

Designer's Risk Register Form

Project name: Burton Washlands Restoration									
Project location: Burton Washlands, Burton on Trent									
Client: Staffordshire Wildlife Trust									
	Initial	Rev1	Rev2	Rev3	Rev4	Rev5	Rev6	Rev7	Rev8
Date	23-07-2021								
By	RW								
Checked	RW								
Approved	RW								

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 data etc). This results in risks associated to the construction 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 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 AquaUoS 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. AquaUoS cannot be held responsible for decisions taken by others on site.

Working with natural processes through river and floodplain restoration means that some changes as the system stabilises are unpredictable and not possible to quantify through the design process. 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.

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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1	General work on site	The site is located on a floodplain and is therefore at risk of flooding. 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.	Specified that all works to be carried out under low flow. In river and floodplain works to stop if flooding into the floodplain and high flows in the channel / floodplain. All equipment should be moved out of the floodplain. Works schedule should be for spring /summer/autumn period when risk of flooding is reduced. Compound / plant to be located / stored outside of known flood event extents.	Drowning. Flooding. Associated hazards such as hypothermia and environmental pollution.	Contractor to be informed of perceived residual hazards. Contractor to consider construction sequence produced for contractor's reference. Contractor to design temporary works and put in place appropriate precautions to deal with flood risk during construction (monitor weather conditions and water levels). Contractor to sign up to EA flood alerts. 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.

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2	Working in vicinity of services.	Service searches have been undertaken for the project. Contractors should be made aware of all service locations as it is possible that some may be crossed / passed under to undertake the proposed works. Some works may also be undertaken under overhead power lines. It is recommended liaison is undertaken with the service provider before construction begins. The contractor should set up goalposts in the vicinity of overhead lines so that machinery operators are aware of its presence. 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 by the contractor and client on site.	Service searches have been provided with the design drawings package.	Contractor to be aware of existing services location prior to undertaking the works to identify if any will be crossed or passed in order to access the site. Encountering private services, e.g. land drains that will need to be dealt with on site by the contractor with agreement by the landowner and client. There may be error in the supplied service search maps from the provider, any uncertainty should be verified with the utility supplier. 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	Contractor to be informed of perceived residual hazards. Location of services and control measures outlined in supplied services search. Contractor to undertake another services search prior to works.
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3	Movement of excavated soil and gravel, and for temporary works (e.g. gravel filled dumpy bags).	The works involve the movement of cobble, gravel material and excavated soil material 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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4	Construction impact on bank stability and impact on natural processes and floodplain function.	The stability of the banks in the vicinity of the works of the watercourse 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. The design is promoting wetland creation and in-channel works in the Silverway that promote natural processes and connectivity to the local floodplain. This will result in wetter floodplain conditions. This is in line with natural processes for watercourses and floodplains of this type. Finer sediments may deposit on excavated areas over time. There may be retention of water in some of the excavated areas.	Any signs of damage and change during and post construction should be monitored and mitigated.	Collapse of bank and fall from height. Persons being buried. Collapse / erosion of bank due to loading during works. Working with natural processes means some future changes can be unpredictable as the system stabilises over time.	Contractor to be informed of perceived residual hazards. Condition of banks and margins to be monitored during works (operatives with binoculars if required). All plant to be set back from the edge of the river. Post-project monitoring program.

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5	Construction impact on floodplain function.	The design is promoting wetland creation and in-channel works in the Silverway that promote natural processes and connectivity to the local floodplain. This will result in wetter floodplain conditions. This is in line with natural processes for watercourses and floodplains of this type. Finer sediments may deposit on excavated areas over time. There may be retention of water in some of the excavated areas.	Any signs of channel and floodplain change during and post construction should be monitored and mitigated if deemed necessary.	Collapse of bank and fall from height. Persons being buried. Collapse / erosion of bank due to loading during works. Working with natural processes means some future changes can be unpredictable as the system stabilises over time.	Contractor to be informed of perceived residual hazards. Condition of banks and margins to be monitored during works (operatives with binoculars if required). All plant to be set back from the edge of the river. Post-project monitoring program.
6	Access to and from site.	Risk to members of public from plant movements. Access routes are to be confirmed with the client and landowner along the reach. If crossing of the watercourse / drains is required to access the site, a temporary bridge will be required that will be specified by the contractor.	Public access routes closure/fencing/diversion of footpaths as required.	Injury / death from collision with vehicles. Contractor will need to specify temporary access bridge requirements if these are required to access the sites.	Contractor to be informed of perceived residual hazards. Access route to site to be defined and all delivery drivers made aware of risks.

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7	Increased flood risk.	Works do not cause an increase to out of bank flooding that increases risk to property / housing or people. However, there are some minor local increases as a result of excavated features in the floodplain for low order flood events. Impacts to flood risk should be reviewed against any future development of the local floodplain area. 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. Risk of flooding to adjacent land and areas adjacent to and upstream of works. The proposed shallow depth spreading of material in the floodplain has not been considered in the hydraulic modelling.	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. Limit width of channel which is closed off at any one time where possible (if this is deemed required by the contractor).	Altered flood regime across the study reach. Drowning. The proposed shallow depth spreading of material in the floodplain has not been considered in the hydraulic modelling – this has been discussed with the Environment Agency.	Contractor to be informed of perceived residual hazards. Construction to consider temporary works approach and sequence. Contractor to monitor weather forecast and river levels.

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8	Spreading of non-native species / biosecurity	Spreading of non-native species during works by moving machinery/ equipment and by boots. All plant and equipment including boots and waders to be disinfected prior to use in the river.	None – no non-native species surveys carried out as part of the project – balsam is present on some of the proposed excavation areas.	Increased area of non-native species. Damage, injury, death to protected species and habitats.	Comply with the Environment Agencies requirements to prevent the spread of invasive species. Contractor responsible for suitable biosecurity measures on site.
9	Tree works and fence removal.	Some tree works and fence removal (including replacement) may be required for machinery access purposes to deliver and facilitate the works. Otherwise, it is envisaged this will only be trimming / pollarding rather than full removal but to be confirmed with the contractor (aside from target trees for creation of wood features proposed for the design).	None.	Low number of trees requiring works. Fence replacement may be required. Tree surveys and protected species habitat surveys may be required. Specialist tree work method statements are to be produced by the tree work contractor as required.	Contractor to be informed of perceived residual hazards. Site walkover to be undertaken by client with the contractor to determine any required tree works following marking out of the works.

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10	Material quantities.	Increased expenditure due to minor design changes during construction based on local conditions encountered during the works (particularly anticipated volume of sediment for removal). Design is based on LiDAR. Formation levels may change based on encountered ground conditions and could impact on calculated infill and excavation volumes. 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.	LiDAR has been checked as far as possible.	Adjusted material quantities. Expansion of excavated material to be considered by contractor in their material management plan/costs.	Client should have suitable contingency funds. Contractor should be made aware of associated risks and can account for them in advance.
11	Inadequate compaction of features and use of incorrect materials results in washout of placed features. Stability of wood features.	Proposed berm 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 and if coir matting not installed as per manufacturers guidelines. The stability of wood features as per the design is reliant on suitable root bole connectivity being retained with the bank. If this is unsuitable, some securing works may be required.	Geomorphologist to supervise the contractor during creation and compaction of features. Staking of tree features should insufficient root boles be retained following winching.	None if designer's interventions followed. The material to be spread across the floodplain may be subject to washout if this does not vegetate before flooding occurs.	Contractor to carefully review design drawings and material requirements and to follow guidance provided by on site geomorphologist during feature creation.

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12	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 constructed. This should be communicated and agreed with landowners prior to works commencing.	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.
13	Unconsented works in the river and floodplain pre, during or post construction of the scheme.	Any unconsented works across the river and floodplain pre, during or post construction of the scheme will mean predicted impacts associated to the scheme from this study are potentially compromised and AquaUoS will not be liable.	None.	Altered flood and geomorphological change across the river and floodplain as a result of any unconsented works being undertaken pre, during or post construction of the scheme.	None.

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14	Fine sediment management and mitigation.	Suggestions have been made for management of fine sediment runoff and transport within the river and floodplain during construction in the Method Statement. Whilst these will help to reduce fine sediment runoff and transport downstream, these measures will not completely mitigate this issue despite best endeavours. This should be noted by the client.	Fine sediment mitigation measures suggested within the Method Statement. It is recommended material to be spread is seeded to reduce the risk of washout.	Some fine sediment may still wash into the river/ditches despite recommended mitigation measures, particularly if large rainfall events occur or if a flood occurs across exposed soil. The material to be spread across the floodplain may be subject to washout if this does not vegetate before flooding occurs.	Mitigation measure recommendations provided as part of the design package.
15	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 have been provided to delineate exact 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.
16	Excess material spreading	It has been assumed as part of the estimated costs that excess excavated material will be spread locally as agreed by the Environment Agency.	None	Projects costs would significantly increase if material was to be transferred off site or sent to landfill. Excess material should not be spread in the active floodplain area / flood zones without agreement from the Environment Agency.	Flood extent information has been provided as part of the project reporting. Refer to Environment Agency Flood Zones.

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17	Modelling limitations linked to data	Hydraulic modelling is a simplified representation of the topographic surface with uncertainties linked to the underlying topographic data, model resolution required to produce sensible model run times and hydrological estimates used/calculated.	The models are run on the finest resolution possible, and data is checked as far as is reasonably possible.	Uncertainty in hydrological estimates and any error in the underlying topographic data could produce errors in the hydraulic model outputs.	Technical note summarising the modelling undertaken.
18	Hydrology	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.	The hydrology has been checked as far as possible.	Uncertainty in hydrological estimates could produce errors in the hydraulic model outputs.	Technical note summarising the hydrology and modelling undertaken.