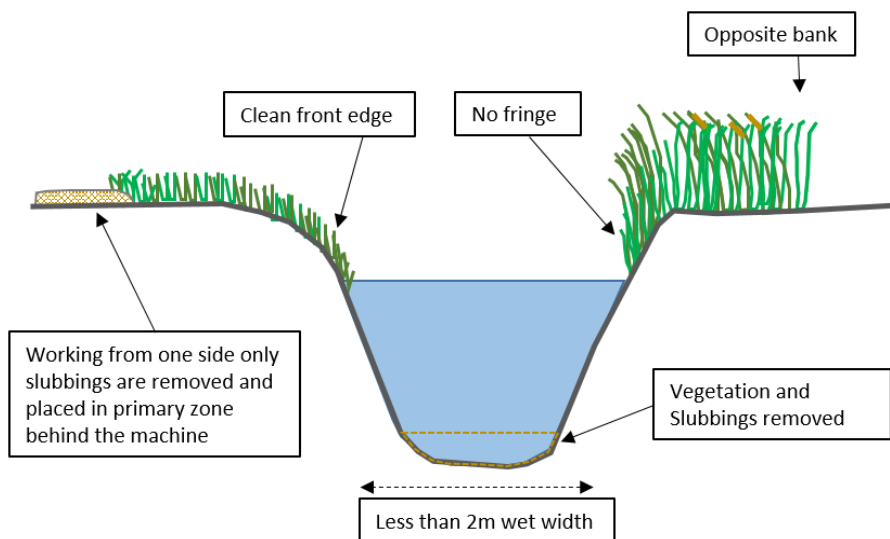
Wet material or mud should not be allowed to slip down the bank face and should not be placed on floristically diverse areas, wet flushes, fill in grips or impact on habitat requirements of Schedule 5 species. The front face of the bank should remain clean.

A WFD assessment will need to be undertaken prior to works.

Before Desilt



After Desilt



6.1.2 In drains greater than 2m wet width - Leave opposite margin

In drains greater than 2m wet width, a fringe of emergent vegetation will be left on the opposite emergent margin to act as a seed bank and refuge area. The machine will work from one bank only.

An appropriate margin of silt and vegetation should be left *in situ* as far as is practicable for the size of the drain (10-20% approx.). The nearside toe should not be exposed or touched by the slubbing bucket.

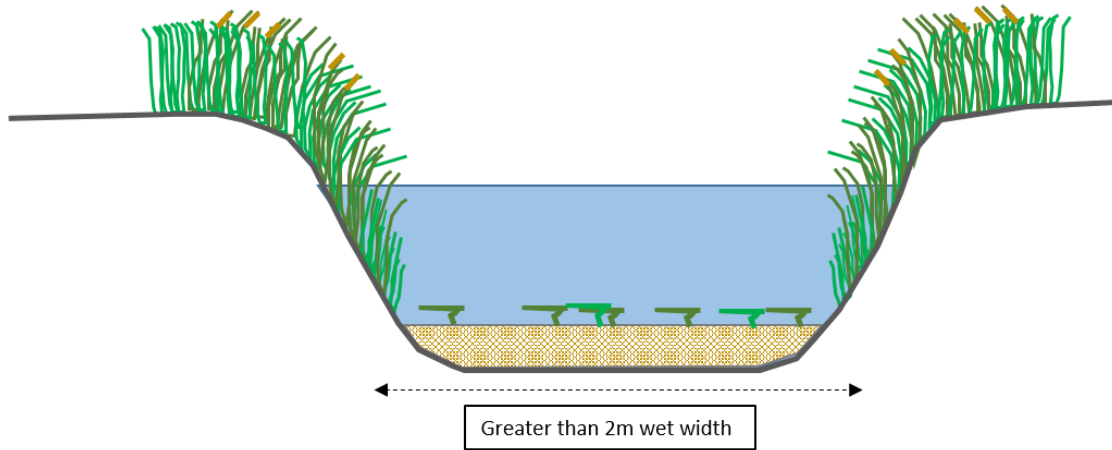
All removed slubbings will be set back behind the machine, preferably on an historic deposition pile or where circumstances dictate, slubbings can be put across the drain as far as possible on the opposite bank top.

Wet material or mud should not be allowed to slip down the bank face and should not be placed on floristically diverse areas, wet flushes, fill in grips or impact on habitat requirements of Schedule 5 species. The front face of the bank should remain clean.

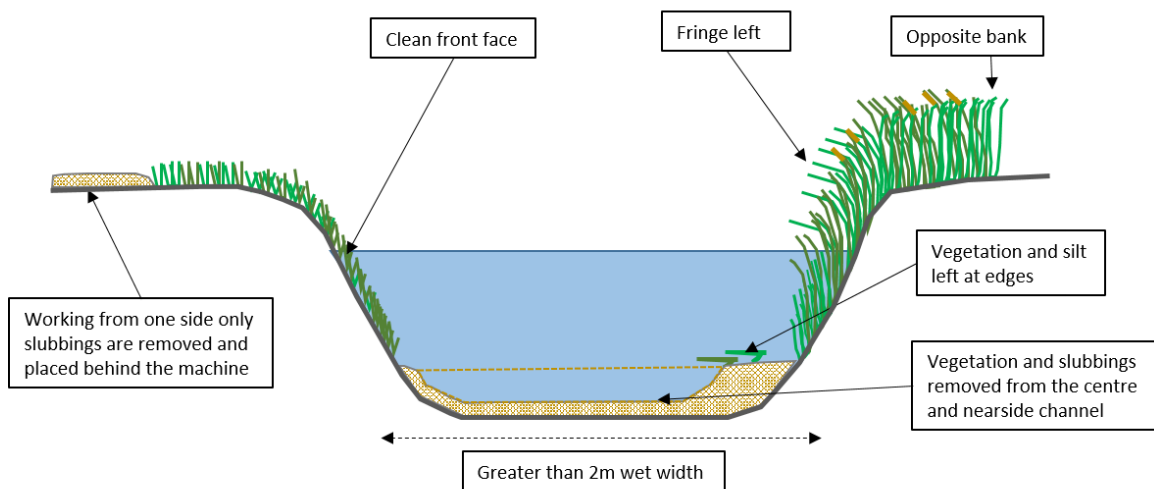
Overlying silts only should be removed; no deepening of the section should take place.

A WFD assessment will need to be undertaken prior to works.

Before Operational Desilt



After Operational Desilt



6.1.3 In drains greater than 2m wet width – Leave opposite and nearside margin

In drains greater than 2m wet width, a fringe of emergent vegetation can be left on the nearside and opposite emergent margin to act as a seed bank and refuge area to encourage recolonization by plants and invertebrates etc. The machine will work from one bank only.

An appropriate margin of silt and vegetation should be left *in situ* as far as is practicable for the size of the drain (10-20% approx.). The nearside toe should not be exposed or touched by the slubbing bucket.

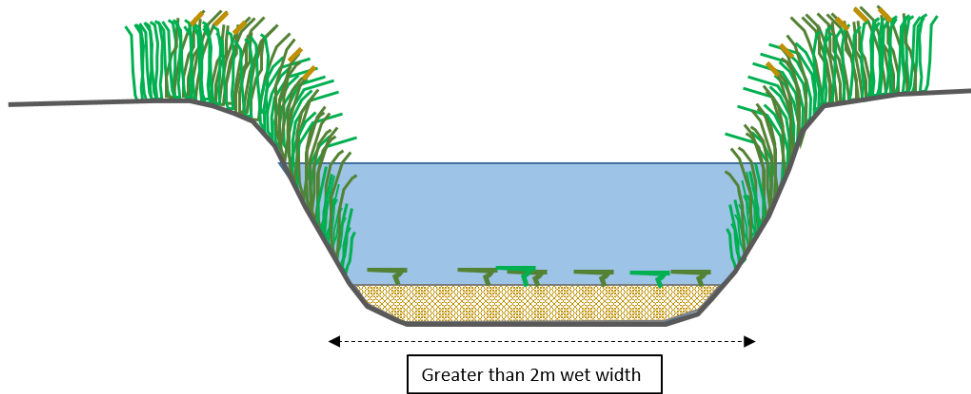
All removed slubbings will be set back behind the machine, preferably on an historic deposition pile or where circumstances dictate, slubbings can be put across the drain as far as possible on the opposite bank top.

Wet material or mud should not be allowed to slip down the bank face and should not be placed on floristically diverse areas, wet flushes, fill in grips or impact on habitat requirements of Schedule 5 species. The front face of the bank should remain clean.

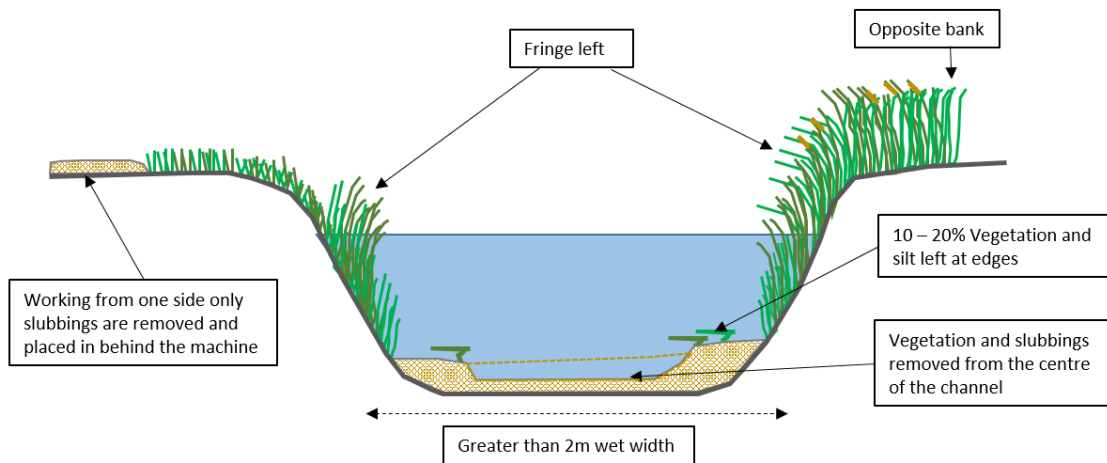
Overlying silts only should be removed; no deepening of the section should take place.

A WFD assessment will need to be undertaken prior to works.

Before Operational Desilt



After Operational Desilt



6.2 Desilting in Gravity Catchment drains

Desilting in a gravity catchment poses a higher ecological and hydro morphological risk to the site than in a pumped catchment. Therefore, desilting needs to be undertaken only where strictly necessary, sensitively and in a targeted, sustainable manner. Some gravitational catchments will demonstrate chalk stream sections that need to be preserved. Chalk stream habitats are very rare globally and it is important that as a custodian of these sites, that each site is managed on a case by case basis.

6.2.1 Selection of Desilting Options

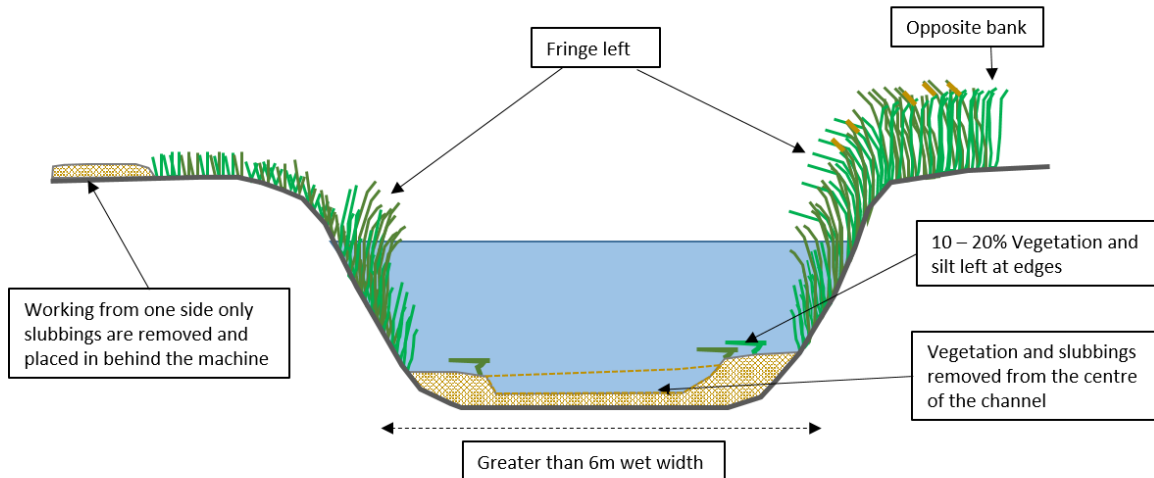
Leaving one or more fringe of marginal vegetation will serve to minimise risks of environmental harm, maintaining the seed bank and leave cover and food for invertebrates and other aquatic animals. However, there may be situations in areas of high flood risk where the watercourse will need to be desilted from bank to bank. All the options will be considered very carefully in relation to flood risk, prior to undertaking a desilting exercise.

Deposits will be spread on one side, the working side of the channel only and particular care will be taken to avoid floristically rich areas or low wet areas and material will be preferentially placed on the historic spoil bank away from the bank top to prevent spoil being washed back into the water and reduce further nutrient enrichment of the watercourse.

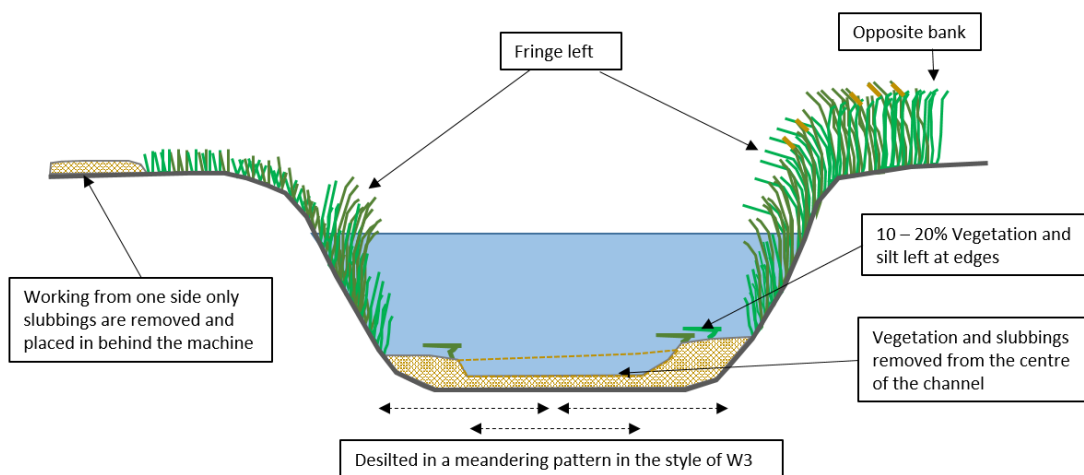
A WFD assessment will be required prior to any desilting operation taking place and mitigation measures put in place as required.

There are four possible options for desilting operations:

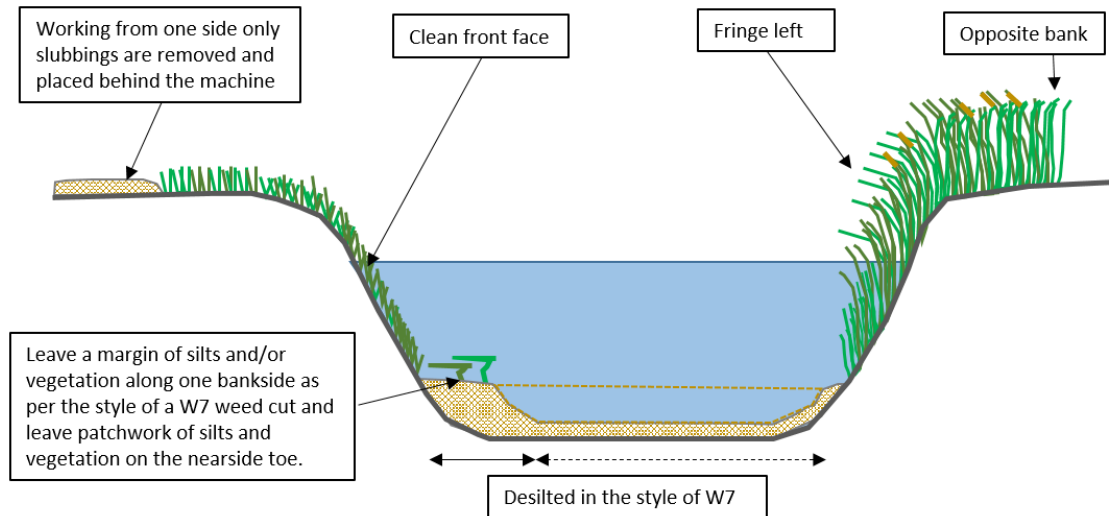
Option SR1: Desilting may be carried out removing silt from the central channel only, leaving marginal silts and or vegetation on both sides of the water course.



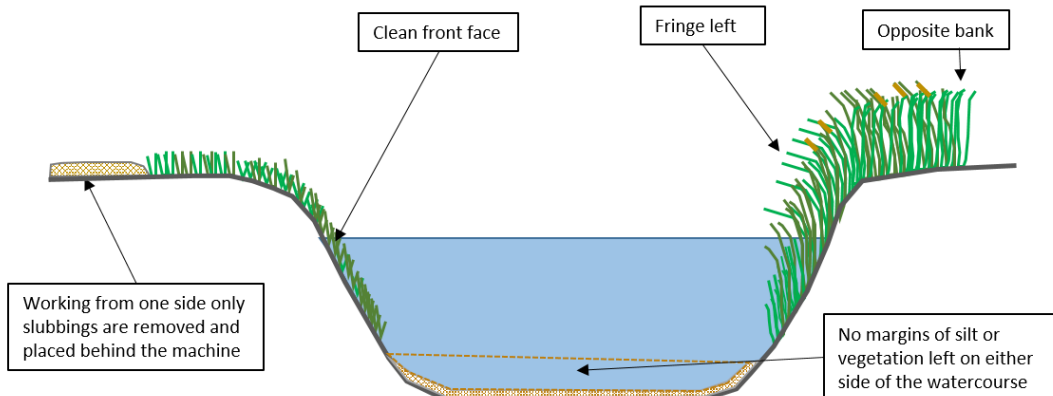
Option SR2: Silt removal may be carried out removing silt and vegetation from the channel in a manner so as to create a sinusoidal pattern of vegetation, leaving silts and vegetation on alternate sides of the watercourse. This method of desilting will be as per the style of the W3 weedcut.



Option SR3: Silt removal may be carried out leaving a margin of silts and/or vegetation along one bankside as per the style of a W7 weed cut and leaving patched of silts and vegetation on the nearside toe.

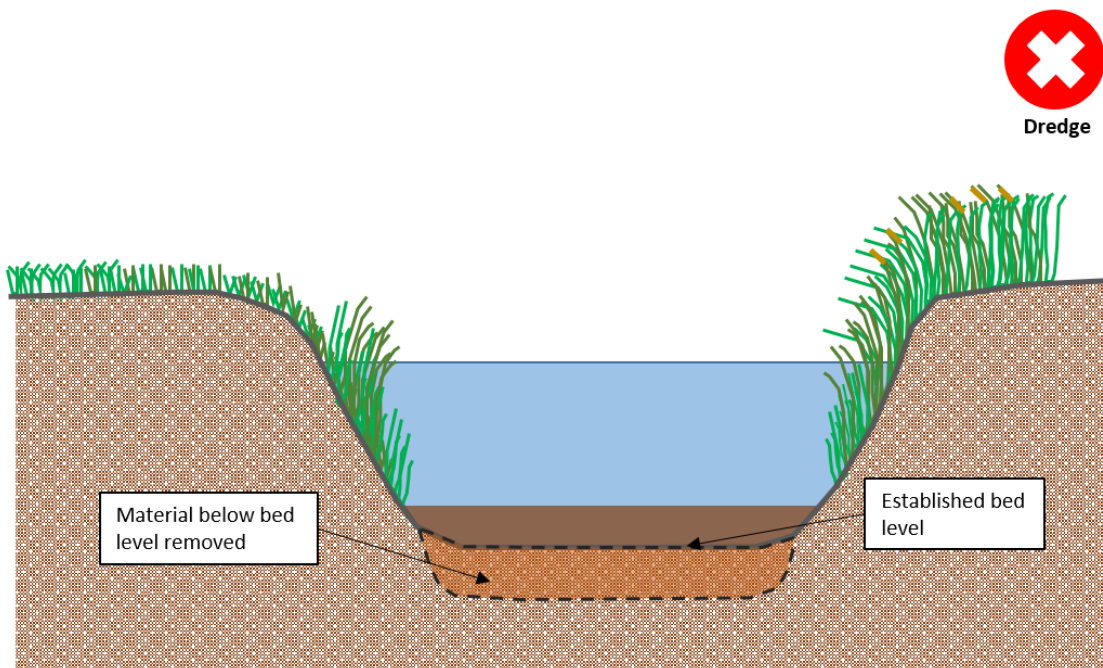
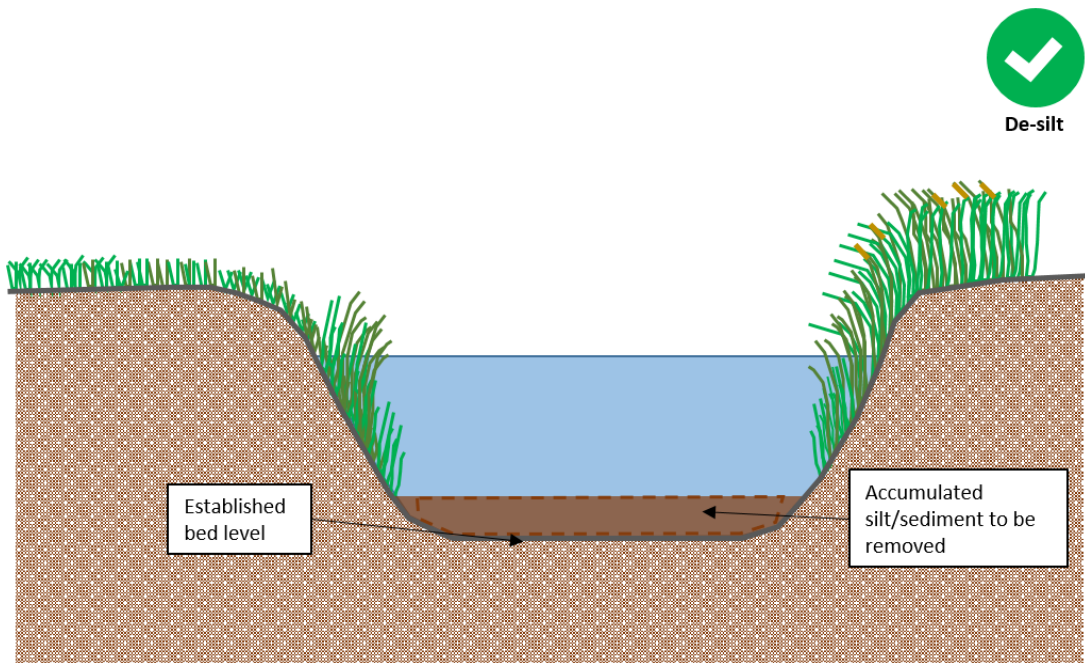


Option SR4: Silt removal may be carried out leaving no margins of silt or vegetation on either side of the watercourse, in the style of the W1 weedcut.



6.3 The important difference between desilting and dredging:

Desilting is when silts that have accumulated in the water channel are removed. **No deepening or over widening will occur during desilting.** Dredging is where material below bed level is removed and is likely to lead to over deepening of the channel, the slowing of flows and a continuous need for further maintenance.



7.0 Herbicide Use for Weed Control

Chemicals are used occasionally to control growth in the WLYL Internal Drainage District. Chemical control will be considered where weed growth cannot be effectively controlled by mechanical means, in inaccessible areas or in the case of alien invasive species, e.g. Japanese Knotweed and Giant Hogweed.

Where species which like to grow in slow moving riverine environments, such as Branched Burr Reed, then consideration must be paid to the cause of the problem with the aim of looking toward a more sustainable solution, moving forward. Restoration of the stretch will provide a better solution to the problem of weed control than continual herbicide application. However, in some locations, where appropriate herbicide will be applied to create a sinusoidal pattern in the weed to improve central flow but encourage silt deposition and berm formation at the edges of the watercourse. This should in turn speed up central flows and discourage future infestations.

Before any herbicides can be used in or near watercourses, written consent must be obtained from the Environment Agency in the way of a Herbicide Licence. Consultations with Natural England must also take place before the licence can be issued, where the chemicals may have an impact on SSSI or SAC rivers or land parcels.

If chemicals are to be used, then only herbicides and adjuvants cleared for aquatic use will be used in or beside water i.e. Glyphosate (Roundup BiActive) and Topfilm. Only suitably qualified operatives with an NPTC certificate in the Safe Use of Pesticides (PA1) and the application of pesticides in or near water using a handheld applicator (PA6W) will be permitted carry out any herbicide application on behalf of the WLYL IDB.

Herbicides will only be used in accordance with the Control of Pesticide Regulations 1986 and the Food and Environment Protection Act 1985. The storage and use of these substances will also comply with the Control of Substances Hazardous to Health Regulations 1988. It should be noted that the use of herbicides within the Board's drainage district is also affected by agri-environment scheme requirements.

No WFD assessment required prior to instigating this method.

8.0 Bank Reprofilng

The environmental risk involved in this activity in the WLYL IDB catchments is deemed high, particularly to water vole whose habitat and the welfare of the animal itself now falls under protected species legislation of the Wildlife and Countryside Act (1981) (as amended).

No bank reprofiling should be undertaken without first receiving instruction from the Environmental Team. Appropriate mitigation measures may be required prior to any reprofiling work taking place.

A WFD assessment will be required prior to work of this nature being carried out.

9.0 Culvert Installation or Repair

Any culvert installation or repair will need prior assessment by the Environmental Team as a WFD assessment may be required depending on the location and the length of the culvert to be installed. The IDB Water Vole Class Licence may apply.

A WFD assessment will be required prior to work of this nature being carried out.

10.0 References

Environment Agency (2012). Delivering consistent standards for sustainable asset management. Maintenance Standards Version 3, March 2012.

Environment Agency (2015). Channel Management Handbook. Report-SC110002

Killeen IJ (2003). Ecology of Desmoulin's Whorl Snail. Conserving Natura 2000 Rivers Ecology Series No. 6. English Nature, Peterborough.

Kings Lynn Consortium of Internal Drainage Boards (2000). Standard Maintenance Operations.

East Suffolk Internal Drainage Board (2008). Standard Maintenance Operations for Rivers. Water Management Alliance.

East Suffolk Internal Drainage Board (2014). Standard Maintenance Operations for Rivers. Water Management Alliance.

Association of Drainage Authorities (2015) An Introduction to the Guide to Management Strategies and Mitigation Measures for Achieving Good Ecological Potential in Fenland Waterbodies

11.0 Appendix

11.1 Table 1: Maintenance works that trigger WFD Assessments

Type of maintenance	Description	Page ref.
Weed cutting	Gravity Catchment - Environmental Option W2: This option allows for 80% of the instream vegetation to be removed centrally, in a sinusoidal manner to allow instream diversity to be maintained and allow silt deposition to occur to encourage narrowing and berm formation. The nearside toe should not be exposed or touched by the weedcutting basket.	27
Weed cutting	This option allows for all the instream vegetation to be removed. The nearside toe should not be exposed or touched by the weedcutting basket.	29
Tree works	Environmental Option TB2 - Where a tree or a bush has overhanging branches trailing in the water, then these can be removed up to bank height and the rest of the tree left in situ.	37
Tree works	Environmental Option TB1 - Where trees or bushes are standing away from the watercourse but access is required or flood risk is an issue, then trees can be felled near the watercourse.	39
Instream silt removal	In all drains (pumped and gravitational) that require desilting.	41
Bank reprofiling	In all drains that require bank reprofiling due to livestock poaching, erosion and bank collapse.	54
Culvert installation or repair	Any culvert that needs to be repaired or for a new culvert that need to be installed.	54

A water framework directive (WFD) assessment requires the Environmental Officer to carry out a desk based study using the EA Catchment Data Explorer (<https://environment.data.gov.uk/catchment-planning/>) and a site visit to assess the quality of the drain in reference to the WFD targets of the water course under the River Basin Management Plan and highlighting whether the works proposed will cause the drain to decline in the ecological and chemical classifications lowering the WFD overall assigned status of either Good, Moderate or Poor.

11.2 Table 2: Schedule 5 Species and other protected groups present in WLYLIDB

Schedule 5* species and other protected groups		Habitat Type					
Scientific Name	Common Name	Water Body	In Channel Vegetation	Bankside Vegetation	Ditch Bank	Emergent Vegetation	Advised Maintenance Technique
<i>Anaciaeschna isosceles</i> *	Norfolk Hawker**	Yes, the larval stage, nymph inhabits unpolluted freshwater environment for up to 2 years before metamorphosing into adult form.	Yes, the optimum conditions for breeding appear to be un-spoilt grazing marsh dyke systems with clean, non-saline water, rushy margins, an abundance of water soldier and the presence of other aquatic plants.				When weed mowing leave opposite margin and if water soldier is present leave water soldier and other floating plants in situ and return some of them to the water if removed.
<i>Anguis fragilis</i> *	Slow Worm			Yes, Requires dense vegetation, especially grasses coupled with sunny areas to allow thermoregulation and, preferably, loose soil into which to burrow.			Mow bank side vegetation down to 150mm. Do not touch the banks. To SMO standard
<i>Arvicola terrestris</i> *	Water vole	Yes all year to feed and travel.	Yes, food and predator cover all year.	Yes, food and predator cover all year.	Yes, burrows into bank all year	Yes, Feeding on most plants	Mow bank side vegetation down to 150mm to SMO standard. Do not touch the banks during maintenance. Weed cutting in-channel vegetation to SMO standard.
<i>Austropotamobius pallipes</i> *	White clawed crayfish	Yes, gravel channel bed, does not like silt	Yes, uses vegetation for cover.		Yes burrows into the bank		Do not remove gravels from the drain bed, do not touch the bank. To SMO standard.

Schedule 5* species and other protected groups		Habitat Type					
Scientific Name	Common Name	Water Body	In Channel Vegetation	Bankside Vegetation	Ditch Bank	Emergent Vegetation	Advised Maintenance Technique
<i>Bufo calamita</i> *	Natterjack toad**	Prefers ponds		Confined to coastal sand dune systems, coastal grazing marshes and sandy heaths. Winterton.			Do not fill in any ponds without first consulting the Environmental Officer.
<i>Dolomedes plantarius</i> *	Fen Raft Spider		Water soldier	Yes, they are found on Water Soldier.			Areas of water soldier should be avoided. If any Water soldier is removed, it should be put back within the drain in order to enhance nesting and feeding opportunities. They tend to breed within the warmer weather months.
<i>Lacerta vivipara</i> *	Common lizard			Yes, Damp or wet areas, especially where abundant grass tussocks are present to provide food, shelter, basking and hibernation sites.			Mow bank side vegetation down to 150mm. Do not touch the banks. Consultations with the Environmental Team are required when drains need desilting, so areas which reptiles may hibernate are not covered, especially on the flood wall folding. To SMO standard
<i>Lutra lutra</i> *	Common Otter	Yes, they are very mobile animals	Yes, uses it for hunting fish and other species.	Yes, if there are areas for resting, couches such as in an old tree.			Leave fallen trees where possible if not causing flood risk. Consult the Environmental Team for further work on trees. To SMO standard.
<i>Natrix natrix</i> *	Grass snake	Yes, they are very mobile animals using all types of habitat.		Yes, they are very mobile animals using all types of habitat.	Yes, they are very mobile animals using all types of habitat.	Yes, they are very mobile animals using all types of habitat.	Mow bank side vegetation down to 150mm. Do not touch the banks. To SMO standard
<i>Papilio machaon</i> *	Swallowtail Butterfly			Yes, The caterpillar larval stage of the butterfly feed on milk parsley, this flowers during July to September. Adults use tall mixed fen and marshes.		Yes – Caterpillars feed on milk parsley	Only use previous tracking routes for the digger that has low biodiversity value. Where milk parsley is known to grow a survey will need to be completed by an ecologist to confirm its presence. If found maintenance should be avoided so not to disturb the plant and surrounding cover. Where milk parsley is identified during scoping/walkover or local knowledge informs us of its presents this should be marked out on the ground and on the plan so it can be protected.

Schedule 5* species and other protected groups		Habitat Type					
Scientific Name	Common Name	Water Body	In Channel Vegetation	Bankside Vegetation	Ditch Bank	Emergent Vegetation	Advised Maintenance Technique
<i>Triturus cristatus</i> *	Great crested newt**	Prefers ponds		GCN move away from ponds and other water during the winter to find a suitable area to hibernate such as tree roots or animal burrows.			Do not fill in any ponds, without first consulting the Environmental Officer, even if they become dry at certain times of the year.
<i>Anisus vorticulus</i>	Lesser ramshorn snail	Rarely maintained calcareous drains					Unlikely to be found in IDB drains but more likely in riparian watercourses rarely maintained in locations of good water quality. Requires work to be undertaken under Licence.
<i>Vertigo angustior</i>	Narrow-mouthed whorl snail			Yes, these are found primarily in marshy ground of high, even humidity, with flowing groundwater, but subject neither to deep or prolonged flooding nor to periodic desiccation. It requires unshaded conditions and lives amongst short vegetation, composed of grasses, mosses or low herbs that is quickly warmed by the sun. These have been mainly found on sea walls.			Mow bank side vegetation down to 150mm. Do not touch the banks. Consultations with the Environmental Team are required when drains need desilting, so areas where snails may inhabit are not covered, especially on the flood wall folding. To SMO standard
<i>Vespertilionidae</i> and <i>Rhinolophidae</i> *	All bats			Yes if ancient trees are present with holes, or trees with potential holes if covered in ivy.			Leave trees that have bat potential. Consult the Environmental Team for further work on trees. To SMO standard

Schedule 5* species and other protected groups		Habitat Type					
Scientific Name	Common Name	Water Body	In Channel Vegetation	Bankside Vegetation	Ditch Bank	Emergent Vegetation	Advised Maintenance Technique
<i>Vipera berus</i> *	Adder			Yes, In all suitable habitats, dry, open, sunny areas with adjacent dense ground cover are essential. Hibernation sites tend to be on south-facing slopes; tree root systems, crevices in banks, and voids in piled materials are often used. Wetter areas around ponds, lakes, bogs or mires are also used (especially in the summer) providing there are dry banks or grass tussocks for basking.	Yes, especially if it is south facing		Mow bank side vegetation down to 150mm. Do not touch the banks. Consultations with the Environmental Team are required when drains need desilting, so areas which reptiles may hibernate are not covered, especially on the flood wall folding. To SMO standard

** included for information, do not usually come in contact during works.

*Schedule 5 (section 9.1a, 9.4a, b, and c) of the Wildlife and Countryside Act 1981

Instruction Notes
1. Is the drain regularly maintained?
2. If the drain is regularly maintained and habitat associated with scheduled 5 species is not present the work can continue with caution following the SMO standard.
3. Is the drain maintained on a two to 10 year rotation?
4. If the drain is not regularly maintained the Environmental Officer needs to assess the drain first by a desk study and scoping visit to find out whether Schedule 5 species and / or habitat is present in the area.
5. Where habitat type is present but works timing is such that Schedule 5 or other protected species won't be present and if after the planned works, sufficient habitat will remain within a natural dispersal distance of the species then works can proceed as planned.
6. Where habitat type is present but works timing is such that Schedule 5 or other protected species won't be present and if after the planned works, sufficient habitat won't remain adjust the works to ensure it will for example reduce the extent or phase the works over several seasons
7. Where habitat type is present and works timing indicate Schedule 5 species may be present appropriate action will be taken, including a thorough ecological survey to identify the presence of Schedule 5 species.
8. If after the thorough survey species are absent, work may continue within parameters set out in 5.
9. If work is required when scheduled 5 species are present suitable licenses and assents will need to be applied for through Natural England to survey and mitigate the habitat successfully.
10. If after the thorough surveys the schedule 5 species are present further measures will need to be undertaken. Such as: a. Work methods adapted to avoid "killing, or recklessly damaging" b. Work timing adapted to avoid "killing, or recklessly damaging" c. Work abandoned and alternative drainage strategy sought

11.3 Table 3: Maintenance and protected species

Month	Maintenance Type	Species to protect
January	Desilt, bank works, tree works, flailing brambles/scrub	<ul style="list-style-type: none"> • Water voles – when carrying out bank works, P/A surveys required • Hibernating reptiles – when placing the desilted material on sea wall folding, surveys are required before winter to confirm P/A, if present strategic grass cutting is required to encourage them out of the area. • Narrow-mouthed whorl snail – when carrying out bank works on sea walls, P/A surveys are required • Otter – when carrying out tree works, survey to ensure otter couches, holts, and other resting areas are not removed. • Wintering birds – Avoiding any drain maintenance in areas where wintering birds feed and rest, such as grazing marshes and designated sites. It is best to carry out this maintenance before November or after March • Bats, hibernating roosts – When carrying out tree works on trees with holes, a bat roost survey will need to be carried out
February	Desilt, bank works, tree works, flailing brambles/scrub	<ul style="list-style-type: none"> • Water voles – when carrying out bank works, mitigation required between 15th Feb and 30 April only. • Hibernating reptiles – when placing the desilted material on sea wall folding, surveys are required before winter to confirm P/A, if present strategic grass cutting is required to encourage them out of the area. • Narrow-mouthed whorl snail – when carrying out bank works on sea walls, P/A surveys are required • Otter – when carrying out tree works, survey to ensure otter couches, holts, and other resting areas are not removed. • Wintering birds – Avoiding any drain maintenance in areas where wintering birds feed and rest, such as grazing marshes and designated sites. It is best to carry out this maintenance before November or after March • Bats, hibernating roosts – When carrying out tree works on trees with holes, a bat roost survey will need to be carried out
March	Desilt, bank works, tree works, flailing brambles/scrub, weed cutting	<ul style="list-style-type: none"> • Water voles – when carrying out bank works, mitigation required between 15th Feb and 30 April only. • Reptiles coming out of hibernation – when placing the desilted material on sea wall folding

		<ul style="list-style-type: none"> • Narrow-mouthed whorl snail – when carrying out bank works on sea walls, P/A surveys are required • Otter – when carrying out tree works, survey to ensure otter couches, holts, and other resting areas are not removed. • Wintering birds – Avoiding any drain maintenance in areas where wintering birds feed and rest, such as grazing marshes and designated sites. It is best to carry out this maintenance before November or after March • Bats, hibernating roosts – When carrying out tree works on trees with holes, a bat roost survey will need to be carried out • Fen Raft Spiders – when carrying out works, maintenance which affects Water soldier should be avoided during the warmer weather months when they are likely to be breeding
April	Weed cutting, flailing banks to 150mm	<ul style="list-style-type: none"> • Nesting birds - if tree works and scrub flailing is needed thorough nesting bird surveys are required. • Swallowtail butterfly larvae – leave areas where milk parsley is identified, do not flail. • Norfolk Hawker dragonfly larvae – do not remove all water soldier from drains where present. • Fen Raft Spiders – when carrying out works, maintenance which affects Water soldier should be avoided during the warmer weather months when they are likely to be breeding
May	Weed cutting, flailing banks to 150mm	<ul style="list-style-type: none"> • Nesting birds - if tree works and scrub flailing is needed thorough nesting bird surveys are required. • Swallowtail butterfly larvae – leave areas where milk parsley is identified, do not flail. • Norfolk Hawker dragonfly larvae – do not remove all water soldier from drains where present. • Fen Raft Spiders – when carrying out works, maintenance which affects Water soldier should be avoided during the warmer weather months when they are likely to be breeding
June	Weed cutting, flailing banks to 150mm	<ul style="list-style-type: none"> • Nesting birds - if tree works and scrub flailing is needed thorough nesting bird surveys are required. • Swallowtail butterfly larvae – leave areas where milk parsley is identified, do not flail. • Norfolk Hawker dragonfly larvae – do not remove all water soldier from drains where present.

		<ul style="list-style-type: none"> • Fen Raft Spiders – when carrying out works, maintenance which affects Water soldier should be avoided during the warmer weather months when they are likely to be breeding
July	Weed cutting, flailing banks to 150mm	<ul style="list-style-type: none"> • Nesting birds - if tree works and scrub flailing is needed thorough nesting bird surveys are required. • Swallowtail butterfly larvae – leave areas where milk parsley is identified, do not flail. • Norfolk Hawker dragonfly larvae – do not remove all water soldier from drains where present. • Fen Raft Spiders – when carrying out works, maintenance which affects Water soldier should be avoided during the warmer weather months when they are likely to be breeding
August	Weed cutting, flailing banks to 150mm	<ul style="list-style-type: none"> • Nesting birds - if tree works and scrub flailing is needed thorough nesting bird surveys are required. • Swallowtail butterfly larvae – leave areas where milk parsley is identified, do not flail. • Norfolk Hawker dragonfly larvae – do not remove all water soldier from drains where present. • Fen Raft Spiders – when carrying out works, maintenance which affects Water soldier should be avoided during the warmer weather months when they are likely to be breeding
September	Weed cutting, flailing banks to 150mm, possible desilt	<ul style="list-style-type: none"> • Water voles when carrying out bank works, P/A surveys ideally required during survey season between 15th April and 30th Sept, mitigation required between 15th Sept and 31 Oct only. • Reptiles when placing the desilted material on sea wall folding, surveys are required before winter to confirm P/A, if present strategic grass cutting is required to encourage them out of the area. • Narrow-mouthed whorl snail – when carrying out bank works on sea walls, P/A surveys are required • Swallowtail butterfly larvae – leave areas where milk parsley is identified, do not flail. • Norfolk Hawker dragonfly larvae – do not remove all water soldier from drains where present.
October	Desilt, bank works, tree works, flailing brambles/scrub	<ul style="list-style-type: none"> • Water voles when carrying out bank works, mitigation required between 15th Sept and 31 Oct only. • Reptiles when placing the desilted material on sea wall folding, surveys are

		<p>required before winter to confirm P/A, if present strategic grass cutting is required to encourage them out of the area.</p> <ul style="list-style-type: none"> • Narrow-mouthed whorl snail – when carrying out bank works on sea walls, P/A surveys are required • Otter – when carrying out tree works, survey to ensure otter couches, holts, and other resting areas are not removed. • Wintering birds – Avoiding any drain maintenance in areas where wintering birds feed and rest, such as grazing marshes and designated sites. It is best to carry out this maintenance before November or after March
November	Desilt, bank works, tree works, flailing brambles/scrub	<ul style="list-style-type: none"> • Water voles when carrying out bank works, P/A surveys required • Hibernating reptiles when placing the desilted material on sea wall folding, surveys are required before winter to confirm P/A, if present strategic grass cutting is required to encourage them out of the area. • Narrow-mouthed whorl snail – when carrying out bank works on sea walls, P/A surveys are required • Otter – when carrying out tree works, survey to ensure otter couches, holts, and other resting areas are not removed. • Wintering birds – Avoiding any drain maintenance in areas where wintering birds feed and rest, such as grazing marshes and designated sites. It is best to carry out this maintenance before November or after March • Bats, hibernating roosts – When carrying out tree works on trees with holes, a bat roost survey will need to be carried out
December	Desilt, bank works, tree works, flailing brambles/scrub	<ul style="list-style-type: none"> • Water voles when carrying out bank works, P/A surveys required • Hibernating reptiles when placing the desilted material on sea wall folding, surveys are required before winter to confirm P/A, if present strategic grass cutting is required to encourage them out of the area. • Narrow-mouthed whorl snail – when carrying out bank works on sea walls, P/A surveys are required • Otter – when carrying out tree works, survey to ensure otter couches, holts, and other resting areas are not removed. • Wintering birds – Avoiding any drain maintenance in areas where wintering birds feed and rest, such as grazing marshes and designated sites. It is best to carry out this maintenance before November or after March • Bats, hibernating roosts – When carrying out tree works on trees with holes, a bat roost survey will need to be carried out

*Please refer to the WMA Ecological Survey Calendar and the Mitigation Calendar for further information.