Felin Puleston Weir - Outline Method Statement

Project name: Felin Puleston Weir Removal									
Project location: Felin Puleston, Nr Wrexham									
Client: Welsh Dee Trust									
	Initial	Rev1	Rev2	Rev3	Rev4	Rev5	Rev6	Rev7	**Rev8**
Date	11-11-2022								
By	SB								
Checked	GH								
Approved	**GH**								

Summary of key works and proposed sequencing

1. Removal of weir, walling and gabions and bed regrading/reprofile
2. Creation of rapids
3. Creation of bed check
4. Excavation of widening

Pre-construction & construction procedure

Construction of site compounds, lay-down areas, delivery of machinery and any other initial preparatory works to be undertaken in-line with specific site work activity. All works on site will be carried out in accordance with the appropriate British Standards and industry Codes of Practice. A qualified and experienced Geomorphologist must attend the site to advise on construction procedure at certain points during the works, particularly during construction of all features and initial setting out.

Biosecurity measures outlined in the following two documents should be followed by all personnel and machinery on site:

https://secure.fera.defra.gov.uk/nonnativespecies/checkcleandry/documents/check-clean-dry-england.pdf

http://www.nonnativespecies.org/checkcleandry/

Tenant farmer to remove livestock from site prior to works commencing and responsibility of the contractor to ensure the site remains secure to livestock for the duration of the construction period.

Construction period

The construction period is expected to take ~6-8 weeks, ensuring cost effective delivery and minimal environmental disturbance as a result of the work on site. However, it is possible that adverse weather conditions such as periods of high rainfall (and associated river level rise), will lead to temporary cessation of some construction. Liaison should be undertaken by the client and contractor with the NRW to determine an appropriate time of year for the contractor to deliver the works as some wet working may be required to construct the scheme.

Working in Proximity of Services

The design drawings and report show the results of a services search for the likely impacted reach of the Afon Clywedog and surrounding area for Felin Puleston weir. Best endeavours have been used to transfer the map information to the design drawings but some error in the location of these may be present as a result. This shows there are BT Openreach and electricity lines crossing the watercourse close to the footbridge upstream of the weir. These are unlikely to be impacted by the proposed works and a bed check feature has been designed to reduce the risk of bed incision propagating upstream and impacting this infrastructure.
All services should be considered carefully by the contractor undertaking the works in terms of safe working procedures, access and crossing these utilities. It should be noted that standard services searches do not identify all local land drains. If encountered, these should be managed on site by the contractor and client. The contractor should review the services search drawing prior to construction and for potential access routes as some may be crossed to deliver the works. The client and/or contractor should undertake another services search prior to the works. The contractor should C.A.T4 / radio-detection scan, in liaison with the provider, and locate these services prior to excavation commencing if deemed required.
Contractors should be made aware of their location as it is possible that some may be crossed / passed under to undertake the proposed works. The contractor should set up goalposts in the vicinity of overhead lines so that machinery operators are aware of its presence. They should also locate any buried services before excavation begins in liaison with the service provider. Track mats may be required across buried services.
Other private services, such as land drains not already mapped, that are not picked up by utilities service searches, could be encountered during the works. This should be monitored and managed by the contractor and client on site.
Dynamic Rivers accept no liability of any kind for the accuracy, currency or completeness of the information provided on this plan by the client. This plan is a compiled cartographical representation of information received from numerous mapping sources of varying scales, quality and resolutions. The source utility companies do not guarantee the correctness of the data provided.
Only use this plan in conjunction with the compiled responses which include further detail, legends, notes and warnings available from the client. It is critical that the location of any utility services and apparatus is confirmed on site prior to any excavation work and that another services search is undertaken prior to construction.

Public Access during the works

During the construction period, public access to the site should be restricted and fenced off. Impacted footpaths will need to be diverted or alternative routes signposted.

The contractor will ensure appropriate signage and fencing off of the construction compound area and work area, and it is the responsibility of the contractor to ensure safe access for the workforce and appropriate restriction of access to the public.

Historic sites within the work zone should be fenced off to ensure no damage is caused by machinery access etc. (where relevant).

Species surveys

No protected or invasive species surveys have been assigned or undertaken as part of the design works.

Timing of vegetation clearance and temporary disturbance to river bed as part of works

Only those areas specifically identified for site clearance (to be marked out by the client and contractor prior to commencement of construction, with supervision from Dynamic Rivers) shall be cleared of existing tree and vegetation cover. Contractor to use tracking mats for river banks when entering and exiting the channels. There are trees identified on site that should not be disturbed by the proposed works, these should be marked and noted by the contractor.

Removal, pollarding and pruning of trees and clearance of ground vegetation may be required during the bird nesting season. These works will only be undertaken immediately after the trees and vegetation have been inspected and deemed free of nesting birds and bats by an ecologist.

Nesting bird season and other ecologically sensitive seasons are summarised below:

- Bird nesting - March to August
- Bat roosting - April to September
- Spring salmonid run (migration) – approx. March to May (depending on local run timing)
- Salmon spawning season – 1st October to 15th June
- Crayfish rescue should avoid late May and June when females may be carrying newly hatched young

Note: There may be some changes to the outlined method statement as more knowledge of site conditions are gained in the pre-construction and construction phases of the project to be determined by the contractor.

Note: This outline method statement does not constitute formal construction advice, safe constructability of the proposed design is the responsibility of the contractor.

Activity: Removal of weir, walling and gabions and bed regrading/reprofile	Method Statement 1

Risks: Overturning of plant machinery, crush injuries, collapse of earth banks, falling trees and branches, overhead and buried services, collision with other plant machines, pollution to watercourse, machine strike to persons, machine strike of services, insect bites and allergic reactions, snake bites, leptospirosis, manual handling, drowning, working on soft ground.

Proposed working method overview:

- Machinery to access site as agreed by the landowner and client. Track mats should be used as appropriate dependent on landowner requests and ground conditions at time of construction. Fence/gate removal and replacement may be required to facilitate / access the works areas, alongside pollarding and vegetation clearance.
- Some working in close proximity to trees required. Contractor should ensure they have appropriate machinery and working procedures to ensure a safe working environment and to minimise damage to trees and vegetation.
- Undertake and review services search and locate services on site prior to works commencing. Review services search and locate services on site prior to excavation commencing. Some may be crossed over/under for access purposes, contractor should ensure appropriate mitigation.
- Tenant farmer to ensure livestock removed from works area (where applicable) prior to works commencing on site and contractor responsible for ensuring the site remains secure to livestock for the duration of the construction period.
- Temporary watercourse crossings may be required dependent on track routes and plant, this is to be agreed with the landowner, contractor and the client.
- Silt control measures to be in place downstream and across the floodplain prior to works starting, during works and inspected daily (replace / repair as necessary).
- Fish/Crayfish rescues should be undertaken through the works area prior to works starting and nets retained in the channel throughout the works under the guidance of an ecologist. Areas must be re-fished should flow overtop the nets.
- Wet working approvals may be required from the NRW to undertake the works – recommended that works are undertaken in the dry (contractor to overpump or bund off to dry working areas).
- Banks to be monitored during the works. No personnel to be in the channel during works.
- Note – following removal, regrading and feature installation there will likely be a period of time when flows should be allowed to adjust. This should be considered by the contractor.
- The weir to be removed, with associated walling and gabions and associated bed regrading length should be surveyed in on site prior to removal and regrading commencing using coordinates provided with the design drawings, this should also be undertaken with supervision from Dynamic Rivers.
- Remove the weir, walling and gabions along its entire length and width (as shown in design drawings), and regrade the bed locally as demonstrated in the design drawings, in the dry (contractor to provide appropriate method to achieve this). The weir, walling and gabions material should be removed in its entirety across the full width and length of the channel (this may result in a greater depth of material removal than that shown in the design drawings as the depth of material may vary along the weir width and length). The bed should then be regraded to the appropriate slope as shown in the design drawings before rapids and bed check features are created. The finished bed level following regrading should tie into the downstream and upstream bed level. Regrade the banks impacted to tie in with the existing grade upstream and downstream.
- Retain gabions material within the cages for use in bed feature creation (suitability of material for re-use to be determined on site).
- Stockpile material temporarily outside of the floodplain. Riddle any excavated boulder/gravel/cobble material for re-use in rapid creation. Weir and walling material to be disposed of off site.
- Remove any tracks into watercourse and across the working area and make good any damage. Utilise bog mats along track routes if ground becomes wet.
- Any fencing removed is to be replaced on agreement with the landowner and client.
- Seed exposed / damaged areas of floodplain, excavated areas and top of bank areas (if seeding is proposed) with suitable seed mix at 5g/m^2 spreading rate.

General Method of Work:

- Client and Principal Contractor to reconfirm area of works and mark up extent of site works.

- Check line of works for any trees to be removed, branches to be cut back, vegetation clearance etc. to ensure safe passage for machinery. Where mature trees are encountered during excavation, avoid where possible and adjust line of features if this is possible with agreement with the geomorphologist.
- Erect temporary fencing to restrict public access to the site and to fence off historic sites.
- Mark location of and install temporary protection measures to utilities, e.g. excavator mats to buried services at crossing points, goal posts for overhead cables where access routes require it.
- Install appropriate fine sediment control measures downstream of works area and across any impacted floodplain e.g. straw bales, fine sediment control mats, silt curtains. These must operate during and after in-channel features are being created, floodplain features are being excavated etc. Machinery access along the bank top or in channel must be controlled to prevent silt/fine sediment-run off from exposed banksides and from disturbed fine sediment.
- All sediment control measures are to be checked and repaired/replaced daily.
- Turbidity monitoring is to be conducted during the works. Work must cease where levels exceed 20 NTU. Any incident exceeding 40 NTU should be considered for self-reporting to the appropriate regulatory authorities. All data are to be recorded and presented to the client on a weekly basis.

Control Measures or Modifications

- No smoking in works area.
- No works to be undertaken during the hours of darkness.
- Ensure staff are aware of risk of drowning associated with working in or near water and the health and safety requirements (as detailed in the site risk assessment by the contractor).
- If any tree felling/vegetation clearance is required, site manager to contact ordnance contractor.
- All re-fuelling will take place at least 20m away from the watercourse, next to the fuel bowser.
- Be vigilant for members of public / pets / stock / wild animals entering works area.
- Be aware of the risk of Leptospirosis in and around the watercourse.
- Ensure bucket is lowered to the ground when machine is not in use.
- When visitors are on site, stop work & lower bucket to ground if they enter the works safety area.
- If working with a Banksman ensure that they are in a position where you can see them.
- Beware of machine blind spots when slewing and turning, especially with regard to tree branches.
- Be aware of any taped off areas/sites that will be of conservation, archaeological or other special interest. Do not enter these areas with any machinery.
- As a minimum use heather bale dams / silt curtains at strategic intervals in the watercourse and across impacted floodplain areas to filter coarse sediments. Pollution booms and silt reduction measures booms to be erected at the downstream end of the works.
- All operators to be competent and certificated on the machines they operate.
- All incidents relating to safety or pollution of any kind are to be reported as soon as it is safe to do so.
- All staff and visitors to undertake induction and wear the appropriate PPE for the site conditions they encounter.
- All personnel working in the river to be confined space trained and contractor to supply appropriate PPE and evacuation procedure.

Activity: Creation of rapids	Method Statement 2

Risks: Overturning of plant machinery, crush injuries, collapse of earth banks, falling trees and branches, overhead and buried services, collision with other plant machines, pollution to watercourse, machine strike to persons, machine strike of services, insect bites and allergic reactions, snake bites, leptospirosis, manual handling, drowning, working on soft ground.

Proposed working method overview:

- Machinery to access site as agreed by the landowner and client. Track mats should be used as appropriate dependent on landowner requests and ground conditions at time of construction. Fence/gate removal and replacement may be required to facilitate / access the works areas, alongside pollarding and vegetation clearance.
- Some working in close proximity to trees required. Contractor should ensure they have appropriate machinery and working procedures to ensure a safe working environment and to minimise damage to trees and vegetation.
- Undertake and review services search and locate services on site prior to works commencing. Review services search and locate services on site prior to excavation commencing. Some may be crossed over/under for access purposes, contractor should ensure appropriate mitigation.
- Tenant farmer to ensure livestock removed from works area prior to works commencing on site and contractor responsible for ensuring the site remains secure to livestock for the duration of the construction period.
- Temporary watercourse crossings may be required dependent on track routes and plant, this is to be agreed with the landowner, contractor and the client.
- Silt control measures to be in place downstream and across the floodplain prior to works starting, during works and inspected daily (replace / repair as necessary).
- Fish/Crayfish rescues should be undertaken through the works area prior to works starting and nets retained in the channel throughout the works under the guidance of an ecologist. Areas must be re-fished should flow overtop the nets.
- Wet working approvals may be required from the NRW to undertake the works – recommended that works are undertaken in the dry (contractor to overpump or bund off to dry working areas).
- Banks to be monitored during the works. No personnel to be in the channel during works.
- Note – following removal, regrading and feature installation there will likely be a period of time when flows should be allowed to adjust. This should be considered by the contractor.
- The rapid locations should be marked out on site prior to them being created using coordinates provided with the design drawings, this should also be undertaken with supervision from Dynamic Rivers.
- Rapid 1 - Over-excavate the length where Rapid 1 is to be created by approximately 500mm to allow placement and creation of this particular rapid feature as shown in the design drawings. The finished level of the feature is at the regraded bed level. Using imported material and re-use of material won on site (ensuring suitable sizes are used as defined in the design drawings – if suitable material/sizes not found, then import of material will be required), ensure the material is well mixed prior to placement and the material is well compacted when placed using the back of the digger bucket with larger material pushed into the channel bed leaving exposed areas against which smaller material may be keyed, following levels as shown in the design drawings and under guidance of onsite geomorphologist. Create level variability across the feature surfaces. Work from downstream to upstream when creating the feature sequence. Ensure rapid material is graded into bank edges and that material placement ensures flow concentration towards the centre of the channel. This should be undertaken under the supervision of the onsite geomorphologist. Changes to features placed may be required once water is flowing through the new channel, undertake under guidance of onsite geomorphologist. Ensure the upstream and downstream ends of each feature grade into the channel bed level. Ensure finished feature has multiple flow routes across the surface.
- Rapids 2 and 3 - Using imported material and re-use of material won on site (ensuring suitable sizes are used as defined in the design drawings – if suitable material/sizes not found, then import of material will be required), ensure the material is well mixed prior to placement and the material is well compacted when placed using the back of the digger bucket with larger material pushed into the channel bed leaving exposed areas against which smaller material may be keyed, following levels as shown in the design drawings and under guidance of onsite geomorphologist. Create level variability across the feature surfaces.

Slopes can vary on the upstream and downstream faces as shown in the design drawings. Work from downstream to upstream when creating the feature sequence. Ensure rapid material is graded into bank edges and that material placement ensures flow concentration towards the centre of the channel. This should be undertaken under the supervision of the onsite geomorphologist. Changes to features placed may be required once water is flowing through the new channel, undertake under guidance of onsite geomorphologist. Ensure the upstream and downstream ends of each feature grade into the channel bed level. Ensure finished feature has multiple flow routes across the surface.

- Retain gabions material within the cages for use in bed feature creation (suitability of material for re-use to be determined on site).
- Remove any tracks into watercourse and across the working area and make good any damage. Utilise bog mats along track routes if ground becomes wet.
- Any fencing removed is to be replaced on agreement with the landowner and client.
- Seed exposed / damaged areas of floodplain, excavated areas and top of bank areas (if seeding is proposed) with suitable seed mix at 5g/m^2 spreading rate.

General Method of Work:

- Client and Principal Contractor to reconfirm area of works and mark up extent of site works.
- Check line of works for any trees to be removed, branches to be cut back, vegetation clearance etc. to ensure safe passage for machinery. Where mature trees are encountered during excavation, avoid where possible and adjust line of features if this is possible with agreement with the geomorphologist.
- Erect temporary fencing to restrict public access to the site and to fence off historic sites.
- Mark location of and install temporary protection measures to utilities, e.g. excavator mats to buried services at crossing points, goal posts for overhead cables where access routes require it.
- Install appropriate fine sediment control measures downstream of works area and across any impacted floodplain e.g. straw bales, fine sediment control mats, silt curtains. These must operate during and after in-channel features are being created, floodplain features are being excavated etc. Machinery access along the bank top or in channel must be controlled to prevent silt/fine sediment-run off from exposed banksides and from disturbed fine sediment.
- All sediment control measures are to be checked and repaired/replaced daily.
- Turbidity monitoring is to be conducted during the works. Work must cease where levels exceed 20 NTU. Any incident exceeding 40 NTU should be considered for self-reporting to the appropriate regulatory authorities. All data are to be recorded and presented to the client on a weekly basis.

Control Measures or Modifications

- No smoking in works area.
- No works to be undertaken during the hours of darkness.
- Ensure staff are aware of risk of drowning associated with working in or near water and the health and safety requirements (as detailed in the site risk assessment by the contractor).
- If any tree felling/vegetation clearance is required, site manager to contact ordnance contractor.
- All re-fuelling will take place at least 20m away from the watercourse, next to the fuel bowser.
- Be vigilant for members of public / pets / stock / wild animals entering works area.
- Be aware of the risk of Leptospirosis in and around the watercourse.
- Ensure bucket is lowered to the ground when machine is not in use.
- When visitors are on site, stop work & lower bucket to ground if they enter the works safety area.
- If working with a Banksman ensure that they are in a position where you can see them.
- Beware of machine blind spots when slewing and turning, especially with regard to tree branches.
- Be aware of any taped off areas/sites that will be of conservation, archaeological or other special interest. Do not enter these areas with any machinery.
- As a minimum use heather bale dams / silt curtains at strategic intervals in the watercourse and across impacted floodplain areas to filter coarse sediments. Pollution booms and silt reduction measures booms to be erected at the downstream end of the works.
- All operators to be competent and certificated on the machines they operate.
- All incidents relating to safety or pollution of any kind are to be reported as soon as it is safe to do so.
- All staff and visitors to undertake induction and wear the appropriate PPE for the site conditions they encounter.

- All personnel working in the river to be confined space trained and contractor to supply appropriate PPE and evacuation procedure.

Activity: Creation of bed check feature	Method Statement 3

Risks: Overturning of plant machinery, crush injuries, collapse of earth banks, falling trees and branches, overhead and buried services, collision with other plant machines, pollution to watercourse, machine strike to persons, machine strike of services, insect bites and allergic reactions, snake bites, leptospirosis, manual handling, drowning, working on soft ground.

Proposed working method overview:

- Machinery to access site as agreed by the landowner and client. Track mats should be used as appropriate dependent on landowner requests and ground conditions at time of construction. Fence/gate removal and replacement may be required to facilitate / access the works areas, alongside pollarding and vegetation clearance.
- Some working in close proximity to trees required. Contractor should ensure they have appropriate machinery and working procedures to ensure a safe working environment and to minimise damage to trees and vegetation.
- Undertake and review services search and locate services on site prior to works commencing. Review services search and locate services on site prior to excavation commencing. Some may be crossed over/under for access purposes, contractor should ensure appropriate mitigation.
- Tenant farmer to ensure livestock removed from works area prior to works commencing on site and contractor responsible for ensuring the site remains secure to livestock for the duration of the construction period.
- Temporary watercourse crossings may be required dependent on track routes and plant, this is to be agreed with the landowner, contractor and the client.
- Silt control measures to be in place downstream and across the floodplain prior to works starting, during works and inspected daily (replace / repair as necessary).
- Fish/Crayfish rescues should be undertaken through the works area prior to works starting and nets retained in the channel throughout the works under the guidance of an ecologist. Areas must be re-fished should flow overtop the nets.
- Wet working approvals may be required from the NRW to undertake the works – recommended that works are undertaken in the dry (contractor to overpump or bund off to dry working areas).
- Banks to be monitored during the works. No personnel to be in the channel during works.
- Note – following removal, regrading and feature installation there will likely be a period of time when flows should be allowed to adjust. This should be considered by the contractor.
- The bed check feature location should be marked out on site prior to it being created using coordinates provided with the design drawings, this should also be undertaken with supervision from Dynamic Rivers.
- Over-excavate the length where the bed check feature is to be created by approximately 500mm to allow placement and creation of this feature as shown in the design drawings. The finished level of the feature is at the regraded bed level. Using imported material and re-use of material won on site (ensuring suitable sizes are used as defined in the design drawings – if suitable material/sizes not found, then import of material will be required), ensure the material is well mixed prior to placement and the material is well compacted when placed using the back of the digger bucket with larger material pushed into the channel bed leaving exposed areas against which smaller material may be keyed, following levels as shown in the design drawings and under guidance of onsite geomorphologist. Create level variability across the feature surfaces. Work from downstream to upstream when creating the feature sequence. Ensure bed check material is graded into bank edges and that material placement ensures flow concentration towards the centre of the channel. This should be undertaken under the supervision of the onsite geomorphologist. Changes to features placed may be required once water is flowing through the new channel, undertake under guidance of onsite geomorphologist. Ensure the upstream and downstream ends of each feature grade into the channel bed level. Ensure finished feature has multiple flow routes across the surface.
- Retain gabions material within the cages for use in bed feature creation (suitability of material for re-use to be determined on site).
- Remove any tracks into watercourse and across the working area and make good any damage. Utilise bog mats along track routes if ground becomes wet.
- Any fencing removed is to be replaced on agreement with the landowner and client.
- Seed exposed / damaged areas of floodplain, excavated areas and top of bank areas (if seeding is proposed) with suitable seed mix at 5g/m^2 spreading rate.

General Method of Work:

- Client and Principal Contractor to reconfirm area of works and mark up extent of site works.
- Check line of works for any trees to be removed, branches to be cut back, vegetation clearance etc. to ensure safe passage for machinery. Where mature trees are encountered during excavation, avoid where possible and adjust line of features if this is possible with agreement with the geomorphologist.
- Erect temporary fencing to restrict public access to the site and to fence off historic sites.
- Mark location of and install temporary protection measures to utilities, e.g. excavator mats to buried services at crossing points, goal posts for overhead cables where access routes require it.
- Install appropriate fine sediment control measures downstream of works area and across any impacted floodplain e.g. straw bales, fine sediment control mats, silt curtains. These must operate during and after in-channel features are being created, floodplain features are being excavated etc. Machinery access along the bank top or in channel must be controlled to prevent silt/fine sediment-run off from exposed banksides and from disturbed fine sediment.
- All sediment control measures are to be checked and repaired/replaced daily.
- Turbidity monitoring is to be conducted during the works. Work must cease where levels exceed 20 NTU. Any incident exceeding 40 NTU should be considered for self-reporting to the appropriate regulatory authorities. All data are to be recorded and presented to the client on a weekly basis.

Control Measures or Modifications

- No smoking in works area.
- No works to be undertaken during the hours of darkness.
- Ensure staff are aware of risk of drowning associated with working in or near water and the health and safety requirements (as detailed in the site risk assessment by the contractor).
- If any tree felling/vegetation clearance is required, site manager to contact ordnance contractor.
- All re-fuelling will take place at least 20m away from the watercourse, next to the fuel bowser.
- Be vigilant for members of public / pets / stock / wild animals entering works area.
- Be aware of the risk of Leptospirosis in and around the watercourse.
- Ensure bucket is lowered to the ground when machine is not in use.
- When visitors are on site, stop work & lower bucket to ground if they enter the works safety area.
- If working with a Banksman ensure that they are in a position where you can see them.
- Beware of machine blind spots when slewing and turning, especially with regard to tree branches.
- Be aware of any taped off areas/sites that will be of conservation, archaeological or other special interest. Do not enter these areas with any machinery.
- As a minimum use heather bale dams / silt curtains at strategic intervals in the watercourse and across impacted floodplain areas to filter coarse sediments. Pollution booms and silt reduction measures booms to be erected at the downstream end of the works.
- All operators to be competent and certificated on the machines they operate.
- All incidents relating to safety or pollution of any kind are to be reported as soon as it is safe to do so.
- All staff and visitors to undertake induction and wear the appropriate PPE for the site conditions they encounter.
- All personnel working in the river to be confined space trained and contractor to supply appropriate PPE and evacuation procedure.

Activity: Excavation of channel widening	Method Statement 4

Risks: Overturning of plant machinery, crush injuries, collapse of earth banks, falling trees and branches, overhead and buried services, collision with other plant machines, pollution to watercourse, machine strike to persons, machine strike of services, insect bites and allergic reactions, snake bites, leptospirosis, manual handling, drowning, working on soft ground.

Proposed working method overview:

- Machinery to access site as agreed by the landowner and client. Track mats should be used as appropriate dependent on landowner requests and ground conditions at time of construction. Fence/gate removal and replacement may be required to facilitate / access the works areas, alongside pollarding and vegetation clearance.
- Some working in close proximity to trees required. Contractor should ensure they have appropriate machinery and working procedures to ensure a safe working environment and to minimise damage to trees and vegetation.
- Undertake and review services search and locate services on site prior to works commencing. Review services search and locate services on site prior to excavation commencing. Some may be crossed over/under for access purposes, contractor should ensure appropriate mitigation.
- Tenant farmer to ensure livestock removed from works area prior to works commencing on site and contractor responsible for ensuring the site remains secure to livestock for the duration of the construction period.
- Temporary watercourse crossings may be required dependent on track routes and plant, this is to be agreed with the landowner, contractor and the client.
- Silt control measures to be in place downstream and across the floodplain prior to works starting, during works and inspected daily (replace / repair as necessary).
- Fish/Crayfish rescues should be undertaken through the works area prior to works starting and nets retained in the channel throughout the works under the guidance of an ecologist. Areas must be re-fished should flow overtop the nets.
- Wet working approvals may be required from the NRW to undertake the works – recommended that works are undertaken in the dry (contractor to overpump or bund off to dry working areas).
- Banks to be monitored during the works. No personnel to be in the channel during works.
- Note – following removal, regrading and feature installation there will likely be a period of time when flows should be allowed to adjust. This should be considered by the contractor.
- The channel widening areas should be surveyed in on site prior to excavation commencing using coordinates provided with the design drawings, this should also be undertaken with supervision from Dynamic Rivers.
- Excavate the channel widening areas following levels / excavation depth and width information provided within the design drawings and under supervision of the geomorphologist. Cut the connection to the main channel following excavation of the rest of the feature (i.e. leave a bund to allow majority of excavation in the dry and remove bund once rest of feature is excavated) where applicable. Create level variability across the channel widening surfaces to provide micro-habitat. Side slopes for these features can vary within a range as shown in the design drawings. Ensure these tie into bank levels and are sloped suitably at the upstream and downstream ends.
- Ensure proposed tree planting is undertaken as shown in the design drawings.
- Retain gabions material within the cages for use in bed feature creation (suitability of material for re-use to be determined on site).
- Stockpile material temporarily outside of the floodplain. Riddle any excavated boulder/gravel/cobble material for re-use in rapid creation. Weir and walling material to be disposed of off site.
- Remove any tracks into watercourse and across the working area and make good any damage. Utilise bog mats along track routes if ground becomes wet.
- Any fencing removed is to be replaced on agreement with the landowner and client.
- Seed exposed / damaged areas of floodplain, excavated areas and top of bank areas (if seeding is proposed) with suitable seed mix at 5g/m^2 spreading rate.

General Method of Work:

- Client and Principal Contractor to reconfirm area of works and mark up extent of site works.

- Check line of works for any trees to be removed, branches to be cut back, vegetation clearance etc. to ensure safe passage for machinery. Where mature trees are encountered during excavation, avoid where possible and adjust line of features if this is possible with agreement with the geomorphologist.
- Erect temporary fencing to restrict public access to the site and to fence off historic sites.
- Mark location of and install temporary protection measures to utilities, e.g. excavator mats to buried services at crossing points, goal posts for overhead cables where access routes require it.
- Install appropriate fine sediment control measures downstream of works area and across any impacted floodplain e.g. straw bales, fine sediment control mats, silt curtains. These must operate during and after in-channel features are being created, floodplain features are being excavated etc. Machinery access along the bank top or in channel must be controlled to prevent silt/fine sediment-run off from exposed banksides and from disturbed fine sediment.
- All sediment control measures are to be checked and repaired/replaced daily.
- Turbidity monitoring is to be conducted during the works. Work must cease where levels exceed 20 NTU. Any incident exceeding 40 NTU should be considered for self-reporting to the appropriate regulatory authorities. All data are to be recorded and presented to the client on a weekly basis.

Control Measures or Modifications

- No smoking in works area.
- No works to be undertaken during the hours of darkness.
- Ensure staff are aware of risk of drowning associated with working in or near water and the health and safety requirements (as detailed in the site risk assessment by the contractor).
- If any tree felling/vegetation clearance is required, site manager to contact ordnance contractor.
- All re-fuelling will take place at least 20m away from the watercourse, next to the fuel bowser.
- Be vigilant for members of public / pets / stock / wild animals entering works area.
- Be aware of the risk of Leptospirosis in and around the watercourse.
- Ensure bucket is lowered to the ground when machine is not in use.
- When visitors are on site, stop work & lower bucket to ground if they enter the works safety area.
- If working with a Banksman ensure that they are in a position where you can see them.
- Beware of machine blind spots when slewing and turning, especially with regard to tree branches.
- Be aware of any taped off areas/sites that will be of conservation, archaeological or other special interest. Do not enter these areas with any machinery.
- As a minimum use heather bale dams / silt curtains at strategic intervals in the watercourse and across impacted floodplain areas to filter coarse sediments. Pollution booms and silt reduction measures booms to be erected at the downstream end of the works.
- All operators to be competent and certificated on the machines they operate.
- All incidents relating to safety or pollution of any kind are to be reported as soon as it is safe to do so.
- All staff and visitors to undertake induction and wear the appropriate PPE for the site conditions they encounter.
- All personnel working in the river to be confined space trained and contractor to supply appropriate PPE and evacuation procedure.

General mitigation of construction impacts on habitats / species

A site Operational Management plan shall be developed by the contractor with reference to the following elements:

Element	Suggested action	Required
Water quality	Control of silt run-off and potential for machinery pollution source	YES
River crossing	Control of disturbance, contamination, silt release, noise, vibration, debris, flooding	YES
Site waste recycling plan	Re-use on site where possible	YES
Noise and dust	Timing of works; selection of plant	YES
Protected species Protection Plans	Follow species protection plans if applicable.	TBD
Invasive plant species, pests & diseases	Fence giant hogweed, remove other invasives during site preparation where necessary	TBD