Delivery Process and Technical Evaluation of the Cumbrian River Restoration Strategy




For

The Cumbrian River Restoration Strategy Partnership

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Prepared by

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1	Draft Report	July 2015
2	Second draft	September 2015
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4	Final Report	June 2016

Disclaimer

These notes are compiled on the basis of RRC's extensive expertise, a short walkover site visit, discussion with some of the key stakeholders and additional written reports and comments. RRC seeks to provide independent advice and observations. The final report aims to form a balanced view of the information provided and forms an independent review based only on the information provided.

National Projects Inventory

RRC is a national centre for information and advice and the National River Restoration Inventory (NRRI) is a dataset of river restoration and best practice management works. To inform this inventory please let us know of any progress with this project and also other projects which are carried out or planned in the future. Please send any information to the RRC (rrc@therrc.co.uk).

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Abbreviations

CRRS	Cumbrian River Restoration Strategy
Defra	Department of Environment, Food and Rural Affairs
EA	Environment Agency
ERT	Eden Rivers Trust
FRC	Flood Risk Consent
FCRM	Flood and Coastal Risk Management

GEP	Good Ecological Potential (for WFD)
GiA	Grant in Aid
HLS	High Level Stewardship
NE	Natural England
RBMP	River Basin Management Plan
RERRS	River Eden River Restoration Strategy
RRC	River Restoration Centre
RT	Rivers Trusts (referring to multiple Trusts, as opposed to the Rivers Trust, and synonymously used with 'the Trusts')
SAC	Special Areas of Conservation
SCRT	South Cumbria Rivers Trust
SSSI	Site of Special Scientific Interest
WCRT	West Cumbria Rivers Trust
WFD	Water Framework Directive

1. Introduction

1.1 Background

In Cumbria, the three rivers (Derwent, Eden and Kent), are notified under the EU Habitats Directive as Special Areas of Conservation (SAC) for both their river types and associated species/habitats. In addition the Derwent and Eden catchments (i.e. the main river and tributaries) are also notified as whole river Sites of Special Scientific Interest (SSSI) for their specific river characteristics. Due to their designations, the River Basin Management Plans (RBMP) for these rivers, stipulate measures of river restoration to achieve Water Framework Directive (WFD) quality objectives. Jointly, the Environment Agency (EA) and Natural England (NE) recognised the need to develop River Restoration Strategies for unfavourable SAC units/WFD waterbodies in the three catchments.

New Common Standards for monitoring SSSI rivers were produced (JNCC 2005). Within this document it stated that SSSIs designated rivers need to have a channel form that is generally characteristic of the river type, with predominantly unmodified planform and profile. Where SSSI river units failed the initial assessment targets, a River Restoration Remedy was required for the unit. This SSSI 'remedy' was assigned by Defra as a joint NE and EA responsibility.

Later, NE and the EA commissioned Jacobs to produce an assessment of potential river restoration options for the Cumbrian SSSI rivers which formed part of their conservation objective setting approach. This followed the condition assessment carried out by NE which identified that many of the SSSI river units in Cumbria were in Unfavourable Condition due to physical modifications: this was identified as affecting their optimal functioning as habitats for characteristic wildlife communities. Dredging, weirs, bank modifications, planform realignment, and inland flood defence works were identified as reasons for the Unfavourable Condition. As the rivers also have SAC designation and are Natura protected areas, the requirement for restoration became an even more powerful driver, even though most of the channel modifications pre-dated the SSSI designation. For more information refer to: http://publications.naturalengland.org.uk/search?q=themed+plan+river+restoration&num=100)

In 2010, Jacobs were commissioned (via the then CRRS Project Board Chair, Dave Brown) to undertake a more detailed geomorphological appraisal with associated ecological interpretation on the 3 Cumbrian catchments. The aim was to locate areas impacted by physical modification, identify places where restoration measures could be implemented and evaluate constraints. This approach resulted in the production of a series of restoration action plans for specific reaches.

In order to implement these action plans the Cumbrian River Restoration Strategy (CRRS) was set up with the aim of delivering river restoration projects. The emphasis of these plans was to working with natural river processes across Cumbria to achieve favourable condition and WFD quality objectives. The three Cumbrian River Trusts (Eden, West and South Cumbria) worked in partnership with the EA and NE and the RTs carried out the restoration work on behalf of these national agencies. The approach, in terms of working with the River Trusts (RT) to deliver some large projects was a relatively new way of working in the Cumbrian area. It was an ambitious project that sought to test how the ethos of this new 3rd sector (catchment partnership approach) worked and, identify how it would best work in the future. The overall view was that the combined strategy could add value to current restoration delivery methods through combined knowledge, skills, networks, and the ability to align new opportunities with existing projects and capitalise on known funding streams. As a result the

restoration strategy was subject to a range of procedural, process and delivery issues that needed to be resolved as the project evolved.

It was recognised by the Project Board that some lessons have been learnt via this process. The RRC was asked to review these lessons and produce a report based on interviews and visits to key restoration sites.

1.2 Report aim and objectives

This review of the CRRS has been undertaken on behalf on behalf of the Cumbria River Restoration Strategy via joint funding and project co-ordination from the Environment Agency and Natural England. The initial request was that the report should reflect both the challenges and successes in implementing natural process-based river restoration to meet SSSI and WFD targets in Cumbria. The review is based on interviews with the EA, NE and RT staff, documents and material provided by these organisations, as well as a site visit to four restoration sites within the CRRS. Time and budget constraints however, meant that is was impossible to interview all stakeholders including landowners and farmers. Advice and suggestions given in the report are therefore based on a subset of stakeholder's views following recommendations from the CRRS Project Board. Nonetheless, this report still provides some overarching principles and guidance to support future EA/NE/RT partnership projects through the sharing of both good practice and lessons learned. This review process will identify issues that were overcome and highlight areas of process and design that worked well, together with a summary of best practice to take forward to similar projects.

Key Aim

Outline the areas where challenges have been identified and recommend/catalogue better working practices that can be implemented in the next round of restoration projects.

Objectives

- Carry out interviews with RT project managers and key personal in the EA and NE to understand the different perspectives of the river restoration process.
- Evaluate the various processes required to deliver a natural process-driven restoration project and provide recommendations about how to ensure that these are best managed based on the interviews and supporting information (see section 2).
- Visit four restoration sites across the three Trusts (on the Rivers Gowan, Leith and Lyvennet, and Whit Beck) to provide a review of how the CRRS, landowners and policy influenced the final design (section 2) and to provide a short technical review of the on-the-ground design outcome (section 3).
- Based on combined (but limited) knowledge of the sites post restoration, provide a prediction about whether the project may need future maintenance and comment (using expert judgement) on the long-term predicted success/limitations of the individual schemes (section 3).

1.3 Site visits and interviews

Site visits to all four sites and interviews with key staff took place between the 15th and 16th April 2015. People present during the interview and visits were:

Ulrika Åberg and Jenny Mant (RRC)
Oliver Southgate, Helen Reid, Ben Bayliss, Maggie Robinson (EA)
Maggie Robinson and Rebecca Gray (NE)
Joanne Backshall and Simon Johnson (Eden Rivers Trust (ERT))
Peter Evoy (South Cumbria Rivers Trust (SCRT))
Ian Creighton (West Cumbria Rivers Trust (WCRT))
Gareth Pedley – via telecom (Wild Trout Trust but previously ERT)

A second set of interviews was undertaken to review the second draft report on the 24th November 2015. This allowed all groups the opportunity to identify any final amendments following an electronic review that needed to be addressed before the report could be finalised. This group included those highlighted in bold above plus John Wilson from the WCRT.

2. Evaluation of the CRRS process

The following sections (2.1.1 – 2.1.14) outline the results from interviews held with several people from the EA, NE, ERT, SCRT and WCRT where applicable and provided support evidence.

2.1 Involvement of Rivers Trusts as delivery partners

Once NE and the EA had secured funding towards delivery of the CRRS it was decided to develop a partnership with the local NGOs. In this instance the local RTs were seen as the ideal partners and the project provided the mechanism to build capacity and expertise within the local groups. NE had, for example, been negotiating with the Derwent River Corridor Group who was keen to identify who would be best placed to carry forward the river restoration work for the west Cumbrian area. The discussion was built around how the Derwent River Corridor Group saw the CRRS project as helping to build capacity and deliver river improvement in the Derwent catchment. It was agreed that the newly formed WCRT was best placed to deliver these projects and as a result CRRS funding was used to employ a Project Officer for the Trust. The funding also allowed extra staffing for the ERT and increased the financial security of the SCRT.

The RTs were seen as ideal partners for the following reasons:

- They had the potential to bring in external funding from additional sources not accessible to the government agencies;
- They had the links and expertise in local communication and engagement beyond the knowledge of both NE and the EA;
- They could build on long-term relationships within the catchment which was essential for the successful delivery of natural process driven river and floodplain restoration;
- Unlike NE and the EA where year on year funding underspend is frequently clawed back from projects and re-assigned, the RTs had the mechanisms to ring-fence project funding within their budgets and move money between financial years subject to an adequate auditable trail.

The partnership was seen as an excellent way of working for all organisations. Specifically, it provided an opportunity for the local RTs to deliver large scale natural-process driven restoration projects on designated rivers which, for the most part, was a significant departure from their prior opportunistic focus on fish passage, tree planting and fencing. Additionally, it provided an excellent opportunity for the local RTs to call on both technical and process-based support from the EA and NE.

2.2 Communication

Communication is a crucial part of any river restoration project. It became clear via the discussions that issues often emerged where and when communication became disjointed. This is obviously not an unusual phenomenon within any large project but, in this case, the Project Board tried to put in place structures to improve/increase communication channels.

This section mainly focuses on communication between the projects' partners (i.e. EA, NE and the Trusts). As a result of a strong Project Board, communication generally worked well but in a few situations tension still arose. Communication between the RTs and contractors (2.1.5) and landowners (2.1.11) will be discussed in the respective sections below.

Project Board and Steering groups

The formation of a Project Board was a crucial element to the successful delivery of the CRRS.

The core organisations/personal that made up the project board included: Chair, currently Olly Southgate, EA; Project manager, Maggie Robinson, NE; the three Cumbrian RTs project managers; key EA officers (specifically Louis Antoine, FCRM; Helen Reid and Duncan Wishart, geomorphologists and; Ben Bayliss, project executive): other organisations and agency functions participated as necessary notably including the National Trust.

The aim was to ensure that there was a focal point to the project. A combination of regular meetings and dissemination of information enabled the majority of people across the different organisations to be kept up to date with developments. This helped to identify where and when support was needed and for the EA consents teams to understand the concept of the project at an early stage.

In addition to the overall Project Board both NE and the EA were keen for each individual RT to form a project steering group with a more local stakeholder focus to support questions and information related to technically-related information.

Initially the ERT opted not to have a steering group in the first year of delivery, feeling that there were sufficient communication channels between key partners via the Project Board and other established communication channels.

Case example:

*The **WCRT** was the only trust that set up a steering group which included representatives from Natural England, **WCRT,** National Trust, National Park and the Derwent Owner's Association. It provided an excellent forum for communication between and within organisations and critically helped with the consenting process. It also provided an excellent forum to work together, to discuss ideas and resolve any issues at an early stage. This ensured that a good understanding of initial aims and objectives of projects were acquired early on by all parties and that the understanding was carried on throughout the life of the project; where necessary any amendments to design could then be quickly and efficiently agreed by all parties.*

From NE and EA's perspective they felt that this approach was the most effective way to communicate ideas and needs. Where a steering group did not exist there was sometimes frustration for all parties mainly relating to a lack of clear project governance, resulting in opinion and interest conflict.

*The **ERT** and the **SCRT** have now acknowledged the importance of such an approach for transfer of knowledge and effective agreements at the local level and that existing communication channels were not sufficient, requiring the backing of a more formal steering group. The **ERT** in particular recognised the need for both a clear communication strategy together with a tactical plan to ensure there is regular and focused communication between the relevant parties. Just focusing and relying on steering groups meetings and subsequent dissemination of information however, is not sufficient. It needs to be backed up by clear guidance on with whom, when and how, information is*

Early stakeholder engagement

It was unanimously acknowledged that consulting all key people right from the start (e.g. the EA and NE staff involved with consenting and budget processes, HLS officers, landowners, tenant farmers, local authorities, anglers and other local interest groups) would have led to much less indecision and wasted time at a later stage. In the case of the WCRT this worked well and they had a good track record with respect to consulting with all the various partners and feeding back to a steering group. Incidents however, were recounted where both local people and/or the Parish Council were not

sufficiently engaged. It was felt that early engagement and better consultation prior to project consent would have dispelled fears and suspicion which often resulted in opposition to the project aims. To some extent strong steering groups and associated upfront communication strategies and tactical plans would have helped to support this process.

Skills, roles and delivery pressures

Expertise and experience varied significantly between RTs. This resulted in misunderstandings about the necessary level of technical involvement from the EA. In some cases the RTs felt that support could have been greater from the EA whilst in other situations there was a feeling that too much control and involvement was exerted.

For example, where RTs were keen to demonstrate that they could deliver independently, it sometimes became apparent that experience tended to be more fisheries focused with experience in fencing, tree planting and small-scale in-channel restoration; larger scale natural river process restoration that required detailed geomorphological assessment was commonly more limited. As a result many required more external guidance than was initially predicted. This in itself brought with it additional difficulties due to a lack of guidelines and understanding about what was being sought to be achieved and why.

Such situations could be easily rectified in the future simply by clearly stipulating at an earlier project stage, the desired outcomes the expected level of involvement from all parties. A clear agreement (which could form part of a communications strategy) with a statement of roles and capabilities within the project from the RTs, NE and the EA would help all parties to understand how the overall restoration strategy will work. Predicted involvement from the EA and NE, at what stage and from which functions from within these organisations would also help.

Personalities

One of the biggest challenges was ensuring that there was good communication and collaboration between the RTS, the EA and NE area officers, farmers/landowners and the Project Board. There were a few instances where people's personalities and ways of working hampered progress, creating disjointed dialogue and at times fractured relationships. Steering groups, so that everyone knows what is happening, when and why, together with clearly stated guidance within a communication strategy, about roles and responsibilities at an early stage from all organisations, would significantly reduce the impact of any such difficulties.

2.3 Finances and budgets

The development of the CRRS strategies and initial implementation was funded through the EA's Flood and Coastal Risk Management grant in aid programme together with funds from NE's SSSI Improvement Funding. Initially it was anticipated that Higher Level Stewardship 'Special Projects' would fund the capital works, however, during negotiations with the RTs as to their involvement with the projects, Defra ceased the Special Projects option due to concern that they were not adhering to EU rules for Rural Development Programme for England (RDPE).

The funding was then transferred to the EA's WFD grant in aid programme and monies then allocated by the Project Board to the three RTs. The Project Board initially estimated an indicative program figure of £2.4 million for the CRRS project over two years. This provided the RTs with a rough idea about the amount they expected to receive and initial project proposals were put together on this assumption. In year two, however, the WFD grant in aid budget was cut by Defra and hence only around half of that anticipated funding (i.e. £1.1 Million) became available. This significant change meant the RTs had to re-evaluate their project priorities and the Project Board allocated funds during years two and three on a priority basis. As a result, expectations that had been built up with partners and stakeholders had to be rethought causing frustration as perceived goal posts had to change in line with reduced budgets.

The Project Board felt they had been clear about the fact that money would be administered at programme level. This was not however, universally recognised.

The process of shifting money between the RTs created confusion and from their perspective some believed this approach resulted in additional unnecessary changes in their programmes of works. It was, however, made with the intention of plugging shortfalls in some projects and using underspend in others.

Furthermore, final budgets were confirmed in April. This time span made the process of obtaining consents before the window for on-the-ground work during summer, extremely difficult. Work then had to finish before the end of March the following year which put a lot of pressure on the RTs to deliver their projects.

Ideally, budgets need to be set earlier in the year, but this falls to Defra to recognise the impact of financial decisions and announcement times of funds. Because of the governmental funding constraints and procurement, the need for a Project Board to administer funding allocations quickly became apparent and the Project Board time spent a considerable amount of time on this aspect.

SCRT and WCRT had volunteer financial managers and the input from them was variable at different times. The EA and NE struggled at times to get an update on budgets from the RTs. There were also instances of inadequate budget tracking, resulting in overspend of available funding. To plug the funding gap and to address the overspend issue Maggie Robinson obtained NE WFD GiA funding, where for example, WCRT were granted a £100K grant to complete their projects. Similarly, the SCRT had long delays in terms of delivering adequate spending profiles to the Project Board. The main reason for these delays was the use of the volunteers to cover accounting roles and/or lack of training in this area. Furthermore, each RT used a different accounting procedure resulting in a less transparent way of accounting to the Project Board. It is now recognised that improved financial management by all the RTs would have helped manage the budgets and address some of the funding problems that arose from lack of budget oversight. As a result a dash board accounting system has now been developed. One of the key lessons learned here is that young and emerging RTs need support to ensure that project budgeting and accountability is more streamlined to ensure that there are clear spending project projections with 2-3 year planning windows. This type of approach (similar to that adopted by the Catchment Restoration Fund (CRF) (Appendix B)) would give the Project Board the opportunity to identify early on any issues or requests for additional funding. Such an approach would have helped with cases such as identified with WCRT who didn't have developed enough accounting and recording systems in place to ensure significant overspends did not occur.

Overall, the evidence for providing a mechanism which allows the RTs more autonomy about how to use budgets over timescales of more than one year projects seems justifiable. It would generally allow for better working agreements with contractors, take account of environmental constraints, potentially result in more cost-effective projects, and help secure more match-funding. It can only work however, in an economic environment that allows for this flexibility alongside mechanisms in

place to ensure governance within all organisations is appropriate for needs. It also relies on a level of trust between all organisations and understanding of individuals' competencies and capabilities.

The implications for changes in budgets had a knock on effect in terms of opportunities to leverage additional funding. The RTs found that without specific match funding guarantees from the CRRS it was difficult to procure other funding, though it would still have been possible to pursue external funding sources. Some in-kind work was forthcoming from landowners and farmers with respect to the capital works and some community-led involvement was financed by the Heritage Lottery fund.

Individual project budget:

As a result of the confusion around the centralisation of overall budgets, different opinions emerged about who should administer the money (i.e. the Project Board or the RTs). In general the RTs would have preferred to be able to set budgets, for example, three years at a time, instead of the current Defra-imposed annual approach. From their perspective, this would provide the freedom to manage the funding more cost effectively and in keeping with environmental constraints. On the contrary, the EA and NE are governed by annual budgets and need to be accountable for how the budgets are spent on a year by year basis. This is an issue that has been identified many times in the past. RRC, as part of the RESTORE EU-Life+ funded project, delivered a workshop in 2011 entitled 'River Restoration Design and Construction': the key points covered are outlined in Appendix A, where this difficulty was raised along with many others encountered within this project. Essentially, without a significant change in how budgets are agreed via central government, justification for enabling budgets to be carried over financial years will only ever be on a case by case basis.

There is precedence for longer term funding approaches, as seen within the CRF where Defra committed to funding for a three year period so that 42 projects could be delivered across England. For this project, the EA produced a slimmed down procurement and reporting process allowing for demonstration of effective budgeting on a year by year basis (see Appendix B). Once satisfied with progress to date (based on discussions and updates for the individual projects) monies were released for the next financial year. This process allowed for the fund to be administered centrally but with opportunities for individual groups to explain and justify any under or overspend within one financial year. This allowed for flexibility of funding across financial years, security of budgets, and enabled more decision making to be within the RTs together with the necessary auditing of funds required by a public body. Alongside this, support documents were provided and update on progress required.

Additional document/information can be found at: https://www.gov.uk/government/publications/catchment-restoration-fund-local-environmental-improvements. Further information can be provided by Jerry Gallop (the EA's Environment and Business Manager).

Furthermore, the increased certainty in budget resulted in significant amounts of additional match funding to be procured by the RTs (approx. £6M of partnership funding (Jerry Gallop (RRC conference 2015)) which equates to nearly 25% additional funding over and above the initial Defra commitment. To achieve this however, significant discussion with Defra at the early fund allocation stage was required, to ensure that they appreciated the unique challenges around river restoration delivery and recognised the need to change their 'business as usual' approach to project funding.

2.4 Procurement strategies

The RTs have the flexibility to procure their own services and contractors, yet because the money is effectively from the public purse there is a requirement for the projects to also comply with EA procurement strategies. Furthermore, since the CRRS is a partnership project there is a need, as discussed above, to account for how project money has been spent to the CRRS Project Board.

Since the CRRS was an innovative pilot project that aimed to test principles and approaches, the EA's procurement service, needed to be comfortable with any working agreements. This was a relatively new way of working and resulted in Olly Southgate (EA) and the wider Project Board, having to work closely with EA procurement leads over a 6 month period, to provide them with the confidence that the RTs had developed sufficiently robust procurement strategies of their own and that any spend on goods or services would be monitored by the CRRS Project Board.

It was highlighted during the interviews that it would be good to have a procurement check list to support the design and implementation process to be used across the RTs. As discussed previously, good communication is fundamental to a successful project and early site visits with all involved parties would have been beneficial. This should have included the various officers from NE and the EA (e.g. FCRM, biodiversity, fisheries, geomorphology). This would have resulted in more strategic forward planning and agreements early on, which subsequently would have supported the procurement process. Catchment Steering Groups could have performed this function if they had been in place. Milestones and sense checks throughout the whole project would have provided increased confidence of successful delivery and good use of funds.

Such a check list needs to recognise that river restoration project (design and delivery) may need to evolve as information is gathered about the site and due to any initially unknown site variation. Such changes can be mitigated by ensuring projects have clearly stated targets and objectives. It is these targets and objectives that are critical to successful project delivery. However, some flexibility needs to be embedded within how these objectives are delivered to achieve optimum river restoration outcomes: ideally the procurement process needs to account for this potential variation. For example, a contractor who is happy to accept that changes may be necessary on site and a consultant that is ready to discuss change is preferable to a procurement statement that insists on a design being delivered to the letter. The outline in Appendix D should help with this process.

Case example:

The **ERT** worked closely with the contractors to deliver the project at Barnskew and developed an agreement that allowed for flexibility in the contract. In this case the agreement was made as a partnership rather than a client-contractor contract. The enabled the project manager to develop a very hands on approach to the project delivery even to the extent of reviewing and inputting into the design and cost of a bridge. This type of approach however, relies on time and expertise commitment of the project manager and an acceptance of risk. This level of site supervision may not always be the most appropriate approach and needs to be considered on a case by case process.

2.5 Permitted development rights

Initially it was expected that the RTs would have to apply for planning permission for each river restoration project, but after some considerable investigation and inspection of the legislation it was identified that the EA's permitted development rights could be employed as the EA was commissioning

the RTs to undertake work on their behalf. A short letter was produced by the EA's legal department stating to local authorities that works could be carried out under EA's permitted development rights. However, it was still down to the local authorities to agree to this approach. Most of them did early on and only Lake District National Park disagreed. Later on, in 2015, the National Park agreed on letting the RTs undertake some work under permitted development rights and thereby relaxing their stance on this.

Once understood and accepted, it made gaining relevant consents easier and avoided the need to seek planning permission. Although it saved significant bureaucracy, each project still required advertising for 28 days prior to work being undertaken and this needed to be built into the time budget.

2.6 Governance structures and impact on relationships

The primary decision to have a Project Board to oversee and manage the CRSS was perceived by NE and the EA as the most effective way of ensuring delivery of a large project that was, unusually working directly with the 3rd sector to deliver projects. The new delivery approach was met with internal criticism from the EA staff who initially felt that project delivery was their job and should not be commissioned out. As part of the Project Board, Olly Southgate and Maggie Robinson in particular, were strong driving forces behind making the CRRS project happen and have been able to steer the project and find different routes to solve issues related to the multiple benefits of utilising skills of other organisations outside the key agencies. For example, NE provided funding towards the Woodland Trust (WT), who managed the woodland elements of HLS and provided additional tree planting for projects. This assisted with riparian zone planting, making the planting cost-neutral to landowners and ensured that schemes were more carefully implemented and overseen than when the WT was not involved. The whole process however has been dependent on individuals and coloured by their individual characteristics. As the project evolved and slightly changed, the governance structure also changed. Although not a major issue, any changes to the Project Board and governance can and did on occasion, hamper progress and/or fracture relationships. Changes in personnel and/or changes in their roles caused some discontinuity and issues for the project. Changes in the governance structure are always bound to create potential issues within any project as individuals move or are moved. However, much of this can be overcome by having a clear and strong strategic overview at the outset that is supported by (in this case) all RTs along with a strong reporting line.

Case example:
The lack of steering groups for the ***Kent and Eden catchments*** *meant that the Project Board had a mixed role of advising and assisting on specific projects in those catchments and also overseeing the governance of the project as a whole. The governance on for the Derwent catchment was clearer as the steering group was more involved in specific projects and the Project Board was more involved in governance than specific management issues related to the projects.*

2.7 EA and local authority consents (flood defence)

Applying for Flood Risk Consents (FRC) is a legal requirement for undertaking works over, under or near a main river. The consenting process is an important regulatory mechanism to ensure that river restoration designs are appropriate to the site and prevent inappropriate designs from being implemented. Throughout the CRRS there were, at times, issues regarding FRCs, mainly due to lack of communication, inadequate involvement of relevant people from the project start and an mis-understanding within some of the RTs about what level of information is required in an FRC application.

Where individual RTs didn't have a Steering Group and associated communication strategies it had a clear knock on effect in terms of the regulation element, especially with respect to FRC. In instances where key EA personnel (especially consenting and biodiversity officers) were not included in discussions from the start, this sometimes stalled or prevented FRC being consented. This was especially the case where benefits and constraints were not adequately conveyed or, where the EA had assumed that the RTs were aware that they needed to go through the same process as normal, despite undertaking works on behalf of the EA.

At times, this outcome resulted in frustration within the RTs. When consent was denied without accompanying recommendations about how projects could be amended to gain consent, the RTs felt that they only received negative feedback, without reasons why the projects should not be undertaken. They would have preferred recommendations about how they could work together to solve flagged concerns. It was perceived by the RTs, that the EA were putting restrictions on the process and were dictating what needed to be done at a more detailed level than deemed necessary. Conversely from an EA perspective they sometimes received incomplete, inadequate, or very last minute FRC applications. From the consenting officer's perspective such circumstances meant that plans could not be approved in time: without the correct paperwork and level of detail it became difficult to agree designs were appropriate and also ensure that they met their statutory obligations. The importance of this consenting process and adhering to requests was exemplified when, on one occasion, consent was given with a recommendation that bed level raising would be necessary for project success. This recommendation was not adhered to which led to the predicted erosion issues.

The whole area of consenting was tricky for all parties through a combination of lack of understanding about what was needed from the RTs (possibly because of the increased scale/complexity of projects compared to previous small scale fencing/planting projects) and short time spans required to turn around consents. Although not easy to address, there are some options that could be implemented that would help smooth the process.

These include:

- Trusts to inform Project Board of project aims, ideas and aspirations early on preferably via a steering group: this would increase confidence of success for all parties and increase the EA's consenting team of project officer competency.
- Consenting officers to be informed by the EA/NE Board Members of these project aims so they are aware of potential projects earlier on.
- Consenting officers to be invited to go out on site and to provide comment at the early stages of the project and throughout. To achieve this they should be part of the catchment working groups.
- Trusts to provide timely applications with adequate information for all parts of the project design to be reviewed by consenting officers. To achieve this however, requires funding certainty and clear guidance from the EA about time lines and what is expected for these large projects.
- Trusts to provide an estimated plan of when consent will be required ASAP.
- Consenting officers to provide accompanying recommendations about how projects could be amended to gain consent if they still have concerns. The Project Steering group needs to be instrumental in ensuring that this happens.
- Consenting officers to recognise that in some cases design flexibility may be needed to deal with local issues that may occur on site (e.g. not being able to place large wood deflector at a specific place due to previously undetected bed rock): if involved throughout the planning process, it will become clear where this is applicable.

- Trusts to comply with conditions given in the consent.
- If feasible projects are not confined to delivery within one financial year.
- The above relates to Main River. Often tributaries require consent from the local council: the same basic principles apply.

2.8 Landowner agreements

A good relationship with the landowners via an initial honest dialogue about what is likely to happen, together with outlining any risk and benefits, is a key to the success of any project. Keeping a more informal approach followed up by a simple agreement letter rather than a long and detailed legal agreement may be one way of achieving this, though it was acknowledged by the strategy group that methods used depends on the risk associated with the project.

Agreement letters

Recognising that this was a significant issue the Project Board led by Olly Southgate (EA) procured a solicitor to produce a simple but legally binding agreement letter. Input was sought from all RT's board members to ensure that it could be adopted. The letter (an example of which is in Appendix C as used by the ERT) is essentially an agreement between the landowner and government agency and/or RT so that all understand the terms and conditions related to the project, future maintenance and potential change associated with natural process driven river restoration. The WCRT, however, felt that in their case a more robust agreement was required because of the complexities of multiple landowners and the more potential risk associated with the project. As a result they developed their own contract (see also Appendix C as used by the WCRT). For their project this approach was critical and included recognition that the landowner and/or tenant would be solely responsible for any post-project maintenance.

Landowner agreements need to be a two way dialogue and an acknowledgement that if unforeseen problems occur with the work, there will be an opportunity to discuss how to redress any issues (the equivalent of a snagging list which is expected with any construction work). Any agreement needs to identify who will deal with future necessary work, agree that access will be necessary and what future work does and doesn't cover. To adequately assess this, requires thorough monitoring of the projects by the RTs even if this is in the simple form of regular detailed repeat photography (see section 2 on objective setting and monitoring).

Explaining the process

By its very nature reinstating more natural river processes to the river to achieve improved habitat for wildlife will often result in re-meandering which may, in turn, lead to a loss of workable land to the farmer, significant disruption in the short term, and some changes to farming practices in the long term. The impact of these factors must be highlighted up front before any paper agreement is signed or even discussed. This approach provides for fair and transparent negotiations to be undertaken. There is no point gaining an agreement only for it to be retracted later if undiscussed issues come to light. The ERTs took this approach and it soon became apparent that if the ecological benefits of the project were fully explained to, and understood by, the landowner and tenant, they were likely to be more interested and amenable to change, providing that the impact upon the farming practice could be minimised. To achieve success of this nature however, negotiations needed to be held between the project manager and the tenant/landowner directly rather than the land agent who may not necessarily have the technical skills to explain what will happen. In addition, by keeping the links with the project manager throughout the process there is the opportunity to build relationships, keep

negotiations simple (and cost-effective) and, be in a better position to discuss options should changes in the programme arise: trust on all sides is critical to success. This area of negotiation or incentivising is one of the RTs core strengths and the initial reason for the RT movement.

Case examples:

*Through **ERT** discussion with the landowner at Meaburn Hall on the Lyvennet river, the landowner is now a strong advocate of river restoration.*

Keeping an open and friendly dialogue even when a tenant farmer isn't initially overly enthusiastic about restoration (i.e. more interested in the project resulting in an opportunity to go into HLS) was nonetheless very valuable. Services at the Thrimby site indicated a BT Openreach asset traversing the site. BT Openreach stated that they required a rerouting of the cable, which they claimed was live. However, the farmer knew that the cable could not be live as it had been cut off at several locations further along. BT Openreach negated the requirement, saving the project £3k (ERT 2014). The additional success of this project is that the tenant farmer now sees the more natural river as an asset for his family to enjoy and the relocated river has improved drainage of the adjacent land.

*The **WCRT** made an agreement with the landowners at Whit Beck prior to the restoration scheme. A list of pros and cons were drawn up and used to negotiate directly with landowners / tenants in the first instance. Because of the high risk and complicated nature, this was then backed up by involving land agents to ensure they were being fairly compensated (audited by EA land agents). Also in this case there were multiple landowners and they needed to feel that no one neighbour was doing better out of the scheme than another!*

Recognising catchment variability

It was stressed during discussions that catchments vary significantly across Cumbria. The ERT was generally in the more enviable position of dealing with rivers that have wide floodplains whilst in other areas, especially in West Cumbria; the catchments are steep with small valley floors limiting productive land extent. 'Full scale' re-meandering where floodplains are narrow is potentially going to be vehemently opposed to by landowners and tenant farmers. Under these circumstances keeping a clear and consistent dialogue between the RTs and the landowners is paramount.

Furthermore, there were significant differences between catchments in terms of eligibility for HLS funding. In this respect, NE's HLS offices were in a good position to identify opportunities for this funding strand which helped to provide an additional incentive needed for land owners to agree to river restoration.

In the short term it may not be possible to achieve large scale projects across the whole of Cumbria, similar to some delivered by the ERT, but without continuous discussion and resultant case studies, current attitudes will remain entrenched. Identifying landowners that are prepared to 'give it a go' (such as on the River Gowan) is an essential part of the agreement process and an area where both the skills of the RTs and NEs expertise in environmental stewardship funding can work in tandem to achieve ambitious natural process driven restoration projects.

2.9 Environmental Stewardship Schemes

Environmental Stewardship Schemes were a key driver for identifying potential scheme participants and an incentive for farmers and land owners to participate in the RRS projects. In the Eden catchment both farmers at Thrimby and Barnskew were in extant Countryside Stewardship Schemes that were close to ending. The NE Adviser who had managed these stewardship schemes approached the farmers at both farms and highly recommended that NE should offer an HLS agreement if farmers were interested in RRS projects. Conversely, without RRS participation they would not have been eligible for HLS. Given that ten year HLS agreements are an important factor for future farm business management this was clearly an important and critical point. Having identified options it then became essential to match up the signing of the HLS contract with the RTs land owner agreement.

On the Kent catchment the farmer was in an existing HLS scheme that had included options to allow river restoration. The NE SSSI Adviser had spoken to the farmer who was amenable to removal of floodbanks on his land.

The Derwent catchment was more problematic in that the Lake District Environmentally Sensitive Area (ESA) scheme was coming to a close, but land managers could not transfer into a HLS scheme that allowed river restoration until their ESA scheme ended. Other RRS schemes had been pursued on the Derwent where this would have been problematic, with multiple start dates for landowners within the project. However, these could not go ahead for other reasons. For Whit Beck, the local land owners were already in an existing HLS scheme, so had less incentive to participate as the CRRS was asking for delivery additional to existing scheme. Nonetheless, the landowner was amenable to participating.

Case examples:

*The project at Thrimby (**ERT**) had the immediate buy-in from the landowner (but who then deferred all negotiations to the land agent). The main reason for this was that the restoration project provided the tenant farmer with enough environmental points to go into HLS; otherwise he might not have been interested in the scheme. Liaison with landowner has been important, but the incentive for the farmer was clearly the HLS. The project has proven to provide multiple benefits to the landowner, who then (hopefully will) begin to communicate this to other farmers or landowners in the area.*

The HLS application process was very complex at Barnskew/Meaburn Hall, with two different HLS schemes, negotiated at different times, with different elements and requirements and two different NE officers. Better coordination between the schemes and support during and after the process for the tenant farmer would have helped considerably, but at the time NE was under considerable resource pressure and staff changes.

ES scheme management can be both a positive and negative for the RRS project delivery. Once a scheme has closed, it is not possible to amend land management prescriptions and the existing ones applied may not be totally suitable for the RRS project once a detailed plan is drawn up. Also, if someone is already in a scheme, they have less incentive to undertake an RRS project. NE SSSI Advisers are working closely with HLS Adviser colleagues on targeting and prescriptions to make sure that individuals and land management options meet future RRS requirements, but older agreements, prior to RRS targeting, may cause problems for future RRS projects.

2.10 Land valuation and compensation

The whole issue of land valuation and compensation for profit foregone is complex. Communication again becomes the critical issue here since the best option is to work with the landowner and/or tenant farmer to agree a package that identifies the merits of a specific project from both an ecological perspective and improvements to farm management (e.g. fencing, improved bridge access across a river, tree planting and, where feasible HLS payments etc.). Such improvements can often represent a significant benefit to the tenant farmer/landowner. Time is needed to explain these benefits and they need to be taken into account when working out land values and land take costs. By taking this approach, short term disturbances related to the farm business can often be accepted through the inclusion of tangible infrastructure benefits for the farm as well as successfully implementing a restoration scheme to increase habitat for wildlife and restore the river's natural features.

Land valuation

The impact of restoration work on the farming business as a whole was an important requirement to assess within the CRRS. The Project Board commissioned H and H Land and Property Ltd (chosen for their knowledge of the area and, in some cases already established relations with farmers and their land and good knowledge of HLS etc.) to look at three examples of potential river restoration projects (in geographically different locations in Cumbria) and identify the financial impact they might have; associated costs and land values were calculated on an individual site basis. Maggie Robinson (NE) then organised an HLS Advisers workshop with input from H and H Land and Property Ltd, to ascertain the impact of findings and produce a suite of potential costs. Any profit-foregone costs identified were over and above those paid through environmental stewardship or single farm payment compliance requirements. This whole exercise enabled the RTs to gain a rough idea of potential costs and impacts at a very early stage.

Compensation in terms of 'cash' payments was not discussed initially preferring rather, to explore multiple benefits for all parties (see discussion below on compensation options). The main reasons for this is because if one farmer receives compensation it will be seen as unfair to another farmer resulting in an assumption that compensation will always be paid. Furthermore, when using funding from the EA's WFD budget, grants cannot be directly given to farmers that will benefit the farm business so such options and discussions become extremely complex.

Where compensation was identified as necessary by a RT, the amount suggested was also assessed by the EA estates team to ensure figures calculated were fair and equitable and equated to generally recognised costs, such as wayleaves. The RT then had to present the cost for dis-benefit calculations to the landowner and acted as the main negotiator in any discussions. Although this approach provided a good cross check in principle, on occasions, the valuations between the RT and the EA varied significantly resulting in the need to discuss cost for dis-benefits/disturbance with the landowners and tenant farmers prior to the start of a project and come to a mutual agreement on reasonable rates. Such discrepancies generally often arose over the current manageability of some land parcels. For example, some fields could clearly not be used for sheep grazing all year round as they became wet and marshy when ground water levels rose in the winter. Understanding the geology and the land use, rather than adopting a broad brush exercise, is essential to provide fair compensation when this approach becomes necessary.

Where compensation is necessary it needs to be clearly stated that any payments are being made on a case by case basis and are for specific, agreed business losses as a direct consequence of the proposed work. This way any request of compensation, where for example, land is marginal in terms agricultural

quality, as identified by the land managers there is the option, backed by economic evidence, to walk away from a potential project on the basis of lack of value for money.

Cost for dis-benefits

The Trusts generally worked alongside the farmers/landowners to incentivise them to agree a package of options for disturbance or dis-benefits to their business by demonstrating the multiple benefits. This included not only fencing, bridges, tree planting options etc., but also an explanation that their annual maintenance was likely to reduce thus resulting in a reduction in capital costs to the landowner. Furthermore, the majority of people who farm actually recognise and appreciate the wildlife function, but are just concerned about the impact on their livelihood if river restoration is carried out; if an agreeable balance can be found, they are generally amenable to such infrastructure compensation schemes. In some instances Trusts negotiated disturbance payments with the landowners/tenants for loss of land use during capital works. The RTs also had to work closely with the HLS Advisers to ensure that the options being implemented on land parcels were the most effective for success of the CRRS.

Case examples:

At Barnskew the work would have been more expensive if it had been completed through a conventional land agreement. Instead a new bridge was installed making it much easier for the landowner to bring logs across the river. The landowner was very happy with this approach and it was a fraction of the any monetary compensation and legal fees.

Sometimes compensation needs to be paid as was the situation on the Whit Beck project. Despite this the landowner still had a lot of influence over the final project in terms of what he was happy with and what he wasn't. This limited the options at this site. Questions have been raised by Natural England about whether a landowner should have so much influence over a project when they have been paid compensation. However, it needs to be recognised that without negotiation and some compromise projects such as these, where valley bottom land is fundamental to the farm business, will not proceed.

2.11 Contract management for design and build

Understanding river restoration concepts and natural processes

Although NE's aspiration was to deliver projects that resulted in rivers that had been returned to a natural state, the reality is that nearly always there is a need for a balance between achieving this status and maintaining a farming livelihood. To achieve this balance, there is a need to ensure that all partners (in this case especially, the RTs, the EA, NE and the landowners) are involved in, and contribute towards, the project design from the early stages. This approach will help to ensure that designs and build are appropriate for achieving WFD measures and improved designated river status. It will also ensure that any flood risk impact, concerns over erosion where this may coincide with existing infrastructure, and any potential effect on existing farming practices are considered, understood and incorporated effectively within the design in a way that is agreeable to all parties.

Before a detailed design is completed by an external consultant however, it is critical that the project specification has clear and specific objectives (SMART) as outlined via the link. In the case of the CRRS the overarching aim was to work with natural processes but how this would be delivered on the ground was not always clearly stated. Therefore, in some cases designs did not take account of this

approach even when, on paper, the designer's credentials were good with a track record of river engineering and geomorphology. In its purest sense restoring natural processes requires a degree of natural adjustment rather than millimetre precision about channel sizing/geometry to prevent any change/movement. Designing-in natural processes that work within specified degrees of freedom rather than unpredicted rates or amounts of change is undeniably a challenge. As a result many contractors' resort to more standard engineering approaches rather than accounting for geomorphological principles and processes. These challenges can be overcome by a range of mechanisms and checks. Understanding your specific objectives together with a landowner's willingness for change before getting to the design stage is clearly critical. Requesting examples of the contractor's previous design experience that takes similar approaches to that framed in the project objectives and, providing them with an opportunity to state their approach to river restoration in the context of natural river restoration processes within in the tender document would help significantly. Furthermore, checking (via landowner discussion with the RTs) for any known specific local constraints or infrastructure (both above and below ground), that could prevent or impact upon the delivery of a natural process-driven river restoration at an early stage would be very beneficial and reduce conflict at a later stage.

Taking this approach to ALL projects would help to identify where and why 'softer' type bio-engineering solutions at a local scale may be necessary to protect specific infrastructure or premium farmland and help to predict impact of approaches.

Critical to this approach is to ensure that the landowner/farmer is engaged in the restoration process and is informed about how reinstating natural river-processes might affect the farm business including potential benefits. This way outline and final designs that are more akin to natural rivers are likely to be met with greater acceptance.

Case example:

*The **WCRT** recognised that there were some constraints to their project. The initial design was identified as too engineered and the design was softened to allow for more erosion. Whilst overall a fair judgement (in the context on delivering natural river process-driven design), the section close to the pipeline failed. Identifying and understanding why some small sections may need some in-channel bank projection at an early stage would have reduced subsequent extra costs to the design and unnecessary bad press. What has been identified in this case on the Whit Beck is that at times there is the need for some agreed appropriate protection at key areas so that the rest of the channel can evolve. Such protection, if agreed and designed into the initial project is more likely to result in more bioengineering approaches being incorporated rather than more emergency hard engineering approaches. Understanding local risks are essential prior to decision making.*

Contracts (design and contractor)

Along with SMART project objectives drawing up clear contracts that state what is expected in terms of river restoration as a basic premise is critical to success. However, discussion with the various CRRS partners revealed that knowledge about how to put together a good contract varied from RT to RT. Table 1 outlines the different types of contract approaches available provides advice about the pros and cons of each.

The success of these types of aspirational projects cannot be just down to contract design and contractor specification and delivery. As with every other part of this River Restoration strategy, where

there are multiple interests and stakeholders clear strategic guidelines on process are essential. In particular it is essential that:

- There are **clear project objectives** that are agreed by NE, the EA and the RTs.
- **Guidelines are provided** about what generic approaches are acceptable (including guidance in circumstances when full scale natural restoration is not possible).
- **Both the design consultant and contractor can demonstrate understanding of natural river restoration** (request statement and examples in the contract specification).
- **An experienced geomorphologist must be part of the design team.**
- **The design consultant goes to site** with a members of the steering group and a representative of the Project Management team (include in contract specification).
- **A contractor is identified early** on and ideally works with the design team since they should have a good idea about what can practically be achieved. This may cost more upfront but can subsequently reduce deliver time and cost.
- **It is recognised there may be minor changes on-site** to specific design and ensured that is acknowledged and planned for in advance.
- **Contractors are aware** that they will need to work closely with the RTs project manager irrespective of contract type.
- **Discussion with the Project Board and any steering group is maintained throughout the contract via the project manager.** This means agreement by all parties at the outline, final design and the construction specification stages.

Ultimately it is essential that a good working relationship is maintained between both the design and the build element of the project across all parties. The need for a good working relationship and how these might be built was discussed at an RRC and RESTORE workshop (see summary in Appendix A).

Contracts for Design and Construction Stages

Whether these stages of the project are to be undertaken separately (i.e. design by a specialist consultant and construction by a contractor) or, combined as a single "design and construct" (D&C) contract by a specialist firm it is absolutely essential that the RTs should prepare a detailed brief which has been agreed by all relevant project partners. Particularly if the D&C route is to be taken the RTs need to ensure that they have an experienced project manager (PM) at this stage able to represent the CRRS aspirations and interests. In the case of the ERT for example, this approach paid dividends as demonstrated in the case example below.

Case example:

*The **ERT's** project manager worked closely with the contractors on site which built trust. In this case, the project manager- contractor's contract was based on a partnership. The project manager was therefore able to make decisions on site that supported the contractor. For example, when an undisclosed water main was discovered at Thrimby the project manager dealt with the negotiations with United Utilities. This freed up the contractor's time and an agreement was made that the contractor should lower the pipe. This plan was successful and saved the project a costly extension of the pipe.*

Where the separate design contract route is chosen the appointed consultant will normally prepare the documentation and supervise the works contract and should be able to represent the CRRS interests during construction; the need for an independent project manager then becomes less essential and the brief prepared by the RTs becomes more straightforward, although certainly no less essential. What is essential in this case, is good feedback throughout to ensure design is agreed and delivered to specification.

Whichever route is taken the brief should illustrate the outline design envisaged and clearly identify the features and aspirations of the scheme, using SMART objectives.

In the case of the Cumbrian Project discussion with the various CRRS partners revealed that knowledge about how to put together a good contract varied from RTs to RTs. It was apparent that there needed to be clearer guidelines on contracts, not only about what is required in terms of a river restoration project, but also in other areas as well. The key areas to consider are highlighted Table 1 over page.

Table 1: Key points related to differing types of contracts.

General Points

Ensure a comprehensive project brief has been prepared and agreed by the project partners before any contracts for the detailed design or construction are awarded. Ensure it is absolutely clear who is going to be responsible for obtaining all necessary consents for the project. Although the CRRS/local RT, should avoid changes of heart once a design has been finalised, all parties need to recognise that the nature of the work means there are likely to be changes on-site to accommodate unforeseen circumstances. Cost variations in such cases can and should be controlled by using an appropriate and established form of contract. Where the work is well defined, this is best done by using a lump sum type contract with any variations charged at day-work (plant/labour/materials) rates previously priced in the tender. Where the extent of the work cannot be well defined, the whole job might be best let on a plan/labour/materials basis so that the contractor does not have to include a risk allowance in his tender, which in the event may not be required.

Design Contracts

The essential 'ingredients' for success design contracts include:

- Supply a specific and as detailed a brief as possible to the contractor.
- Ensure a site visit is carried out potential design consultants prior to making an appointment. This will both help to ensure they understand the project objectives, but may also result in some re-thinking and adjustment to the design brief.
- Identify a project manager or liaison officer to channel communications between the project steering group, the Project Management group and the design consultant: how this is done can be specified in an overall strategy communications plan.
- Specify the available budget for the design and construction phases combined so the designer knows what order of costs to work to.
- Maintain regular contact during the design stage.

Construction Contracts

- The RTs in conjunction with the EA and NE, should agree with the consultant who will be invited to quote for the job (ideally the consultant should be able to advise on suitable firms). They should then draw up the contract documentation - drawings, specification, tender doc, invite tenders and prepare tender report for consideration by the RT and steering group. Before agreeing tender ensure the Project Board have had site of the proposal for any final comments of concerns.
- In this situation the consultant should be able to provide most of the supervision necessary and administer the contract, reporting any queries back to the CRRS Project Management group via the RTs Project Manager (PM). The PM in turn, should consult the steering group on any significant issues, including organising a site visit if necessary. The PM, individual partners, etc. should not need to deal directly with the contractor for the most part.

Design and Construct Contracts

- These can be more demanding to manage as the contractor is likely to hold firm views on what he thinks might be best. On the other hand, most likely this type of approach will result in procuring a more specialised and experienced design and construction team in terms of undertaking the particular site operations needed in river restoration work rather than a more general river works contractor. As indicated above, an experienced project manager capable of undertaking the preparation of the contract documentation, carrying out its administration during the job and ensuring the CRRS interests are safeguarded is absolutely essential for this organisational model to work.

- A "D &C" contractor will be anxious to move forward with the job ASAP but every effort should be made to pin down the design before construction commences. Again this is where firm project management is essential.

2.12 EA Operations Delivery Team

On the River Gowan the project made a significant saving by involving the EA Ops Delivery Team. SCRT had to ring-fence the cost of the project in case there was a flooding incident and the Ops Delivery Team had to be back-filled by contractors, but this was not the case and the works were completed successfully by the EA.

Additional benefits to using Ops Delivery are that it gets them more involved in WFD/Biodiversity delivery; they have existing skills and expertise for river management work and understand the constraints such as timing of in-river works; they can fit it around other demands on their time and can undertake within the EA framework of similar works, (e.g. Construction Design Management (CDM) requirement). The dis-benefit, however, is that they can suddenly be called off an RRS project to do higher priority FCRM work (e.g., after a severe flood event).

Overall, it would be worth considering what scope there is for greater use of Ops Delivery within the CRRS project as part of a the general project assessment and approach.

CDM process

The inclusion of a CDM process is an integral part of any river restoration construction project. However, it became clear during discussions, that the process, when implemented within the CRRS projects was variable in quality. Initially CDM was carried out via the EA's standard process until it was identified that the approach was only permissible in situations where the EA's internal workforce was responsible for the construction. In situations where other contractors completed work it became their responsibility to implement it with an expectation that the RTs were adequately trained to ensure that it was correctly implemented and at an adequate standard.

However, it soon became apparent that the understanding of the CDM processes and principles varied across RTs and contractors.

It took time to resolve the issue of ensuring that adequate CDM measures were in place. The ERT arranged for an external person to put CDM regulations which helped significantly. However, overall there was a lack of clarity and this resulted in delays within the overall CRRS projects. This was frustrating especially given the short time scales to complete the construction phase of the projects.

One option discussed was to have a dedicated CDM officer to work across all Cumbrian Rivers Trusts although it was recognised that it was questionable as to whether anyone would be prepared to take on this role alongside their other work tasks. Whichever option is agreed it needs to ensure that delays are kept to the minimum.

2.13 Impacts on SSSI and Main River boundaries

It was demonstrated on-site that some of the river restoration projects had resulted in significant re-routing or reshaping of the river and its corridor. This raised concerns about the impact that this would have on the SSSI boundaries and original reasons for designation. Indeed the river restoration schemes may result in the river being outside of the designated SSSI site, theoretically meaning the river is no longer the responsibility of NE. The protection of the Cumbrian SSSIs mentioned in this document is however still in place, due to them being SACs so any plan or project that could have an adverse effect on site integrity would still be subject to Habitats Regulation Assessment.

Generally speaking though, this is a potentially a serious cause for concern which needs to be rectified through NE's internal mechanisms and may require an amendment to their SSSI notification policy statement. This policy statement identifies the need to occasionally add additional species to an existing SSSI or expand the extent. It does not currently include a clause about how to deal with a complete location shift. The way of defining what is the new SSSI extent (especially in the context of river restoration projects) needs to be re-defined so that these situations will not occur in the future.

Similarly, the Main River boundary has changed and, in some cases this could result in the river not being liable for flood defence consent. The Main River maps need to be amended to account for their relocation.

> ***Case example:*** *In the case of River Lyvennet at Barnskew the paleo-channel was restored and the river was therefore 'moved' from its SSSI location. As the outline of the river is no longer at the SSSI location on the map, the section of the river is no longer a SSSI and no longer follows the line of the Main River map*

2.14 State aid rules and conflict resolution

State Aid Rules were identified as a significant issue. Natural England's Environmental Stewardship schemes can contribute to the delivery of river restoration as an incentive payment for profit foregone on land adjacent to the river. However, the options available within these Environmental Stewardship schemes are limited to environmental delivery and several effects of a river restoration project on land use and business asset are not taken into account.

There was uncertainty surrounding the CRRS for quite a period whilst NE sought guidance as to whether the contributions to farmers for disturbance was in conflict with State Aid Rules (i.e. potential gain for farm businesses) by giving farmers funding that could be seen as a business advantage. NE is used to fund partnership projects and realised that e.g. putting in a bridge (as compensation for dis-benefits) would need State Aid approval. As such, Maggie Robinson (NE) identified the issue of potential breech of State Aid Rules whereon the Project Board notified EA national WFD leads. The resolution took quite a while as NE struggled to get anyone nationally to take responsibility for resolving the issue. EA nationally considered the funding was covered by FCRM spend approved by the EU. On further scrutiny however, it was realised this was not the case. Eventually NE and EA jointly raised the issue with Defra, who sought approval for WFD spend for various project delivery options from the EU. This took a few months but made the CRRS (and most other WFD driven projects) exempt from State Aid Rules.

The reason for this was to avoid the farmers knowingly or unknowingly taking on a liability that could result in having to pay back any funds that were against State Aid Rules, plus additional penalty fines. To avoid any future issues the Project Board should monitor any spend, and with the support of the RTs, manage any procured services or items (e.g. bridges, gates, and farm infrastructure). The time devoted to identifying and resolving the issues around State Aid Rules has resulted in national change in the context of WFD driven projects.

2.15 Project objective setting, monitoring and evidence

Throughout the discussions and observations of the specific projects detailed in this review, it became clear that SMART overall restoration strategy objectives and specific project objectives (as noted in

section 2.10) would have helped within the design and build processes. Additionally, however, associated monitoring of the projects could both demonstrate project success directly linked to these objectives, and help with early identification of any post-construction concerns and associated remedies. Recognising the uniqueness of projects that specifically aim to restore natural processes and the potential need for an adaptive management approach post-restoration requires an extremely focused approach to pre- and post- project monitoring. NE is in the process of developing a help note as part of a series of river restoration design, construction and monitoring guidance. This information will be available shortly (please contact Jenny Wheeldon for more information).

However what you need to monitor can be determined by asking a few simple questions as outlined below:

- **Why** – What are the project objectives and the specific targets to be monitored? (*E.g. to increasing the area of riffles and clean gravel habitats by 80% over 2km of river*).
- **What** – What is your monitoring objective and what are you trying to observe? (*E.g. to monitor increased habitat diversity and change in macro-invertebrate assemblages*).
- **How** – What techniques are being used to collect data and what assessment methods are you using? (*E.g. habitat mapping, three min macro-invertebrate kick-sampling; α-diversity, PSI index*).
- **Data** – Do you have access to any pre-project/baseline data? If not, this needs to be collected. (*E.g. previously collected three min macro-invertebrate kick-samples from two locations in autumn*).
- **When** – When are you collecting data – month/season, duration of monitoring, sampling repeats? (*E.g. habitat survey: pre survey one month before works; post survey one year after. Macro-invertebrates: pre survey spring and autumn samples one year before; post survey one and three years after both including a spring and an autumn sample*).
- **Who** – Who are the individuals and/or organisations responsible for monitoring? Ensure all data are comparable. (*E.g. habitat mapping in-house by Jo Smith; macro-invertebrate pre survey by third party and in-house by Jo Smith, post survey in-house by Jo Smith*).

Applying these principles to all projects will help to identify the level of monitoring that is achievable and increase the confidence that it will provide useful outputs. It is recommended that ALL projects at the very least carry out Fixed-Point Photography since, provided it is completed systematically, this can provide a cost-effective monitoring technique that shows the visual progress of the project.

For more detailed information about monitoring visit: RRC monitoring guidance.

2.16 Overall review (CRRS process and prioritisation)

The following table records a summary of key implementation requirements with additional recommendations to better implement the various elements. Table 2: Key CRRS process observations and opportunities/recommendations.

Report Section	Subject	Opportunities/recommendations
2.1 Involvement of RTs as delivery partners	*Delivery partnerships*	- Opportunity to use joint expertise (e.g. RT communication and incentivise land owners v EA specific geomorphic and other technical expertise) - RT have long term relationships with landowners - Options to access alternative funding to agencies - Close liaison with NE over ES targeting and land management options required
2.2 Communications	*Project board steering groups*	- Project Board essential to provide key focal point for overall strategy. Ideally, this should be supported by a clear strategic plan that includes guidelines about roles, responsibilities for all organisations. - Individual RT- driven steering groups are a useful mechanism for a) fast tracking concerns and b) communicating change. Steering groups, however, need to work in conjunction with a clear communications plan to ensure all parties are informed of change and requirements at the appropriate time and communication is not solely reliant on steering group meetings.
	Early stakeholder engagement	- As part of the early design phase ensure that all stakeholders are identified. - Stakeholder engagement needs to be an integral part of a clear communication strategy. - Have informal meetings to ensure early agreement to concepts and ideas are clearly stated. Ensure dates are clearly stated. - Feedback concerns to steering group. - Appoint HLS officers to contact landowners and tenants where HLS schemes are viable.
	Skills, roles and delivery pressures	- Clearly state responsibilities and boundaries of ALL individual's roles: Build on detail already available for Project Board roles. - Ensure communications plan identifies who should be involved and when (there needs to be regular meetings/emails on progress to all from the start with opportunity to

		comment). - Early discussion essential to prevent issues being identified too late. - RTs to provide a statement of key pressures in their catchment. Consider when/if/how these could be overcome. - Relay these pressures and constraints to the steering group early on so they can help identify and support any action that may alleviate these. - Identify in-house expertise and where needs external expertise will be necessary. Agree early on.
	Personalities	- Have clear roles and responsibilities stated within an overarching communications strategy together with a strong steering group should provide for conflict resolution and significantly reduce any negative impact.
2.3 Finances and budgets	*Allocation of funds*	- To change the way money is allocated requires a change of attitude from central government. This has been discussed before as outlined in Appendix A.
	Individual project budget	- Discuss options with Jerry Gallop (project manager of CRF) and identify how the approach taken for this fund could be used for the CRRS in the context of being able to allocate funding over multiple years AND still ensure that budgets are accounted for satisfactorily for procurement purposes. *Note:* Jerry should be able to provide guidelines regarding procurement, project and budget reviews along with associated forms and paperwork. See: https://www.gov.uk/government/publications/catchment-restoration-fund-local-environmental-improvements for more information and reporting mechanisms (see also Appendix B). - Issue of yearly funding restraints has been discussed before (see Appendix A). Needs change of attitude at Government level to implement change. Confidence in terms of over year-end funding can result in more confidence in terms of match funding. - RTs need effective financial management of budgets and reporting of financial profiling. - There needs to be recognition that young, emerging Trusts may need more support in terms of accounting for project spend.
2.4 Procurement		- A clear procurement check list needs to be designed for all the Rivers Trusts. This should map across to the requirements of the EA resulting in a process where specific

strategies		milestones, when achieved, can be monitored. It is however, essential that this guidance and associated checks are not just sat within the EA's procurement department, but agreed with wider EA, NE and Trust officers that have procurement or consenting roles. - All parties to sign up to and monitor progress. - Procurement of consultants and contractors should be included in the check list. - List could also include information similar to that shown in Appendix D. - A steering group would have been helpful to support the above concepts.
2.5 Permitted development rights		- In circumstances where Trusts are working on behalf of the Environment Agency (i.e. funds administered by EA) the permitted developments rights can be used. - Need to check that the local council agree to this approach early on in the process. - Ensure advertising of changes is thought about early since 28 days are required.
2.6 Governance structures and impact on relationships		- Success relies on a strong leader. - The process can be supported by a strong steering group which should be set against clear guidelines about its roles and responsibilities. - Guidelines and good support from the steering group should help to ensure the smooth running of projects both in terms of delivery and individual personal preferences/viewpoints. - Steering group would help split tasks: Project Board could focus on governance and steering group on specific management issues.
2.7 EA consents (flood defence)		- Ensure there are specific project objectives clearly defined so that all project partners can work towards (and achieve) the same vision. - Essential to success is early communication with the consenting officers about what is planned - The consenting officer can then help to ensure that the right level of detailed project information is submitted with the FRC applications. - Invite to the site (see check list in main section 2.7). - EA officers to feedback comments throughout the process. - Consenting officer to be part of project steering group

2.8 Landowner agreements	*Agreement letters*	- Avoid lengthy legal documents where possible. - Use short letters of legal agreement outlining key responsibilities where possible approach (see Appendix C- ERT agreement). - Short letters of agreement not always feasible. It depends on the associated project risk and ideally future management should be identified as a responsibility of the landowner (see Appendix C – WCRT agreement). - Trusts to monitor regularly to ensure any adaptive management necessary is identified and dealt with early on in agreement with the landowner.
	Explaining the process	- On-going discussion is essential with the project manager. - This should not be left to the land agent who may not have the technical knowledge but instead should be a partnership with the local RT who has detailed knowledge of the site. - Building up a strong relationship with the project manager is essential to success.
	Recognising catchment variability	- Be realistic about what can be achieved depending on catchment characteristics. - Getting landowner consent can be a long process and the attitude of the landowner can be vital for project success. It is therefore important to understand the farm business and how it could best work around or even benefit from a river restoration project. - Using NE's HLS officers is extremely valuable to establish a first point of contact and to negotiate deals with landowners or tenants.
2.9 Environmental Stewardship Schemes	*HLS and ELS*	- ES can be both positive and negative in terms of delivering RRS. When closed it means that it is difficult to amend land management. - Need to understand mechanisms and look for opportunities. Currently, NE SSSI and HLS advisers are in the process of review this situation.
2.10 Land valuation and compensation	*Land valuation*	- Providing generic assessment based on case studies in Cumbria is an excellent idea as is the cross referencing assessment between the Trusts and the EA. - Needs also to be a better assessment of realistic land use and hence value (especially in the bottom of the floodplain when much of the land cannot be used for grazing all year round). - The assessment may provide a rationale for not doing a project if it is not value for

		money.
	Compensation	- Wherever possible, any compensation for business dis-benefit to the landowner/tenant caused by the restoration project should be linked with Environmental Stewardship (e.g. HLS) payment opportunities. - Additionally, packages of options (rather than cash payments) should be discussed, which not only include fencing, bridges and tree planting options, but also demonstrates how reductions of capital costs to landowners are likely to decrease due to less annual maintenance needs. - Critical to success in achieving this is for the project manager to engage in discussion about the multiple benefits of projects.
2.11 Contract management for design and build	*Understanding river restoration concepts and natural processes*	- Prior to procuring both design engineers and contracts, request statements about both in terms of understanding of river restoration principles and natural processes. - With respect to the designs, ensure it is clearly demonstrated how they relate to the project objectives, location and any constraints. If Trust/EA/NE are unsure about responses seek independent advice (e.g. from the RRC).
	Contracts (design and contractor)	- Ideally get contractor involved early on and work close to the design engineer. - Ensure that all parties are clear about the different approaches to build and design contracts (as outlined in Table 1). - Critical to project success is the relationship between contractors and the RTs project manager. - Feedback mechanisms need to be in place for each part of the process and agreed with the Steering Groups and Project Board (i.e. initial design, final design, amendments (both prior and during construction).
2.12 EA Operations Delivery team and Regulations	*Using EA Ops team*	- The potential for using the EA ops team should be considered in all projects for construction. - Need to recognise the positive and negative elements (i.e. have specialist expertise but may be called off a RR project at short notice for a flooding incident.

	CDM	- It is essential that a universal approach is agreed for the CRRS by the steering group and accepted by all Trusts. - Either train one/two individuals within the Trusts willing to carryout CDM assessments and inspections on behalf of all Trusts or contract out: the problem, especially with the latter, is delays in assessment are more likely to occur.
2.13 Impacts on SSSI boundaries		- Need to review NE's SSSI notification policy statement. - Any agreed changes to take account of the change of a river course then need to be included within the overall procurement check list to ensure consent agreed in advance. - Chris Mainstone is currently re-writing the River SSSI Guidelines to accommodate this issue. Guidelines need to take account of Main River issues for flood consent in this context.
2.14 State aid rules and conflict resolution		- Ensure any funding allocation that is likely to cause risk to land owners has state aid approval
2.15 Project objective setting, monitoring and evidence		- Set clear project objectives (SMART) - Have a clear plan from the beginning of what you will monitoring… use the RRC monitoring planner as guidance - Know your resources - Also include fixed point photography Fixed-Point Photography - Identify your monitoring techniques RRC monitoring guidance

3. Technical evaluation of river restoration

Four projects were visited to back up the evaluation of this report. The aim was to cover projects within the three Rivers Trusts. Three large scale projects were visited (namely, the River Leith at Thrimby Hall, the River Lyvennet at Barnskew (both ERT); and the Whit Beck near Lorton (WCRT). To date, the work carried out by the SCRT is small scale relative to the other projects. However, the River Gowan was also visited. The project primarily involved lowering banks to reconnect to the floodplain upstream of Stavely.

3.1 River Leith at Thrimby

Background

The narrow Leith catchment is located in the upper Eden Valley in North Cumbria. The catchment drains a limestone dominated region interspersed with the clay rich Argillaceous rock. The bedrock is overlain with glacial till, characterised by a cohesive matrix of poorly sorted larger gravel-boulder sized material. The River Leith has a coarse limestone bed made up of sizes mainly from gravel to cobble. Due to the gentle gradient of the catchment, and the low drainage density, the bed sediment is likely to derive foremost from reworking of the till in the narrow valley. Land use in the upper catchment is dominated by improved grassland and in the lower by horticulture and pine forest.

The Thrimby Hall restoration site is located in the middle stretches of the Leith catchment (NY 5573020390). At this point the valley is still narrow with small floodplains. The floodplain pocket at Thrimby Hall is approximately 80m wide and 350m long. The North West Mainline railway line runs through the site, further narrowing the valley. The river in this section was straightened between 1863 and 1891, probably in conjunction with construction of the railway line, which further constricted the river. During the summer, macrophytes are common across the channel bed, including water crowfoot. The adjacent floodplain is stocked with mostly sheep and some dairy leaving patchy riparian margins. The driver for the farmer allowing a restoration scheme on the floodplain was that he could move from Countryside Stewardship to High Level Stewardship (HLS).

The River Leith at Thrimby Hall was identified as an area for restoration in the 2010 Jacobs report (PSA3 riverine SSSI Restoration Visions, River Eden Catchment – Technical Report, 2010). The site was also of interest because the existing agri-environment scheme on the land was ending and the farm would not have been eligible for HLS without a river restoration project.

Project aim

The River Eden River Restoration Strategy (RERRS) project was developed as a remedy for the unfavourable condition of large areas of SSSIs in Cumbria. The primary aim of the RERRS project was to demonstrate innovative ways of delivering river restoration in a cost-effective manner that can be realistically replicated around the catchment. Working in this way maximises the environmental benefits that can be achieved within current restricted budgets and helps to create a template that can be used on other catchments.

The project design aimed at moving the river to favourable condition by restoring the geomorphology. As straightening was one of the reasons for failing SSSI and WFD objectives, the objective was to reverse this and reinstate natural processes and the ecology that goes with this. Although broad aims were outlined for the project, there was no list of specific targets or SMART objectives defined.

Another significant goal of this project was to deliver the work in an inclusive manner that involved friendly negotiation with landowners and tenants to gain agreement for the work, avoiding complex legal agreements and ensuring that bureaucracy is kept to a minimum. To this end, incentives such as land stewardship schemes (Higher Level Stewardship) and improvements to the manageability of land parcels were used, rather than compensation, to gain agreement. Similarly, where consenting and permitting was required it was kept to a minimum through close liaison with the competent authorities and utilisation of permitted development powers wherever possible.

Design

Originally, the design for Thrimby Hall was going to be made by Richard Hey (Streamwise), but due to work pressures the designs could not be produced within the required time scale. Instead Helen Reid (EA) was appointed to do the design work. This meant that the project could get funded that same year (2012) and ERT could get on with the work at Thrimby Hall. The following sections are mainly based on a site visit to Thrimby Hall; Helen Reid's report *Design of River Restoration of the River Leith at Thrimby Hall* (2013) and Gareth Pedley's summary report of the River Eden River Restoration Strategy (2014).

A combination of historical maps and field measurements was used to inform the design of the restored channel. The OS map survey of 1863 shows that the river had a more sinuous course at the time. At some point prior to the following OS map survey in 1891 the river had been straightened to run down the right side of the floodplain pocket, but with the original river course still outlined on the map. This outline was also clearly visible in the field. During high floods the paleo-channel is still flowing, which demonstrated that no barriers to this flood flow path were present.

The high quantity and quality of information regarding the location of the paleo-channel made designing the restoration scheme relatively intuitive. The design therefore aimed to restore fluvial processes by returning the flow to the paleo-channel, which had a more appropriate slope, planform and channel geometry, allowing a more natural assemblage of habitats to be created and sustained.

The location of the proposed restored planform was surveyed using a GPS, with a 3D accuracy of 40mm. It was guided by the use of photographs taken during a flood, which showed the current flood flow paths. This information was combined to identify which alignment was the most relevant for contemporary channel processes. The upstream paleo-channel alignment was adjusted to avoid a sharp angle at the diversion from the straightened channel. The outside of the bend which curves towards the railway line was designed with glacial boulders dug into the bank and trees planted behind to provide further protection.

The straightened reach is overwidened, which limited its ability to scour an appropriate range of habitat features. A less-impacted, representative reach downstream was therefore surveyed to provide a basis for the geometry of the paleo-channel, where it was not already evident on the floodplain. These observations lead to the recommendation of a wetted low channel width of between 5.5 and 6m as being most appropriate for the restored reach. Channel depth was determined by the depth of the bed of the paleo-channel and using the channel geometry from a less impacted reference reach downstream. The outside of the meanders were designed with steeper banks to capture the natural morphology. Other banks were designed with a gently sloping profile to allow the channel to widen through erosion of the bank toe, without delivering high loads of silt into the channel, or narrow through grass trapping silt and forming benches.

Carrying out shear stress and bed load transport analysis was not deemed as necessary for designing this scheme as the bed is infrequently reworked, sediment load is low and the scheme will adopt the pre-straightening slope and energy gradient. This approach provides scope for the river channel

dimensions to adjust to provide a more natural morphology. It was also expected that the old bed would retain traces of geomorphic units, by exhibiting variations in topography and grain size. If no diversity of form would be apparent, the excavation might need to mimic natural trends with pools on the outside of meander bends and riffles on the straights.

The project was also designed to include some planting and fencing of the riparian margin at a width decided through conversations between the Programme Manager (Gareth Pedley) and the landowner.

The main issue identified by the Jacobs report (2010) for River Leith was the limited sediment supply from the river banks. This was partly due to natural limitations, but also due to the presence of bank protection. Of the 26,588m bank surveyed only 4% was subject to erosion while 12% had reinforcements. Other issues mentioned in the report are diffuse pollution from agriculture, overgrazing and invasive species. River realignment in the upstream reach and assisted natural recovery in the lower reaches by removing bank protection are also listed as potential restoration options.

Implementation

A more detailed description of the implementation process can be found in the River Eden River Restoration Strategy Summary Report (ERT, 2014).

Contact on the River Leith at Thrimby Hall was first made with tenant farmer by Natural England's HLS advisor. The tenant was keen on the fact that the farm would become eligible for HLS with the inclusion of a river restoration scheme, providing that a bridge could be provided to improve access across the river and that the scheme included a contribution towards boundary fencing on the farm.

Restoration was undertaken in three phases between summer 2013 and spring 2014. In the first phase the line of the paleo-channel was staked out and then excavated, maintaining an 8m bund between the old and the new channel at the upstream and downstream ends. When the turf and topsoil was removed, the original river bed was found along the line of the paleo-channel. This alleviated the requirement to import river bed materials and meant that the natural bed features found could in many areas simply be reinstated. Once excavated, the new bridge was constructed as compensation for any dis-benefits to the farm business.

In the second phase the channel was left over winter. There were two options of how to manage the channel prior to reconnecting the flow. The ERT proposed to, at times of high flows, lower the upstream bund (separating the old and new channels) to a height that would allow inflow of water and remove the lower bund to facilitate natural channel flushing when the river was in flood and could handle an increased sediment input. However, this was rejected by the EA due to risk of high silt loads possibly contaminating the downstream SSSI/SAC. An alternative option was adopted instead whereby the bank-full height bunds at both the upstream and downstream ends were left intact for a number of months to prevent river water entering the restored paleo-channel while the banks re-vegetated. To achieve full coverage after reseeding on the disturbed banks took approximately four months. However, the root mass and sward were still significantly poorer than that of re-turfed sections over the same timeframe.

In the third phase the paleo-channel was re-connected, but before commencing the diversion of flow, a fish survey was undertaken in the straightened channel. Reconnection of the river flow to the paleo-channel was initiated by removing the final 8m of the downstream bund and placing sandbags at the upstream end to allow excavation of the upstream bund. The line of sand bags was then moved across to the top of the straightened channel to divert the flow. The old channel was filled in and at the upstream end (i.e. the outside of the new bend towards the railway line) and lined with local glacial boulders. The boulders were set back approximately 1m from the channel edge, covered with sediment and planted with willows.

The infilled channel was dressed with topsoil and covered with the turf. It is possible that the water seeping into the backfilled straightened river channel would simply drain away through the old river bed, but the tenants at Thrimby Hall requested field drains be installed to ensure that backfilling of the straightened channel did not result in waterlogged unworkable land.

Monitoring

At Thrimby Hall a pre-restoration fly over and mapping of habitat, sediment size and morphology were done by APEM using their Fluvial Information Systems (FIS) method. It has been proposed that APEM would do the fly over again, but this had not yet been done by the time of this report. The larger sites at Barnskew and Whitbeck were used to carry out more detailed geomorphic monitoring.

To date the restoration of the paleo-channel at Thrimby Hall has created a more natural channel with higher habitat diversity and substrate types. Slight channel migration should also provide some sediment input from the banks.

Cost

The ERT believed that that large cost savings could be achieved at Thrimby Hall due to the buy-in from the landowner. The summarised costs below are derived from the River Eden River Restoration Strategy Summary Report (ERT, 2014).

Action	**Cost (£)**
Planning (permitted development, disturbance payments and associated costs)	3524.00
Detailed design (including for example LiDAR/aerial surveys) : ***Note: Mainly EA in-house so design not included in costs***	**1037.00**
Groundworks	49675.00
Drainage (300m)	2520.00
Bridge	29175.00
Fencing	7649.00
In kind costs (volunteers and university) (approx)	30000.00
Total (inc VAT)	**96580.00**

*More detail about in kind cost can be provided from the ERT

Lessons learned

Explaining HLS process: Approaching the tenant farmer through NE's HLS advisor worked well. The advisor informed the tenants that they could potentially be eligible for HLS schemes on their land, but only in conjunction with river restoration, as the land holding did not have the requisite interest features for an HLS scheme otherwise. This created the opportunity for ERT's Programme Manager (Gareth Pedley) to enter into more detailed discussions with the tenants and landowners regarding the possibility of river restoration.

Setting objectives: When several project partners, stakeholders and external contractors are working together on the same project, it is very important to have a common vision to work towards and that everyone also understands the more detailed objectives of the project (as opposed to only an overarching aim of 'working to achieve favourable condition'). Setting specific objectives for future projects will also help to guide an effective monitoring program. Effective monitoring programmes provide an evidence base for success evaluation, an important factor when applying for funding for future river restoration schemes. Monitoring is essential to provide funders with evidence of success and to improve future restoration projects. As a rule of thumb, it is advised that about 10% of the

project budget should be allocated to monitoring, but as a bare minimum, before-during-after and long-term Fixed Point Photography should always be implemented.

Managing sediment: High flows on the River Leith over the 2013/14 winter caused some river water to overspill into the restored paleo-channel, flushing much of the excess sediment into a sump that was created by the downstream bund. This left the restored channel clear of fine sediments (ready for reconnection) in the upper reaches. The ERT felt that this demonstrated the potential benefits of flushing out fine sediments from the restored channel during times of high flows when silt loads in the river are high anyway, saving the work to dig out the deposited sediments at the bottom end bund before reconnection. The EA on the other hand, believed it was better that the silt generated after high flows was captured by the bund so it could be dug out and removed from the system before connecting the channel, which decreased the volumes of silt washed into the SSSI/SAC and decreased the risk of having to deal with potential pollution incidents. At less sensitive sites it might be possible to deal with sediment loads from new channels differently, but this would require some more research into the effects of additional silt loads during high flows.

Managing farmland where water logging perceived as a potential problem: The tenant farmer was initially afraid that the land would flood more and the strip of land on the infilled channel would be waterlogged and not workable. Instead, the land that used to be water logged (i.e. the line of the paleo-channel) now encompasses the river and the farmer stated that he can now instead use the wider strip of land on the infilled channel, which is staying dry and not becoming waterlogged.

The tenants at Thrimby Hall requested field drains be installed to ensure that backfilling of the straightened channel did not result in waterlogged unworkable land. The ideal solution here would have been for the tenants to enter the land into a higher tier payment within the HLS scheme that allowed for wet woodland or similar, but unfortunately they preferred to retain the use of the land for grazing. In future schemes, working such areas of land into a stewardship scheme should be an aspiration.

Managing the construction phase: The ERT was very pleased with the work carried out by the contractor (i.e. Waitings). However, it was seen as very valuable to have ERT's Programme Manager (Gareth Pedley) on site during the construction period. The collaboration worked well and Gareth could instruct the contractors on the details of the design and any issues, such as the discovery of a drainage pipe, could be resolved together on site. However, ERT was less pleased with how the contractors handled the CDM process. For example, the ERT needed to tell the contractors to stop working when it was too wet, although they should have known this themselves and stopped without having to be told to do so.

Post project management agreements: The landowner was initially opposed to any fencing at the site, but the ERT managed to negotiate with the landowner who agreed to fence both sides of the river. This will both prevent future poaching and allow the riparian vegetation to establish. The fence line is quite close to the river banks (Figure 1), but the landowner is aware that it might have to be moved back due to meander development. There is a ten year agreement between the ERT and the landowner regarding management of the site. However, long-term management of the site is an unresolved issue. Currently there is an open-ended commitment from ERT (both at Thrimby Hall and Barnskew) to resolve issues that arise. This is necessary for the reputation of the Trust, but should not be ignored or underestimated in terms of cost and staff time.

Bridge design: The bridge at Thrimby Hall was built over the paleo-channel before the river was connected. Building a bridge before the watercourse is 'live' meant that ERT did not have to apply for Flood Defence Consent, but also that the bridge had to be less than 3m above ground level to comply with the agricultural permitted development powers. Although the design had to be approved by the

Eden District Council, this resulted in the construction of a bridge with a span much too narrow and low for the river at this point which may cause a flow restriction during flood events.

Figure 1: An overview of the newly constructed river.

This photo overlooking the restored paleo-channel at Thrimby Hall shows the fence line which has been placed on the bank tops very close to the river. The photo also shows the narrow bridge span, which may constrain the channel at this point as it changes. Once the riparian vegetation has matured and trees fall in, they might also get trapped due to the low bridge height.

Summary

The full benefits of this project are yet to be evidenced and it is recommended that there are some clear time lines put in place to evaluate the outcomes of this project. It is recognised that this is potentially time and financially restrictive but, increasing the evidence base for such project in terms of landowner perception and satisfaction, future management, flood risk benefits as well as benefits of working with natural processes to deliver habitat gain in SSSI rivers is critical. To date fixed point photography has successfully shown the geomorphological processes that have occurred and, to some extent, confirmed that the tenant farmer is happy with the result. In terms of some of the key issues to consider for future projects these are bulleted below.

- Land owner discussion with the Natural England HLS advisor worked well in terms of explaining HLS funding would only be feasible in conjunction with a river restoration scheme.
- Developing clear objectives at the beginning of the project would have helped in terms of delivery and monitoring (this applies to all projects).
- Sediment transport is always a contentious issue regarding project construction. In this case a bund was put in place to capture sediment at the request of the EA to reduce risk downstream. This is however, counter intuitive to natural river restoration. It is recommended that sediment impact is considered early in a river restoration design and opportunities to work with natural process to disperse initial sediment slugs are included in the construction where ever possible based on a risk analysis.
- Working within farm land has limitations and needs to take account of farmer's livelihoods. This was the case here but resulted in a need to include land drains. A better option would be to encourage farmers to enter stewardship schemes where ever possible.

- When identifying a contractor for project construction it is important to ensure that they are committed to properly implementing CDM regulations. By the ERT working alongside the contractor they were able to provide an additional check that this was being implemented in the context of river restoration.
- Long term management of these projects is critical. Current management is for 10 years but in the context of a river restoration of this nature, this may not be long enough, especially in connection with fencing.
- Bridge construction must be part of the consenting process as a matter of course to avoid the design and construction of narrow span bridges which, whilst they may be cheaper, may result in unwanted flood in specific areas.

3.2 River Lyvennet at Barnskew

Background

The 70km^2 Lyvennet catchment is located in the Upper Eden Valley in North Cumbria. The undulating limestone catchment has a maximum altitude of 392 m.a.s.l. with improved grassland being the predominant land use. The Lyvennet is part of the River Eden SSSI/SAC which is designated based on provision of good habitats for a range of BAP species such as crayfish, bullhead, lamprey, salmon and a variety of macrophytes, including *Ranunculus*.

The River Lyvennet at Barnskew was straightened, dredged and realigned sometime before the oldest available OS survey map from 1867. A weir was also constructed at the upper section of the reach, limiting fish migration. By reducing the length of the river by some 350m the gradient was increased from 0.0038 to 0.0052 causing river bed incision by between 0.5 and 0.9m over the same distance and scouring of the finer gravels suitable for spawning. The straight planform has resulted in a simplified morphology, lacking the range of habitat (i.e. pools and riffles) necessary to support a range of life stages for fish and macroinvertebrates; the bed was concreted with silt, covered with algae and consequently the SSSI was classified as being in unfavourable condition.

Project aim

As stated in the project aims section for Thrimby Hall, the RERRS was developed as a remedy for the unfavourable condition of large areas of SSSIs in Cumbria with the overarching aim of delivering river restoration that maximises the environmental benefits in a cost-effective manner.

The project at the River Lyvennet (and its tributary Howe Beck) at Barnskew restored paleo-channels with the aim to reinstate a lower gradient channel with more natural hydrology, morphology and sediment transport. The resultant increased diversity of habitats, along with increased in river length, will move the river towards favourable condition.

Design

Information in the following sections is mainly based upon: a site visit to the Barnskew site; Richard Hey's report *Design of River Restoration Scheme: Lyvennet Beck, Cumbria* (2013); and Gareth Pedley's summary report of the River Eden River Restoration Strategy (2014).

Designs for the Lyvennet and Howe Beck at Barnskew were originally suggested by Richard Hey. However, although the flood risk is low in this area, the sinuous design was considered inappropriate for the location by the EA as it did not meet project objectives. It would also have resulted in a degree of sediment movement and morphological change that would not be accepted by the tenant farmer.

Through the use of LiDAR data a new design was created to reflect the planform of the visible paleo-channels. LiDAR and field surveys uncovered multiple relic meander bends and courses of the Lyvennet, indicating that the river had been actively meandering prior to being straightened. Their relative levels were visualised by manipulating the LiDAR data so that the most recent outline could be detected. As there have been minimal changes to patterns of sediment and flow across the catchment, this alignment should provide the most sustainable form to support natural river processes. However, the nature of the restoration also had to be governed by local conditions and land management constraints, for example it was necessary to not impact on the meadows used for cultivating hay crop.

To restore a naturally functioning river, it was important to restore the higher bed levels of the paleo-channel, connecting the river with the floodplain and thereby increasing the groundwater level. To reduce impact upon the hay meadows, the design initially thought to maintain the lower bed level in the short sections where the river flows along its previous straightened alignment, at the lower end of Lyvennet Plantation. Levelling surveys were undertaken to ensure that the bed of the new channel would transition into the bed of the existing river at the upper and lower connecting points. However, during the consenting process, this was seen as a concern because of the risk of head cutting and erosion of the paleo-channel bed. The consent therefore required the bed level to be raised in the sections where the river would flow along its old straightened sections.

Parts of the original course of Howe Beck can be seen on the oldest available OS survey map from 1867. The LiDAR maps also clearly showed the course of the paleo-channel. Measurements of the longitudinal profile of the paleo-channel indicated that all the flow from Howe Beck could be diverted into the paleo-channel without the need to significantly modify bed levels. However, the gradient of the paleo-channel would be considerably steeper than that in the upper reaches of the existing beck.

The Jacobs report (PSA3 riverine SSSI Restoration Visions, River Eden Catchment – Technical Report, 2010) identified four main issues along the River Lyvennet:

- Reduction in channel sinuosity due to historic channel straightening
- Extensive areas of bank reinforcement (13% of bank length)
- Localised livestock induced channel erosion (poaching)
- Twelve weirs present, six classed as major

It also pointed out that there is a lack of suitable crayfish habitats and the coarse substrate along much of the river length limit spawning potential for several fish species. Five potential restoration options are listed:

- Reinstate a more sinuous channel planform
- Removal of bank reinforcement
- Restrict livestock access to the channel
- Improve the riparian zone
- Removal or modification of existing weirs

The work carried out on the Lyvennet and Howe Beck addresses the suggested restoration measures by restoring the paleo-channels (which do not have bank reinforcements), fencing off the banks from livestock, planting, and bypassing a weir.

Implementation

As with the project on the Leith at Thrimby Hall, the first contact with the tenant farmer at Barnskew was made by NE's HLS officer. The tenant farmer's stewardship was about to finish, and he was interested in river restoration. However, the tenant farmer passed away, and the son who took over

the business was is less keen on river restoration. Farmer peer pressure was considerable on the new tenant farmer and his opposition to river restoration made negotiations difficult. Fortunately, the landowner was positive to river restoration and after much negotiation the plans could go ahead.

The Lyvennet is classed as *mainriver,* meaning that work undertaken within 8m of the channel required Flood Defence Consent (FDC). FDC was obtained for both permanent and temporary works (e.g. sandbagging for flow diversion, over-pumping etc.) prior to any excavation works taking place.

Due to delays in securing consents for the site subsequently causing delays in getting contractors in, the channel could not be excavated in autumn as initially planned, but instead begun in April 2014. Work lasted approximately six weeks, and the banks were then left to vegetate before reconnecting of flows after the summer. An 8m bund between the paleo-channel and the straightened channel was left to prevent flushing while the banks re-vegetated, but allowed for some cleansing of the substrate through rain washing. When excavation started, the old river bed was found and the location of this was used to identify channel depths and habitat features such as pools and riffles. The plan was also to allow the river to develop its own equilibrium, dimensions and morphology once the flow was re-connected. The bed material in the paleo-channel was much finer than in the straightened reach, providing good spawning gravels, and no bed material had to be imported.

Before reconnecting the flows, sandbag bunds were created at the up and downstream end of the restored paleo-channel to allow excavation of the final 8m earth bunds in the dry and then facilitate flushing by gradually removing the sandbags at the upstream end. During flushing, silty water collected at the downstream end was pumped out via sediment traps onto the adjacent pasture. Silt curtains were also installed across the path of the flow to increase retention time and sediment deposition before returning to the river.

To reinstate the bank between the paleo-channel and the straightened channel, it was initially anticipated that a clay bund would have to be instated to create a watertight bank line. However, due to the wide size range of the material and high portion of fine limestone sediment in the alluvial material, it could be made completely watertight with minimal compaction. The banks were dressed with topsoil and turf. On the outside of meander bends in areas of recently disturbed banks, live willow trees were planted into the face of the topsoil to increase stability. The trees were then secured with posts, and laid so that the canopy of each tree would protect the trunk and root ball of the tree downstream from erosion, and encourage sediment deposition.

It is possible that the water seeping into the backfilled straightened river channel would simply drain away through the old river bed, but the tenants requested field drains be installed to ensure that land on the backfilled channel would not remain waterlogged. The restored paleo-channel should slow the flow through the section and provide local flood risk benefits and decreased flood peaks.

The paleo-channel of the small Howe Beck was clearly visible in the field and the only work needed was to remove the turf to expose the old channel.

Cost

Table 3: Project costs for the River Lyvennet at Barnskew.

Action	Cost (£)
Planning (permitted development, disturbance payments and associated costs)	10214.26
Detailed design	6000.00

Groundwork	161124.46
Drainage (402m)	7100.93
Bridge	55932.29
Fencing	27791.00
Tree felling	8224.00
Large wood	2126.00
Planting	305.00
In kind costs (university, volunteers and farmer)	50000
Total (inc VAT)	**330,817.94**

*More detail about in kind cost can be provided from the ERT

Monitoring

As for the site at Thrimby Hall, APEM did a pre-restoration fly over Fluvial Information System (FIS). Post-project monitoring of both the Barnskew and Whitbeck sites is currently being undertaken by an M.Phil student at Aberystwyth University, supervised by Richard Williams. However, the results were not available at the time of writing this report; the thesis is not due until December 2015 due to technical difficulties. It is however, understood that more site fly overs using drones are planned in the future.

The objectives of the monitoring survey are to:

- acquire aerial imagery of each reach following high-flow events to map surface sedimentology and vegetation, generate DEMs, and subsequently quantify morphological change; and
- develop 2D/3D hydraulic models, and assess their efficacy for delineating geomorphic zones and habitat.

Objective achievement will result in substantive methodological advances in state-of-the-art geomatics and will shed new light on the nature of channel form and adjustment processes, leading to improved design and assessment of restoration activities.

The M.Phil student has surveyed the entire length of both restoration schemes three times (autumn 2014, spring 2015 and summer 2015) using aerial imagery from a UAV platform. Structure-from-Motion techniques are being used to rebuild the topography, resulting in a seamless aerial photo and topographic map with a resolution of c. 5cm and a vertical error of c. 10cm. The aerial photos and maps are being used to map morphological units (pools, bars, runs etc.). Repeat topographic maps will enable the production of maps of erosion and deposition, and tied to the unit mapping will show morphological unit change through the sequence of high flows. Bed sediment patches have also been spray painted to look at reworking and recovery of bar surfaces.

The morphological data is being tied to habitat monitoring. Invertebrate sampling was carried out at each scheme in July/August 2015. For each scheme, samples were collected at three riffles (with three samples at each riffle) and also at a nearby reference reach (tying in with EA WFD sites). Electro-fishing was carried out across three reaches on each scheme. The invertebrates are currently undergoing identification at Liverpool JM University (Patrick Bryne). The fish data have been sent to the EA for inclusion in the 2015 data analysis run.

ERT has made observations of white clawed crayfish in the new channel, though initially the numbers have been low as the channel establishes (a single biological monitoring survey event found none, but native crayfish have been observed in the new channel on subsequent visits to the site). During a monitoring event (within a month of completion), the Trust also found 22 salmon redds and four trout redds.

Lessons learned

Local community consultation: This was generally been excellent at Barnskew post-restoration. However, beforehand it was limited to land owners and required consultees, and there have been some comments locally that local people, e.g. Parish Council, were not consulted sufficiently. ERT had some worries that if the local community had been consulted before the project, the fear and suspicion generated might have prevented it going ahead. But in future projects it is essential to revisit this approach and consider carefully managed consultation with the local community before the process starts. Furthermore, consultation often needs to be wide as possible; for example, archaeological interests posed rather a challenge at Barnskew. Fortunately most of the interest was found to be outside the restoration site but early engagement with local councils, English Heritage and local historians can prevent potential delays and alterations to project specification.

The importance of steering groups to avoid delays in construction and associated impacts: The paleo-channel at Barnskew was excavated and re-connected in the same year due to the delays in getting consents and contractors in. This was not the most ideal solution since it did not allow the planted banks time to stabilise. However, due to funding and spending restrictions the re-connection could not be postponed. This highlights the importance of having a steering group which includes representatives from different authorities and consenting officers. Early discussions with the consenting officers where the project aim and objectives are clearly explained are crucial to ensure an efficient consenting process. It also shows the funding and spending problems that many restoration projects encounter (see discussion in section 2.3).

The delays and time pressure then led to some issues regarding flushing of the excavated paleo-channel. It would have been better to dig the channel one year and not re-connect until the next, as it would have allowed the banks to stabilise and vegetate (although where re-turfed, the four months from May to August seemed to be sufficient for the vegetation to establish). It would also have allowed high flows to flush the new channel naturally over winter, instead of having to flush and gravel wash the new bed in the same year that it was dug.

Sediment flushing when opening new river course: Flushing the channel was instead achieved by gradually removing the sandbags at the upstream end of the paleo-channel and placing them across the upstream end of the straightened channel, while ensuring that sufficient flows went down the straightened channel. It was found that removing as many bags as possible, as quickly as possible, then allowing a short flushing period before closing off the channel again gave the best results. In some instances, the bags removed from the upstream end of the paleo-channel had to be placed across a portion of the straightened channel to divert sufficient flows down the paleo-channel.

Prolonged periods of flushing at constant flow removed no more sediment than the initial few minutes of flushing, but instead created issues with overloading the pumps at the downstream end. This also created significant delays while waiting for the channel to drain before further flushing could be undertaken. Some issues were encountered due to low summer flows, with the lack of water available making it difficult to obtain a great enough flushing flow for the paleo-channel without depleting the residual flow of the river.

Project management alongside contractors: ERT was happy with the work carried out by the contractors (Cubby Construction Limited) and, as at Thrimby Hall, it was seen as very valuable to have ERT's Programme Manager on site during the construction period. Although collaborating with, and directing the contractors worked well, ERT's impression was that if the Programme Manager had not been on site, there might have been a risk that the contractors would have made some inappropriate

decisions on their own initiative when issues occurred (e.g. when some bedrock was encountered). A CDM process was built into the contract with the contractors the ERT was pleased with how Cubby handled this.

Flood consent and bridges: Similar to the bridge at Thrimby Hall, the project at Barnskew was built over the paleo-channel before the Lyvennet was connected and the Trust did not have to apply for Flood Defence Consent. The new bridge has been designed with a narrow bridge span which could cause problems in the future when the channel starts to migrate or causing erosion around the bridge footings at high flows (Figure 2). NE is of the opinion that the design would not have been approved, had it required a FDC.

Figure 2: The new bridge over the restored paleo-channel of the Lyvennet.

The HLS application process: This was very complex at Barnskew, with two different HLS schemes, negotiated at different times, with different elements and requirements and two different NE officers. Better coordination and "hand-holding" during and after the process for the tenant particularly would have helped considerably. There also needs to be better lines of communication with the tenants/landowners and NE throughout the process and ensure that if there are HLS and Conservation Enhancements scheme agreements they are sure what is being funded by which pot, as there seems to have been some confusion regarding this at Barnskew.

The river restoration approach suited the landowner's new rare-breed farming type at the Meaburn Hall end of the site, but the tenant farmer at the Barnskew end requested that the buffer fence was kept to a minimum as the HLS payments on those areas would not cover the dis-benefit (this is why the HLS payments across whole farms have to be considered as an incentive in the negotiations). Although the design followed the planform of the paleo-channels, it promoted more active channel migration than the original design. By spring 2015, the active meandering had already eroded close to the fence line in several places (Figure 3). It is important that the landowner/tenant is aware that this is likely to occur if the fence is placed too close (especially on the outside bend) to a meandering river.

Setting back fences and trees: The Lyvennet has the character of an upland river with a gravel bed and relatively flashy flows responding quickly to the high rainfall in the area. The natural morphological processes support an actively meandering river which migrates across the floodplain. When the flow is diverted to the restored paleo-channel some adjustments, channel migration and erosion/deposition

is to be expected in such an active channel. Tree planting is a good way to provide shade and stabilise banks, but should not be expected to provide bank stability until they have grown into mature trees. Planting on the outside of meander bends should preferably be done after a few high flow events to prevent erosion of the newly planted young trees. The fence line on the outside of meander bends should be put well back from the banks as initial erosion can be expected.

Figure 3: Meanders migrating towards the fence line.

On the outside of meander bends the channel is migrating towards the fence line. The root system of the newly planted trees is not strong enough to stabilise the bank.

Flood risk consent agreements: This flood risk consent for this project recommended that in short sections, where the paleo-channel crossed over the old straightened sections, the bed level should be raised to the level of the paleo-channel. This requirement was not implemented which has resulted in bed lowering, and more erosion and adjustment than would have been expected. This is a good demonstration of the importance of taking into account the requirements of such consents as they are stated to avoid this kind of avoidable effects.

The flood risk consent also stipulated that white clawed crayfish and other fish species had to be relocated from the dewatered stretches. This needs more careful planning and sufficient personnel identified for future projects. NE's planned assistance could not be fulfilled as frequent, last minute changes would have impacted on other commitments. The EA had to provide a lot of resource for electrofishing, which affected their work programme.

Long-term maintenance: Since the river was re-meandered and re-connected in September 2014, there have been at least 15 trees which have fallen down in the woodland, ending up in the river and in adjacent fields (Figure 4a). The main reason for this is that the bed of the straightened sections was not increased to the height of the bed of the paleo-channel. While fallen trees creates excellent habitat in the river for the wildlife, it has caused concerns for the land owner and tenant, crushed fences and led to a significant amount of maintenance work and expense which is still on-going. These are issues that need to be considered. Apart from adhering to the FRC requirements, where trees are in close proximity to the site it is important to recognise the potential maintenance issue early on in terms of impacts to fence lines and in some cases bank protection with large wood may be necessary (Figure 4b.) in small locations, through generally this is counter intuitive to natural process-driven river restoration. Interestingly, where riparian vegetation maintenance has been carried out by the Woodland Trust this has generally resulted in a more sustainable result than when left to than the landowner or tenant farmer. Ultimately long-term maintenance needs to considered in the context of the project (and land owner) agreement.

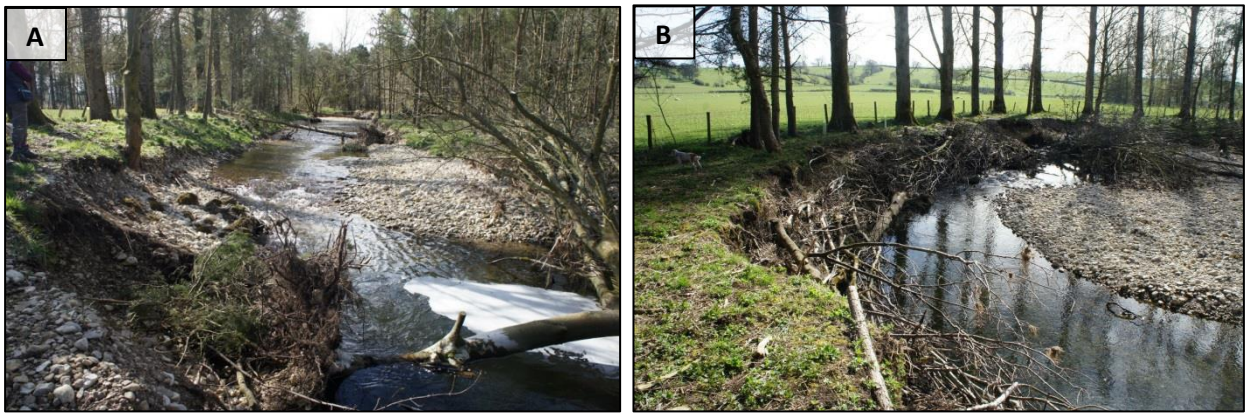

Figure 4 A and B: Channel migration.

A) Channel migration and erosion mainly due to bed levels of old channel not being raised to the level of the paleo-channel, causing mature trees to fall into the channel, but also into the grazed field. B) Channel migration towards pasture and trees placed on the outside bank as protection against further erosion. This, however, counteracts the objective of restoring natural processes in the river system.

Summary

- Community consultation requires careful management. Consultation at the beginning is critical and avoids potential criticism at a later date. Where concerns have been voiced this projects provides a good demonstration of the positive impacts of a project in terms of dealing with flood management and, locally working with the tenant farmer to ensure land is not water logged.
- Steering groups can help to mitigate project delays in the context of consent process which subsequently can have an impact on construction times. Timing can be critical to outcomes (e.g. not allowing sufficient time between construction and stabilisation of planted banks before allowing flows down new channel).
- Flushing of sediment post construction was critical to consider. How this is dealt with needs to be considered on a project by project basis. However, if not managed properly (e.g. the use of bunds in certain locations) there is a risk that flow will initially preferentially choose the old rather than the new channel.
- Having the ERT project manager working alongside the contractors is positive and should be recognised as a good liaison since this person provides a key liaison between project design and construction and will have the most overall knowledge of a site's constrictions and opportunities.
- There is a tendency to reduce cost by designing bridges that are not wide enough span in situations where flood consent is not required. Flood consent should be a pre-requisite of bridges to avoid both unforeseen flood risk and impacts in terms of sediment movement where narrow span rivers cause constrictions and therefore, increase flow velocities and forces.
- HLS process can be complex especially when dealing with multiple landowners. The impact on all landowner needs adequate explanation.
- In active rivers fencing and planting needs to be set back a sufficient distance to avoid future maintenance. It needs to be recognised by landowners and tenant farmers that initial flood

events will actively move sediment and that this will be more significant in the first few years until the new water course finds its exact equilibrium course.

- Future maintenance agreements need to be clearly stated and responsibilities understood.

3.3 Whit Beck near Lorton

Background

The Whit Beck drains from the Lorton fells and joins the River Cocker about ¾ of a mile upstream of Low Lorton village. The Cocker eventually joins the River Derwent, which has both SSSI and SAC status. Its geology ranges from reworked glacial gravel deposits interspersed with boulder clay though to peat. As fast flowing, spatey systems, both the Cocker and the Whit Beck drain areas that are used primarily for cattle and sheep grazing. During the spring and summer, a lot of this valley bottom land is utilised for silage production. The valley bottom land is used intensively since they are generally the only productive/useable areas for farming in these catchments.

With respect to WFD status the Cocker and Whit Beck have been classified as heavily modified (see Figure 5). This is clearly evident from maps of the area that show that both rivers have, historically, been significantly straightened in response to a combination of flood control, agriculture use, historical mining and road building. This channel alteration together with current land use has had a significant impact on what can be achieved in terms of working toward complete natural process driven river and floodplain restoration. Despite the heavy modification, the Cocker catchment has been identified as having good biological, high physio-chemical and locally variable (moderate to high) pollutant status. Additionally, the Whit Beck has specifically been identified as having some good Atlantic Salmon juvenile areas and Lamprey habitats upstream. As a result increasing habitat for these species, both through natural process-driven restoration and water quality improvements, was identified as important in the lower sections of the Whit Beck.

Although funded through the CRRS (as part of the national river restoration pilot programme), targeted at SSSI rivers in rural areas, the projects identified for restoration along the river Derwent and its tributaries also form part of the North West River Basin Management Plan. This plan is aimed at meeting WFD standards in that area, thus providing additional impetus for the delivery of restoration measures.

The restoration site discussed here is located downstream of Whit Beck bridge on the B5289 and continues to where it meets the confluence of the River Cocker (i.e. NY 15582489 to NY 15072528). It was identified in the River Derwent Catchment – technical report (Jacobs 2010) as the most viable section for river restoration on the Whit beck. Recommendations included removing bank walls and reinstating more natural processes: prior to the scheme 2.5km of the whole 3.8km length of the beck was stabilised with stone wall. Naturally occurring bank erosion processes were confined to 3% of the banks in the upper sections.

Figure 5: Whit Beck prior to restoration.

Project aims

Prior to restoration the downstream section the Whit Beck had stone walls on both banks. In parts this was beginning to fail and it was recognised that this would continue to increase without intervention. It was also observed that failure was being exacerbated by a noticeable increase in the size and frequency of large bank fall size events exerting significant structural forces on the wall. Full failure would have eventually resulted in uncontrolled flooding of farm land. An opportunity was therefore, identified for restoration at this site that would remove the risk of current bank protection failure, together with potentially increasing the bed habitat for all stages of a fish lifecycle.

The aspirations of the project from a WCRT perspective were therefore:

- To move the beck from its current constrained site.
- Enable more reconnection to the floodplain thus achieving some modest flood attenuation.
- Increase the length of the beck and thereby reducing the gradient to provide opportunity for a wider variety of habitats to form (i.e. increase from 350m to 1205m).
- Design a restoration scheme able to work with in-channel river processes to form habitats for all life cycle stages of fish (especially Lamprey and Atlantic Salmon).
- Encourage the development of aquatic plants that prior to the restoration struggled to establish in the unnaturally high sloped downstream section of the Whit Beck.
- Plant bank side trees to support a new wildlife corridor.
- Set fencing back from the new river to provide for some natural regeneration of vegetation and prevent animal poaching.

From the perspective of the landowners and farmers the primary aim was to design a river option that would reduce the impact of complete failure/breaching of the existing walled beck whilst also increasing the habitat mix within the beck.

In contrast the overall ambition of the CRRS was to deliver a number of totally natural-processed based river restoration projects across Cumbria in partnership with the various Rivers Trusts.

Implementation

In the context of a heavily engineered river system where farm land, along the valley floor, is at a premium for both livestock farming and associated fodder crops, this project required significant input and discussion with the various interested parties. The WCRT had already cemented a strong partnership with the landowners. This relationship enabled the WCRT to incentivise the local stakeholders (both land owners and the local community driven Melbreak Partnership) to agree to the scheme voluntarily. All parties recognised that the existing Whit Beck walled section had a high risk of future failure. This concern provided the opportunity to open discussion. The initial scheme put forward by Jacobs (2010) (see Figure 6) recommended a route that bypassed the Whit Beck on the right hand side. However, during discussion with the stakeholders it became apparent that this field was one of the prime sites for farming: the risk associated with digging a more natural channel through

this area was deemed too great for the owners and tenant: out of bank flooding at the wrong time, could have had a significant negative impact on both livestock and fodder crops related to both flood water and sediment deposition with significant consequences for livelihood. Furthermore, setting back fencing alongside of the river corridor would have meant too much land becoming unusable for farming. As a result options on the left bank were discussed. Overall the investigations, design, planning and construction took two years. Carrying projects over two years has financial risks (guarantee of funding and procurement rules).

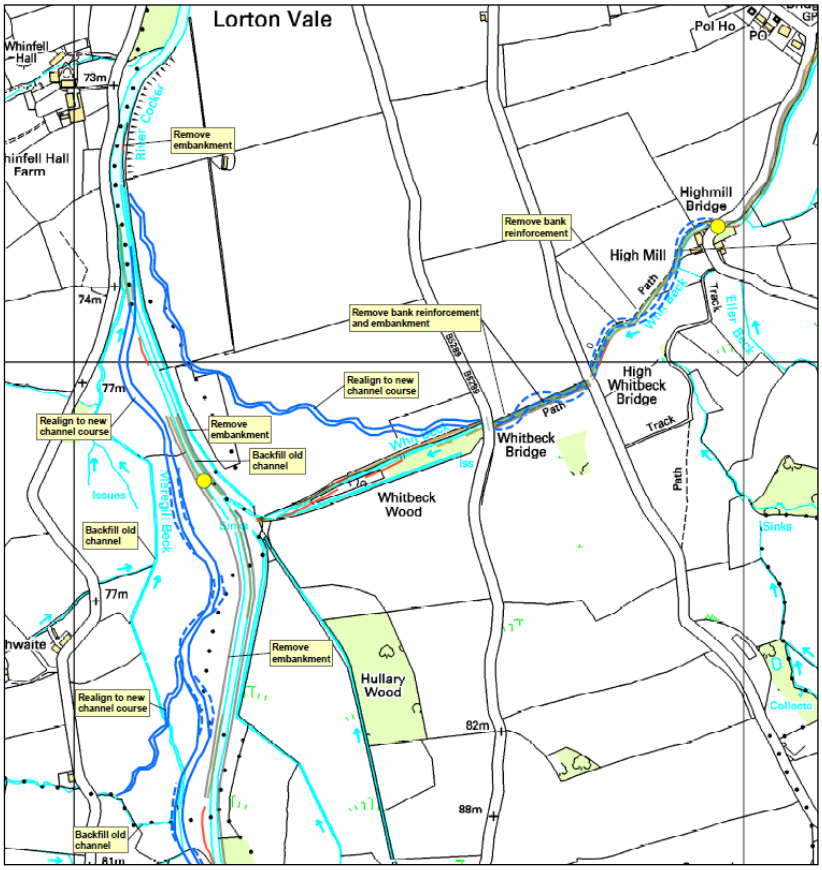

Figure 6: Diagram showing initial proposed restoration through right hand field (Jacobs 2010).

The project, which the WCRT recognised represented an ambitious project for them, took two years to agree, consent and design. Typically, 18 months to a two year window is required to get to the point where construction could commence, this is governed by a range of hurdles that need to be overcome. Many are related to standard design and construction formalities, but in the context of this pilot project, there were significant other areas that needed careful consideration. For example (but not exhaustive) these included:

- **Consents** not only related to EA flood consents but more specifically related planning permission from the Lake District National Park for whom this was a major variation on their normal practice.

- Understanding the **Ownership** of land especially where multiple owners and/or where vested interest from third party (pension funds) and the impact in terms of access and associated costs.

- **Liability/legal agreements** with for example the management of the beck once handed back to the landowner, compliance with state aid rules, land licence agreements and construction contracts to protect all parties and the agreement of disturbance payments as and when necessary.
- **Constraints and compromises** related to for example, route of new beck, footpath closures/ diversions, services (two main trunk water mains in this case) etc., and the need for landowners to be satisfied they understood the impact of the project.

Subsequently construction was completed during the summer of 2014 over a four month period. Ideally, however, the WCRT would have preferred an opportunity to allow time for the newly dug channel to naturalise and provide some natural stability along the banks from the vegetation. Because of the funding time line restrictions this was not possible. This issue is one that is not just related to the WCRT streams, but is often muted as a preferred option especially in high energy or mobile bed situations.

Design

Unlike some of the other restoration projects in Cumbria, this project was carried out in agreement with the land owners and farmers on the understanding that the new project would not only increase river habitats and natural river processes but would also remove the concerns related to the failing wall. No agreed action would have resulted in complete failure of the current alignment of the beck at some time in the future. This large scale project was used to demonstrate an opportunity to increase habitat quality, whilst also mitigating future maintenance costs and reducing flood risk on higher premium land by sacrificing some less productive marginal areas. Additionally the design incorporated both a vehicle crossing for farm traffic and a stock bridge, thus supporting the local farming needs.

Because of the perceived risks the approach used was to follow more traditional engineering principles than some of the other Cumbrian schemes. A local civil engineering firm (Burgess Roughton) with an excellent track record in designing roads, bridges, flood alleviation projects etc., but more limited understanding of natural river processes were commissioned to design the project. The work was then carried out by IT Shaws Ltd Civil Engineering Contractors again a company will little knowledge of large scale natural-process driven restoration projects. It is, however, understood that in this case, these companies were chosen because they were both relatively local thus providing benefits to the local economy and significantly cheaper than the big national companies/ consultants would have been. Furthermore, it was felt that being local they were keen to uphold their reputation and therefore more likely to work with the land owner to ensure land was left useable (e.g. being aware of the farming impacts of churning up fields during bad weather).

The new channel design and construction was sized to take account of what were expected to be naturally occurring bank fall events with occasional flooding onto the surrounding land once in every two years. The channel was lined with a mixed substrate of graded river gravels/cobbles/boulders (from a wash out area adjacent to the River Liza). The original confluence with the River Cocker was sealed off and stabilised using existing in situ stone at the toe. Excavated materials were used to make up the bank, top soiled and seeded.

The aspiration was that the river's natural processes would rework the substrate in the channel. Some of the larger boulders were also placed along the toe of the banking where the channel was diverted to provide protection and to reduce the potential for excessive movement of the channel because of the perceived risk and the land owners concerns over excess bank erosion. The new channel was fenced a significant distance from the bank edge to allow for some movement of the new channel, to create a riparian corridor and to ensure there was sufficient distance (should excessive bank erosion occur) between the Whit Beck and the River Cocker where they run parallel to each other.

One of the key concerns about this project has been related to the two mains water pipes in the left hand field. Clearly, due to the angle of the river and the steepness of the bank (because of its necessary location to enable the project to go ahead) the outside of the bend near the pipeline was always at risk of eroding.

However, because of the overall vision of the Cumbrian River Restoration Strategy (i.e. natural river restoration) no bank projection along this section was originally consented. This resulted in a subsequent requirement to review this section post construction and review options to repair and stabilise the bank when the pipe became threatened. Discussion about the repair of this section is outside the remit of this report. The significant constraints imposed by landuse and utilities, resulted in a river channel being designed that does not fully follow its natural line with respect to its location and trajectory. Whilst natural process and improved habitat features are very evident within the confines of the channel this project, it cannot be seen as delivering a fully functioning natural river-process driven project for its entire length. It should, however, be noted that the landscape here is so modified that original locations for rivers and becks are difficult to identify, making the risk associated with this project higher than others within the Cumbria area (see Figure 7).

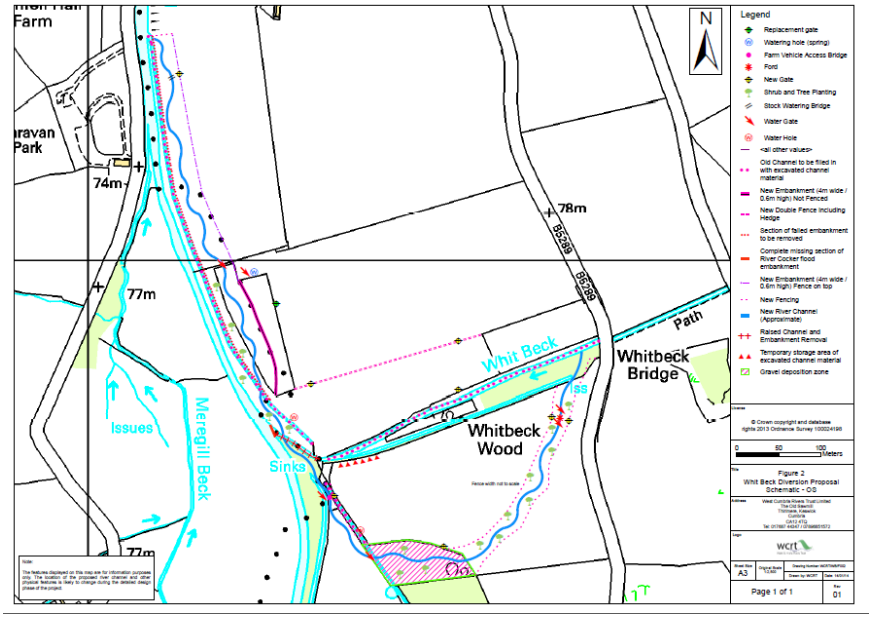

Figure 7: Final approximate route of the river restoration in a very modified river landscape (WCRT).

Cost

The funds for this project were specifically earmarked for river restoration projects and could not be used in flood alleviation works (Lorton experienced large scale flooding in 2005 and 2009). Once this fact was established, the community showed a keen interest and supported the project. Public presentations and site visits were well attended.

Table 4: Project costs for Whit Beck.

Action	**Cost (£)**
Planning/permits and disturbance and HLS payments, land agents, legal costs etc.	214000
Detailed design (including surveys)	26500
Ground work	310000
Bridges (2)	45000
Locally imported boulders and gravels	6000
Fencing	18000
Tree planting	3400
In kind (tree planting and support from Trustees during design/construction phase)	*51000*
Total (inc VAT) and including in kind work	**673900**

Monitoring and assessment

This project continues to be monitored. Some of this is being carried out by a PhD student at Aberystwyth University. He is focusing on channel evolution, but colleagues are also looking at aquatic invertebrate and the re-colonisation by fish. The outputs of this monitoring are not yet available. In contrast the WCRT have been carried out regular fixed point photography (24 sites), a macrophyte colonisation study, redd counting and assisting with the surveys by Aberystwyth University.

The fixed point photos have provided a good indication of the evaluation in-channel and the mobilisation of bed substrate. Habitats are clearly now more variable with macrophytes colonising the watercourse and there is evidence that the project has resulted in flow outside the channel with initial indications suggesting that this has had a direct impact on the village of Lorton downstream: anecdotal evidence has suggested that there was no flooding at the village during the November 2015 floods under rainfall and flow conditions that would normally have resulted in flooding within the village. See Figures 8 and 9.

A

C

Figure 8: Progress of change/out of bank flows November 2015 (up-stream of R. Cocker confluenc (A-C))

A

Figure 9: Downstream of confluence: change since completion. 9c shows section during November flows at downstream section (A-C)

Furthermore, twenty pairs of salmon, trout and sea trout autumn spawned in the reach in 2014 and a 50m single pass electric fishing survey found over 400 salmon and trout fry along with eels, lamprey and sticklebacks.

Lessons learned

Clear project objectives**:** From an overall CRRS perspective one of the key lessons learned is that of having clear objectives. In the case of the WCRT if this had been clear from the beginning of the project it would have provided a better opportunity to justify the rational for departure from a fully natural river restoration project. For example, the overall aim is to restore natural river process using no bank protection etc.; however, where there is risk to (for example a mains pipe) it is recognised that robust bio-engineering methods may be necessary at a small section to allow for the development of natural features elsewhere. For a partnership of this type to work well, objectives need to be strongly stated with recognition in the statements of what is acceptable where full scale natural process-driven river restoration is not feasible.

Benefits even where full natural process driven restoration is limited by local constraints: In the context of delivering a river restoration that has improved habitat and an opportunity to enhance these habitats through the work of natural process, this project has been successful. It has removed the concern about failure of the stone walled section and reduced flood risk downstream by increasing the available flood storage on the newly re-connected floodplain. The new channel is beginning to develop appropriate 'in channel' bed features, abundant marginal vegetation, macrophytes and has provided a new wide riparian strip and wildlife corridor along with new woodlands. If assessed in the context of a purely natural river restoration project this has not been delivered along its entire length, but nonetheless has delivered significant benefits and first steps towards getting farmers and landowners engaged in this type of work.

As outlined above this is a pilot project and one of the first of this size to be delivered in partnership with NE/EA in the Cumbrian area. There has undoubtedly been discussion about the value of this scheme from that perspective. Therefore the key lessons from this project are as follows:

- ***Negotiation with multiple stakeholders***: This can be a lengthy but essential process.
- ***Flexible funding:*** As a result estimating costs at the beginning of a project may not be valid two years later. This calls for more flexibility in funding, because of the long lead in time: something that is not currently feasible.
- ***Communication planning:*** There needs to be an excellent communication plan not only with respect to the steering groups but also the overall project board.

Monitoring and repeat photography: From the repeat photography and fish counts, it is clear that the project has had benefits for fish, wildlife corridors and flood management. The full details of these benefits will, however, take some time to evaluate. What is essential is that this evaluation continues over a longer time frame. The true benefit, or indeed difficulties that maybe encountered, may not become evident for another 10 years. As with all river restoration projects there needs to be an adequate time frame and ideally some large flow events before being able to really assess benefits.

Summary

- Clear objectives from the start of the Restoration Strategy would help with respect to understanding what can be achieved at a specific site.
- There are many multiple benefits to be gained even in more constrained sites. Not least that flood risk appears to have been reduced through this project and already additional ecological benefits have been identified.
- Negotiation with stakeholders can take a considerable amount of time, especially where there are multiple land owners and therefore ensuring that this is a well thought out communication plan will also be beneficial.
- Young and emerging Trusts often need support in terms of project budgeting and management. Providing standard report systems would help.
- Funding over multiple years would help provide a window of opportunity to stabilise river projects prior to transferring all water to new channel.
- The use of fixed photography to demonstrate success and maintenance issues has been shown to be highly effective.

3.4 River Gowan

Overview and funding

The River Gowan report provides a clear summary of project background, design and delivery. www.therrc.co.uk/sites/default/files/projects/river_gowan_embankment_removal_final.pdf. The project essentially comprised of bank lowering with the inclusion of some bio-engineering along more vulnerable bank sections. In contrast to the other three projects discussed within this report this was a relatively low cost, small scale scheme (around £31K in total, of which £11k was in-kind work). It is therefore, deemed unnecessary to reiterate the facts from the case study and instead this section will focus solely on the recommendations and lessons learned.

Monitoring

This was carried out mainly by the FBA during 2012 and 2013 to cover pre- and post- restoration surveys. It provided valuable information, detail of which can be gained from the ***SCRT***. The monitoring was comprehensive including mapping of habitats, substrate surveys, white-clawed crayfish, macroinvertebrate and botanical surveys. In essence, this indicated that both the white clawed crayfish and mixture of habitats had increased since the restoration scheme with both the overall ecology and geomorphology improving. The report however, does recognise that the monitoring is over a very short period and changes can sometime be a result of the initial disturbance. Nevertheless, the results are encouraging.

Lesson learned

Planning regulations: One of the significant elements identified in this project was the benefit of being able to use EA exemptions for planning regulations in the Lake District National Park area. This was especially beneficial in this situation where small scale flood improvements were one of the key drivers of the project.

Floodplain reconnection: Perhaps, however, in the context of the SCRT the key lesson to be learned is that whilst reconnection to the floodplain by lowering the banks is a positive approach, without wider restoration measures the benefit on the in channel habitats long term benefits in-channel are likely to

be limited: allowing the development of a more natural water course (i.e. more sinuous) would lead to more heterogeneity in terms of habits and hence species colonisation. Indeed the section targeted for river restoration was not a section initially highlighted within the Jacobs report (2010): other opportunities were identified where flood banks could be lowered in conjunction with encouraging natural in-channel river processes to develop. In future, if funds become available, the SCRT could learn from the successes and difficulties encountered within the other Cumbrian RT projects and set objectives to deliver large scale initiatives that deliver wider multiple objectives.

Partnership working and incentivising: In this case, the landowner was happy for the work to be carried out, but it would be useful for the SCRT to build on the experiences (especially of the WCRT) and focus on incentivising landowners with more opportunity to carry large scale restoration works even where they currently have some misgivings. This is both the challenge for and the forte of the RTs: it is where they can really contribute and add value to these partnership projects.

The need for photographic evidence to demonstrate floodplain reconnection benefits: Anecdotal evidence from NE suggests that the during the current (November 2015) high flow event, water was observed lying in the fields behind the left hand embankment. Conversely, where bank and bund lowering have been carried out, water that had been on the floodplain area had already receded. This is an excellent example of the benefits of lowering bunds along rivers to increase the benefits of reconnecting the floodplain. It is recommended that next time there is a large rainfall event a series of fixed point photos are taken over a few days from the road to demonstrate the multiple benefits of more natural flood management approaches.

Summary

- Lowering floodbanks can have benefits for flood management and better control of water on land.
- Reconnecting floodplains are a positive step, but allowing more in-channel river processes as well will provide increase ecological benefits over-time.
- Photographic evidence is essential to demonstrate what is happening especially during high flood events at this site.
- The RTs need to use their expertise to incentivise and encourage landowners to recognise the benefits of these projects: the Gowan should be used to encourage more ambitious approaches.

4. Conclusions and recommendations

It must be stressed that this ambitious partnership approach across Cumbria was a pilot project. Whilst the overall aim was to deliver naturally functioning river restoration the critical point to be made here, was the process of delivery (i.e. projects were funded and agreed with the EA and NE but delivered by the local RTs). One of the key rationales for this working practice was that it was recognised by the national agencies, that the local trusts not only had a vast amount of knowledge about the local area but had also already built up good relationships with local landowners. Their ability to discuss options with them and tenant farmers resulted in the necessary incentive and enthusiasm to go ahead with these ambitious projects: this was a critical and crucial element of the development of the individual schemes. Furthermore, the Trusts were generally well placed to carry out public engagement work, because of their local in depth understanding of local issues and concerns. On a practical note, this partnership also provided a mechanism for NE and the EA to carry out the type of schemes they were keen to champion: working through a 3rd party (in this case the RTs), enabled them to deliver schemes which otherwise they would not have been in the position to complete.

Other benefits of partnership working were identified and there was an aspiration that the Trusts could bring in match funding. Whilst this was not as successful as hoped (probably because of lack of resources) nonetheless, projects were successful in procuring CRF funding AND equally importantly resulted in securing a large amount of in-kind time (i.e. Trustees, volunteers and student monitoring). Cumulatively, between the four projects reviewed, this is estimated to be well in excess of £100,000.

As a pilot project however, there were a lot of lessons learned and these are recounted in the body of the text of this report and specifically highlighted in the summaries of each of the four restoration reviews and in the table in section 2.16 (Table 2) which is more related to the delivery process. What became clear however was that the complexity of these schemes resulted in significant challenges. For example, site choice is critical in determining how much compromise may be necessary related to the overall ethos of this project to delivery fully functioning natural-process driven restoration. Having clear overall project aims and some upfront decision about what is perceived as being acceptable to fund in this context would have helped with many of the design and consenting difficulties. Similarly, the approach would have been much clearer if all projects had set similar project objectives. Synergies and deviations from the original project's ambitions can then be identified and discussed at an early phase.

Construction and contractual issues were discussed at length throughout the whole process of this review. What is abundantly clear is that although there are some specific processes that should be adopted, the route taken will vary depending on the overall risk of the project (e.g. that related to flood management, land use and livelihoods etc.). Similarly, approaches to agreements with farmers will vary although, in all cases, the preferred method is to pass back the maintenance of the site to the landowner following restoration. The RTs can provide support and recommendations about the best future maintenance approaches and an understanding of what the individual land owners' agreements mean to them.

Unanimously, all RTs reiterated the frustrating constraints surrounding funding. Indeed funding (not only in terms of state aid rule regulations, compensation payments and project spend being restricted to one year etc.) caused unexpected difficulties throughout the project. In the context of this strategy, an exemption to state aid rule regulation was gained early on and covered the overall project beyond on year which was a great achievement for this project and all WFD projects across England. Without

other national changes in approach however, it is difficult to see how many of the problems can be resolved: river restoration is a very unique situation in terms of delivering habitat benefits and would provide much more scope for ambitious projects if government spending could be provided over a 2-3 year period alongside clear procedures to ensure funds are well and appropriately managed and used. As reiterated by more than one Trust the opportunity to dig a channel one year and allow full hydro-morphological functioning (i.e. allowance of a small flow only during the first year followed by full connection) the following year is predicted to be more beneficial in terms project delivery since this would allow time for natural channel stability to occur through vegetation colonisation.

Perhaps one of the key messages, however, has been the need for good communication not only through the development of the project board but also through the formation of individual steering groups. It has been clear, throughout this review process that this approach would have significantly helped with consent, design, delivery and management processes.

It is early days in terms of the completion of these project but the early signs are encouraging in terms of their development. Monitoring is being carried out on all projects, essential to provide an evidence base for the multiple benefits. Ideally, monitoring should be carried out over a number of years and this should include reviews of landowners' perceptions of the projects as well have the ecological and morphological elements. The use of fixed point photography has already been used to demonstrate morphological change within these sites and to identify any potential maintenance requirements. In addition together with anecdotal evidence a picture is beginning to be built around the additional benefits in terms of flood management.

This review process has aimed to piece together the various challenges and benefits of these large projects. This type of partnership is a new way of working for most Trusts and for NE and the EA. The outcomes have been aspirational and exciting. However, the challenges should not be underestimated when embarking on such projects. It is hoped that the experiences and the outcomes of this partnership scheme can be used to support the development and delivery of many more large scale ambitious natural-process functioning river restoration projects.

5. References

ERT (2014) -*River Eden River Restoration Strategy (RERRS)*. Thrimby Hall, River Leith and Meaburn Hall and Barnskew, River Lyvennet Summary Report (ERT technical report)

Hey, R. (2013) - *Design of River Restoration Scheme: Lyvennet Beck, Cumbria* (STREAMWISE technical report)

Jacobs (2010a) - *PSA3 Riverine SSSI Restoration Visions, River Eden Catchment* (Jacobs technical report B1284600/E01)

Jacobs (2010b) - *PSA3 Riverine SSSI Restoration Visions, River Derwent Catchment* (Jacobs technical report B1284600/E01)

Jacobs (2010c) - *PSA3 Riverine SSSI Restoration Visions, River Kent Catchment* (Jacobs technical report B1284600/E01)

JNCC (2005) *Common Standards to Monitoring Guidance for Freshwater Habitats and Species.* ISSN 1743-8160 JNC

Reid, H. (2013) - *Design of River Restoration of the River Leith at Thrimby Hall.* Report for the Eden Rivers Trust (EA technical report)

Appendix A: River Restoration Design/Construction

RESTORE Events: (abstract from event)

River Restoration Design and Construction

Date

July 13th 2011

LIFE 09INF/UK/000032

Topics discussed at event and key comments

Topics:

River restoration products ranging from bank protection that works with natural processes to in channel deflectors: their use and limitations (initial discussed by contractors);

Communication between contractors and consultants: managing expectations for stakeholders (initially discussed by contractors);

Rigidity of project design: interpretation between consultant/client and consultant/contractor (initially discussed by consultants);

Your design is only as good as your digger driver': understanding to translate design to implementation (initially discussed by consultants);

Project management and project planning: improving the process (initially discussed by client managers).

Discussion points:

Lack of appropriate contractors with relevant river restoration/WFD expertise;

Early Contractor Involvement (ECI) to streamline the river restoration process (i.e. ability to provide practical advice to the design and to understand the process).

Timescale slippage from lead in time, consents process (including waste), project management, transfer of money across year end, material availability etc.: what can be done to minimise the impacts?

Uncertainty and Risk: - lack of client managers' understanding of river restoration – leading to overdesigned projects and difficulty in delivering: who/how can we facilitate the reduction of uncertainty/risk/liability?

What tolerance is acceptable to river restoration materials and availability of products? Should we/can we produce standard specification of materials (what, where, when and how) to improve river restoration outcomes?

Key Issues identified from Event

Management

This was seen as a crucial element to the success of all river restoration projects and can manifest itself in many ways from stakeholders' expectations through to appropriate communication between project designer and contractor, no process followed to ensure consents are considered sufficiently early, through to no/limited site attendance from the project designer. If not managed efficiently, such elements can result in project delays and the inability to secure funding.

Delivery

This is often hampered by funding strands that is only provided for one year with no roll-over facility to the next. However, the consents and site investigations (soils/silt sampling, archaeology etc.) can also significantly delay

delivery. One of the most significant elements was that of early involvement of contractors to allow a smooth process from inception to delivery.

Specifications: A lack of standard specifications for products commonly used for river restoration projects often results in an inappropriate level of design (too little or too much) for the specific river type.

Understanding: Views were voiced that there was a lack of experienced project designers and client managers resulting in projects that are over engineered to take account of perceived risk rather than producing designs that can be flexible and include adaptive management principles to bring about a successful outcome. This is made more difficult to rectify due to limited guidance on the appropriate use of river restoration technique which could be increased through post- project audit management and programs.

Key Outcomes: There is a need for a clear mechanism to identify experienced river restoration contractors so that procuring the right services is straightforward and cost effective. To achieve this would need a river restoration/WFD accredited contractors' framework agreements within the EA and other procurement bodies (or could be a subset of existing ones such as the landscape or environment services frameworks or regional agreements). It would be necessary to lobby the Environment Agency Chief Executive and/or Head of Procurement to ensure appropriate questions are asked of contractors through interviews

Early contractor involvement is needed to mitigate the impacts of inexperienced river restoration project designers producing designs which are impractical, too risky or over engineered. As 'an art informed by science' any one project can be approached in a number of ways. When the designer and the implementer work together, evolving concepts, the outcome is likely to be better and more cost effective than when it lurches from one to the other. It could also result in cost reduction and smoother running of the project (i.e. translation of design to implementation).

Project funding that is set up to span financial years is currently limited. This presents problems in terms of any unforeseeable delays in the project (e.g. weather conditions) and often results in a need to deliver projects on-the-ground at times of the year that are not the best with respect to environmental or working conditions. To achieve a change in this approach, it would first be necessary to collect evidence to justify the limitations that are currently imposed by such a system and suggest mechanisms to ensure that any longer funding initiative remain effectively monitored. This requires government and policy maker lobbying.

There is still a high level of uncertainty and risk associated with river restoration projects. In part, this could be reduced by ensuring there a strong project manager with an overarching understanding all river restoration associated elements. Some projects which are externally funded do not include provision for remedial work and hence are over-engineered to try and mitigate for the need for additional works for which there would be no funding. Ensuring that all stakeholders appreciate the value of robust river restoration design and making funding allowance for post project remediation would reduce these uncertainties.

For many of the common river restoration products there are no/limited standard specifications or where they exist guidance is not necessarily available to end users. Examples might include the specification of specific materials (e.g. how old should a coir roll be/where should it be stored etc.) through to how to understand the mechanisms related to how to deal with spoil and associated land drainage issues.

Appendix B: CRF Application for interim payment of grant

Note: For more information contact Jerry Gallop (Environment and Business manager, Environment Agency)

Catchment Restoration Fund for England – Application for interim payment of grant

- A separate form must be completed for each project.
- Please send the completed form to the Environment Agency at the address below:
- Business Finance – Grants Administration Team
Environment Agency
Manley House
Kestrel Way
Sowton
Exeter
EX2 7LQ
- Alternatively, email it to CRFfinance@environment-agency.gov.uk
- If you are not sure about anything in this form, contact the person who sent it to you or phone us on 01392 442 002.
- Application forms for interim payment may be sent by email attachment; an electronic signature will be accepted. If electronically unsigned, a signed paper copy should be sent by post.
- If changes are required to your organisation's bank details, these should be notified by letter to the Head of FCERM and Business Finance.
- Contents

Project details

Name of organisation

Name of project

Scheme number notified by the Environment Agency

Date work commenced (DD/MM/YYYY)

Estimated date of project completion (DD/MM/YYYY)

Certificate of the organisation

For completion by Project Manager or Finance Manager.

It is certified that:

- the particulars given below are correct;
- the expenditure has not been and will not be the subject of any other claim from other funding bodies;
- the conditions set out in the Catchment Restoration Fund (CRF) Grant Conditions and the CRF Guide relating to grants are being observed.

Application is hereby made on behalf of the organisation for an interim payment of grant in respect of this project.

Claim Number	Financial Year	Budget allocated in this financial year

Particulars	Date (DD/MM/YYYY)	£
Approved cost of the project (including all approved variation orders; excluding any matched funding)		
Grant eligible expenditure up to and including your last claim		

Grant claim	£
(a) Total grant eligible expenditure (from start of project) to the date of this claim (as set out in appendix 1)	
(b) Estimated expenditure for the next three months from the date of this claim (not to extend beyond the end of the current financial year)	
(c) Total grant eligible expenditure now claimed (a + b)	

Grant rate		Grant rate x Total grant eligible expenditure now claimed (c)	
		Less : Grant already received (prior to this claim) (d)	
		* CRF grant claim on this CRF3 (e) = (c – d)	

*Please provide all supporting evidence for this claim

The Data Protection Act 1998

We, the Environment Agency, will process the information you provide so that we can:

- deal with your application;
- make sure you keep to the conditions of the licence, permit or registration;
- process renewals; and
- keep the public registers up to date.

We may also process or release the information to:

- offer you documents or services relating to environmental matters;
- consult the public, public organisations and other organisations (for example, the Health and Safety Executive, local authorities, the emergency services, the Department for Environment, Food and Rural Affairs) on environmental issues;
- carry out research and development work on environmental issues;
- provide information from the public register to anyone who asks;
- prevent anyone from breaking environmental law, investigate cases where environmental law may have been broken, and take any action that is needed;
- assess whether customers are satisfied with our service, and to improve our service; and
- respond to requests for information under the Freedom of Information Act 2000 and the Environmental Information Regulations 2004 (if the Data Protection Act allows).

We may pass the information on to our agents or representatives to do these things for us.

Declaration

Without prejudice to any other rights and remedies of the Environment Agency, a false or inaccurate statement can lead to loss of entitlement and recovery of any payments made.

I declare that as far as I know and believe the information in this application is true. I understand that this application may be refused, or approval withdrawn, if I give false or incomplete information.

Signature	

Name (in BLOCK LETTERS)

Title (Mr, Mrs, Miss and so on)	
First name	
Last name	

Organisation	
Position	

Contact numbers, including the area code

Phone	
Fax	
Mobile	
Email	
Today's date (DD/MM/YYYY)	

For Environment Agency use only

Comments		
Signature		
Name		
Title (Mr, Mrs, Miss and so on)		
First name		
Last name		
Position		
Date (DD/MM/YYYY)		
Claimed (e)	£	
Less ineligibles (f)	£	
Recommended (g) = (e – f)	£	

Appendix C: Landowner agreements: E- and WC- RTs

EXAMPLE FROM ERT

Eden Rivers Trust

Dunmail Building

Newton Rigg College

Penrith, Cumbria CA11 0AH

Tel: 01768 866788

River Restoration Agreement:

Landowner:

Tenant:

River:

Location:

Grid Reference:

The terms and conditions of this Agreement, as set out below, form a binding contract only when signed by all parties and dated in the space provided.

Parties

This Agreement is made between:

Name:

Of:

Who is the **Owner** of the land described in Clause 2, and:

Name:

Of:

Who is the **Tenant** of the land described in Clause 2, and:

Name:

Of:

Description of the land

This Agreement relates to the following land:

Farm/Field:

Parish:

Location: The area of the Agreement is depicted by the crosshatched area outlined on the attached map (Annex 1), with more detailed plans for the river course depicted in Annex …….

This Agreement outlines the management of land at ……

Start date and period of the Agreement

Start date:

Period:

End date

Owner's/Tenant's Obligations

To enter into this agreement the **Landowner and Tenant** will:

a. Establish their right to enter into the agreement.
    i. For the Landowner: a copy of the Land Registry certificate of ownership, or, where unregistered, other satisfactory evidence.
    ii. For any Tenant: a copy of his tenancy agreement (to make sure he is the legal tenant, that the tenancy includes the land upon which the work is to be carried out and to evidence that the term covers the period of the agreement) and a letter of consent from the Landlord.

b. consent to restoration of the River Lyvennet to its former course as detailed on maps (Annexes 2 & 3);

During the period of this agreement the **Tenant** will:

c. allow the formation of natural erosional and depositional channel characteristics within the restored river reach;

d. consent to installation of river-side buffer fencing along the reinstated course (set back from the bank top by a minimum of 5m, and minimum of 10m on the outside of bends) to exclude livestock from the river and its banks;

e. maintain the fencing and associated works in stock proof condition for the period of this Agreement, promptly carrying out and paying for minor repairs, such as the replacement of a broken post, re-tensioning of wires, replacement of staples, etc.;

f. promptly remove any stock which gain access to the fenced buffer strip, to prevent degradation of the riparian area and reduce the potential for accelerated rates of erosion;

g. not allow the removal of, or changes to any fence or improvement works which is subject to this Agreement without the prior approval of ERT or its successor and, if no longer in existence, the Environment Agency, (such approval not to be unreasonably withheld) who in the event may require the repayment of all or part of any related capital costs;

h. in the event of any large scale damage to the site by flooding or otherwise, inform Eden Rivers Trust or its successor and, if no longer in existence, the Environment Agency, before undertaking any remedial work to the river bed, banks or channel, so that the issue can be appropriately assessed and a mutually amicable solution devised. In this eventuality, the tenant will not be responsible for the cost of reinstating the fence;

i. agree locations and consent to planting of native broad leafed species within the buffer strip;

j. subject to reasonable prior notice, grant ERT personnel and their agents, as well as representatives from any other grant giving organisation, access at to the site;

During the period of this agreement the **Landowner** will:

k. consent to installation of a bridge over the reinstated river course to provide passage over the River Lyvennet for farm and forestry machinery, and livestock;

l. assume all future liability and maintenance for the bridge upon its completion.

Disposal of interest in the land

a. before disposing of any interest in the land (for example by selling, letting or granting a licence), inform anyone proposing to acquire the interest of the existence of this Agreement and notify the ERT, or its successor and, if no longer in existence, the Environment Agency, in writing as soon as possible before any transaction takes place. The Owner and or Tenant will indemnify ERT for any loss (including any reclaim of grant) arising from the disposal of the interest in the relevant land and/or from the subsequent non-compliance with the terms of this Agreement.

Eden Rivers Trust Obligations

During the period of this Agreement **Eden Rivers Trust** will:

a) obtain all relevant consents, permissions and licences for the proposed works, prior to their undertaking;

b) manage river realignment works and other operations in accordance with the plan and referred to in Annex 1;

c) upon restoration and reinstatement of the old channel; backfill the then redundant channel, using materials won through the works, and

undertake limited bank re-grading, re-turfing and re-seeding as appropriate;

d) appoint and manage contractors to install small vehicle and stock passage bridge (at location, and to specification agreed by all parties) over the River Lyvennet. The Trust shall use reasonable endeavours to enforce the Building Contractor's obligations under the Building Contract to remedy any defects or faults appearing in the Works during the Rectification Period;

e) undertake tree planting at locations agreed with landowner and tenant;

f) agree timing of the works with the landowner and tenant;

g) cover any costs associated with changes to Rural Land Registry Parcels arising from the river realignment work.

Payment

h) payment for temporary disturbance to farming practice during the channel restoration works will be payable to the **Tenant** by the Environment Agency; 50% shall be payable prior to commencement of the works with the remainder payable upon completion;

i) Eden Rivers Trust / The River Restoration Project shall pay for the full capital cost of the project that are not covered by the tenant's Higher Level Stewardship Agreement.

SIGNED BY THE OWNER:

Signature:……..

Name:……

SIGNED BY THE TENANT:

Signature:……

Name:……

SIGNED FOR AND ON BEHALF OF THE EDEN RIVERS TRUST BY:

Signature:……

Name:……..

Dated:.....

EXAMPLE FROM SCRT

DATED **2013**

(1) **[ ]**

(2) **[ ]**

LICENCE AGREEMENT

re River Restoration Project

at

[ ]

---

baines wilson LLP

2 Merchants Drive
Carlisle
Cumbria CA3 0JW
DX 741450 Carlisle 10
Tel: 01228 552600
Fax: 01228 549560
Ref:

CONTENTS

THIS LICENCE AGREEMENT is dated [ ]

PARTIES

(1) [ ] of [ ] ('the Owner/Tenant) and

(2) [ ] whose registered office is at [ ] ('the Trust')

BACKGROUND

(A) The Trust is collaborating with Natural England and the Environment Agency in the implementation of a River Restoration Strategy which involves the re-naturalisation of river stretches, the reinstatement of meanders in straightened sections and/or the removal of flood banks and bank modifications to reconnect a river with its flood plain.

(B) As part of the River Restoration Strategy and as a demonstration project for the River the Owner has agreed to enter into this Agreement with the Trust, to enable the Works to be carried out upon the terms set out below.

6. Definitions and Interpretation

6.1 In this licence the following expressions shall have the meanings respectively assigned to them:

"Approved Documents": All plans, specifications, drawings, engineering calculations, flood risk assessments, bills of quantity and data for the Works in the agreed form [annexed to this agreement] including (where applicable):

(a) any variations or amendments that may be agreed by the Owner and the Trust from time to time in accordance with clause 3.4; and

(b) any minor variations permitted under clause 3.5;

"CDM Co-Ordinator": such person as may be appointed for the time being by the Trust to be the CDM Co-Ordinator for the purposes of the Project and the CDM Regulations;

"CDM Regulations": the Construction (Design and Management) Regulations 2007;

"Civil Engineering Contract": a civil engineering contract to be entered into between the Trust and the Civil Engineering Contractor for the carrying out of the Works;

"Civil Engineering Contractor": such suitably experienced and competent civil engineering contractor as may be appointed by the Landlord to carry out the Works together with any replacement civil engineering contractor that may be appointed by the Landlord in accordance with the terms of the Civil Engineering Contract;

"Client": the client as defined by the CDM Regulations;

"Compensation":

"Contract Administrator": [ ] of [ ] or such other person as may be appointed as a replacement contract administrator for the time being by the Trust in relation to this agreement and the Civil Engineering Contract;

"Deed of Covenant": a deed of covenant in favour of the Trust containing covenants in the same terms as those given by the Owner in clause numbers [6.1, 6.2 and 6.3] of this Agreement with such reasonable modifications as the parties may agree, such agreement not to be unreasonably withheld or delayed;

"Disposal":	assent or transfer;
"Health and Safety File":	the health and safety file required by the CDM Regulations;
"Plan A":	means the plan annexed to this Agreement and marked Plan A;
"Planning Acts":	the Town and Country Planning Act 1990 and any other present or future Act relating to town and country planning and any Act amending or re-enacting those Acts;
"Practical Completion Date":	the date stated in the Practical Completion Certificate;
"Practical Completion Certificate":	the Contract Administrator's certificate or written statement issued in accordance with the Civil Engineering Contract certifying that the Works are practically complete according to the terms of the Civil Engineering Contract and setting out the date on which practical completion occurred;
"Property":	the property described in Schedule 1;
"Property":	the property at [ ] as more particularly defined in Schedule 1;
"Rectification Period":	the defects liability period or rectification period for the making good of defects or faults in the Works under the Civil Engineering Contract;
"Requisite Consents":	the planning permissions, building regulation consents, by-law approvals, and any other consents, licences and authorisations required from any competent authority, statutory undertaker or person for the carrying out of the Works;
"Restricted Period":	the period commencing on the date of this Agreement and ending on the expiry of the period referred to in clause 6.1(b);
"Rights":	the rights granted to the Licensee in Schedule 3;
"River":	means the [ ];
"SWMP Regulations":	the Site Waste Management Plans Regulations 2008;
"Target Date":	[ ] (as may be extended in accordance with clause 3.2);
"The Project":	a scheme for the restoration and re-naturalisation of a stretch of the River flowing through the Property by the carrying out and completion of the Works;
"The Works":	the works to be carried out on the Property in accordance with the terms of this Licence Agreement and more particularly described in Schedule 2 and the Approved Documents.

6.2 Words importing only the singular number include the plural number and vice versa and the masculine includes the feminine and neuter.

6.3 Any reference to an Act of Parliament shall include any modification extension or re-enactment of it for the time being in force and shall also include all instruments orders plans regulations permissions and directions for the time being made issued or given under such Act or deriving validity from it.

6.4 Any reference in this licence to any charge fee cost expense or payment whatever shall be deemed to include a reference to any VAT levied thereon or on anything in respect of which such charge fee cost expense or payment is made save where and to the extent such sum is recoverable by the Owner.

6.5 Where the consent approval or agreement of either party is required under this licence or something is required to be done to the satisfaction of a party there shall be implied (unless specifically otherwise provided) a qualification that such consent approval or agreement shall not be unreasonably withheld or delayed and that such party must act reasonably in determining and giving notice of whether he is satisfied.

6.6 Any obligation in this Agreement on a person not to do something includes an obligation not to agree or allow that thing to be done.

6.7 The paragraph headings are inserted for reference purposes only and do not form part of this licence.

7. Grant of Licence

7.1 In consideration of the Compensation (receipt of which the Owner acknowledges) and of the obligations on the part of the Trust contained below the Owner consents to the Trust carrying out the Works on the terms set out in this Licence, and grants to the Trust the Rights.

8. Trust's Obligations

8.1 The Trust shall apply for and use reasonable endeavours to obtain the Requisite Consents. The Trust shall enter into the Civil Engineering Contract once the Requisite Consents have been obtained.

8.2 The Trust shall use reasonable endeavours to procure that the Practical Completion Date occurs by the Target Date which shall be extended commensurate with any extension of time:

(c) allowed by the Contract Administrator under the terms of the Civil Engineering Contract; and/or

(d) certified by the Contract Administrator as being fair and reasonable, having regard to the delay in question, where completion of the Works is delayed due to an event or cause that is beyond the Trust's control.

8.3 The Trust shall use reasonable endeavours to procure that the Works are carried out:

(e) with due diligence and in a good and workmanlike manner;

(f) using only good quality materials and well-maintained plant;

(g) in accordance with this agreement, the Approved Documents and the Requisite Consents;

(h) in accordance with all statutory or other legal requirements and the requirements of the local authority or statutory undertakings;

(i) by selecting and using materials so as to avoid known hazards to the health and safety of any person.

8.4 The Trust shall not, (subject to clause 3.5), vary, alter, add to or remove anything from the Approved Documents without the Owner's consent (such consent not to be unreasonably withheld or delayed).

8.5 The Trust may make minor variations to the Approved Documents without the Owner's consent provided that:

(j) the variations are insubstantial and immaterial;

(k) the variations are in accordance with the Requisite Consents and any statutory requirements; and

(l) any substitute materials used are of an equal or better quality and suitability to those originally specified.

8.6 The Trust shall use reasonable endeavours to procure that the Contract Administrator:

(m) gives at least 5 working days' notice to the Owner of the Contract Administrator's intention to inspect the Works for the purpose of issuing the Practical Completion Certificate and allows the Owner to attend the inspection and make representations either during the inspection or in writing immediately thereafter; and

(n) without fettering the discretion of the Contract Administrator in carrying out duties under the Civil Engineering Contract, takes proper account of any representations that are made in accordance with clause 3.6(a) when considering whether to issue the Practical Completion Certificate in accordance with the terms of the Civil Engineering Contract.

8.7 The Trust shall use reasonable endeavours to procure that the Contract Administrator gives a copy of the Practical Completion Certificate to the Owner as soon as practicable after its issue.

8.8 The issue of the Practical Completion Certificate shall be conclusive evidence binding on the parties that the Works have been completed in accordance with the terms of this agreement, subject to the Trust's obligations during the Rectification Period.

8.9 The Trust shall use reasonable endeavours to enforce the Civil Engineering Contractor's obligations under the Civil Engineering Contract to remedy any defects or faults appearing in the Works during the Rectification Period.

9. Insurance

9.1 From the date of this agreement until the Practical Completion Date, the Trust shall insure or shall procure that the Civil Engineering Contractor insures, the Works and all plant and unfixed materials and goods delivered to or placed on or adjacent to the Property and intended for incorporation in the Works against all perils resulting in loss or damage thereto on customary contractors' all risks terms for not less that their full reinstatement value (taking into account the progress of the Works) together with all site clearance and professional fees incurred in connection with such reinstatement.

9.2 In the event of any loss or damage occurring before the Practical Completion Date to the Works, plan, materials or goods so insured, the Trust shall procure that their reinstatement or replacement is carried out diligently and with all reasonable speed. The Trust shall apply the proceeds of the insurance towards such reinstatement or replacement.

9.3 The Trust shall maintain, or procure that the Civil Engineering Contractor maintains, insurance in respect of injury to or death of any person or loss or damage to any real or personal property for an indemnity of not less than £[ ] for any one occurrence or series of occurrences arising out of the same event. Such insurance shall be maintained from the date of this agreement until the end of the Rectification Period.

9.4 The Owner and the Trust mutually agree not knowingly to do or permit anything to be done that may render any insurance policy void or voidable.

10. Title

10.1 The Owner's [Freehold] title to the Property has been deduced to the Trust before the date of this Agreement [and commences with **].**

11. Owner's Obligations

11.1 The Owner covenants with the Trust:

(o) not to interfere with, interrupt or impede the carrying out of the Works on the Property, and

(p) during the period of [ ] years following [the completion of the Works] [the Practical Completion Date] not to remove, alter, modify or undo any of the Works (as finally completed).

11.2 The Owner covenants with the Trust, with the intention of binding the Property and each and every part of it, not to make any Disposal of the whole or any part of the Property at any time during the Restricted Period without first procuring that the disponee enters into a Deed of Covenant with, and supplies the same to, the Trust.

11.3 The Owner consents to the entry of the following restriction against the Owner's title to the Property at the Land Registry and shall provide the Trust with all necessary assistance and/or documentation to permit entry of the restriction:
"No disposition of the registered estate (other than a charge) by the proprietor of the registered estate is to be registered without a certificate signed by [the Trust] of [ ] or their conveyancer that the provisions of clause [6.2] of [the Licence Agreement] have been complied with."

11.4 The Trust covenants with the Owner and its successors in title that, immediately upon receipt of a Deed of Covenant properly executed by the person to whom a Disposal is being made, the Trust shall provide a certificate consenting to the registration of that Disposal at the Land Registry.

12. The CDM Regulations and SWMP Regulations

12.1 The Trust elects to be treated for the purposes of the CDM Regulations as the only Client. The Owner agrees with such election by the Trust.

12.2 The Trust agrees to undertake all the obligations of a Client and to use all reasonable endeavours to ensure that the Works are carried out in accordance with the CDM Regulations.

12.3 Before commencement of the Works, the Trust shall ensure that the Works are properly notified to the Health and Safety Executive in accordance with the CDM Regulations and shall give the Owner a copy of the notification and any acknowledgement from the Health and Safety Executive.

12.4 The Trust shall use all reasonable endeavours to ensure that the CDM Co-Ordinator and Civil Engineering Contractor each comply with their respective obligations under the CDM Regulations.

12.5 The Trust shall ensure that the CDM Co-Ordinator and Civil Engineering Contractor are both promptly:

(a) supplied with all relevant information required under the CDM Regulations; and

(b) notified of any changes relating to the Project which may have any effect on their responsibilities or

duties under the CDM Regulations.

12.6 The Trust shall use all reasonable endeavours to ensure that the Civil Engineering Contractor complies with its obligations under the SWMP Regulations**.**

13. Acknowledgement and Agreement

13.1 The Owner acknowledges and agrees that:

(q) the Project is inherently innovative and experimental, and therefore the consequences of its completion will be unpredictable;

(r) the completion of the Project may result in an increased incidence of flooding, there may be ongoing bank erosion and deposition of gravel and other material on land in the vicinity of the River, and over time the River may change its course;

(s) the Owner has had the opportunity to inspect and examine all of the documents, reports and calculations relevant to the Works, has accepted the risks of the Project, and has entered into this Agreement of his own free will and after having had the opportunity to take independent legal advice; and

(t) in entering into this Agreement, the Owner does not rely on and shall have no remedy and the Trust shall have no liability in respect of any statement, representation (unless fraudulent), warranty, collateral agreement or other assurance (whether made negligently or innocently) of any person

13.2 It is hereby agreed and declared that:

(u) those elements of the Property that are altered or affected as a result of the Works (including any structures that have been constructed, moved or modified as part of the Works) shall be the responsibility of the Owner with effect from the Practical Completion Date, and thereafter (save in relation to the Rectification Period) the Trust shall not accept or have any responsibility or liability either for any maintenance works or costs in relation to the Project once completed, nor for any costs relating to any future replacement or renewal of any element of the Works; and

(v) neither the Trust, nor its workers, contractors, agents or professional advisors shall be liable to the Owner or other occupier of or person at the Property for any loss, damage, injury, nuisance or inconvenience arising by reason of its exercising any of the Rights

14. Limitation of Liability

14.1 This clause 9 sets out the entire financial liability of the Trust (including any liability for the acts or omissions of its employees, agents, consultants and subcontractors including, without limitation, the Civil Engineering Contractor and the Contract Administrator) to the Owner in respect of:

(w) any breach of this licence however arising;

(x) any use made by the Owner of the Works or any part of them; and

(y) any representation, statement or tortious act or omission (including negligence) arising under or in connection with this licence.

14.2 All warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from this licence.

14.3 Nothing in this licence limits or excludes the liability of the Trust:

(z) for death or personal injury resulting from its negligence; or

(aa) fraud or fraudulent misrepresentation.

14.4 Subject to clause 9.2 and clause 9.3:

(bb) the Trust shall not under any circumstances whatever be liable for:

i. loss of profits; or

ii. loss of business; or

iii. loss of goods; or

iv. loss of use; or

v. any special, indirect, consequential or pure economic loss, costs, damages, charges or expenses; and

(cc) the Trust's total liability in contract, tort (including negligence or breach of statutory duty), misrepresentation, restitution or otherwise arising in connection with the performance or contemplated performance of this licence shall in all circumstances be limited to [£]

15. Disputes

If any dispute arises between the Owner and the Trust arising out of this agreement the dispute shall be referred (in the absence of any express provision to the contrary) to an arbitrator appointed jointly by the Owner and the Trust. If the parties cannot agree on the arbitrator's identity the arbitrator shall be appointed on either party's request by the President for the time being of the Chartered Institute of Arbitrators. The arbitrator shall act in accordance with the Arbitration Act 1996 and the costs of the arbitration shall be payable by the parties in the proportions determined by the arbitrator.

16. Force Majeure

16.1 A party shall not be in breach of this agreement nor liable for any failure or delay in performance of any obligations under this agreement arising from or attributable to acts, events, omissions or accidents beyond its reasonable control, including but not limited to any of the following:

(dd) Acts of God, flood, earthquake, windstorm or other natural disaster;

(ee) nuclear, chemical or biological contamination;

(ff) terrorist attack, civil war, civil commotion or riots;

(gg) any law or governmental order, rule, regulation or direction, or any action taken by a government or public authority, including but not limited to failing to grant a necessary licence or consent;

(hh) adverse weather conditions;

(ii) interruption or failure of utility service, including but not limited to electric power, gas or water;

(jj) non-performance by suppliers or subcontractors; and

(kk) failure of plant machinery, machinery, or vehicles.

16.2 In such circumstances, the time for performance shall be extended by a period equivalent to the period during which performance of the obligations has failed or been delayed.

17. Entire Agreement

17.1 This Licence Agreement and any documents annexed to it constitute the whole agreement between the parties and supersede all previous discussions, correspondence, negotiations, arrangements, understanding and agreements between them relating to their subject matter.

17.2 Each party acknowledges that in entering into this Agreement and any documents annexed to it it does not rely on, and shall have no remedies in respect of, any representation or warranty (whether made innocently or negligently) other than those set out in this Agreement.

17.3 Nothing in this clause shall limit or exclude any liability for fraud.

18. Notices

Any notice required to be given under this licence shall be served by sending it in a prepaid letter by recorded delivery to the party concerned at his or its address as given in this licence or at such other address as such party may have notified in writing to the other parties for the purpose or by delivery. Any such notice will be deemed to be properly served at the expiration of 48 hours after the time the same was posted (and in proving such service it will be necessary to prove that the envelope containing the notice was properly addressed stamped and posted) or as the case may be at the time it was delivered.

19. No Partnership

Nothing in this Agreement is intended to, or shall be deemed to, establish any partnership or joint venture between the Owner and the Trust.

20. Third Party Rights

This licence shall not confer any rights on any persons who are not parties to it.

This document has been executed as a deed and is delivered and takes effect on the date stated at the beginning of it.

Schedule 1 **The Property**

Land at [ ] shown edged red on Plan A [and registered at the Land Registry with Title Number].

Schedule 3 The Rights

2. The right for the Trust to enter upon the Property with such plant machinery contractors workmen agents and professional advisors as may be necessary:-

   (a) to carry out and complete the Works, and

   (b) to inspect the Works and (if necessary) remedy any defects or faults appearing in the Works during the Rectification Period.

3. The right to store building materials on the Property for use in connection with the Works.

4. [Lay/connect into services?]

[Execution Clauses]

Appendix D: Summary of main river restoration permissions/issues

Note: Adapted from http://www.therrc.co.uk/RESTORE/How-to/Planning_Restoration_Advice_Note.pdf

Permissions[1]	General comments	Example documents
Flood Defence Consent	Some level of flood risk assessment is likely to be required as part of obtaining consent, so seeking guidance from the EA early on is key. The assessment should be proportionate to risk and does not always have to involve intricate modelling. At some sites it may be appropriate to use conveyance estimation (see link) which is a relatively simple way of checking the impact of the work on water levels. If more complex modelling is required, there may be an existing model that can be adapted. With increasing variability in flows due to climate change, the impact of restoration works on water levels may be disputed. Some level of modelling is therefore strongly recommended even if not required for consenting.	CES website
Planning permission and EIA scoping and screening	You should contact the local planning authority to find out if statutory Environmental Impact Assessment (EIA) and planning permission is required. River restoration is an unfamiliar area for many planners, so contact them early and provide as much information as possible to help them make a decision. Providing clear examples and documentation of other similar successful restoration projects or visits to existing and proposed sites are a useful way of explaining your plans. Where there is an Openreach service across land a wayleave (consent in writing) will be necessary to allow work to be carried out. If planning permission is required it will take 2-6 months to prepare the submission, and longer if formal EIA or Appropriate Assessment is needed. The statutory period for determination of the application is 8-13 weeks where no EIA is required, and 16 weeks minimum where EIA is required. However, planning applications often take longer, so it is crucial that you talk to the local planners early. Where permitted development rights are being used to implement restoration, this must be advertised a minimum of 30 days in advance on site and in local papers.	Planning Portal for England and Wales
Designated sites consent	Where river restoration is proposed on a site of national or European importance (SPA, SAC, Ramsar, SSSI) all works need written consent from the agency granting them. Permissions are subject to Appropriate Assessment, unless the work is undertaken for the purposes of conservation management of that site. The restorer will be obliged to provide sufficient information (in the form of a Habitat Regulations Assessment, HRA). It is useful to consult with Natural England, Countryside Council for Wales or Scottish Natural Heritage officer responsible for the site prior to starting any consent applications.	Guidance on planning law and nature conservation in England

Waste licences/ exemptions	Waste licencing has the potential to be complex, however, careful planning and choice of materials means you can design out many potential licencing issues. The choice of materials can affect what licences are needed and there are a number of exemptions available for “low risk” activities.	Waste regulation in England and Wales Simple waste exemptions
Felling licences and tree protection orders	A felling licence may be required from the Forestry Commission to cut down trees, with various exemptions related to the volume felled in any calendar quarter, diameter of trees for thinning or coppicing, health and safety concerns and provision of statutory duties. Where tree protection orders and conservation areas apply, permission from the local planning authority is also needed. Tree protection should be included in the EIA screening letter to planners. A landscape assessment provides a way of assessing the visual impact of felling works.	Forestry Guide to felling licences
Agri-environment derogation	The Rural Payments Agency and Natural England should be formally notified of any restoration project that affects agricultural land. If they are not notified in advance farm and scheme payments are at risk.	HLS derogation request
Protected species licences	If river restoration is for conservation rather than associated with development, a protected species licence should be obtained. If protected species are present contact Natural England for guidance early on.	Wildlife management and licencing
Landowner permission and consultation	You will need the landowner’s written permission to work on their land, and must formally notify them if applying for planning permission on land they own. Allow plenty of time to gain their support for the project aims, input to the designs, and a clear process for consulting them during the design and construction stage is vital. A long term management plan for the site should also be agreed. If there is possibility for an HLS scheme, a good point of contact is the local HLS officer.	
Maintenance strategy	A long-term maintenance strategy for the restoration site needs to be agreed by all project partners. This is often a written agreement between the project lead and the landowner which stipulates maintenance needs and responsibilities for the site, e.g. management of vegetation and fences.	
Community consultation	River restoration is a very visible activity and may affect areas or features that are highly valued by the local community. If it is a community led project there will be a lot of consultation, but even so it is important to identify all the people who may be concerned and keep them informed. All communication activities should be guided by a Communication Strategy, be agreed between all project partners and briefing notes should be provided so that standard responses can be given to any enquiries. All communications should then follow the strategy and public meetings and press releases appropriately timed.	

Public meetings, open days and press releases	Hold a meeting in the vicinity of the restoration site before work begins so that people can find out about their local river and the restoration and raise any concerns they have. It is important to talk about potentially contentious issues such as tree felling and approximate time it will take for construction works and for plants to regrow on any bare surfaces. Local press releases at the start and end of the works are another way to tell a wider audience what is happening. Reports and updates in relevant local newsletters also keep riparian landowners up to date. Inviting people to come and see the river after the restoration work is done is particularly useful where public access is usually limited, and to encourage follow-on projects.	
River restoration design	The design should preferably be led by a fluvial geomorphologist and/or freshwater ecologist with river restoration experience. If possible, these should be the same people as involved in the morphological survey and the EIA. This ensures full integration of environmental issues throughout the design process. Several types of surveys may be required before restoration starts: physical (width, depth, fluvial audit etc.) to guide design, protected species (to obtain consents) and other biological or chemical pre monitoring. Pre-work surveys must be are commissioned early so that they can inform the design. This is particularly important for ecological surveys, which can only be done at certain times of year e.g. water voles survey March – August, juvenile salmonids August – October. Surveys and monitoring may need to commence one or more years before restoration.	PRAGMO Monitoring Planner
Design contract	Public bodies and NGOs are often affected by restructuring which can disrupt planning for river restoration. This presents a risk, as restoration funding usually means projects must be completed by a certain date. Splitting time-critical design elements between internal staff and external consultants is strongly recommended. Engineering design and construction contracts take a particular form, and specialist procurement support will be needed. Unless framework contracts are in place already, timescales for tendering can be long for projects over the European tendering threshold, so consult procurement specialists early.	
Construction contracts	Involve construction staff at the earliest opportunity, check if what you are designing is physically possible and make sure feasible access routes are available. Get access agreements if needed. It is advised to work with contractors who are comfortable with non-standard engineering designs and preferably have previous experience of river restoration works. As part of the Environmental Impact Assessment an Environmental Action Plan (EAP) is generated. The construction contract should include a clause to ensure the contractor is jointly responsible for implementing the EAP.	ICE standard engineering contracts
Health and safety and construction	No project should be undertaken without due health and safety planning and the development of appropriate risk assessments. In addition, anyone having construction or building work carried out has legal duties under the Construction Design and Management (CDM) Regulations. For notifiable construction work, it also involves appointing a CDM coordinator, a principal contractor, ensure a health and safety plan is in place and keep a health and safety file. River restoration is often not straightforward and it could be difficult to communicate exactly what is required on a standard design drawing. Constant or	CDM guidance

	regular site supervision supplemented by extra visits at critical times is vital. Good communication between project manager and contractors is also essential to facilitate any changes required due to unforeseen circumstances. An environmental clerk of works must visit regularly and ensure the project manager and contractor act on any issues raised. Weather and seasonal constraints (bird nesting, spawning etc.) can impact on the length and timings of the construction works. These needs to be taken into consideration and mitigated against.	
Monitoring, evaluation and adaptive management	Monitoring and evaluation of the river restoration project needs to be built into the plan from the start. It is also important to agree on a strategy for the timing and budgeting of post-monitoring and evaluation. The monitoring result should also provide information for and underpin any adaptive management works that are required. If the time limit and budget is restricted for the project, volunteers can be used to carry out citizen science type monitoring such as the Riverfly scheme.	Riverfly Partnership
Public open days	Inviting people to come and see the river after the restoration work is done is particularly useful where public access is usually limited, and to encourage follow-on projects. At more accessible sites, interpretation boards are useful to explain the aim of the project to a larger number of people passing by.	

[1] The list of permissions is not exhaustive, and legislation and policies can change. Advice should always be sought as to what permissions are required for each restoration project.

[2] The documents are examples only and may not be appropriate for other locations.