

Designer's Risk Register Form

Project name: Lake View Park Restoration									
Project location: Lake View Park, Coventry									
Client: Warwickshire Wildlife Trust									
	Initial	Rev1	Rev2	Rev3	Rev4	Rev5	Rev6	Rev7	Rev8
Date	02-02-24	20-02-24							
By	SB	SB							
Checked	GH	GH							
Approved	GH	GH							

ASSUMPTIONS - River, floodplain and water schemes that involve working with natural processes and the natural environment often means working with incomplete spatial datasets (e.g. complete utilities services coverage, current survey and topographic data, hydrological estimates etc). This results in risks associated to the construction and post completion phase of the project that cannot always be identified at the design stage, and it is not uncommon for unexpected issues to be encountered during and post construction. This often requires decisions to be made in a short timeframe on site to ensure works can continue to progress and to reduce downtime. It is therefore recommended that a Dynamic Rivers staff member or other competent field specialist supervises the works on site at specific points to ensure any modifications on site are appropriate in accordance with the original design and to reduce the risk of future issues arising. Dynamic Rivers cannot be held responsible for decisions taken by others on site.

Working with natural processes through river and floodplain/valley side restoration means that some changes as the system stabilises are unpredictable and not possible to quantify through the design process following completion of the works. A river and / or floodplain restoration scheme is often most reactive during and immediately post completion of works, with some systems taking several years to stabilise depending on climatic conditions and flood flows during that time. During this period, the site and scheme will be particularly susceptible to adjustment, particularly during high flow events, therefore it is strongly recommended that monitoring of the constructed scheme is undertaken, particularly after large floods as mitigation works may be necessary to ensure the future functioning of the scheme. This should be considered by the client and communicated to those impacted by the works.

1. In accordance with the Construction (Design and Management) Regulations, Regulation 9, the hazards associated with the work activity have been considered and eliminated, where possible.
2. The residual hazards and the provision made in the design solution to manage them, thus reducing the risks from the hazard are shown below. In accordance with HSE advice only the significant hazards are recorded on this form.
3. In order to put these provisions in context, assumptions about the method of construction have been stated. However, this does not restrict the contractor to the construction methods implied by this.
4. It is understood that a competent contractor will carry out the construction, maintenance and demolition work in accordance with relevant regulations and recognised good industry practice.
5. It is recommended and assumed that the works are overseen by a competent geomorphologist who is familiar with the design.

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<p>1</p>	<p>General work on site</p>	<p>The site is located on a floodplain and river and is therefore at risk of flooding.</p> <p>Working near water around the restoration site. There is a risk of drowning, flooding, high velocity flows and associated hazards such as hypothermia and environmental pollution.</p> <p>Risk of water borne diseases e.g. leptospirosis.</p> <p>A proportion of the works will take place in very wet floodplain/valley side areas. The principal contractor is responsible for ensuring safe working practices are followed in these areas where there is a risk of soft ground to people and machinery.</p> <p>Trees marked for felling should be kept following felling and incorporated under the guidance of the onsite geomorphologist (where relevant). Trees marked for no-felling should not be disturbed through careful construction methods.</p> <p>Stockpile excavated material temporarily outside of the floodplain. Import of material will be required to construct the riffle features. Ensure correct mix of sediment is used for creation of these features and is constructed as defined in the method statement and shown in the design drawings. Any excess spoil will need to be spread elsewhere out of active flood zone areas. When spreading material</p>	<p>Specified that all works to be carried out under low flow conditions. In river and floodplain/valley side works to stop if flooding into the floodplain and high flows in the channel / floodplain. All equipment should be moved out of the river and floodplain. Works schedule should be for spring/summer/autumn period when risk of flooding is reduced.</p> <p>Compound / plant to be located / stored outside of known flood event extents.</p> <p>Dry working to be undertaken wherever possible.</p> <p>All works to be undertaken with use of a banksman.</p> <p>Site workers and operatives to wear buoyancy aids and to avoid entering the watercourse.</p> <p>No workers should enter the river channel. Suitable PPE including buoyancy aid should be available on site in case of emergency.</p> <p>No lone working on site.</p> <p>Throw line to be available on site.</p>	<p>Drowning.</p> <p>Flooding.</p> <p>Associated hazards such as hypothermia and environmental pollution.</p> <p>Risk of water borne diseases e.g. leptospirosis.</p> <p>Road traffic accidents.</p> <p>A proportion of the works will take place in very wet floodplain/valley side areas. The principal contractor is responsible for ensuring safe working practices are followed in these areas where there is a risk of soft ground to people and machinery.</p> <p>There are sensitive habitats and species on site. Contractor and client should consult with an ecologist before works are undertaken. Contractor to consider this through sensitive working methods.</p> <p>Stockpile excavated material temporarily outside of the floodplain. Import of material will be required to construct the riffle features. Ensure correct mix of sediment is used for creation of these features and is constructed as defined in the method statement and shown in the design drawings. Any</p>	<p>Contractor to be informed of perceived residual hazards.</p> <p>Contractor to consider construction sequence produced for contractor's reference.</p> <p>Contractor to design temporary works and put in place appropriate precautions to deal with flood risk during construction (monitor weather conditions and water levels).</p> <p>Contractor to sign up to EA flood alerts.</p> <p>Works to be programmed such that no critical sections are left open at the end of the working day, or over a weekend, in case a flood event occurs.</p> <p>All works to be undertaken with use of a banksman.</p> <p>Site workers and operatives to wear buoyancy aids and to avoid entering the watercourse.</p>
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		<p>and tracking over any archaeologically sensitive areas (where applicable), this should be undertaken using Low Ground Pressure Plant.</p> <p>There are sensitive habitats and species on site. Contractor and client should consult with an ecologist before works are undertaken. Contractor to consider this through sensitive working methods.</p> <p>Work around mature trees where possible where these are encountered on site.</p>	<p>First aid trained personnel to be on site with appropriate first aid kit.</p> <p>Consult with ecologist with regards to management of habitats and species on site.</p> <p>Mark trees on site that are not to be removed.</p>	<p>excess spoil will need to be spread elsewhere out of active flood zone areas. When spreading material and tracking over any archaeologically sensitive areas (where applicable), this should be undertaken using Low Ground Pressure Plant.</p>	

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<p>2</p>	<p>Working in vicinity of services.</p>	<p>A services search has been conducted for the site (note this was undertaken over two years ago as a result of a previous phase of the project, a new service search should be undertaken prior to works commencing on site) and is shown in the design drawings against the proposed design. 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.</p> <p>No services are likely to be directly impacted by the proposed works. Some may be crossed under or over for access purposes and to deliver the works.</p> <p>All services should be considered carefully by the contractor undertaking the works in terms of safe working procedures, access and crossing these utilities, with appropriate liaison with the service provider. 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 undertake a C.A.T4 / radio-detection scan, in liaison with the provider, and locate these services prior to excavation commencing if deemed required.</p>	<p>Service searches have been conducted for the site (note this was undertaken over two years ago as a result of a previous phase of the project, a new service search should be undertaken prior to works commencing on site). These have been mapped as accurately as possible by Dynamic Rivers. Dynamic rivers accept no liability with regards the presence of services on site or the supplied services information. This is the responsibility of the client.</p> <p>No services are likely to be directly impacted by the proposed works. Some may be crossed under or over for access purposes and to deliver the works.</p> <p>It is strongly recommended the client and/or contractor should undertake a services search prior to the works and undertake additional C.A.T4 / radio-detection scanning before commencing works.</p> <p>Dynamic Rivers accept no liability of any kind for the accuracy, currency or completeness of the information provided on this supplied plan. This plan is a compiled cartographical representation of information received from numerous</p>	<p>A services search has been conducted for the site (note this was undertaken over two years ago as a result of a previous phase of the project, a new service search should be undertaken prior to works commencing on site) and is shown in the design drawings against the proposed design.</p> <p>It is the clients responsibility to make any utility provider aware of work being undertaken in close proximity to any services, this includes where increased wetting may occur around services.</p> <p>No services are likely to be directly impacted by the proposed works. Some may be crossed under or over for access purposes and to deliver the works.</p> <p>Risk of damaging services during construction.</p> <p>Contractor to be aware of existing services locations prior to undertaking the works to identify if any will be crossed or passed under in order to access the site.</p> <p>Encountering private services, e.g. land drains that will need to be dealt with on site by the</p>	<p>Client to liaise with service providers in advance, as required.</p> <p>Contractor to be informed of perceived residual hazards.</p> <p>Location of services outlined in supplied services search.</p> <p>Contractor to undertake another services search prior to works commencing.</p> <p>Contractor to undertake C.A.T4. / Radio-detection scanning.</p>
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		<p>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 and work with limiters. They should also locate any buried services before excavation begins in liaison with the service provider. Track mats may be required across buried services.</p> <p>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.</p> <p>Service searches do not always show manhole presence. There is a risk of water flowing across manholes and underground services more frequently, and to greater depths, as a result of floodplain reconnection works. Wetter floodplain areas also may occur around overhead services. Pylon locations are not always plotted on supplied service searches, attempts to plot these have been made using aerial imagery. This could mean that some pylons have been missed. This should be reviewed by the contractor on site prior to works commencing.</p>	<p>mapping sources of varying scales, quality and resolutions. The source utility companies do not guarantee the correctness of the data provided.</p> <p>Only use this plan in conjunction with the compiled responses which include further detail, legends, notes and warnings. It is critical that the location of any utility services and apparatus is confirmed on site prior to any excavation work.</p>	<p>contractor with agreement by the landowner and client.</p> <p>There may be error in the supplied service search maps from the provider, any uncertainty should be verified with the utility supplier.</p> <p>Client/contractor to check with utility provider with regards to safe working distances/heights from services present on site e.g. any work/access underneath overhead powerlines, excavation in close proximity to underground services.</p> <p>Service searches do not always show manhole presence. There is a risk of water flowing across manholes and underground services more frequently, and to greater depths, as a result of floodplain reconnection works. Wetter floodplain areas also may occur around overhead services. Pylon locations are not always plotted on supplied service searches, attempts to plot these have been made using aerial imagery. This could mean that some pylons have been missed. This should be reviewed by the contractor on site prior to works commencing.</p>	
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3	Movement of excavated soil, gravel / cobble/ trees and for temporary works (e.g. gravel filled dumpy bags).	The works involve the movement of excavated soil material, gravel/cobble/trees potentially weighing several hundred kg. There is a risk of dropping material.	None.	Injury from falling material etc.	Contractor to be informed of perceived residual hazards. Contractor to consider construction sequence produced for contractor's reference. Safe working zones to be established between operative and plant.

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<p>4</p>	<p>Construction impact on bank stability and impact on natural processes.</p> <p>Future channel change linked to naturalisation of a lowland river system.</p>	<p>The stability of the banks in the vicinity of the works of the existing channel and surrounding drains / ditches / channels should be monitored during the works particularly when the bank is loaded or damaged during construction or otherwise disturbed. This is particularly the case following wet weather.</p> <p>Upstream water level monitoring should be undertaken during placement of in-channel features (where applicable) and adjustments made to features should unacceptable increases occur.</p> <p>Monitoring around existing infrastructure (e.g. bridges) should be undertaken during the works, although these should not be directly impacted by the proposed works. No engineering assessments/inspections have been undertaken on any structures along the reach.</p> <p>All works could be subject to local change over time as part of natural processes linked to the restoration work undertaken, this includes potential for erosion and deposition. This should be continually monitored. The system is naturally low/moderate energy so restoration will see gradual change through deposition and strong vegetation growth, and localised erosion, but this is in line with a more natural channel style. Erosion could occur, particularly around the outside of meander bends.</p>	<p>Any signs of damage during and post construction should be monitored and mitigated.</p> <p>Post-construction erosion, bank stability and deposition should be monitored and mitigated where deemed necessary.</p> <p>Upstream water level monitoring proposed during construction where necessary.</p> <p>Monitoring around existing infrastructure (e.g. upstream bridges, bridges across the watercourse, structure controlling flow split in Lake View Park) should be undertaken during the works, although these should not be directly impacted by the proposed works.</p> <p>There could be local change over time and in response to flood events. The features and stretches of river should be continually monitored, particularly after a flood event.</p>	<p>Collapse of bank and fall from height.</p> <p>Persons being buried.</p> <p>Collapse / erosion of bank due to loading during works.</p> <p>Working with natural processes means some future changes can be unpredictable as the system stabilises over time.</p> <p>Existing/remaining banks, gabions, revetment and embankments remain at risk of future failure where these exist.</p> <p>Remedial works required to features following high flow events.</p> <p>Adjustments to in-channel features required to mitigate upstream water level changes.</p> <p>Fine and coarse sediment deposition across introduced features and the reconnected floodplain areas is likely over time with associated vegetation colonisation.</p> <p>The design is promoting improved floodplain connectivity, wetland and in-channel works that promote natural processes associated to a lowland, moderate energy, single thread channel and encouragement of flow across</p>	<p>Contractor to be informed of perceived residual hazards.</p> <p>Condition of banks and margins to be monitored during works (operatives with binoculars if required) and recorded prior to works commencing. All plant to be set back from the edge of the river.</p> <p>Contractor should take photographic record of all infrastructure along the reach prior to works commencing.</p> <p>Pre-works survey should be undertaken.</p> <p>Post-project monitoring program.</p>
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		<p>The design is promoting improved floodplain connectivity, wetland and in-channel works that promote natural processes associated to a lowland, moderate energy, single thread channel and encouragement of flow across the floodplain through local channel and floodplain works. This includes potential for erosion and deposition over time. This will result in wetter floodplain conditions and more frequent out of bank flows along the reconnected floodplain areas. The targeted floodplain areas will result in more frequent flows across them all year round, therefore the floodplain area will be significantly wetted by the works throughout the year resulting in vegetation change over time. Improved floodplain connectivity may encourage deposition of gravels/cobbles over time within the current main channel, with associated low level bank erosion around deposits as they develop. Fine sediments, gravel and cobble material could also deposit across the floodplain during flood conditions. This is inline with natural processes for a watercourse of this type. Wetland vegetation will develop over time in response to the reconnected floodplain areas and created wetland features. There will be retention of water in some of the excavated areas. The reconnected floodplain areas will be wetter under both summer and winter normal flow conditions, promoting the</p>		<p>the floodplain through local channel and floodplain works. This includes potential for erosion and deposition over time. This will result in wetter floodplain conditions and more frequent out of bank flows along the reconnected floodplain areas. The targeted floodplain areas will result in more frequent flows across them all year round, therefore the floodplain area will be significantly wetted by the works throughout the year resulting in vegetation change over time. Improved floodplain connectivity may encourage deposition of gravels/cobbles over time within the current main channel, with associated low level bank erosion around deposits as they develop. Fine sediments, gravel and cobble material could also deposit across the floodplain during flood conditions. This is inline with natural processes for a watercourse of this type. Wetland vegetation will develop over time in response to the reconnected floodplain areas and created wetland features. There will be retention of water in some of the excavated areas. The reconnected floodplain areas will be wetter</p>	
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		<p>development of wetland habitat. The proposed floodplain features, e.g. wetlands, scrapes etc, will create permanently and seasonally wet areas across the target floodplain area. This should be communicated with the landowner. Deposition may change the flooding regime over time along the study reach, this is a part of natural processes.</p> <p>Channel widening will encourage deposition of sediment in the channel over time. This could change the flooding regime.</p> <p>Created riffle features could be subject to some movement over time, particularly after significant floods. This should be monitored.</p> <p>Feature creation in the channel should be carefully undertaken so that no unforeseen water level raising occurs. Monitoring of water levels should also be undertaken at the upstream limit of where change is acceptable.</p> <p>The proposed floodplain features, e.g. wetlands, ponds, scrapes etc, will create permanently and seasonally wet areas across the target floodplain area. This should be communicated with the landowner. Deposition may change the flooding regime over time along the study reach, this is a part of natural processes.</p> <p>Fine and coarse sediment deposition across introduced features and the</p>		<p>under both summer and winter normal flow conditions, promoting the development of wetland habitat. The proposed floodplain features, e.g. wetlands, scrapes etc, will create permanently and seasonally wet areas across the target floodplain area. This should be communicated with the landowner. Deposition may change the flooding regime over time along the study reach, this is a part of natural processes.</p> <p>Adjacent land will be wetted as a result of the proposed design, this should be communicated with the landowner.</p> <p>Created riffle features could be subject to some movement over time, particularly after significant floods. This should be monitored.</p> <p>Channel widening will encourage deposition of sediment in the channel over time. This could change the flooding regime.</p>	
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		<p>reconnected floodplain areas is likely over time with associated vegetation colonisation.</p> <p>Adjacent land will be wetted as a result of the proposed design, this should be communicated with the landowner.</p> <p>Existing/remaining revetment and embankments remain at risk of failure.</p> <p>Expected future change of the area is described further in the supporting technical note.</p>			

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<p>5</p>	<p>Construction impact on floodplain and valley side function.</p>	<p>The stability of the banks in the vicinity of the works of the existing channel and surrounding drains / ditches / channels should be monitored during the works particularly when the bank is loaded or damaged during construction or otherwise disturbed. This is particularly the case following wet weather.</p> <p>Upstream water level monitoring should be undertaken during placement of in-channel features (where applicable) and adjustments made to features should unacceptable increases occur.</p> <p>Monitoring around existing infrastructure (e.g. bridges) should be undertaken during the works, although these should not be directly impacted by the proposed works. No engineering assessments/inspections have been undertaken on any structures along the reach.</p> <p>All works could be subject to local change over time as part of natural processes linked to the restoration work undertaken, this includes potential for erosion and deposition. This should be continually monitored. The system is naturally low/moderate energy so restoration will see gradual change through deposition and strong vegetation growth, and localised erosion, but this is in line with a more natural channel style. Erosion could occur, particularly around the outside of meander bends.</p>	<p>Any signs of damage during and post construction should be monitored and mitigated.</p> <p>Post-construction erosion, bank stability and deposition should be monitored and mitigated where deemed necessary.</p> <p>Upstream water level monitoring proposed during construction where necessary.</p> <p>Monitoring around existing infrastructure (e.g. upstream bridges, bridges across the watercourse, structure controlling flow split in Lake View Park) should be undertaken during the works, although these should not be directly impacted by the proposed works.</p> <p>There could be local change over time and in response to flood events. The features and stretches of river should be continually monitored, particularly after a flood event.</p>	<p>Collapse of bank and fall from height.</p> <p>Persons being buried.</p> <p>Collapse / erosion of bank due to loading during works.</p> <p>Working with natural processes means some future changes can be unpredictable as the system stabilises over time.</p> <p>Existing/remaining banks, gabions, revetment and embankments remain at risk of future failure where these exist.</p> <p>Remedial works required to features following high flow events.</p> <p>Adjustments to in-channel features required to mitigate upstream water level changes.</p> <p>Fine and coarse sediment deposition across introduced features and the reconnected floodplain areas is likely over time with associated vegetation colonisation.</p> <p>The design is promoting improved floodplain connectivity, wetland and in-channel works that promote natural processes associated to a lowland, moderate energy, single thread channel and encouragement of flow across</p>	<p>Contractor to be informed of perceived residual hazards.</p> <p>Condition of banks and margins to be monitored during works (operatives with binoculars if required) and recorded prior to works commencing. All plant to be set back from the edge of the river.</p> <p>Contractor should take photographic record of all infrastructure along the reach prior to works commencing.</p> <p>Pre-works survey should be undertaken.</p> <p>Post-project monitoring program.</p>
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		<p>development of wetland habitat. The proposed floodplain features, e.g. wetlands, scrapes etc, will create permanently and seasonally wet areas across the target floodplain area. This should be communicated with the landowner. Deposition may change the flooding regime over time along the study reach, this is a part of natural processes.</p> <p>Channel widening will encourage deposition of sediment in the channel over time. This could change the flooding regime.</p> <p>Created riffle features could be subject to some movement over time, particularly after significant floods. This should be monitored.</p> <p>Feature creation in the channel should be carefully undertaken so that no unforeseen water level raising occurs. Monitoring of water levels should also be undertaken at the upstream limit of where change is acceptable.</p> <p>The proposed floodplain features, e.g. wetlands, ponds, scrapes etc, will create permanently and seasonally wet areas across the target floodplain area. This should be communicated with the landowner. Deposition may change the flooding regime over time along the study reach, this is a part of natural processes.</p> <p>Fine and coarse sediment deposition across introduced features and the</p>		<p>under both summer and winter normal flow conditions, promoting the development of wetland habitat. The proposed floodplain features, e.g. wetlands, scrapes etc, will create permanently and seasonally wet areas across the target floodplain area. This should be communicated with the landowner. Deposition may change the flooding regime over time along the study reach, this is a part of natural processes.</p> <p>Adjacent land will be wetted as a result of the proposed design, this should be communicated with the landowner.</p> <p>Created riffle features could be subject to some movement over time, particularly after significant floods. This should be monitored.</p> <p>Channel widening will encourage deposition of sediment in the channel over time. This could change the flooding regime.</p>	
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		<p>reconnected floodplain areas is likely over time with associated vegetation colonisation.</p> <p>Adjacent land will be wetted as a result of the proposed design, this should be communicated with the landowner.</p> <p>Existing/remaining revetment and embankments remain at risk of failure.</p> <p>Expected future change of the area is described further in the supporting technical note.</p>			

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6	Riffle feature construction and functioning	There is a risk of seepage of water through constructed gravel / cobble riffles if the proposed material mix is not followed and material is not well mixed prior to placement by the contractor. Smaller material helps to infill the voids between larger material within the overall mix.	<p>Material mix composition stated on design drawings. Ensure full range of sizes are represented in each gravel/cobble mix. Ensure riffle length is constructed as shown in the design drawings. Ensure riffle stoss slope length, crest length and lee slope length are constructed as shown in the design drawings.</p> <p>Check flow is across the surface of the feature during low flow and ensure no significant seepage occurring that results in the water surface falling below the crest of the feature. Careful mixing of stated sediment size composition should avoid this occurring.</p>	Risk of seepage through constructed riffle features that requires mitigation.	<p>Material mix composition stated on design drawings. Ensure full range of sizes are represented in each gravel/cobble mix. Ensure riffle lengths are constructed as shown in the design drawings. Ensure riffle stoss slope length, crest length and lee slope length are constructed as shown in the design drawings.</p> <p>Check flow is across the surface of the feature during low flow and ensure no significant seepage occurring that results in the water surface falling below the crest of the feature. Careful mixing of stated sediment size composition should avoid this occurring.</p>

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<p>7</p>	<p>Access to and from site.</p>	<p>Risk to members of public from plant movements.</p> <p>Access routes are to be confirmed with the client and landowner along the reach. If crossing of the watercourses / ditches is required to access the site, a temporary bridge may be required that will be specified by the contractor.</p> <p>No loading assessments have been undertaken on any structures that may be used for access purposes, the contractor should undertake a loading assessment prior to these being used as access routes.</p> <p>Steep sided banks / valley side and very wet floodplain/valley side areas will require careful consideration for access by the contractor.</p> <p>Contractor to avoid tracking over archaeological sensitive areas on site (where present). Any excess spoil will need to be spread elsewhere out of active flood zone areas. When spreading material and tracking over any archaeologically sensitive areas (to be marked out on site prior to works beginning), this should be undertaken using Low Ground Pressure Plant. An archaeological watching brief may be required.</p> <p>Contractor to avoid tracking over sensitive habitat areas (where present).</p> <p>Working in/near woodland/trees is required to create some features and</p>	<p>Public access route closure/fencing/diversion of footpaths.</p> <p>Works area to be fenced off from members of the public and re-routed via alternate paths.</p> <p>Contractor to avoid tracking over archaeological sensitive areas on site (where present). Any excess spoil will need to be spread elsewhere out of active flood zone areas. When spreading material and tracking over any archaeologically sensitive areas (to be marked out on site prior to works beginning), this should be undertaken using Low Ground Pressure Plant. An archaeological watching brief may be required.</p> <p>Contractor to avoid tracking over sensitive habitat areas (where present).</p> <p>Banksman to be provided by the contractor at all times.</p> <p>Work around mature trees where these are encountered on site.</p> <p>No loading assessments have been undertaken on any structures that may be used for access purposes,</p>	<p>Injury / death from collision with vehicles.</p> <p>Banksman required – to be provided by the contractor.</p> <p>Contractor will need to specify temporary access bridge requirements if these are required to access the sites.</p> <p>Steep sided banks / valley side and very wet floodplain/valley side areas will require careful consideration for access by the contractor.</p> <p>Working in/near woodland/trees is required to create some features and for access purposes. Contractor should ensure they have appropriate machinery and working procedures to ensure a safe working environment and to minimise damage to trees and vegetation.</p> <p>Work around mature trees where possible where these are encountered on site.</p> <p>Failure of access structures.</p>	<p>Contractor to be informed of perceived residual hazards.</p> <p>Access route to site to be defined and all delivery drivers made aware of risks.</p>
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		<p>for access purposes. Contractor should ensure they have appropriate machinery and working procedures to ensure a safe working environment and to minimise damage to trees and vegetation.</p> <p>Work around mature trees where possible where these are encountered on site.</p>	<p>the contractor should undertake a loading assessment prior to these being used as access routes.</p>		

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<p>8</p>	<p>Increased flood risk.</p>	<p>Works do not cause an increase to out of bank flooding that increases risk to property / housing or people in accordance with the modelling undertaken. There are some changes in flood extents along the study reach and floodplain area, as shown in the accompanying technical note. However, more frequent out of bank flows and flood extent increases in the target floodplain reconnection areas can be expected as part of the works. This is an objective of the overall project as these will develop into diverse wetland areas.</p> <p>Upstream water level monitoring should be undertaken during placement of in-channel features and adjustments made to features should unacceptable increases occur, particularly for proposed riffle features. The improved floodplain connectivity and wetland/pond/scrape areas of the proposed works will likely be summer and/or winter wet.</p> <p>There are no modelled changes in water levels upstream of the proposed works beyond the site boundary.</p> <p>Impacts to flood risk should be reviewed against any future development of the local floodplain area.</p> <p>The flooding regime could change over time as the river and floodplain naturalises and responds to the</p>	<p>Improved connectivity to the local floodplain and wetland/permanent water body creation is an objective of the study through the proposed restoration works with associated wetland development and feature creation across the floodplain.</p> <p>Monitor upstream water level change during the works.</p> <p>Recommended that contractor places a limit on height and extent of temporary works, such that if a large event occurs the temporary works will over top and not reduce channel capacity.</p> <p>Limit width of channel which is closed off at any one time where possible (if this is deemed required by the contractor).</p> <p>Proposed spreading areas should be outside of the Environment Agency flood zones. Spreading areas to be determined by the client/landowner.</p> <p>There will be a period of time where works are partly complete. If a flood were to occur at this point during the construction, then unpredictable flooding could</p>	<p>Altered flood regime across the study reach.</p> <p>Drowning.</p> <p>There will be a period of time where embankments / banks are partly removed / or works partly complete. If a flood were to occur at this point during the construction, then unpredictable flooding could occur. This risk cannot be removed as part of the design process.</p> <p>Existing/remaining banks, revetment, gabions and embankments remain at risk of future failure.</p> <p>Impacts to water levels upstream/downstream requiring changes to restored features.</p> <p>The flooding regime could change over time as the river and floodplain naturalises and responds to the proposed works. This is part of natural processes.</p>	<p>Contractor to be informed of perceived residual hazards.</p> <p>Construction to consider temporary works approach and sequence.</p> <p>Contractor to monitor weather forecast and river levels.</p>
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		<p>proposed works. This is part of natural processes.</p> <p>Temporary works (dependent on contractor approach) may partly block the channel / floodplain reducing its capacity. If an event occurs, this could result in out of bank flows and premature flooding.</p> <p>Flooding of the fields/park where works are proposed will also still occur.</p> <p>Risk of flooding to adjacent land and areas adjacent to and upstream of works.</p>	<p>occur. This risk cannot be removed as part of the design process.</p>		

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9	Reconnection of floodplain and storage of water in hydrologic features (wetlands, ponds, scrapes, inset floodplain / berms etc).	<p>Dependent on flow volumes, topography and water levels, it could take a considerable amount of time for reconnected/created features and the floodplain to become wet following completion of the works. This is an unknown and the risk cannot be removed as part of the design process. Features and the floodplain could be drier than anticipated.</p> <p>Unknown and hidden drainage could impact the functioning of reconnected areas and created features. This is an unknown and the risk cannot be removed as part of the design process. Features and the floodplain could be drier than anticipated.</p>	None.	<p>Dependent on flow volumes, topography and water levels, it could take a considerable amount of time for reconnected/created features and the floodplain to become wet following completion of the works. This is an unknown and the risk cannot be removed as part of the design process. Features and the floodplain could be drier than anticipated.</p> <p>Unknown and hidden drainage could impact the functioning of reconnected areas and created features. This is an unknown and the risk cannot be removed as part of the design process. Features and the floodplain could be drier than anticipated.</p>	None.

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10	Spreading of non-native species / biosecurity	<p>Spreading of non-native species during works by moving machinery/ equipment and by boots.</p> <p>All plant and equipment including boots and waders to be disinfected prior to use in the river.</p>	None – no non-native or protected species surveys carried out as part of the project.	<p>Increased area of non-native species.</p> <p>Damage, injury, death to protected species and habitats.</p>	<p>Comply with the Environment Agencies requirements to prevent the spread of invasive species.</p> <p>Contractor responsible for suitable biosecurity measures on site.</p>
11	Tree works, fence removal and vegetation clearance.	<p>Some tree works and felling will be required to deliver some of the works and for machinery access purposes. This is to be determined by the contractor. Trees marked for felling should be retained on site and incorporated under guidance of onsite geomorphologist.</p> <p>Work around mature trees where possible where these are encountered on site.</p> <p>Any fencing removed is to be replaced with agreement from the landowner and client. No designs of fence or gate removal undertaken by Dynamic Rivers.</p>	<p>Stands of trees retained where possible around feature excavation.</p> <p>Work around mature trees where possible where these are encountered on site.</p>	<p>Fence/gate replacement may be required.</p> <p>Tree surveys and protected species habitat surveys may be required e.g. bats.</p> <p>Specialist tree work method statements are to be produced by the tree work contractor as required.</p> <p>Work around mature trees where possible where these are encountered on site.</p>	<p>Contractor to be informed of perceived residual hazards.</p> <p>Site walkover to be undertaken by client with the contractor to determine any required tree works following marking out of the works. This should also be undertaken with overview of an ecologist for bat potential assessment prior to removal.</p>

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<p>12</p>	<p>Material quantities.</p>	<p>Increased expenditure due to design changes during construction based on local conditions encountered during the works (particularly anticipated volume of sediment for removal and volume for feature creation). This is particularly the case for the proposed excavation and infill volumes where local variations in level (including bed levels) may influence the volumes given. Design is based on LiDAR and EA model cross sections that is subject to inherent error (particularly around vegetation and under trees where this data is filtered). Levels may be subject to local change due to the presence of silt and vegetation. This may mean that formation levels will change based on encountered ground conditions and could impact on calculated infill and excavation volumes.</p> <p>Temporary works have not been costed.</p> <p>Import of material will be required for creation of riffle features.</p> <p>Excavated material could be subject to expansion (dependent on type) and may initially require additional spreading area/storage volume until it compacts. Contractor would normally account for this in material movement costs or as part of their material management plan.</p>	<p>LiDAR and EA model cross sections has been checked as far as possible.</p> <p>Excavation should monitor groundwater during works and adjust the level of associated features as necessary. This may result in adjustments to excavated volumes.</p>	<p>Adjusted material quantities and subsequent impact on project costs as a result of underlying data error.</p> <p>Changes in formation levels to those given in design drawings.</p> <p>Expansion of excavated material to be considered by contractor in their material management plan/costs.</p> <p>Impacts to exact location of feature positions (different to those shown in design drawings) and impacts to specified feature volumes. Contractor should account for this prior to works commencing on site.</p> <p>Import of material will be required for creation of riffle features.</p>	<p>Client should have suitable contingency funds if further material is required for import, or if more material is required to be excavated.</p> <p>Contractor should be made aware of associated risks and can account for them in advance.</p>
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13	Inadequate compaction of features and use of incorrect materials results in washout of placed features.	<p>Created riffle features at risk of washout if contractor does not ensure suitable compaction of features and use of stated material sizes, mixes and types as described on the design drawings.</p> <p>Import of material will be required for creation of riffle features.</p> <p>There is a risk of seepage of water through constructed gravel / cobble riffles if the proposed material mix is not followed and material is not well mixed prior to placement by the contractor. Smaller material helps to infill the voids between larger material within the overall mix.</p>	<p>Geomorphologist to review materials and methods used on site in creating features and to supervise the contractor during creation and compaction of features.</p> <p>Material mix composition stated on design drawings. Ensure full range of sizes are represented in each gravel/cobble mix. Ensure riffle length is constructed as shown in the design drawings.</p> <p>Check flow is across the surface of the feature during low flow and ensure no significant seepage occurring that results in the water surface falling below the crest of the feature. Careful mixing of stated sediment size composition should avoid this occurring.</p>	<p>Existing/remaining banks, gabions, embankments and revetment remain at risk of future failure.</p> <p>Import of material will be required for creation of riffle features.</p> <p>Some movement of riffle material could occur over time. This should be monitored.</p> <p>Risk of seepage through constructed riffle feature that requires mitigation.</p>	<p>Contractor to carefully review design drawings and material requirements and to follow guidance provided by on site geomorphologist during feature creation.</p> <p>Monitoring programme post construction.</p> <p>Material mix composition stated on design drawings. Ensure full range of sizes are represented in each gravel/cobble mix. Ensure riffle length is constructed as shown in the design drawings.</p> <p>Check flow is across the surface of the feature during low flow and ensure no significant seepage occurring that results in the water surface falling below the crest of the feature. Careful mixing of stated sediment size composition should avoid this occurring.</p>

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14	Material spreading mobilisation risk.	<p>Stockpile excavated material temporarily outside of the floodplain. Import of material will be required to construct the riffle features. Ensure correct mix of sediment is used for creation of these features and is constructed as defined in the method statement and shown in the design drawings. Any excess spoil will need to be spread elsewhere out of active flood zone areas. When spreading material and tracking over any archaeologically sensitive areas (where applicable), this should be undertaken using Low Ground Pressure Plant.</p> <p>Proposed spreading locations for excess excavated material could be subject to mobilisation should flooding occur before vegetation is allowed to re-establish.</p>	<p>Advised client that excess material should be spread outside of the floodplain area.</p> <p>Stockpile excavated material temporarily outside of the floodplain. Import of material will be required to construct the riffle features. Ensure correct mix of sediment is used for creation of these features and is constructed as defined in the method statement and shown in the design drawings. Any excess spoil will need to be spread elsewhere out of active flood zone areas. When spreading material and tracking over any archaeologically sensitive areas (where applicable), this should be undertaken using Low Ground Pressure Plant.</p> <p>Advised that contractor compacts spread material initially.</p>	<p>Mobilisation of spread material if flooding/surface flow occurs across it.</p> <p>Stockpile excavated material temporarily outside of the floodplain. Import of material will be required to construct the riffle features. Ensure correct mix of sediment is used for creation of these features and is constructed as defined in the method statement and shown in the design drawings. Any excess spoil will need to be spread elsewhere out of active flood zone areas. When spreading material and tracking over any archaeologically sensitive areas (where applicable), this should be undertaken using Low Ground Pressure Plant.</p>	n/a
15	Works sequencing and flood risk	A sequence of works has been provided within the accompanying Method Statement. There will be a period of time during construction where elements are part built and / or part removed. This will have implications with regards to local flood patterns, extents and timings should a flood occur when these are part	Works sequence provided, but risk associated to this cannot be completely removed through the design.	Altered flood extents, patterns and timings during construction.	Method Statement provided with the design package.

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		constructed. This should be communicated and agreed with landowners prior to works commencing.			
16	Unconsented works in the river and floodplain/valley side pre, during or post construction of the scheme	Any unconsented works across the river and floodplain/valley side pre, during or post construction of the scheme will mean predicted impacts associated to the scheme from this study are potentially compromised and Dynamic Rivers will not be liable.	None.	Altered flood and geomorphological change across the river and floodplain/valley side as a result of any unconsented works being undertaken pre, during or post construction of the scheme.	None.
17	Changes to the design by third parties	Any third party changes to the design across the river and floodplain/valley side pre, during or post construction of the scheme will mean predicted impacts associated to the scheme from this study are potentially compromised and Dynamic Rivers will not be liable.	None.	Altered flood and geomorphological change across the river and floodplain/valley side as a result of third party changes being undertaken pre, during or post construction of the scheme.	None.
18	Ordnance Survey Map Error	The existing 10K Ordnance Survey mapping for the site shows some error with regards to alignment against the LIDAR data.	Coordinates and feature mapping can be provided to delineate feature position based on available LIDAR.	Contractor to be made aware of error with regards to review of the overview drawings.	Drawings and coordinates show proposed locations of works.

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19	Fine sediment management and mitigation	<p>Suggestions have been made for management of fine sediment runoff and transport within the river and floodplain/valley side during construction. Whilst these will help to reduce fine sediment runoff and transport downstream, these measures may not completely mitigate this issue despite best endeavours. This should be noted by the client.</p> <p>Recommended that dry working is undertaken wherever possible.</p>	<p>Fine sediment mitigation measures suggested within the Method Statement. This should include turbidity measuring of the watercourse downstream during the works, with turbidity working limits advised, 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. The contractor will also provide a named environmental adviser who will be responsible for overseeing sensitive phases of construction.</p> <p>Recommended that dry working is undertaken wherever possible.</p> <p>Turbidity working limits advised – see Method Statement.</p>	<p>Some fine sediment may still wash into the main rivers/ditches despite recommended mitigation measures, particularly if large rainfall events occur or if a flood occurs across exposed soil.</p>	<p>Mitigation measure advice provided as part of the design package.</p>

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20	Excess material spreading	It has been assumed as part of the estimated costs (where applicable) that excess excavated material will be spread locally (where relevant), outside of the active floodplain area / flood zones as agreed by the Environment Agency.	None. Spread sites should be assessed for surface flow risk to avoid material remobilisation.	Projects costs would significantly increase if all material was to be transferred off site or sent to landfill. Excess material should not be spread in the active floodplain area without agreement with the Environment Agency.	Flood extent information has been provided as part of the project reporting.
21	Modelling limitations linked to data	<p>Hydraulic modelling is a simplified representation of the topographic surface and reality with uncertainties linked to the underlying topographic data, model resolution required to produce sensible model run times and hydrological estimates used/calculated.</p> <p>Modelling has not considered spreading of material within the active floodplain area / flood zones.</p> <p>Best practice has been used for modelling of tree features in the channel and floodplain (where relevant). However, there is inherent variability in these features in reality that cannot be accurately represented in hydraulic models, therefore modelled impacts of these features are indicative only.</p>	The models are run on the finest resolution possible, and data is checked as far as is reasonably possible.	<p>Uncertainty in hydrological estimates and any error in the underlying topographic data could produce errors in the hydraulic model outputs.</p> <p>Modelling has not considered spreading of material within the active floodplain area / flood zones.</p> <p>Uncertainty in impacts on flood extents, hydraulics, depths etc linked to representation of in-channel and floodplain wood features in the model. This could lead to error in modelled flood extents and hydraulic model outputs.</p>	Technical note summarising the modelling undertaken.

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22	Hydrology	<p>Hydrological estimates used for hydraulic modelling purposes are subject to error, particularly for ungauged catchments. This uncertainty could impact on feature functioning and modelled flow and flood extents and depths.</p> <p>Flow estimates for ditches/drains within the model domain (where relevant) have been estimated for the purposes of the modelling assessment as standard hydrological techniques do not allow for calculation of flows in ditches.</p>	The hydrology has been checked as far as possible.	<p>Uncertainty in hydrological estimates could produce errors in the hydraulic model outputs.</p> <p>Uncertainty in flow estimates linked to ditches could produce errors in the hydraulic model outputs.</p>	Technical note summarising the hydrology and modelling undertaken.
23	Works constructed to design specification	Risk of works not being constructed as specified.	<p>Design drawings and method statement provided.</p> <p>Recommended that designer assists the contractor in setting out, supervises the works during construction and undertakes a final supervision visit before contractors demobilise.</p>	Risks still remain, particularly when designer not present on site during works between visits. A final supervision visit helps to minimise this risk.	Design drawings and method statement provided to the contractor.

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24	Unexploded Ordnance	Risk of unexploded ordnance being excavated/found on site during works.	Search of freely available maps via Zetica UXO reveals the site to be in a high-risk area for unexploded ordnance. Client and contractor should consider further UXO investigations prior to works commencing.	Unexploded Ordnance encountered on site resulting in project delays. Client to consider undertaking a detailed UXO assessment. Contractor to consider whether a cat and genny scan required.	n/a
25	Land Use	The proposed floodplain reconnection and wetland / pond / scrape works will result in year-round wetter conditions across the floodplain/valley side target areas that are likely to result in a required change of land use by the landowner. This should be communicated with the landowner.	None.	Wetter floodplain/valley side conditions means a change of land use is likely required by the landowner.	Modelled summer and winter estimated wetted extents have been provided with the accompanying technical note. Post-project monitoring programme recommended.

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26	Working near woodland	<p>Working in/near woodland/trees is required to create some features and for access purposes. Contractor should ensure they have appropriate machinery and working procedures to ensure a safe working environment and to minimise damage to trees and vegetation.</p> <p>Work around mature trees where possible where these are encountered on site.</p>	Work around mature trees where possible where these are encountered on site.	<p>Working in/near woodland/trees is required to create some features and for access purposes. Contractor should ensure they have appropriate machinery and working procedures to ensure a safe working environment and to minimise damage to trees and vegetation.</p> <p>Work around mature trees where possible where these are encountered on site.</p>	n/a
27	Working in semi-confined space	Any personnel required to work in the river/ditch/watercourse during construction may require confined spaces training and have suitable PPE. Contractor responsible for developing a suitable evacuation procedure and to ensure safe working throughout the construction period.	None	<p>Injury as a result of working in a semi-confined space making evacuation difficult.</p> <p>Contractor responsible for developing a suitable evacuation procedure and to ensure safe working throughout the construction period, including provision of suitable PPE.</p>	Contractor responsible for developing a suitable evacuation procedure and to ensure safe working throughout the construction period, including provision of suitable PPE.