



Westmorland  
& Furness  
Council

# ERDF Final Report – North Kendal Industrial Area Flood Risk Management Scheme Project



Project Ref: 07R18P02482

Westmorland and Furness Council  
and Environment Agency

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## Introduction

The Kendal Flood Risk Management Scheme (Kendal FRMS) seeks to address flood risk in the town of Kendal and through separate phases into neighbouring villages of Burneside, Staveley and Ings in south-east Cumbria.

Like many towns and areas within Cumbria, in December 2015 Kendal suffered from devastating flooding from Storm Desmond, with over 2,150 properties affected within the town and surrounding villages.

The Secretary of State and Floods Minister voice their commitment to deliver new defences in affected communities across Cumbria in the aftermath of the December 2015 flood events.

Kendal continues to be a complex flood risk management catchment that has required a multi-solution scheme to address flooding at three flood risk locations; Kendal, Burneside and Ings. The proposed flood risk management scheme will be delivered in three phases to deliver a 1% AEP standard of protection as follows;

- Phase 1 – linear defences and pumping station in Kendal (ERDF expenditure footprint)
- Phase 2 – linear defences in Burneside, Staveley and Ings
- Phase 3 – upstream flood storage, a catchment drain and culvert repairs in the upper Kent and Stock beck catchments.

The Flood Risk Management Scheme will deliver 1.9km of improved riverine habitat, improvements to 5ha of floodplain, 50ha of upland blanket bog, enhance community and social interaction with the river and provide security for local tourism and stability for local businesses.

## Strategic Case

The Kendal FRMS was designed to align with a number of national policies and action plans, including Defra 2016-2020 Strategy and Environmental Agency 2016-2020 Action Plan, which included a key objective to “provide a nation better protected against the natural threats and hazards, with strong response and recovery capabilities”. The peat restoration aspect of the scheme was in alignment with the Government’s 25 Year Environmental Plan and the draft National FCERM 2100 Strategy at the time of the ERDF application.

The scheme also met the aspirations of the Cumbria County Council Local Flood Risk Management Strategy (now adopted by Westmorland and Furness Council) to “reduce flood risk to the people of Cumbria; increase knowledge and awareness of the factors affecting flood risk, facilitate close partnership working between all risk management authorities and improve community resilience”.

Partnership working across a wide range of organisations has been key to the success of a large scale flood risk management scheme. The Environment Agency, along with representatives from Westmorland and Furness Council (previously

Cumbria County Council and District Councils), United Utilities and Network Rail formed a Cumbria Strategic Flood Partnership with the purpose of providing a co-ordinated response to addressing flood risk and consistent messages.

The Environment Agency's Project team worked closely with the partnership to evaluate all sources of flood risk which would be impacted by the Kendal FRMS. The Project identified areas where there was a risk from sources of flooding other than fluvial. An integrated model for Stock Beck and action plan for addressing the key surface water hot spots.

### European Regional Development Fund (ERDF) Fund

The full ERDF application was submitted in May 2018 and on 26 March 2019 (date of signed grant funding agreement), South Lakeland District Council (now Westmorland and Furness Council) received £5.34m of ERDF funding under ESIF Priority Axis 5 "Promoting climate change adaptation, risk prevention and management" and investment priority 5b "*Promoting investment to address specific risks, ensuring disaster resilience and developing disaster management schemes*".

Under those investment priorities, the unit of measure to calculate the outputs was:

- Output indicator P6 – Businesses and properties with reduced flood risk

The Kendal Flood Risk Management Scheme has been one of the Environment Agency's most critical and high profile projects in the north-west, providing local businesses and residents with improved flood resilience following the extensive flooding in December 2015.

The ERDF funding elements of the scheme has consisted of the construction of raised linear flood defences (concrete flood walls and earth embankments) along an approximate 6km length of the River Kent, and installation of a new pumping station on the Stock Beck at Gooseholme.

Phase 1 of the Kendal Flood Risk Management Scheme was divided up into 26 construction sub-reaches in order to effectively manage construction.

Phase 1 of the Kendal FRMS has been designed to increase the level of flood resilience to 1,717 businesses and 170 residential properties from an existing 1 in 5 year standard to between a 1 in 20 and 1 in 50 year standard of protection. The businesses benefitting from Phase 1 of the Kendal FRMS either benefit directly from flood protection measures or indirectly through resilience of transport infrastructure.

The ERDF funding of £5.34m was critical in ensuring that the Kendal Flood Risk Management Scheme commenced due to its vital links to reducing flood risk to a high number of businesses throughout Kendal. The ERDF funding predominantly protected businesses and the project would not have been delivered without ERDF funding, as other funding sources had to be targeted towards increasing flood protection to residential properties.

## Project Change Request

In March 2021 the Project Change Request was approved to extend the Project practical completion date beyond 1 March 2022. The change required to address changes in the project expenditure and milestone schedule resulted from a number of factors.

Delays to the approval of the Environment Agency's Full Business Case impacted on the scheme construction start date as well as delays to the planning permission approval for Phase 1.

As the scheme design developed from the initial submission in 2018, knowledge of the project design and phasing increased including the environmental seasonal working constraints. Design work presented further complexities than envisaged due to unforeseen ground conditions and service diversions leading to amendments to the original planning application.

The purchase of a small stone built kiosk at Gooseholme to house then Electricity North West electric pump station was not anticipated at the applications stage in 2018. Following a re-calculation of flows down the Stock Beck.

These delays meant that the draft granular budget and milestone schedule submitted at the application stage in 2018 was out of date by 2021 and resulted in the project underspending against its original expenditure profile and the Phase 1 expenditure forecast was increasing.

It was highlighted that there were a number of risks to the construction of Phase One at the time the Project Change request was submitted, that would impact further on the project programme. The risks highlighted included;

- Extension/ deterioration of the current Covid-19 pandemic resulting in a further elongation of the project
- A longer construction duration to address the design changes e.g. the need for sections of piling which is more complex to install
- Impacts of Brexit which may result in increased cost of goods or unavailability of materials
- Required design changes to reaches to accommodate in-river working periods and community support for additional infrastructure such as glass panels
- Major utility diversions taking longer and costing more than estimated

The risks have been monitored and reported throughout the Project progress and reporting mechanisms.

The Project Change Request was approved allowing the extension of the ERDF Funded element project completion date to 30 June 2023 and the ERDF financial completion date to 31 September 2023.

**\*\*NOTE\*\*** Most recently following discussions with the Managing Authority (DLUHC) the decision was taken to close down the project as of 31 December 2022 in line with the final financial claim.

## ERDF Project Outputs Background

Under the Investment Priority 5b, the unit of measurement to calculate the outputs is the number of business premises with reduced flood risk as a result of ERDF funded activity. For Cumbria, under Priority 5, the output target to be achieved was 670 businesses.

The Kendal Flood Risk Management would provide flood risk benefit to 1717 businesses, 170 residential properties and to the A6 which runs throughout Kendal, parallel to the North Kendal Industrial Areas, and remains the main route in and out of Kendal for businesses, supply chain businesses, residents and visitors. The A6 also continues to be the main diversion route in the event the M6 North Bound is closed.

The outputs for the ERDF funding were calculated using the guidance in ESIF-GN-1-002 version 6, that stated both direct and indirect beneficiaries can be counted, if, as a result of ERDF funded activity they:

- Experience a reduced risk of flooding (directly); or
- if, they benefit as a result of, for example, reduced risk of road or infrastructure damage or closures that prevent employees, deliveries or supply chain businesses from gaining access to businesses premises (indirect).

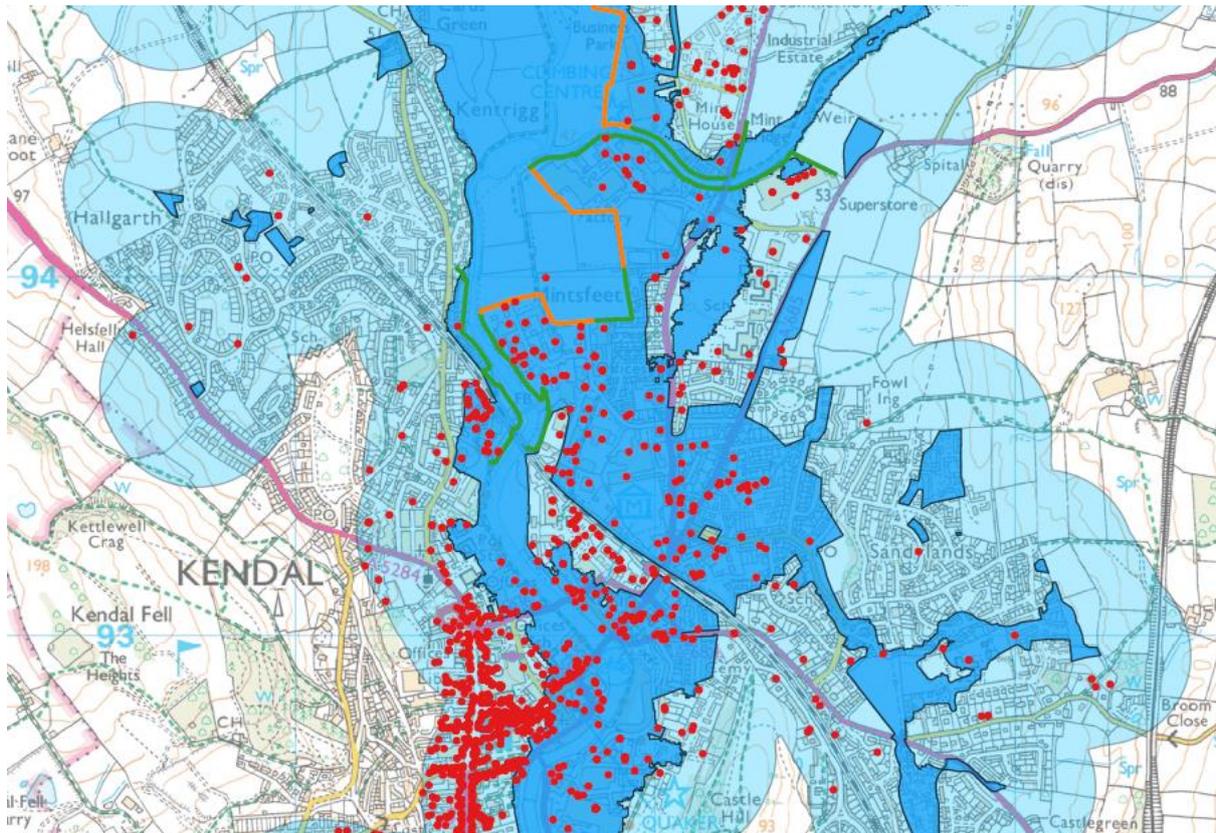
A total of 1717 businesses were counted as benefitting by:

- mapping the walls and embankments that the project will deliver;
- applying the flood zone 2 map over the geographical scope of the project;
- applying a 250 meter buffer beyond the flood zone 2 outline to capture those businesses that would benefit as a result of reduced risk of road damage and closure
- using the National Receptor Dataset (NRD) and the Multi-Coloured Manual to determine property and business type to remove any properties representing receptors such as a post and phone boxes or property shells.

The exercise to calculate the outputs was carried out in January 2018 and again in September 2018. In order to verify the number of businesses, the National Receptor Dataset was used to identify businesses. The Multi-Coloured Manual was then used to determine the type of property and get a breakdown of different types of business. Any properties given a Multi-Coloured Manual code of 9 could be removed, as upon further interrogation were identified as phone or post boxes and property shells. A total of 1,186 businesses identified from the modelling using the National Receptor Dataset and a further 531 businesses identified through a manual exercise using

Council Tax records to identify buildings that contained more than one business, sole trader etc.

The flood zones were modelled by the Environment Agency using hydrological modelling and taking characteristics of a catchment into account, including features such as topography, geography and peak recorded river flows. These were nationally accepted standards for determining flood risk in any given location. The 250m buffer zone in addition to the flood zone data provided uncertainty that could be experienced with flood events, particularly with increasing unpredictable weather patterns and increasing storm severity as a result of climate change.



Although not required for ERDF output purposes, to understand the full benefits of the project the net gross and net floor area for each of the 1717 businesses was estimated using NDR data and Employment Density Guide methodology to estimate the number of full time equivalent jobs that the 1717 businesses provided. It was estimated that 6,105 FTE jobs were provided from the 1717 businesses benefitting from the project. This equated to over £270 million in GVA, assuming the average GVA per job was £45,656 which was taken from the Office of National Statistics 2016 regional data for Cumbria.

The methodology was tested and applied to rural, industrial and city scale ERDF projects.

The scheme is enhancing two existing habitat locations to improve biodiversity and improved Disability Discrimination Act (DDA) compliant accessibility to the areas Mintsfeet and Beezon Fields.

The areas at Mintsfeet and Beezon Fields will see the creation of green corridors that have been designed to enhance habitat for wildlife and better community access and usability. The extensive landscape regeneration will include wetland scrapes, habitat creation, woodland planting, footpath repairs, sensory pathways and willow sculptures.

The mixture of planting at these sites will bring a diverse range of habitat, food and shelter for insects and provide extensive foraging for birds and other wildlife and significantly enhancing biodiversity.

### ERDF Output Review: 2023 modelling results

Following discussions with the Managing Authority (DLUHC) the decision was taken to close down the project as of 31 December 2022 in line with the final financial claim.

As a result of this, WSP the design supplier for Phase 1 undertook a modelling scenario in order to advise on the following:

- To test the impact of removing designated sections of linear flood defences and to identify and count directly impacted businesses
- To identify and count businesses indirectly impacted by flooding using the national GIS flood zone 2 data set

The results gathered are based on the scenario of removing all reaches where flood defence construction was not completed by December 2022 and running this scenario for a 1 in 20 year (5% AEP) fluvial flood event.

Scenario methodology:

- Relevant wall sections/ pumping station removed from the model. Modelling then runs for various flood events
- Modelled flood outlines compared to NRD data (which contains the property locations)
- Comparison identifies those properties (business and residential) which could be at direct risk should the flood defences not be in place
- To calculate businesses at indirect flood risk then NRD property points were compared to the EA's flood zone 2 and flood zone 3 outlines with the 250m buffer applied (as per the ERDF methodology).

Construction reaches A, B1, B2, C1, C2, F1, F2, F3, F4, F5, F6, G1, G2, G3, H1 all of which had not been completed by the ERDF end date of 31st December 2022, were removed from the model run.

**\*\*NOTE\*\*** The modelling scenarios used information from the National Dataset however please note that where buildings contained more than one business these were added as additional businesses and identified manually from Westmorland and Furness Council through its business rates records. This exercise identified a total of 531 businesses.

The table below indicates the extent of the problem, where the sum total of each inflated individual reach is far in excess of the NRD business totals.

	Businesses at indirect risk	Businesses at direct risk	TOTAL
NRD identified businesses (modelled)	973	213	1,186
Manually identified businesses (est.)	455	76	531
<b>TOTAL</b>	<b>1,428</b>	<b>289</b>	<b>1,717</b>

Sum total for each reach is 3,782

Sum total for each reach is 489

The modelling generated similar inflated totals for businesses benefitting directly and indirectly from completed flood defences by 31st Dec 2022. However, since each data set is inflated to the same level, it is still possible to do a direct comparison between them to indicate the % of overall businesses at risk we would expect to have partial protection by 31st December 2022.

Directly protected

$$\frac{36 \text{ (businesses with some level of protection by 31/12/22)}}{489 \text{ (total number of businesses at direct risk)}} \times 100 = 7.4\%$$

Indirectly protected

$$\frac{1261 \text{ (businesses with some level of protection by 31/12/22)}}{3782 \text{ (total number of businesses at indirect risk)}} \times 100 = 33\%$$

Because the modelling had inflated businesses at risk figures (double or triple counting), the team undertook a manual exercise to adjust the businesses at risk breakdown for each sub-reach, and to remove the duplication of risk numbers. This was undertaken as follows:

Using the modelled outline maps as reference, each sub-reach has been assessed to determine which other sub-reaches affect its flood risk (and therefore its businesses at risk count), and the amount of potential double counting (has the business figure for a particular reach been fully or partially duplicated).

- A further 25% reduction factor was then applied to account for optimism bias in terms of some locations of double counting not being identified.
- A similar approach was been undertaken for each sub-reach. This provided a breakdown of businesses at risk for each reach, totalling 1,186 (which corresponds with the total number from the NRD data count).

Using this approach, we have also been able to re-estimate the split between direct/indirect risks and also the number afforded some protection by 31/12/22.

*Business Properties Protected Summary:*

	Using inflated modelled data	Using adjusted data
All businesses at risk	4,271	1,186
All businesses at direct risk	489	213
All businesses at indirect risk	3,782	973
Businesses at direct risk and protected by 31/12/22	36 (7.4%)	15 (7%)
Businesses at indirect risk and protected by 31/12/22	1261 (33%)	377 (39%)
Total businesses at risk and protected by 31/12/22	1297 (31%)	392 (33%)

## Project Performance Review

As of December 2022 Phase one of the Kendal Flood Alleviation Scheme is ongoing to deliver a reduced direct and indirect flood risk to businesses and residential properties however, the full ERDF funding of £5.34m was expended by December 2022 towards the reduction of direct and indirect flood risk to businesses.

A total of 11 construction reaches had been completed as of 31 December 2022. (Please note that the breakdown of reaches was not a requirement of the ERDF funding, the breakdown of reaches is for construction purposes).



*Reach K, Natland Road*



*Reach I, Romney Road*



*Reach D, Dockary Hall*

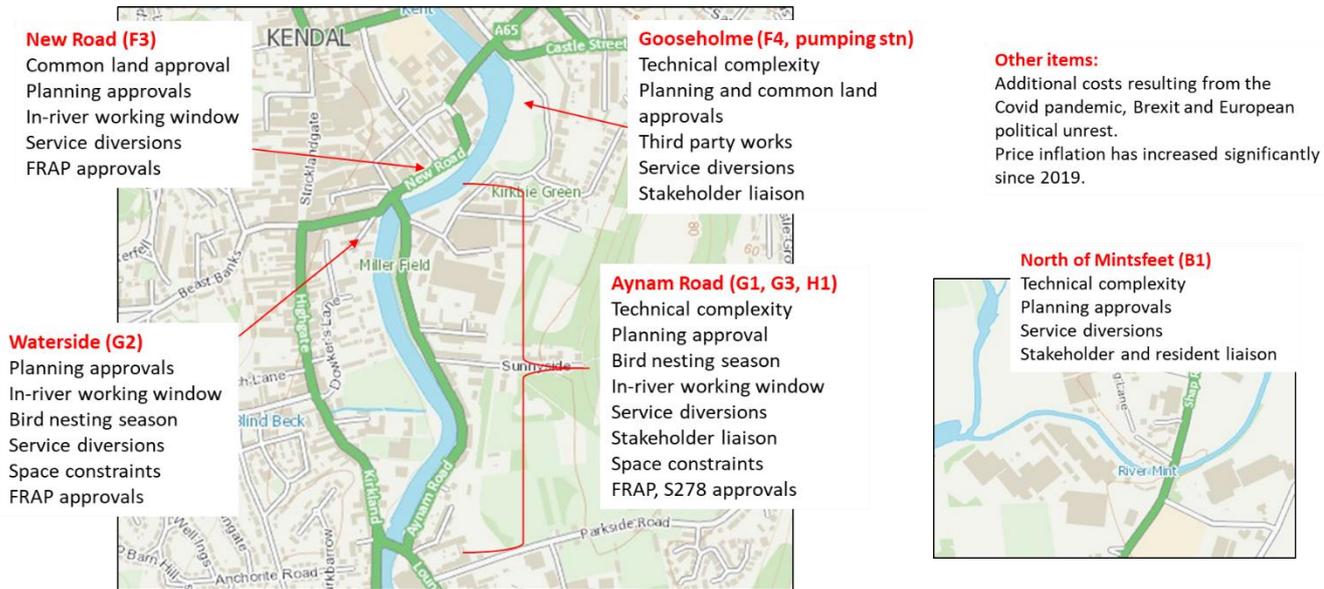


*Reach J, Natland Road (Ford Park)*

Phase 1 of the Kendal Flood Scheme to date has delivered a reduced flood risk to businesses and residential properties throughout Kendal through creation of wetlands, construction of earth embankments, construction of pressure release drainage and construction of concrete liner wall defences and floodgates as well as significantly enhanced public realm through installation of railings, resurfaced footpaths, planting schemes and public engagement structures.

Project construction of the outstanding reaches will continue into spring 2025 due to significant project pressures. Complex project challenges that have impacted on the programme include:

- Common land approvals required from the Planning Inspectorate
- In-river working windows (only permitted between July and October)
- Service diversions (Gas, electricity, water and sewage)
- Bird nesting season (tree removal only permitted outside of this window)
- FRAP approvals
- Technical design complexities (resulting in redesign of some reaches)
- Space constraints
- S278 approvals



*Project Reach Challenges*

These complex project challenges have impacted on the project delivery and construction costs both for the overall project and ERDF funded elements.

The project has seen a variety of public areas along the river corridor developed to enhance biodiversity through community involvement. The public areas have seen improvements including planting of native species, nesting boxes, bat and bird boxes, wild flowering, grasslands, woodlands, tree and shrub planting, footpaths, sensory paths and information boards.

The areas of enhanced accessibility and biodiversity include;

- Ford Park
- Beezon Fields
- Parish Church
- Gooseholme Park
- Mintsfeet



*Reach E2 under construction (Beezon Fields)*



*Reach E2 Completed (Beezon Fields)*

The ERDF funded element to Phase 1 of the Kendal Flood Alleviation scheme was vital in order for the project to begin and ensured project security. The funding has not only provided both direct and indirect flood protection to a number of businesses, it has in turn created opportunities for Community involvement to enhance reaches within the scheme to create an accessible and inclusive riverside route for the town.

The areas of enhancement at Mintsfeet and Beezon Fields have been designed with the support and influence of local community groups and local schools as an opportunity to be used for educational spaces in the summer. These two particular areas following support and guidance from the schools will include sensory paths,

information boards, interactive play equipment and a sound to stone trail which is an audio trail that plays the memories of the river from residents in local care home.

The scheme has and continues to provide direct and indirect flood protection for residential properties and will the vital ERDF funding the protection of businesses throughout Kendal. Ensuring the increased level of flood risk protection will enhance the town economic profiling and attract future investment opportunities.

Although project delivery is ongoing the project is continuously being reviewed to reflect changes in approach, delays, construction amendments, permits etc. The top lessons learnt to-date include:

1. Consider a staged approach to intrusive site surveys where the extent of detail of surveys can be increased gradually, depending upon the findings from the previous stage. This would reduce the risk of upfront high-cost surveys leading to abortive design work or change of approach.
2. Ensure the project team fully understand the implications of working within a Special Areas of Conservation (SAC) designated watercourse. This would significantly increase the requirements at planning stage, the level of consultation, the input from environmental specialists and the requirements for the HRS/ FRAP approvals.
3. Identify clear lines of communication early-on between the project team and the local authority/ other key stakeholders, where it is anticipated that numerous approvals are required to maintain project progress (for example, highway consents, footpath diversions, schedule ancient monument consent, HRA approvals).
4. Ensure that the level of liaison between the project team and utility companies reflects the size and complexity of the project. If there is a likelihood of significant numbers of service diversions, then ensure lines of communication are set up early in the project design process between named personal.

## Impacts and Value for Money

These complex project challenges have impacted on the project delivery and construction costs both for the overall project and ERDF funded elements. Applying the agreed ERDF funding % to an increased quarterly construction expenditure has led to higher than forecasted ERDF quarterly contributions. The cost increases can be attributed to the following:

1. Survey work and service utility diversions
2. A more complex construction methodology
3. Construction delays attributable to an extended programme
4. Increases to inflation

## 5. Increases to material and labour due to Covid and Brexit

At the time the ERDF submission was made the overall project costs for Phase 1 were estimated at £16.7m however the estimated cost due to the above attributing factors has risen to £36m. The increased costs will be fully funded by the EA using Flood Defence Grant in Aid (FDGiA).

Through the ERDF investment to provide direct and indirect flood protection to businesses the economic profile for the town is expected to increase and further become an attractive site for business expansion, set up and relocation.

## Conclusion

Although the Project is ongoing the construction of reaches completed by December 2022 had afforded a level of flood risk protection to 392 businesses. As the construction continues into spring 2025 the number of businesses with flood risk protection will increase.

By the end of June 2023 following the completion of further reaches by using the modelling scenario the number of businesses with flood risk protection had risen to 615 (52%).

All businesses at risk	1,186
All businesses at direct risk	170
All businesses at indirect risk	1,016

Businesses at direct risk and protected by end of June 2023	53 (31%)
Businesses at indirect risk and protected by end of June 2023	562 (55%)
Overall businesses protected by end of June 2023	615 (52%)

As the project is ongoing it allows us to undertake continuous reviews to ensure the project is running effectively and efficiently and to avoid further delays where possible.

Not only will Phase 1 of the Kendal Flood Risk Management Scheme reduce flood risk for business properties, it will also provide both direct and indirect protection for residential properties and significant investment to improve public realm along the river corridor and a variety of public art installations inspired by the river corridor, community stories and local schools.