



Portadown Flood Alleviation Scheme

Volume 1 Non-Technical Summary



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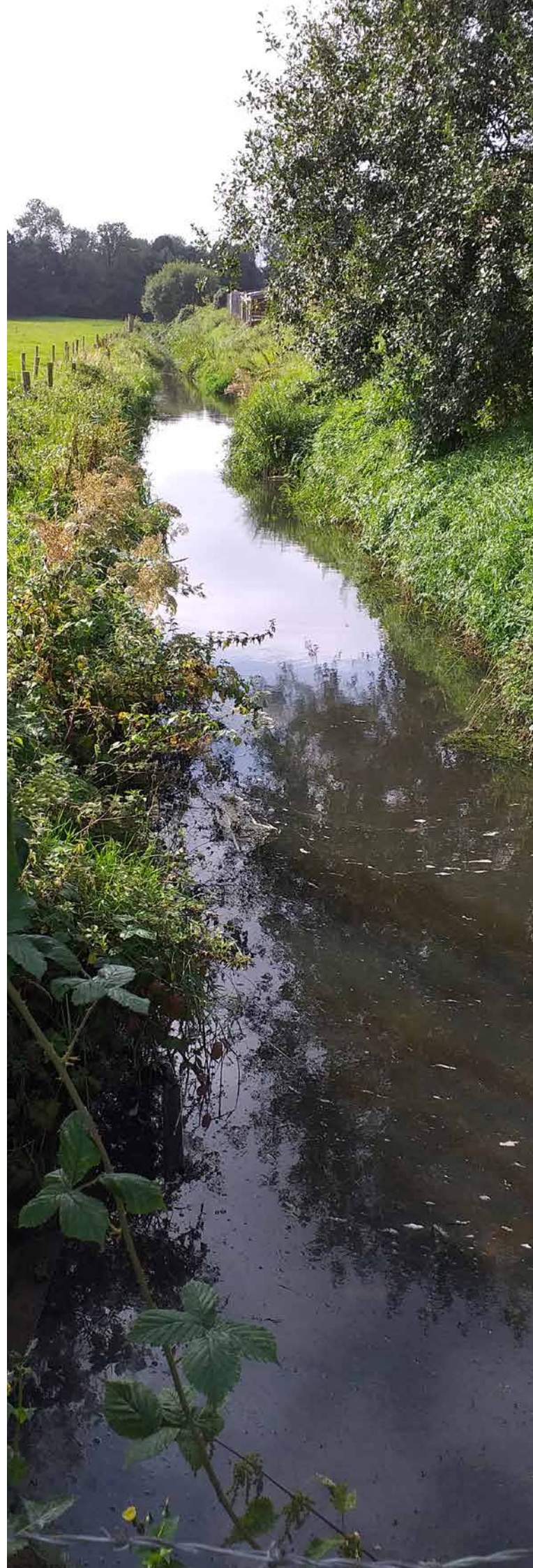
Introduction

Introduction

The Department for Infrastructure (DfI) proposes to manage the risk of flooding within and around the town of Portadown, County Armagh through the provision of a range of flood defences. The Portadown Flood Alleviation Scheme (the proposed scheme) is comprised of 20 individual sites throughout Portadown and the surrounding area. The aim of the proposed scheme is to reduce the impact of flooding to properties, infrastructure and businesses from the River Bann and some of its tributaries.

The Department has determined that the works specified in the proposed scheme are likely to have significant effects on the environment and as such are required to carry out an Environmental Impact Assessment (EIA). An Environmental Statement (ES) has been prepared by the Department's consultants Amey, which details the outcome of the EIA. It sets out: a description of the scheme and the reasonable alternatives considered in the development of the design, the environmental setting, the likely significant effects of the scheme on local communities and the environment, and the measures proposed to mitigate these effects.

This document provides a summary of the ES in non-technical language.





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Need for the Scheme

Need for the Scheme

Flooding is a natural phenomenon which can have a range of adverse impacts on the environment, the economy and human health. Typical effects of flooding can include loss of life, damage to property and infrastructure and the spread of contamination and disease as a result of polluted flood waters.

Portadown has experienced regular flood events over the past 40 years which have resulted in significant damage to residential properties, commercial properties and transport infrastructure. Flood events have been recorded within the town in 1986, 1987, 2009, 2011, 2014 and 2015/16.

In October 2011 out-of-bank flooding from the River Bann occurred in the Portadown area resulting in the flooding of numerous properties. It is estimated that this flood was approximately a 1 in 100 year flood on the River Bann. Most recently, flooding has occurred in Portadown and the surrounding area in 2014 and 2015, resulting in further damage to essential infrastructure.

As part of the implementation of the European Floods Directive 2007/60/EC (the Floods Directive), a Flood Risk Assessment for Northern Ireland was prepared and published in 2018. The Northern Ireland Flood Risk Assessment (NIFRA) is a high-level analysis of the potential economic, social and environmental impacts which could result from flooding in Northern Ireland. It identifies the areas within Northern Ireland which are at greatest risk of flooding and classifies these as 'Areas of Potential Significant Flood Risk' (APSFRR). Within the NIFRA, Portadown and its neighbouring community of Craigavon are identified as APSFRR.

Considering the historic nature of flood events in Portadown and the identification of the town as an APSFRR, DfI Rivers commissioned RPS Consulting in 2018 to identify the flood risk associated with the local watercourse system and to assess options for the alleviation of future flooding.

The study identified that 308 properties in the Portadown area were at risk of river flooding in the event of a 1% Annual Exceedance Probability (AEP) flood event. The main risk of flooding was established to be from the River Bann, which flows directly through Portadown, and the Ballybay/Corcrair River, which is one of its tributaries.

Scheme Objectives

The primary objective of the scheme is to provide flood protection, to the residential, commercial and community receptors which are currently at risk of flooding during a 1% AEP flood event. A 1% AEP flood event has a 1% chance of occurring in a year or once in every 100 years.

The proposed scheme has been designed to provide protection during a 1% AEP flood event, with allowance for climate change.







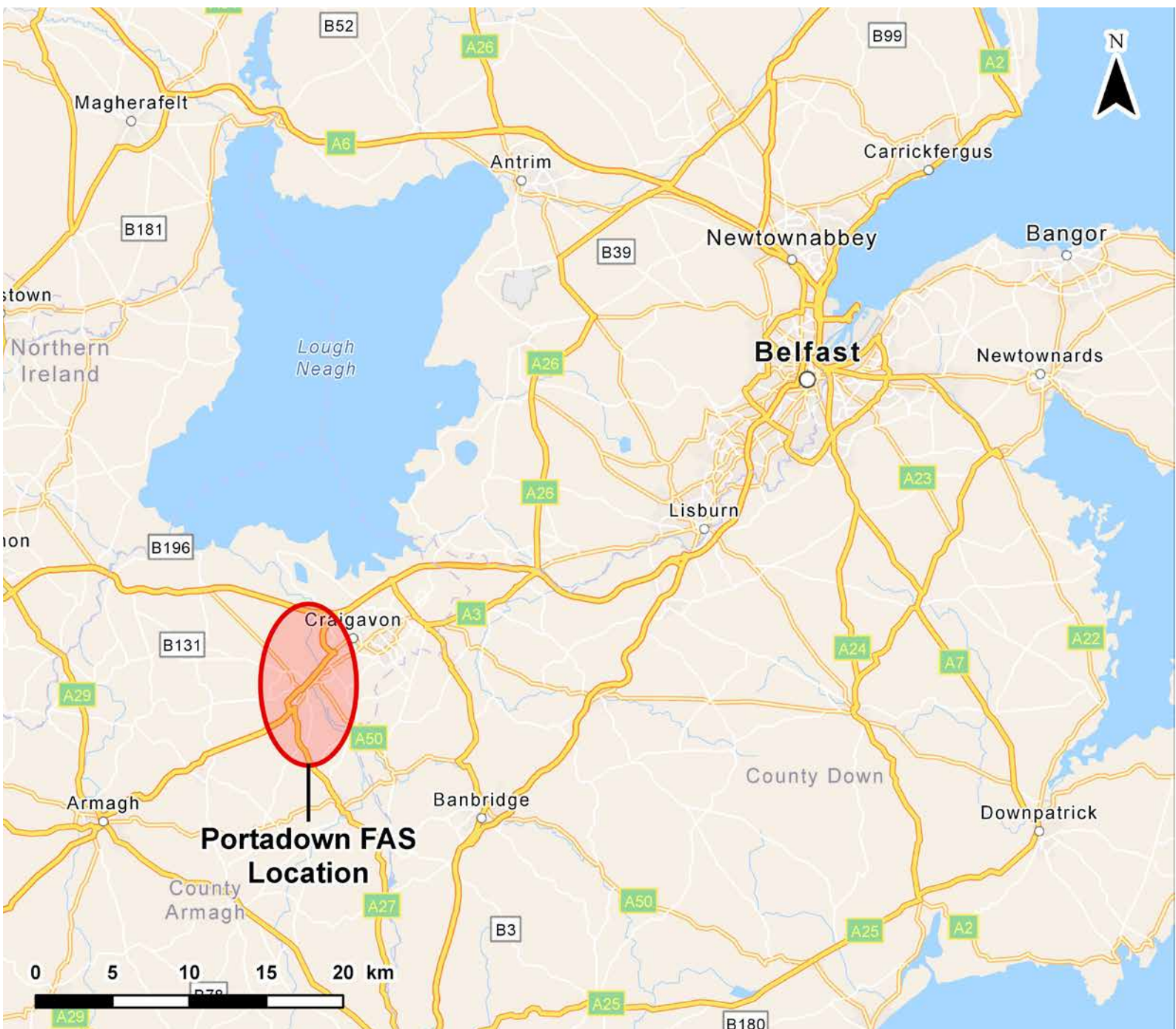
A landscape photograph of a river flowing through a wooded area. The river is calm, reflecting the sky and the surrounding trees. The scene is framed by a large, stylized geometric shape composed of yellow and blue triangles. The text '3' is positioned on the left side of the image, and 'Scheme Location' is written below it in a red font.

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Scheme
Location

Scheme Location

The scheme is located within and around the town of Portadown which is located approximately 35km to the south west of Belfast in Northern Ireland. The town lies within the boundary of Armagh City, Banbridge and Craigavon Borough Council. This area of Northern Ireland is predominantly rural where the land use outwith of the minor towns is primarily agricultural. The settlements of Craigavon, Moyravety and Lurgan are situated to the immediate north east of Portadown, while Armagh lies approximately 12km to the south west.



Location Plan





A landscape photograph of a river flowing through a wooded area. The river is in the center, reflecting the sky and the surrounding trees. The sky is overcast with grey clouds. The trees are mostly bare, suggesting autumn or winter. The image is framed by a large yellow triangle in the top right and a large blue triangle in the bottom right, meeting at a diagonal line. The number '4' is positioned on the left side of the image.

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Environmental Impact Assessment

Environmental Impact Assessment

The purpose of an Environmental Impact Assessment (EIA) is to ensure that the environmental effects of a proposed scheme are fully considered and to propose mitigation to reduce environmental impacts. The findings for the environmental impact assessment are presented within the Environmental Statement.

The ES is presented in four volumes with this standalone Non-Technical Summary being Volume 1. Volume 2 is the Main Text, Volume 3 presents the Technical Appendices and Volume 4 the Figures associated with relevant chapters of the ES.

EIA provides a process whereby environmental constraints and impacts are incorporated into the iterative design of a scheme, to reduce impacts and identify mitigation measures. Information to inform the assessment was derived from a combination of desk top study, consultation with statutory and non-statutory bodies and scheme specific surveys. Various guidance documents and standards have been used to inform the methodology.

EIA Scoping is the process of determining the scope and extent of issues that should be covered as part of the EIA and contained within the ES. A scoping exercise was undertaken by Amey in October 2020 to focus the EIA upon only those topics where potentially significant impacts could arise as a result of the proposed scheme. Where insignificant effects were identified within the scoping, the topics or areas were not included within the ES (i.e. 'scoped out').

The general headings of the topics and issues reported on in the ES are as follows:

- Air Quality
- Cultural Heritage
- Landscape and Visual Effects
- Terrestrial Biodiversity
- Fisheries and Aquatic Ecology
- Soil and Land Contamination
- Noise and Vibration
- Population and Human Health
- Hydrology and Drainage
- Climate.

Environmental impacts are assessed taking into account design mitigation. These are the control measures implemented in order to prevent or reduce impacts.

The significance of environmental effects is determined based on the magnitude of impact and the environmental value or sensitivity of the receptor.



Consultation

During the EIA process, consultation has taken place with numerous statutory and non-statutory bodies. This has included:

Armagh City, Banbridge and Craigavon Borough Council;

- RSPB Northern Ireland;
- Northern Ireland Bat Group;
- Northern Ireland Environment Agency (NIEA) – Natural Environment Division;
- NIEA – Water Management Unit;
- Department for Communities - Historic Environment Division;
- Council for Nature Conservation and the Countryside (CNCC);
- Northern Ireland Environment Link (NIEL);
- CEDaR (Ulster Museum);
- Ulster Wildlife Trust (UWT);
- Waterways Ireland;
- DfI - Inland Waterways;
- Ulster Angling Federation; and
- Department of Agriculture, Environment and Rural Affairs (DAERA) - Inland Fisheries.

The project team has worked closely with the key stakeholders including landowners to develop a scheme that aims to reduce the overall environmental effects, by avoiding sensitive features and through careful design. Stakeholder feedback was reviewed by the project team and incorporated into the assessment and design process where appropriate.

Alternatives

A requirement of the EIA regulations is that alternatives for a scheme are considered during the environmental assessment process. Scheme alternatives could involve an alternative location, design or technology. By considering alternative options, the aim is for the scheme to evolve sustainably by taking into account all constraints throughout the lifetime of the project.

A number of options were considered during the design process and their potential to resolve flooding issues within Portadown evaluated. This included the following:

- No development alternative: Implement no new flood risk management measures and abandon any existing practice.
- Hard Defences: Construction of structures such as reinforced concrete walls, earth embankments, demountable barriers.
- Flood warning /Forecasting: Installation of flood forecasting and warning system and development of emergency flood response procedures.
- Other works: Flood resilient properties and flap valves.

Three options were developed for further assessment:

- Option 1: Maintain existing regime (Baseline scenario);
- Option 2: Hard defences and flood resilience;
- Option 3: Hard defences, flood resilience and flap valves (Tandragee Road).

Following an economic and environmental appraisal of the options, Option 3 was selected as the preferred option to take forward.



A landscape photograph of a river flowing through a wooded area. The river is calm, reflecting the sky and the surrounding trees. The sky is overcast with soft, grey clouds. The trees are mostly bare, suggesting a late autumn or winter setting. The photograph is framed by a large, stylized geometric overlay consisting of a yellow triangle pointing downwards and a blue triangle pointing upwards, meeting at a diagonal line. The text is overlaid on the left side of the image.

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Description of the Scheme



Description of the Scheme

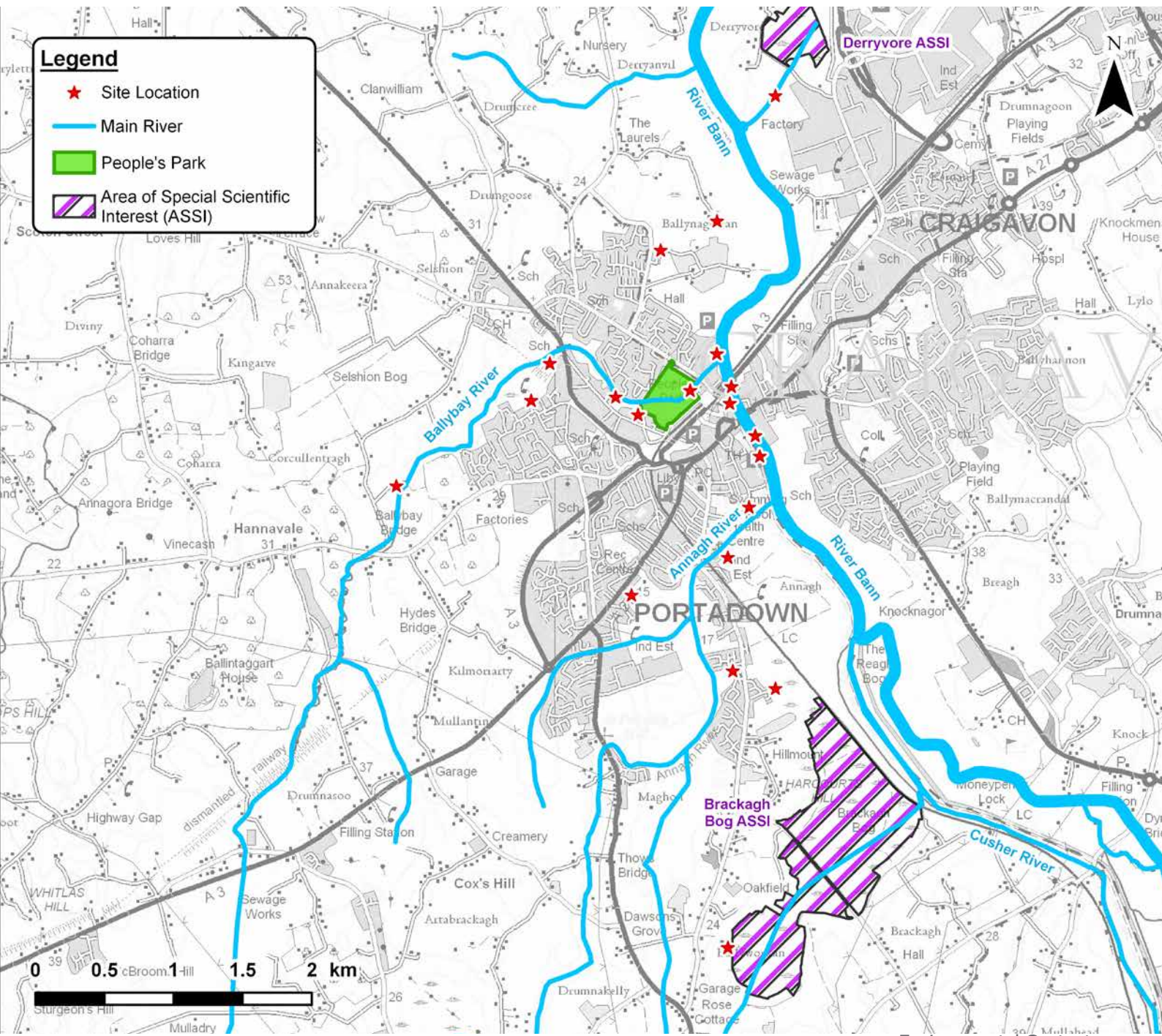
Environmental Context

The proposed scheme is located within and around the town of Portadown, County Armagh. This lies to the south of Lough Neagh in an area of Northern Ireland that is relatively flat. The town has an approximate population of 32,000 and it contains a mix of land uses, including residential, commercial and community properties. The majority of the settlement is comprised of residential properties, however there are numerous commercial and industrial properties located within the centre of the town, including a number of older warehouses and factories. A notable community asset within the town is Portadown People's Park; a large area of open space which provides a range of recreational opportunities for the local community.

The River Bann is one of the main features of the area and it flows through the north eastern extents of Portadown as it flows towards Lough Neagh. Numerous tributaries of this watercourse also flow directly through the town, including Ballybay/Corcrain River, Annagh River and Cushier River; all of which outfall to the Bann within Portadown. The floodplain of the River Bann is largely developed as it flows through the town and there are numerous large warehouses and industrial yards which lie immediately adjacent to the river.

Outwith Portadown, the majority of the surrounding land is agricultural and there are a number of agricultural holdings in the wider area. Land on the outskirts of the town has also been utilised for new housing developments or is currently zoned for new housing.

There are a number of designated sites within the area surrounding Portadown which are of ecological importance. The sites include Derryvore Area of Special Scientific Interest (ASSI), Brackagh Bog ASSI and Selshion ASSI. Historic constraints within the area are predominantly limited to listed buildings and scheduled monuments located within Portadown.



Legend

- ★ Site Location
- Main River
- People's Park
- ▨ Area of Special Scientific Interest (ASSI)



Environmental Context

The Proposed Scheme

The proposed scheme involves the provision of flood alleviation infrastructure and associated landscaping at 20 sites within and around Portadown. The aim of the scheme is to reduce the risk of flooding from the River Bann and its tributaries through the construction of flood defences.

The proposed work at each of the 20 sites differs, yet will comprise of construction of one or more of the following:

- **Raised flood embankments:** Structures usually of earth or gravel which are used to hold back water. The construction of the embankments will involve excavation and earthworks together with clay/ stone placement and compaction.
- **Reinforced concrete walls:** Structures which are constructed using reinforced concrete to provide additional strength. Steel bars or welded wire fabric are embedded within freshly made concrete at the time of casting in order to provide the reinforcement.
- **Sheet pile walling:** Structures which are formed from sections of sheet material (e.g steel) with interlocking edges that are driven into the ground to provide earth retention and excavation support.
- **Embedded walls:** Relatively thin structures which are anchored into the earth to be used as a retaining walls, where shallow foundations are appropriate to the ground conditions.
- **Raised footpath/walkways:** Existing footpaths and walkways that have been raised to certain ground level to reduce their risk of flood risk.
- **Embedded cantilever walls:** Structures which use earth pressure to anchor the wall and provide retaining support, allows for a shallower excavation.
- **Secant piling:** Structures which provide the formation of a retaining wall through the placement of reinforced concrete piles that interlock to form a continuous wall.



Site Locations

Air Quality

The proposed scheme is located within the boundary of Armagh City, Banbridge and Craigavon Borough Council. Air quality within this administrative area is considered to be mixed as the entire area is designated as an Air Quality Management Area (AQMA). AQMA are areas which the local authority has identified as requiring management to achieve desired air quality objectives. The Armagh City, Banbridge and Craigavon Borough Council AQMA has been declared due to exceedances in the annual mean objective of nitrogen dioxide. Air quality within the area is largely influenced by vehicle emissions from road traffic as well as emissions from domestic heating. Potential sources of dust emissions within the local area include a site contractor, a metal handler and a concrete product supplier.

Sensitive human receptors within the area include residential properties, schools and health care facilities.

Sensitive ecological receptors within the area include Derryvore Area of Special Scientific Interest (ASSI) and Brackagh Bog ASSI and National Nature Reserve (NNR) and Nature Reserve.

Construction

Without mitigation, construction of the proposed scheme could temporarily impact air quality as a result of dust and particulate matter from construction activities such as demolition, earthworks, construction and trackout. There is a high to medium risk of dust soiling impacts and a low risk of health impacts as a result of increased particulate matter concentrations. Through good site practice and the implementation of suitable mitigation measures, the impacts of dust and particulate matter releases will be substantially reduced.

With mitigation in place, the effects of dust and particulate matter generated by construction activities on air quality and the effects of emissions to air from construction vehicles and plant on local air are direct, temporary, short to medium term and of negligible significance.

Operation

No significant operational effects are anticipated.



Cultural Heritage

Cultural heritage includes archaeology, historic buildings/structures and historic landscapes including parks and gardens. A total of 74 cultural heritage sites were recorded within the 300m study area. Eight sites of cultural heritage interest are located on or in very close proximity to the proposed flood alleviation locations. These comprise a listed warehouse, a brick hole, a sawmill, two road bridges, a WWII Pillbox, which is a Scheduled Monument and two Designed Landscapes.

A further sixty-six cultural heritage sites, including one Scheduled Monument, one B+ Listed Building, seven B1 Listed Buildings, two B2 Listed Buildings and four B Listed Buildings, are located within 300m of the proposed scheme.

Construction

Construction activities could lead to temporary adverse effects on the setting of a number of heritage assets, including: partial or total removal of heritage assets within the scheme footprint, compaction of archaeological deposits by construction traffic and structures, impacts upon the settings of the heritage resources, changes to key views and sightlines.

The assessment has concluded that the proposed scheme could result in direct effects upon six cultural heritage sites which lie within close proximity to the proposed flood defences. Direct effects could occur as a result of ground-breaking, demolition works and the movement of machines over or near to sensitive areas. The six assets are a brick hole (CHS 2), a sawmill (CHS 34), the Shillington Building (CHS 33), Charles Street Bridge (CHS 44), WWII Pillbox - DHP no.221 Scheduled Monument (CHS 71) and the People's Park Designed Landscape (CHS 73). These potential adverse direct effects upon these cultural heritage sites could be removed through the implementation of mitigation measures.

The proposed scheme could also have an adverse indirect effect upon the settings of two designated cultural heritage sites. These are the grade B1 Listed Shillington Building (CHS 33) and WWII Pillbox - DHP no.221 Scheduled Monument (CHS 71).

Essential mitigation of construction impacts would include measures that reduce the likelihood of physical damage as well as changes to the setting that affect the significance of the heritage assets. With these measures in place, there are no significant adverse effects.

Operation

During operation without mitigation, there is a risk of indirect effects upon the settings of The Shillington Building (CHS 33), WWII Pillbox - DHP no.221 Scheduled Monument (CHS 71) and the People's Park Designed Landscape (CHS 73) if the design of the proposed scheme is intrusive to these areas. The design has considered such effects within the embedded mitigation and as a result, no significant adverse effects are determined.



Landscape and Visual

The proposed scheme is made up of 20 individual sites located within and around Portadown. As a result of the wide area covered by the project, there are a range of landscape characteristics within the 500m study area. The majority of the study area is low-lying, particularly along the various river courses. There are three Local Landscape Policy Areas (LLPAs) within the area, including River Bann P/LLPA/4 and P/LLPA/4(a) and People's Park P/LLPA/1. LLPAs are areas considered to be of greatest amenity value, landscape quality or local significance and therefore worthy of protection from undesirable or damaging development.

There are no designated landscapes of national, regional or local landscape importance within the 2km study area. There are no Conservation Areas within the study area.

There are numerous visual receptors within the area including; residential and commercial properties, community and worker receptors and users of recreational routes.

Construction

During construction, potential impacts on landscape include the removal of existing landscape features within a localised area, the excavation, removal and regrading of soil, the re-alignment of footpaths and one footbridge and the introduction of new features within the landscape including sheet piling; embedded walls. The LLPAs are anticipated to experience short term adverse impacts due to the presence of construction activities. With mitigation in place, effects are not determined to be significant.

There will also likely be adverse visual impacts associated with the presence of construction vehicles, traffic control and movement and stockpiling of materials. The assessment has found that the scheme would incur significant effects on a number of visual receptors during the construction phase, including those at the following locations:

- Users of Upper Bann Recreational Routes
- Users of Walking Route 31: People's Park
- Users of the NCNR 94: Loughshore Trail
- Site D: People's Park
- Site E: Parkside
- Site H: Castle Street
- Site J: Bowling Green
- Site R: Corcullentragh Road.

Operation

Landscape mitigation for the project has sought to restore lost features where practicable and to restore or offset impacts on landscape character. Landscape mitigation may also function as visual screening when it has become established and reaches a reasonable height. All effects are predicted to reduce to not significant as the schemes and associated visual changes integrate with their surroundings.





Terrestrial Biodiversity

The proposed scheme covers a wide area and as a result, there are a range of habitats and ecological features present within the study area. The study area was taken as 5km for designated sites, 4km for bats and 2km for all other species. Habitats within the area include amenity grassland, fen, hedgerow, improved grassland, unimproved grassland, running water and scrub. Protected species recorded within the study area include bat, otter, smooth newts, badger and wintering birds.

Designated sites within 2km of the proposed scheme include: Derrylvore Area of Special Scientific Interest (ASSI), Brackagh Bog ASSI and Nature Reserve and Selshion ASSI. The closest designated sites to the proposed scheme are Derrylvore ASSI and Brackagh Bog ASSI/nature reserve which lie adjacent to sites at Tandragee Road and Derrylvore Lane.

Construction

Potential impacts on ecological features associated with construction include loss of habitat (vegetation clearance) due to ground and excavation works, temporary loss of habitat and associated species through siting and subsequent removal of site compounds, temporary disturbance of species within the site due to construction non-chemical pollution (e.g noise, vibration, light and site personnel) and environmental incidents and accidents - spillages, noise, fire and emissions.

Mitigation has been incorporated into the scheme design to avoid or reduce the potential adverse effects of the scheme on ecological receptors during construction, which includes, restriction of felling and vegetation clearance activities, use of unidirectional lighting only and pollution prevention and sediment control measures. With mitigation in place, there are no significant adverse effects on any designated site, species or habitat.

Operation

Impacts on ecological features during the operational phase will be minimal but could occur during minor routine maintenance. This will likely include disturbance of species and habitats due to increased people, vehicles and typical uses and activities e.g., noise, vibration and artificial lighting, and during the implementation of landscape design and management.

Pollution prevention plans will be in place during operation. The assessment has concluded no significant adverse effects on any terrestrial biodiversity feature during operation.



Fisheries and Equatic Ecology

The scheme is located in the Portadown area in the Upper River Bann catchment with the following four main sub-catchments; the Upper Bann, the Ballybay/ Corcrair river; the Annagh River; and the Cusher River.

There are no site designations either under European or local legislation relating to river habitats intersecting or potentially interacting with the scheme. Brackagh Bog Area of Special Scientific Interest (ASSI) lies adjacent to part of the scheme towards the eastern extent of Tandragee Road, while Derryvore ASSI lies adjacent to Derryvore Lane. Both are bog, fen and wet woodland habitat and are designated for their invertebrate assemblages that include moths and dragonflies, and aquatic and wetland plants.

Only one river with potential interactions with the scheme, the main channel River Bann, is designated as a "salmonid" water- i.e waters capable of supporting salmon. Salmonid waters are protected and the River Bann is known to support populations of Atlantic Salmon. Other species recorded within the wider Bann catchment include lamprey, eel, brown trout, minnow, three-spined stickleback, stone loach and gudgeon.

Construction

The main potential impacts of the scheme during the construction phase are sediment release, the release of other pollutants, the removal/ loss of sensitive species, temporary obstruction of fish passage, noise and vibration from the construction of the flood defences, and unintentional spread/ release of aquatic invasive species. Together, the design of the scheme and implementation of the full range of recommended mitigations will ensure that the scheme's effects during the construction phase will not be significant.

Operation

The main potential impacts of the scheme during the operational phase are the loss/decline in habitat quality/area, the permanent obstruction of fish passage and the permanent obstruction of angler access. The design of the scheme and the proposed mitigation measures will ensure that there will be no significant adverse effects during operation.



Soil and Land Contamination

The soils and land contamination assessment considers impacts on soils and pollution to the receiving environment and construction workers from existing contaminated land at eight of the twenty sites proposed for flood defences.

Ground conditions vary throughout the 100m study area of the proposed scheme. Ground investigations have taken place at each site scoped in for the soils and land contamination assessment. The results have indicated that the underlying geology of the area is generally comprised of a mixture of made ground, peat, alluvium (clay, sand, gravel), glacial till (sandy gravelly clay) and bedrock (clay and mudstone). Groundwater levels vary throughout the area and investigations revealed strikes occurred at depths ranging from 0.5m below ground level (mbgl) to 19.6mbgl.

The area has experienced a number of previous industrial land uses. Historical sources of contamination within the area include an old railway line, a refuse tip, former weaving and linen factories, a flour mill, a flax mill, housing and gas works.

Construction

During construction, adverse impacts could arise on construction workers from exposure to contaminated made ground during excavations for the flood walls. Groundwater and surface water also have the potential to be polluted as a result of the creation of new pathways for existing pollutants within the ground.

Mitigation will consist of additional investigation and sampling at five sites, in order to inform the contractor's Construction Environmental Management Plan. Alternative methods of piling will be considered in order to prevent the movement of pollutants into the groundwater environment. Pollution Prevention Guidance (PPG) as well as a health and safety management plan will be implemented on site in order to protect construction workers from existing land contamination. With such measures in place, no significant adverse effects are concluded.

Operation

No significant operational effects are anticipated.







Noise and Vibration

The proposed scheme is located across a mix of urban and rural land. As a result, there are a number of different noise sources within the study area. This includes road, rail, agricultural and commercial sources.

Noise sensitive receptors within the study area include residential properties, churches, schools, community assets and health facilities, the majority of which lie within the limits of Portadown. A total of 3,157 noise sensitive receptors have been identified within 300m of the proposed scheme.

Construction

During construction the proposed scheme has the potential to cause temporary noise and vibration impacts on the closest receptors to the development. The potential for temporary construction vibration impacts is dependent on the construction activities being undertaken. Construction and vibration impacts have been assessed as significant effects at a number of receptors when construction is at its busiest and closest to receptors.

The proposed scheme has been designed where possible to avoid and minimise potential adverse noise and vibration effects through the process of design development and consideration of good design principles. Measures have been set out within the Construction Environmental Management Plan (CEMP) to reduce noise and vibration impacts, including implementation of Best Practicable Means (BPM).

With mitigation in place, construction activities have the potential to result in significant noise effects for the closest receptors, particularly those within 50m of construction activities. These effects will be short term. The number of noise sensitive receptors to be affected by significant noise levels is relatively low.

Operation

No significant operational effects are anticipated.



Population and Human Health

The population and human health assessment considers impacts on private property and housing, community land and assets, development land and businesses, agricultural land holdings and walkers, cyclists and horse riders (WCH). There are multiple residential, commercial and community receptors located within Portadown. Key receptors within the study area include residential properties, ten schools, nine churches and Portadown Health Centre.

The proposed flood defence sites located on the edge of Portadown lie within or adjacent to privately owned agricultural land, which is used for a mixture of arable and pastoral farming.

There is a Public Rights of Way (PRoW) network located within the vicinity of the proposed scheme, including National Cycle Route 9, National Cycle Route 94 and a number of local footpaths which form a network around Lough Neagh. These routes serve a wide range of users including pedestrians and cyclists.

The health and well-being of the local communities that will be impacted by the project have been considered within the assessment.

Construction

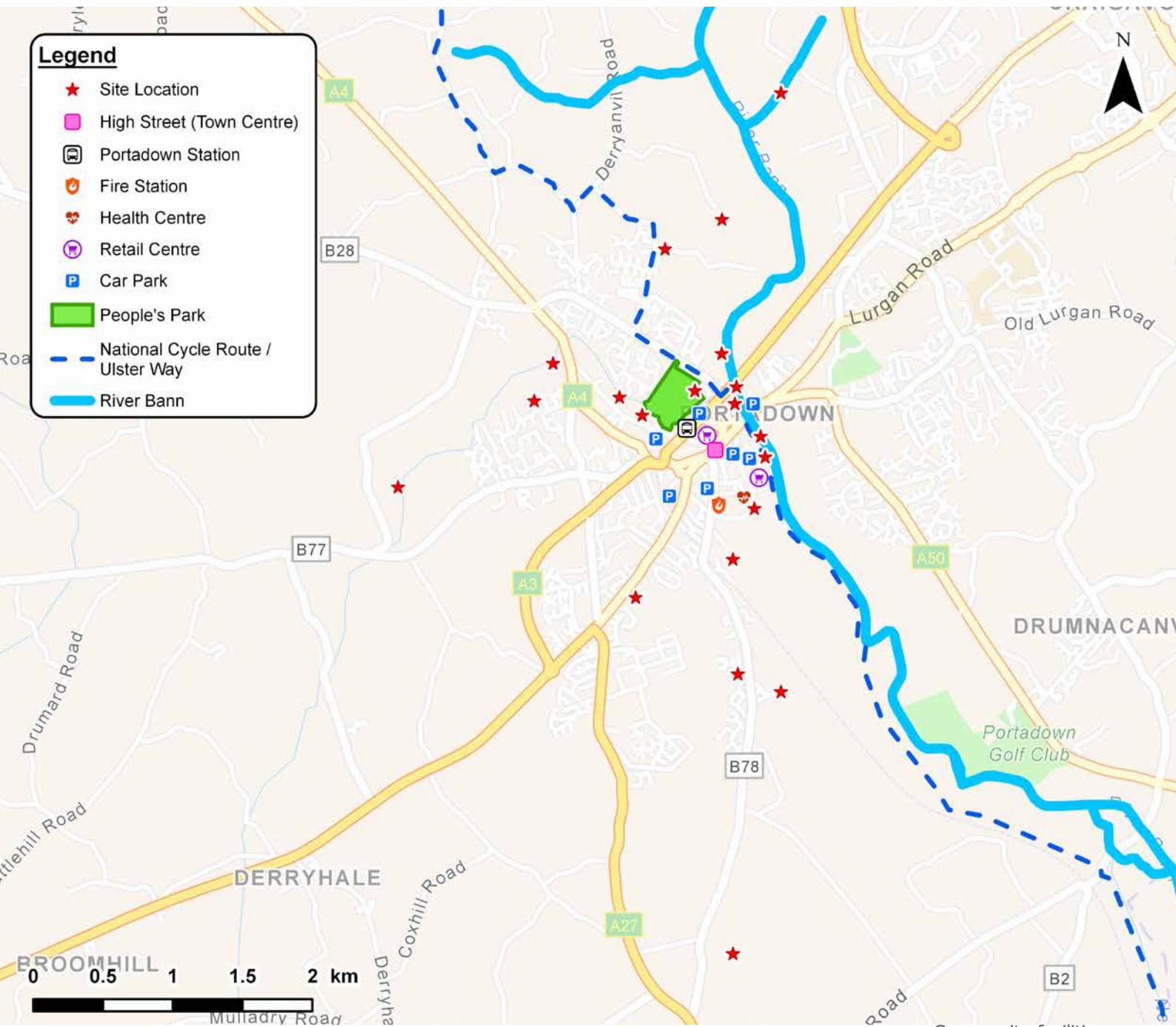
During construction, the proposed scheme has the potential to impact upon residential, commercial and community receptors. Construction will require temporary land take for site compounds, access routes and working corridors from private property, community assets, agricultural land and commercial assets. Access to these receptors will also likely be disrupted along with WCH routes.

The proposed scheme has been designed to minimise disruption to property and land take where possible. Mitigation measures during construction will include temporary diversions and signage to limit the impacts of any temporary closures of WCH routes. The assessment has concluded no significant adverse effects on population and human receptors during construction.

Operation

During operation, positive effects on human health have been identified due to the risk of flooding being reduced.





Community facilities

Hydrology and Drainage

The hydrology and drainage assessment considers impacts of the proposed scheme on surface water and flood risk.

The study area lies within the Neagh Bann River Basin District which covers an approximate area of 5740km². There are a number of surface waterbodies located within this catchment, some of which flow directly through the study area, including: River Bann, Ballybay/Corcrair River, Annagh River, Cusher River and a number of minor unnamed streams/ drainage channels.

There are a number of designated sites present within the study area, two of which are wetlands designated for their flora and fauna; Derryvore Area of Special Scientific Interest (ASSI) and Brackagh Bog ASSI. The wetlands are likely dependant on local hydrology and drainage patterns and have therefore been considered within this assessment.

Sections within the study area are at risk of flooding from rivers or other watercourses and flooding as a result of rainfall and surface water sources.



Construction

During construction before mitigation, there is potential for significant impacts on the surface water environment. Surface water quality may be impacted by increased pollution from mobilised suspended solids and spillages of fuel and other hazardous substances. Construction activities within or within close proximity to surface water features also have the potential to impact the movement and distribution of the watercourses. The watercourses where in-river works are required are those most at risk during construction. Changes to the level of impermeable area may result in increased flood risk.

Prior to mitigation, construction activities have the potential to alter surface water flows into the two designated sites. A Construction Environmental Management Plan will be applied throughout construction which will include adherence to best practice methods and pollution prevention. No significant adverse effects are determined for surface water or flood risk with the implementation of mitigation.

Operation

A surface water assessment has taken place for the operation phase which has concluded there will be no significant adverse effects on watercourses during operation.

The proposed scheme will result in significant beneficial effects for flood risk receptors during operation due to a reduction in flood risk the flood defences will provide.



Climate

The assessment of climate considers the effects of greenhouse gas (GHG) emissions associated with the proposed scheme during construction. Consideration is also given to the resilience of the scheme to cope with future extreme weather events associated with UK climate projections.

Construction

The total GHG emissions estimated to arise from construction is approximately 22,357 tCO₂e (tonnes of carbon dioxide equivalent). The embodied carbon of construction products (all the CO₂ emitted in producing materials) is the largest emission sources of construction GHG emissions accounting for 67% of emissions. Average annual construction emissions across an anticipated three-year construction period are estimated as 7,802 tCO₂e. This accounts for approximately 0.057% of Northern Ireland's 2030 carbon budget of 13,556.83 ktCO₂e. This level of emission is not considered to be significant.

GHG emissions have been minimised where possible through design and will continue to be minimised during construction through measures included within the CEMP. These measures include; reducing construction traffic through careful planning, use of low-emission fuels, maximising opportunities for use of renewable energy within compounds and reuse of materials.

Potential climate change risks during construction such as increased health and safety risks and damage to construction materials are expected to be mitigated through codes of practice and construction mitigation measures included in the CEMP.

Operation

During operation, the proposed scheme is itself vulnerable to climate change risks, particularly in the medium to long term. Potential impacts during the operational phase include: material and asset deterioration due to extreme climate events resulting in the need for enhanced maintenance, risks that the protection afforded by embankment vegetation and vegetation adjacent to the river within other areas of the catchment may be undermined and therefore create increased pressure on the flood defences.

With mitigation measures in place however, the magnitude and likelihood of impacts will be reduced, resulting in no significant effects.



Cumulative Effects

The assessment has considered cumulative effects with single projects (numerous different impacts affecting a single receptor from the proposed scheme) and cumulative effects with different projects (impacts from different projects in combination with the scheme).

Cumulative effects with single projects

Residential, commercial and community receptors will be impacted by increased noise from construction, nuisance from dust and by the visual intrusion of machinery. Construction may also impact water quality and aquatic wildlife through sedimentation and pollution. With appropriate mitigation in place however, the effects are not considered to be significant.

Cumulative effect with different projects

A review of the planning applications and allocations within the area around the proposed scheme was undertaken to identify any other developments which may result in a cumulative effect together with the scheme, which is a greater, new or different significant effect than would result from the proposed scheme on its own. The search area for these other developments was the largest combined area based on the likely distances from which developments could influence each environmental topic.

Due to the size and location of developments, most were scoped out of the assessment. Where projects were scoped in, there is potential that their construction programmes could coincide with construction of the proposed scheme. Where this occurs, there will likely be cumulative construction impacts, particularly on air quality, noise, landscape and visual and population and human health effects.

Impacts will be managed through Construction Environment Management Plans and so no significant cumulative effects are concluded.





ameyconsulting