Clifton Scannell Emerson Associates

Pedestrian/Cycle Bridge, New Bridge, Navan, Co. Meath
Options Evaluation Report

Údarás Náisiúnta Iompair
National Transport Authority

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Table of Contents

1 Introduction

1.1. Project Description

Clifton Scannell Emerson Associates (CSEA) have been appointed by Meath County Council (MCC) as Consulting Engineers for the preparation of documentation for public tender for the proposed cycle/pedestrian bridge at New Bridge, Athlumney Street, Navan, Co. Meath. The scheme involves the following as illustrated by drawing 11_079A_00_4002PL06 of Appendix A:

- Construction of new 4.0 metre wide cycle/pedestrian bridge over the River Boyne.
- The construction of new shared cyclist/pedestrian surface, of varying width due to existing constraints, along Athlumney Street.
- The installation of new wearing course to road surface with associated line markings and signage.

This report is prepared in order to:

- To carry out a constraints study and options evaluation for the structural form of the proposed bridge.
- Recommend an emerging Preferred Option in terms of economic, safety, environment and ecology, accessibility and social inclusion, integration, engineering (buildability) and cultural heritage.

1.2. Existing Conditions

The existing 'New Bridge', a protected structure constructed in 1756, is a 7-span masonry arch bridge connecting Athlumney to the east bank of the River Boyne with Navan on the west bank. This bridge was previously understood to have consisted of 6-spans only; however further investigations have identified a buried 7th arch at the eastern end of the bridge.

The bridge carries a 7.0 metre wide single-lane carriageway over the River Boyne. Athlumney Street is the end section of the R153 regional route which connects Navan with the N2 national route. The bridge is an important piece of infrastructure as it carries a large volume of traffic from the N3 corridor to the N2 national route and onwards to the M1 Motorway, the main Dublin-Belfast road.

1.3. Need for the Scheme

The proposed scheme will involve the delivery of a cycle route that provides high quality linkage between residential areas and the key trip attractors (e.g. Schools/College, Sports Clubs, Navan Town Centre). This will improve the cycling and pedestrian offer and encourage modal shift among the local population to cycle and walk as a safe and convenient means of making local trips (work, school/college, recreation trip).

As there are currently no dedicated cycle tracks over the River Boyne at this location, the proposed works will substantially improve safety for pedestrians and cyclists.

The finished scheme will provide a safe, coherent and attractive route with a high Quality of Service that will form part of the overall Johnstown Quarter Cycle Network and form part of a wider strategic cycle network in the Navan area.

The level of take up will ultimately judge the success of the scheme (i.e. the number of cycle trips along the route). The route must provide a high Quality of Service and address the five needs of the cyclist (directness, safety, coherence, comfort and attractiveness). The route will aim to serve the broadest range of possible users (e.g. commuters, leisure cyclists, and children).

It is the policy of the Council to support the implementation of the National Cycle Policy Framework 2009-2020 and the DTO Cycle Policy.

The proposed Scheme will support the objectives embodied in the National Transport Authority's Greater Dublin Area Transport Strategy in respect of improving safety for all road users, and facilitating increased cycle usage and walking.

2 Scoping of Bridge Form Options

2.1 Initial Options Considered

Three options have been developed for the proposed cycle/pedestrian bridge with regard to structural form, finishes and aesthetics. These options are included within Appendix B of this report.

The major considerations taken into account in selecting these options are as follows:

- Crossing the Rover Boyne
- Buildable structural forms
- Economic structural forms
- Connectivity of the greater cycle scheme

3 Constraints

3.1 Natura 2000 Sites

The River Boyne and River Blackwater Special Area of Conservation (SAC, Site Code 2299) is a protected area that spans a large area, mainly in County Meath. The Boyne and Blackwater were also recently designated as a Special Protection Area (SPA, Site Code 4232).

The River Boyne and River Blackwater SAC is designated due to the presence of two habitats listed in Annex I of the EU Habitats Directive - alkaline fen and alluvial woodlands. The alkaline fen of the SAC is located at Lough Shesk, Feehan Lough and Newtown Lough, near Clonmellon on the Meath/Westmeath border. Alluvial woodlands are situated within the river

channel downstream of Oldbridge, near Townley Hall, 2.5 kilometres west of Drogheda. The SAC is also selected for the presence of the following species listed on Annex II of the same Directive - Atlantic Salmon (*Salmo salar*), Otter (*Lutra lutra*) and River Lamprey (*Lampetra planeri*). These species occur along the length of the rivers. An additional Annex II Lamprey species is also known to occur in the Boyne – the brook lamprey (*Lampetra fluvialitis*).

The rivers were designated as an SPA because of the presence of the Kingfisher, a species that is listed in Annex I of the Birds Directive. In 2010 an estimated 19 breeding pairs were recorded from the site and it is, therefore, considered a site of national significance for this species.

There are no additional SPA or SAC sites located within a 15km radius of the present proposed development.

3.2 Natural Heritage Area

Jamestown Bog Site Code 1324. This bog is situated approximately 9-10 km west of the present New Bridge site. It has been designated due to the presence of high bog and cutover raised bog. It is one of the most north-eastern remaining raised bogs in the country and one of only two raised bogs in County Meath. Despite presence of raised bog habitat this site is not listed as a Special Area of Conservation.

3.3 Proposed Natural Heritage Area

Thomastown Bog Site code 1593

There is little information available on this site since it has not been designated a Natural Heritage Area. Thomastown Bog is located approximately 12-13 km east of the New Bridge site. This species rich site is a raised bog surrounded by wet woodland and grassland. There are also areas of reed beds. Sites with this level of habitat and species diversity in Meath are rare (cited from Anon 2008).

Balrath Wood Site code 1579

This woodland is situated 11 km east of the New Bridge site. This complex of three separate woodlands near Duleek is of particular value in the county due to the rarity of mature deciduous woodland in Meath. In addition, the Common Wintergreen (*Pyrola minor*), a rare plant, has been recorded there recently (cited from Anon 2008).

3.4 Impact Assessment

The construction and operational phases of the proposed development have the potential to impact on the natural environment. This is of particular concern and will require the management of the following:

- Heavy machinery movements
- Vegetation and soil removal
- Habitat disruption
- Construction of bridges

- On-site material storage
- Increased noise and dust

These activities will incur direct and indirect impacts on the site, including:

- Removal / modification of some of the habitat recorded, including sections of hedgerows and tree lines.
- Establishment of permanent footpaths and cycle ways will lead to increased lighting, human disturbance, noise and a permanent loss of vegetation.
- On a temporary level, activities on the site will lead to certain species, such as bat, bird and mammal species avoiding the immediate construction area, with a potential for the pollution of the Boyne River and of groundwater. Post construction, fauna may return to the site and with the implementation of effective mitigation the potential exists for the fauna to increase long term utilisation of the site.

3.5 Ecology

An Appropriate Assessment Screening Report, Flora & Fauna Survey and Lichen Survey has been prepared as part of an environmental assessment for the scheme. The ecological impact of the three options is discussed within.

The Ecological Study Reports for the route options were prepared by Dr Niamh Roche and these reports can be found in Appendix C.

3.6 Receiving Environment & Flora

The habitats of the SAC and SPA at the proposed development site are listed below and are assigned to categories (and given codes) according to the Heritage Council classification system (Fossitt 2000).

A number of habitat types are present in the SAC/SPA site at this location. These include willow scrub (WS1), verge grassland (GS2) and stone walls (BL1). The River Boyne at the present location can be described as a lowland depositing river (FW2). The most common habitat of the area in general, outside the conservation designations, is buildings and artificial surfaces (BL3).

Scrub (WS1)

Willow scrub has developed in places along the river bank here and includes grey willow (*Salix cinerea*) and osier willow (*S. viminalis*). Alder (*Alnus glutinosa, A. incana*), ash (*Fraxinus excelsior*), sycamore (*Acer pseudoplatanus*), dogwood (*Cornus alba*) and bramble (*Rubus fruticosus*) are also present. Among field layer species here are vetch (*Vicia sepium*), hedge woundwort (*Stachys sylvatica*), cow parsley (*Anthriscus sylvestris*), creeping buttercup (*Ranunculus repens*) and nettles (*Urtica dioica*). Scrub occurs in mosaic with rough grassland/grassy verge habitat. During the July 2013 visit, a number of specimens of Himalayan balsam (*Impatiens glandulifera*) were observed. This represents the initial stage of

invasion by this species along the banks of the river Boyne. Himalayan balsam is considered a highly invasive non-native species in Ireland.

Grass verge (GS2)

Dry meadow/grassy verge habitat is found on the banks of the Boyne here, in mosaic with scrub and more inundated wetland habitats. Species present include rough grasses such as false oat (*Arrhenatherum elatius*), Yorkshire-fog (*Holcus lanatus*), cocksfoot (*Dactylis glomerata*). Other species include dove's foot crane's bill (*Geranium molle*), creeping cinquefoil (*Potentilla reptans*), ribwort plantain (*Plantago lanceolata*), spear thistle (*Cirsium vulgare*), nipplewort (*Lapsana communis*), robin-run-the-hedge (*Galium aparine*), lesser hogweed (*Heraclium sphondylium*), broad dock (*Rumex obtusifolius*), broad willowherb (*Epilobium montanum*) and hoary willowherb (*E. parviflorum*). In very waterlogged areas grassland grades into swamp-like vegetation (FS1) which includes common reed (*Phragmites australis*), reed canary grass (*Phalaris arundinacea*), yellow loosestrife (*Lysimachia vulgaris*) and flag iris (*Iris pseudacorus*).

Stone wall (BL1)

The bridge at New Bridge was constructed in the late 1700s. A number of species that are typically found growing on old stone walls were recorded from the bridge in January 2013. These include ivy leaved toadflax (*Cymbalaria muralis*), pellitory of the wall (*Parietaria judaica*), fern grass (*Desmazeria rigida*), maidenhair spleenwort (*Asplenium trichomanes*), wall rue (*Asplenium ruta-muraria*) and western polypody (*Polypodium interjectum*). Other vegetation also found on the bridge includes ivy (*Hedera helix*), particularly on the southern façade. Common figwort (*Scrophularia nodosa*), rose species (*Rosa* sp.), ragwort (*Senecio jacobaea*) and dandelion (*Taraxacum officinales* agg.) are also present. Ledges of the bridge buttresses are matted with grass, possibly *Poa pratensis* subsp *irrigata* which was identified from a higher ledge on the bridge in July 2013. Additional species growing on walls of the bridge and identified in July include red valerian (*Centranthus ruber*) and hemp agrimony (*Eupatorium cannabinum*).

Some cushion mosses are also present including rigid beard moss (*Didymodon rigidulus*), grey cushioned grimmia (*Grimmia pulvinata*), *Orthotrichum anomalum*, and *Orthotrichum diaphanum,* along with *Homalothecium sericeum* and rough stalked feather moss (*Bracythecium rutabulum*). None of the Red Listed mosses highlighted by the NPWS (such as *Funaria muhlenbergii* or *Grimmia orbicularis*) were identified from the bridge.

A full assessment of lichens present is provided separately in a supplementary report by Whelan (unpub). In summary, however, 23 lichen species were recorded from accessible parts of the bridge and the area around it. None of these are protected or considered of conservation importance. Many specimens were poorly developed, which may be attributable to pollution from high levels of vehicular traffic.

Buildings and Artificial Surfaces (BL3)

Very few plants are found on paved or artificial surfaces. Occasional annual weedy species may be present at road edges or between paving slabs. These include pineappleweed (*Matricaria discoidea*), annual meadowgrass (*Poa annua*), dandelion, knotgrass (*Polygonum aviculare*) and bittercress (*Cardamine flexuosa*).

***Depositing*/lowland River**

Among the species in the water at this location are bur reed (*Sparganium erectum*), yellow water lily (*Nuphar lutea*), common clubrush (*Schoenoplectus lacustris*) and common reed (*Phragmites australis*).

Adjacent habitats

The playground area can be categorized as amenity grassland (GA2) and flower beds and borders (BC4). The most abundant habitat in the immediate area is buildings and artificial surfaces (BL3).

Other Records: Flora

There are historical records (19th Century) for hairy St John's wort (*Hypericum hirsutum*) within the 10 km square that includes the current site (www.npws.ie). This is a tall perennial that can be found in woodland and scrub. Its exact former location is unknown. This species is rare in Ireland and is protected under the Flora Protection Order.

The scrub habitats of the riverbank at this location have been modified substantially and are unlikely to support this species, even if it has been present in the past.

According to available data from the National Parks and Wildlife Service and from the National Biodiversity Data Centre, no other rare or protected plant species have been recorded from the 2 km grid square within which the site is situated. None were found during multiple field visits to the site from January to July 2013.

3.7 Fauna

Features noted from the study are:

Table 1 – Areas of Fauna Interest Identified

Fauna Type	Fauna Evidence	Mitigation Measures
Badgers	The presence of Badgers within the site was not noted	• N/A
Otters	The presence of Otters within the site was not noted but this species is likely to occur	• A preconstruction survey is to be carried out • Protection and retention of existing vegetation • Ensure unrestricted access to the river banks • Bridge supports to be kept back from the river
Hare	The presence of Hares within the site was not noted	• N/A
Birds	Numerous species have been recorded in the vicinity of the site, some of which are; blackbirds, robins, jackdaws, wood pigeons, etc	• Vegetation removal restrictions will be enforced between the months of March and August
Amphibians	Boyne not suitable for frogs or newts due to its strong current at the location.	• N/A
Invertabrates	Brown snail, swarming dipteral and red-tailed bumble bee observed around the site. No butterflies were recorded from the site	• N/A

Fauna Type	Fauna Evidence	Mitigation Measures
Fish	It is possible that populations of both *Lampetra planeri* and *Lampetra fluvialitis* are present in the Boyne here. Lampreys are less abundant along this stretch of river compared to the lower Boyne. Lampreys and their habitats in this area are, however, under threat from pollution and drainage maintenance.	• Works effecting the water course are prohibited between the months of October and March
Bats	Despite observation of Daubentons bat and Soprano Pipistrelle bat being observed in flight, no roosting was observed, hence New Bridge is not considered a bat roost.	• Riparian vegetation should be retained and enhanced • Restrictions implemented to minimise light disturbance

3.8 Cultural Heritage

'New Bridge' is a Protected Structure on the Navan Development Plan 2009-2015 (No. 115) and is listed on the National Inventory of Architectural Heritage (No. 14010086). It is described in the Record of Protected Structures as a 'six arch road bridge over river, built 1752 with cutwaters and coursed rubble masonry parapet walls'. Views of the bridge from the western banks are also protected.

The survey of the bridge has shown that the bridge has been widened twice since it was built. It is clear from the nature of the stonework on the bridge that the original is on the northern or downstream side, while the southern or upstream side is the last of the three phases.

Survey has also identified a 7th arch, located at the eastern end of the bridge, hidden from view as it is buried.

The proposed works are located adjacent to the Zone of Archaeological Potential for the town established by the Urban Archaeological Survey and designated a Zone of Archaeological Importance (Navan Development Plan 2009–2015). It would also fall under the Zone of Archaeological Importance for the Boyne River. In terms of Built Heritage, it is the policy of Meath County Council and Navan Town Council (HER POL 9c) to require that all applications for development within these zones of archaeological potential be accompanied by a professional archaeological impact assessment. The New Bridge is not listed in the records of the Archaeological Survey of Ireland. There are a number of archaeological monuments within 250 m of the proposed works, all connected with settlement in the medieval period.

No previous excavations have taken place at the location of the proposed works. A number of archaeological investigations (both excavation and riverbed surveys) have taken place adjacent to the subject site and have not identified archaeological sites or artefacts. Archaeological investigations of the riverbed and bank (of both the Boyne and Blackwater) within Navan have yet to identify buried archaeological material. While the impact on the riverbank is unlikely to be extensive in area, the River Boyne is nonetheless regarded as a Zone of Archaeological Importance (Navan Development Plan 2009–2015), owing to its potential for associated archaeological remains to be present.

A topographical survey of the river bed immediately adjacent to New Bridge on both the upstream and downstream side was carried out by Apex Surveys in December 2012. The accuracy of the survey results were affected by fast river currents. The survey indicated a generally level river bed within the channels on both sides, with build-up of river carried deposits between the arches, in particular on the downstream side. There was no indication of previous bridge structures, which concurs with the historical research that suggests there was no bridge at this location before the mid eighteenth century AD when the current bridge was constructed.

A cultural heritage assessment has been carried out for the existing site and the proposed scheme and is included in Appendix D of this report. Repair works were completed on the Bridge during the Summer of 2015. This included removal of vegetation, repointing of cutwaters, parapets, spandrel walls and vaults of the arches.

4 Options Assessment

4.1 Options Under Review

The options under review are illustrated in Appendix B of this report.

Option 1 - Involves the erection of a 4.0 metre wide boardwalk to the upstream elevation of New Bridge. This is achieved by inserting a series of pile foundations through each pier to the underlying bedrock. The pile foundations will be sleeved so as to not induce additional loading on New Bridge itself. A cantilever cross-head beam will project through the spandrel wall via the careful removal of a small number of stones. The new boardwalk is then supported on these projections.

Option 2 - Involves the erection of a 4.0 metre wide boardwalk to the upstream elevation of New Bridge, however the means of support differs from that of option 1.This option would involve supporting the proposed steel bridge via a combination of tie rods drilled horizontally through the bridge and restrained by pattress plates on the downstream, protected, elevation and inclined props to the existing cutwaters below. This option requires consolidation/strengthening of the existing cutwaters which would involve working within the River Boyne.

Option 3 - Involves the construction of a clear span bridge upstream of New Bridge. This option avoids any interruption or intervention into the fabric of New Bridge but would require substantial works to the existing river banks to construct the required abutments and foundations.

4.2 Appraisal Criteria

In accordance with the Department of Transport, Tourism and Sports ‘Guidelines on a Common Appraisal Framework for Transport Projects and Programmes’, the provision of and need for improved transport systems is based on the following five criteria:

- Economy
- Safety
- Environment & Ecology
- Accessibility & Social Inclusion
- Integration

These guidelines and requirements are themselves in compliance and in accordance with the Department of Finance’s ‘Guidelines on the Appraisal and Management of Capital Expenditure Proposals in the Public Sector’. The development and appraisal of this scheme is being

undertaken in accordance with the National Transport Authority 'Guidelines for the Management of Public Transport Investment Projects delivered by Conventional Procurement'.

Further to the five criteria listed above, the following two criteria will be used to evaluate each option given the protected nature of the existing structure:

- Cultural Heritage
- Buildability

4.3 Option 1 – Piled Cantilever Proposal

Economy

Budget costs place the construction cost of this option at €800,000 excluding VAT.

Safety

The piled cantilever proposal offers good levels of pedestrian and cyclist safety as all movements are carried out away from vehicular traffic on a dedicated non-motorised vehicle bridge.

Environment & Ecology

Habitats beside the site are not particularly diverse. Excepting the fact that the river and banks here are situated within the SAC/SPA boundaries they are not, in this location, of high conservation importance. However, there are no plans to remove or disturb any of these semi-natural habitats as part of the proposed Option 1.

There are no mature trees that may be impacted by the proposed Option 1 development.

The soprano pipistrelle bat is a species that can adapt to urban environments. Daubenton's bat occurs along the river here but tends to select unlit areas of the waterway for foraging. The proposed scheme shall include the replacement of street lighting to reduce light spill to the river area beyond the bridge footprint. This shall assist in protecting the foraging areas.

No bat roosts were found under the bridge in mid-July 2013 therefore roosting bats should not be impacted.

Kingfishers occur in the area but do not nest here. The proposed walkway will not impact kingfisher habitat availability.

Most of the remaining bird species present can adapt to garden or urban environments provided green spaces and scrub around the bridge are retained.

The River Boyne at this location is a relatively disturbed aquatic ecosystem, although protected species such as Lamprey have been found nearby. The proposed cantilevered walkway will not introduce any new disturbance to the river channel at this point. Sensitive species such as lamprey, salmon and otter will not, therefore, be disturbed by the proposed development.

The proposed Option 1 development will not affect the river itself, accessibility to river banks, river vegetation or the river sediments.

Accessibility & Social Inclusion

The option provides safe access across the River Boyne at Athlumney Street linking the east and west banks of the river for all users. The proposed option is fully accessible and complies with the guidelines set down in "Building for Everyone" published by the National Disability Authority.

Integration

The option provides linkages across the River Boyne for all users in accordance with the Johnstown Quarter Cycle Network.

Modal integration will be achieved by maintaining vehicular traffic routes while improving pedestrian and cyclist access.

Geographical integration is achieved by the bridge being on the most direct 'desire line' to cross from the west bank to the east bank of the River Boyne.

There is minimal impact on existing land banks and land take is minimal with this option.

Cultural Heritage

Both the existing 'New Bridge' itself and views of same are protected from a cultural heritage point of view. This option ensures there is minimal visual intrusion into the upstream face of 'New Bridge' by providing both:

- A minimum depth structure, circa 250 mm deep as viewed from the upstream side
- A transparent balustrade.

This option requires no intervention whatsoever into the downstream face of the bridge. The downstream face of the bridge is the original section of 'New Bridge', i.e. the section which was added to by the subsequent widening of the bridge.

The use of sleeved pile foundations, installed by low vibration methods, ensures no damage to the existing bridge structure during construction while imparting no additional loading on the original bridge structure itself.

The cantilever beams to support the new pedestrian/cycle bridge will protrude through the spandrel panel of the upstream face and will require the removal of small pockets of existing masonry. All work to existing masonry will be carried out using best conservation practises and under the supervision of Meath County Council Heritage Officers.

By recording and storing all existing masonry removed from the existing bridge and given the proposed structural form, this option is fully reversible from a cultural heritage point of view in that the bridge could be returned to its original state if necessary.

Buildability

This option will require disruption to traffic on Athlumney Street for a period of time to install the pile foundations, to install the steel structural frame and to undertake reinstatement works.

Construction works would be undertaken during a period of school holidays to take advantage of the lower traffic volumes.

There is no requirement to work within the River Boyne as part of this option.

4.4 Option 2 – Propped Cantilever Proposal

Economy

Budget costs place the construction cost of this option at €800,000 excluding VAT.

Safety

The propped cantilever proposal offers good levels of pedestrian and cyclist safety as all movements are carried out away from vehicular traffic on dedicated non-motorised vehicle bridge.

Environment & Ecology

Habitats beside the site are not particularly diverse. Excepting the fact that the river and banks here are situated within the SAC/SPA boundaries they are not, in this location, of high conservation importance. However, there are no plans to remove or disturb any of these semi-natural habitats as part of the proposed development (Option 2).

There are no mature trees that may be impacted by the present proposed development.

The soprano pipistrelle bat is a species that can adapt to urban environments. Daubenton's bat occurs along the river here but tends to select unlit areas of the waterway for foraging. The proposed scheme shall include the replacement of street lighting to reduce light spill to the river area beyond the bridge footprint. This shall assist in protecting the foraging areas.

No bat roosts were found under the bridge in mid-July 2013 therefore roosting bats should not be impacted.

Kingfishers occur in the area but do not nest here. The proposed walkway will not impact kingfisher habitat availability.

Most of the remaining bird species present can adapt to garden or urban environments provided green spaces and scrub around the bridge are retained.

The River Boyne at this location is a relatively disturbed aquatic ecosystem, although protected species such as Lamprey have been found nearby. The proposed propped walkway would, however, introduce disturbance to the river channel at this point. Sensitive species such as lamprey, salmon and otter may, therefore, be disturbed by the proposed development.

This option would cause greater disturbance to the bridge façade and would require removal of all vegetation from bridge cutwaters. This option would also require work to be carried out within the waterway itself, as well as an increased need for strengthening and consolidating work on the bridge, compared with Option 1 above. Such works, particularly working within the river channel, would increase risk of sediment and/or construction materials falling into the

waterway and therefore causing pollution and is less favoured for these as well as engineering and heritage considerations.

Accessibility & Social Inclusion

The option provides good safe access across the River Boyne at Athlumney Street linking the east and west banks of the river for all users. The proposed option is fully accessible and complies with the guidelines set down in "Building for Everyone" published by the National Disability Authority.

Integration

The option provides linkages across the River Boyne for all users in accordance with the Johnstown Quarter Cycle Network.

Modal integration will be achieved by maintaining vehicular traffic routes while improving pedestrian and cyclist access.

Geographical integration is achieved by the bridge being on the most direct 'desire line' to cross from the west bank to the east bank of the River Boyne.

There is minimal impact on existing land banks and land take is minimal with this option.

Cultural Heritage

Both the existing 'New Bridge' itself and views of same are protected from a cultural heritage point of view. This option ensures there is minimal visual intrusion into the spandrel area of the upstream face of 'New Bridge' by providing both:

- A minimum depth structure, circa 250 mm deep as seen from the upstream side
- A transparent balustrade with narrow vertical fins and small diameter horizontal cable members

Strengthening and repair works have been undertaken previously as recommended in the Cultural Heritage Assessment.

Buildability

This option will require disruption to traffic on Athlumney Street to install the tie rods and to install the steel structural frame. Construction works would be undertaken during a period of school holidays to take advantage of the lower traffic volumes.

4.5 Option 3 – Independent Bridge Proposal

Economy

Budget costs place the construction cost of this option at €900,000 excluding VAT which would include for lighting and CCTV camera upgrades to the park.

Safety

The independent bridge proposal offers good levels of pedestrian and cyclist safety as all movements are carried out away from vehicular traffic on dedicated non-motorised vehicle bridge.

The bridge however is somewhat remote from the main Athlumney Street corridor and is accessed through parkland. The inclusion of lighting and CCTV cameras to increase personal security of all users will be required.

Environment & Ecology

Habitats at the site here are not particularly diverse. Excepting the fact that the river and banks here are situated within the SAC/SPA boundaries they are not, in this location, of high conservation importance.

However, while with Options 1 and 2 there would be no plans to remove or disturb any of these semi-natural habitats as part of the proposed development, with Option 3, an Independent Bridge, the river bank would be disturbed by construction of the new bridge. Vegetation removal would take place and bankside soil and materials would be removed. Bankside vegetation and sediments would continue to be disturbed for the duration of site works, potentially a number of months thereby increasing the risk of sedimentation.

The River Boyne at this location is a relatively disturbed aquatic ecosystem, although protected species such as Lamprey have been found nearby. The construction of the proposed independent bridge could potentially cause new disturbance to the river channel at the points of construction. Sensitive species such as lamprey, salmon and otter could, therefore, be disturbed by the proposed development.

Construction of a new bridge across the river channel would increase the risk of sediment and/or construction materials falling into the waterway and is less favoured for the above ecological constraints as well as financial and engineering considerations.

Accessibility & Social Inclusion

The option provides good safe access across the River Boyne at Athlumney Street linking the east and west banks of the river for all users. The proposed option is fully accessible and complies with the guidelines set down in “Building for Everyone” published by the National Disability Authority.

Integration

When compared with Option 1 and 2 this option provides a less direct linkage across the River Boyne, for all users in accordance with the Johnstown Quarter Cycle Network.

Modal integration will be achieved by maintaining vehicular traffic routes while improving pedestrian and cyclist access.

Geographical integration is not substantially achieved due to the fact that the bridge is not on the most direct 'desire line' to cross from the west bank to the east bank of the River Boyne.

There is an impact on existing land banks to construct bridge abutments and land take is required through the park to the west bank of the River Boyne with this option.

Cultural Heritage

The proposed independent bridge is circa 30 metres upstream of 'New Bridge' and as such has no direct impact on its cultural heritage or protected views.

Buildability

In order to install such a large prefabricated element as the independent bridge, a substantial crane will be required with circa 500 tonne lifting capacity – such a crane would require a lifting platform of approximately 40 metres x 40 metres. This area would have to be provided in either the parklands to the west bank of the River Boyne or on the R147 regional route to the eastern bank with both locations having substantial impacts on the environs during the construction stage.

There will be a requirement to work within the River Boyne as part of this option for the installation of the proposed bridge.

4.6 Options Appraisal Matrix

Table 2 – Options Appraisal Matrix

Appraisal Criteria	Option 1	Option 2	Option 3
Economy	Lowest Cost	Lowest Cost	Moderate Cost
Safety	High Level of Safety	High Level of Safety	Low Level of Safety without introduction of lighting and CCTV
Environment & Ecology	Least Intrusive	Moderately Intrusive on 'New Bridge' Requires works in the river to be undertaken.	Moderately Intrusive on Existing Banks of River Boyne
Accessibility & Social Inclusion	Fully Accessible	Fully Accessible	Fully Accessible but not on 'desire line'

Appraisal Criteria	Option 1	Option 2	Option 3
Integration	High Level of Integration	High Level of Integration	Moderate Level of Integration
Cultural Heritage	Moderate Effect on Cultural Heritage of 'New Bridge'	Moderate Effect on Cultural Heritage of 'New Bridge'	Least Effect on Cultural Heritage of 'New Bridge'
Buildability	Disruption to traffic will be required to install the supporting structure. Works can be undertaken during school holidays	Disruption to traffic will be required to install the supporting structure. Works can be undertaken during school holidays	Buildable with Minimal Disruption to Existing Bridge and Maximum Disruption to R147 and Parklands
Order Of Preference	**First**	**Third**	**Second**

4.7 Preferred Option

As outlined in Sections 4.2 to 4.5 above and as summarised in the 'Options Appraisal Matrix', the preferred option for the construction of the new pedestrian/cycle bridge is Option 1 – piled cantilever option.

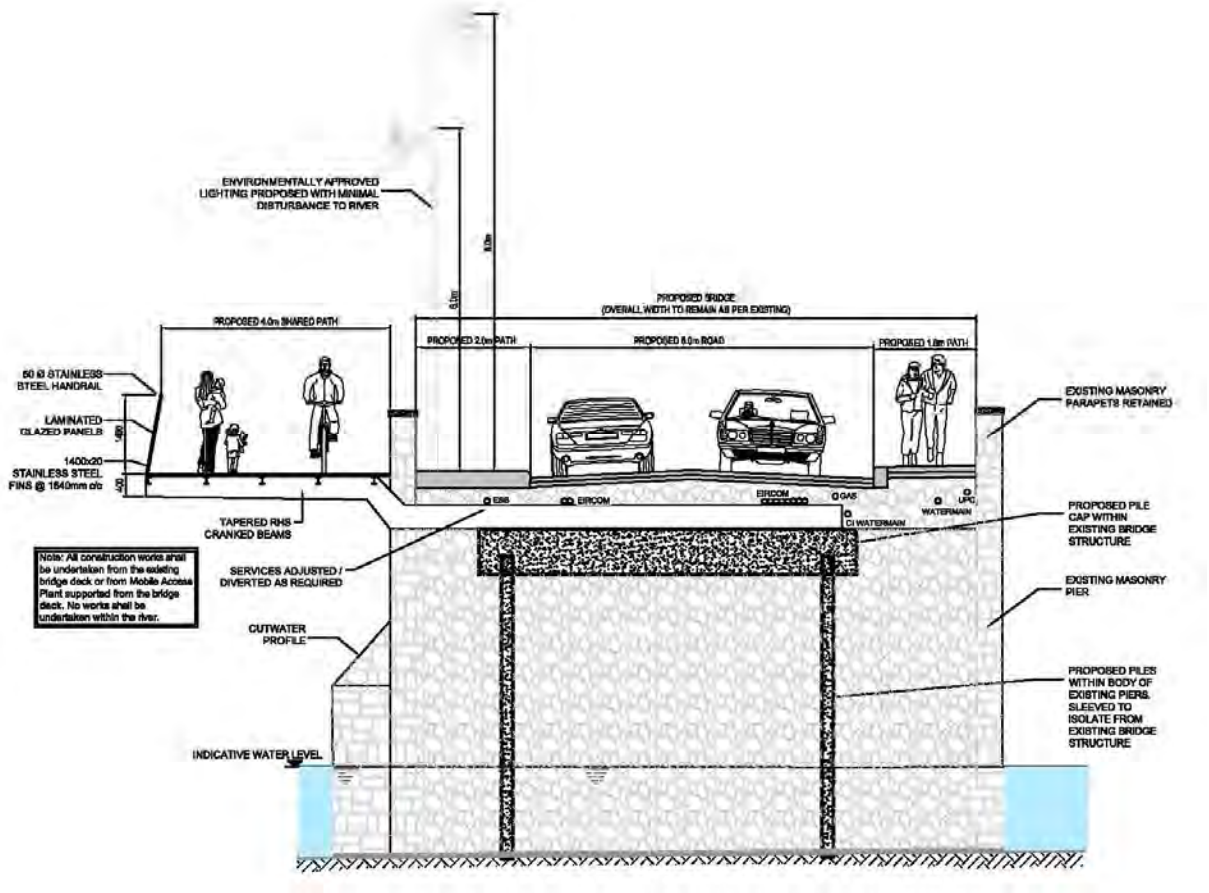
5 Narrative on Preferred Option

The proposed construction methods, visual appearance and finishes for the preferred option of the proposed pedestrian/cycle bridge at 'New Bridge', Navan, Co. Meath is described below.

Structural Form

The proposed structural form will consist of cantilever steel beams protruding through the upstream spandrel wall, at each existing pier location of 'New Bridge', as illustrated in the cross-section detail below.

Figure 1 – Option 1 Proposed Cross Section Detail



The proposed cantilever beams will be tapered along there length to ensure a minimum depth at the upstream edge. Furthermore, given the relative levels of the proposed bridge and the R147 to the east, the view of the underlying structure will never be realised.

Balustrade & Handrail

The proposed balustrade to the pedestrian/cycle bridge will be constructed using stainless steel vertical posts supporting intermediate glass panels.

The glass balustrade will ensure there is minimal visual intrusion on the view of the upstream face of ‘New Bridge’.

Deck Finishes

The proposed deck will be an anti-skid glass-reinforced plastic system providing a durable and maintenance-free surface similar to the Anna Livia Bridge in Chapelizod and the Grand Canal Footbridge in Adamstown, Co. Dublin.

Figure 2 – Anna Livia Bridge, Chapelizod; Northern Deck Finishes

The exact colour/orientation for the deck panels can be agreed with Meath County Council Architect's and Heritage Officer in due course.

Interaction with Existing Bridge Walls

In order to provide a suitable shared surface at the Navan-side of the proposed bridge, it will be necessary to remove a 3.5 metre long section of the upstand wall along the R147 to allow bridge users cross to Navan.

Although not part of the protected bridge structure itself, the works to the existing wall along the R147 will be carried out in accordance with best conservation and heritage practises to ensure minimal disruption to the existing fabric.

Works have been carried out in this location previously (during the road widening works in the 1980's) and this would provide the opportunity to complete the interface of the proposed bridge with the R147 in keeping with best conservation practises.

Figure 3 – Anna Livia Bridge, Chapelizod; Western Interaction with Existing Bridge

The above image illustrates the envisaged detail for the shared surface to the Navan-side of the proposed bridge showing the existing upstand wall cut and repaired with salvaged masonry.

Appendix A – Proposed Scheme Drawing

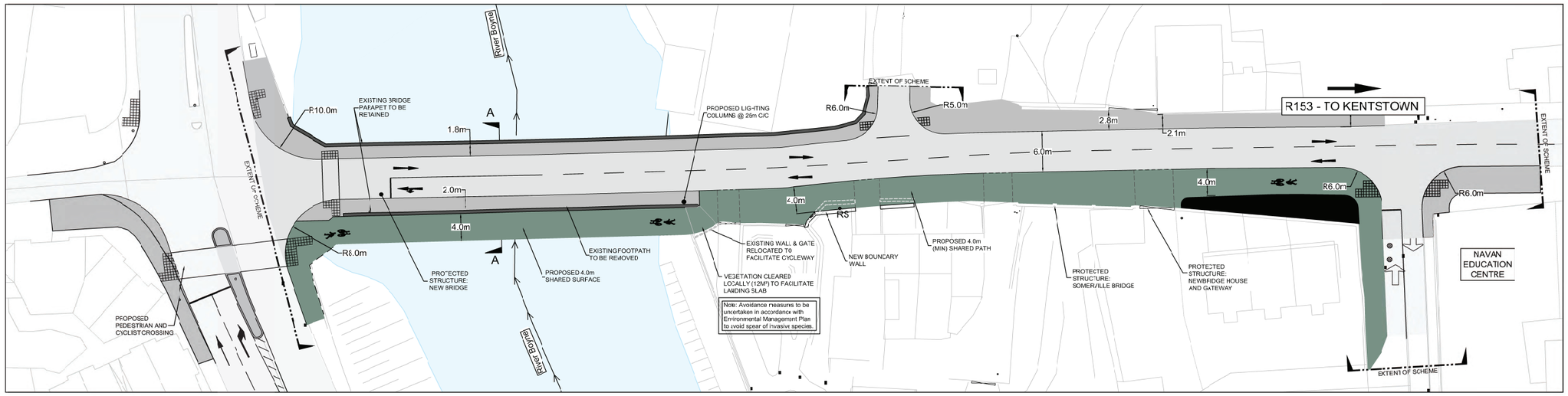
Údarás Náisiúnta Iompair
National Transport Authority

PROPOSED PEDESTRIAN / CYCLE BRIDGE ATHLUMNEY STREET, NAVAN

comhairle chontae na mí
meath county council

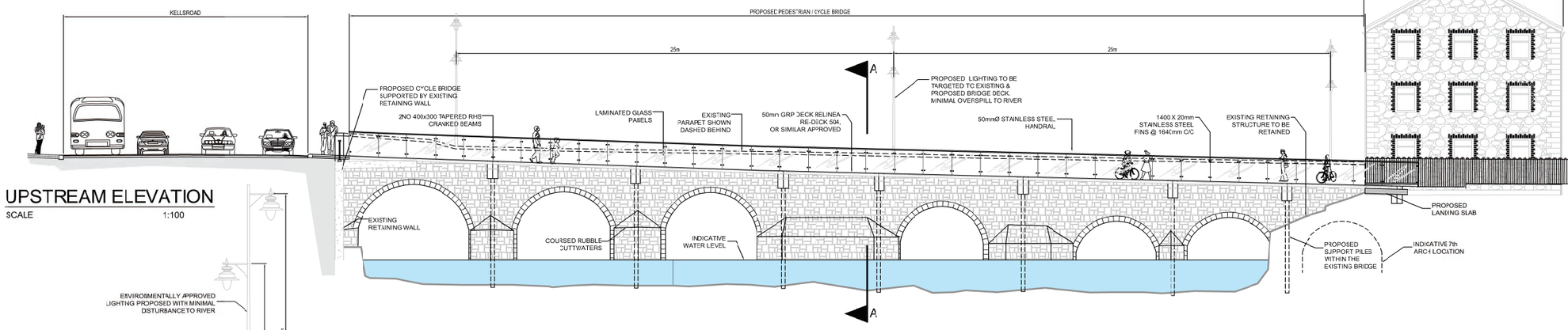
This drawing is producec using the Irish Grid Gecgraphic Coordinate System

A0



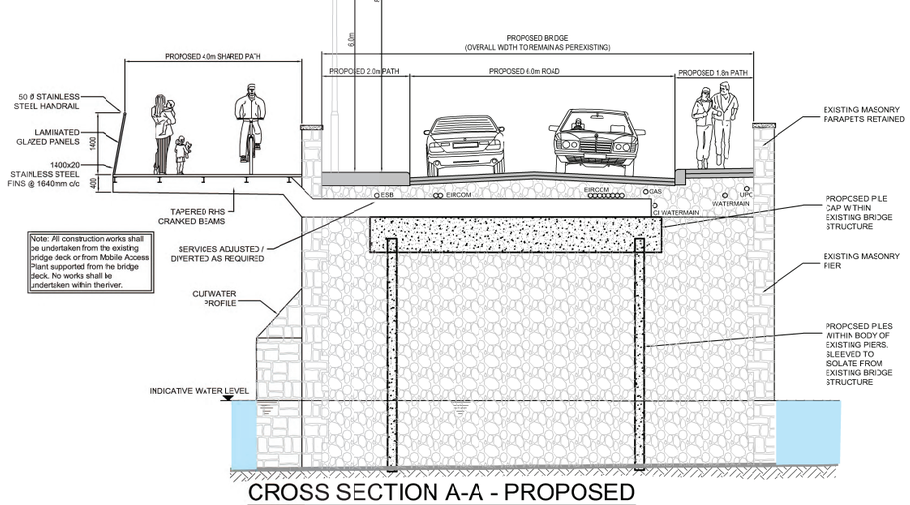
SITE PLAN

SCALE 1:250



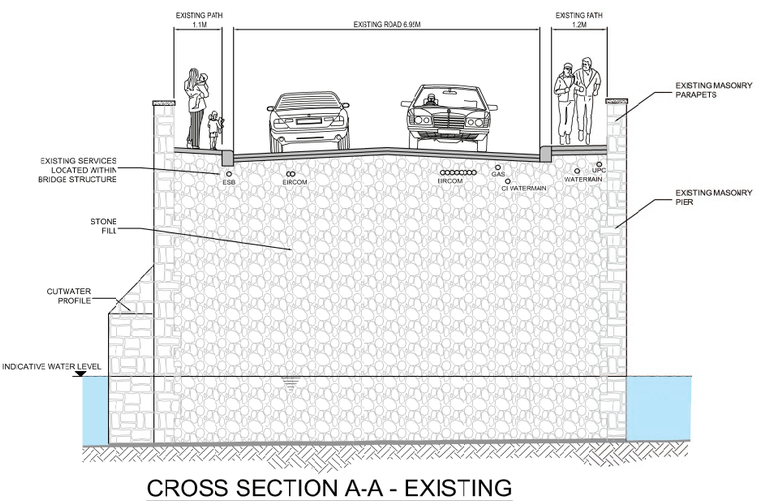
UPSTREAM ELEVATION

SCALE 1:100



CROSS SECTION A-A - PROPOSED

SCALE 1:50



CROSS SECTION A-A - EXISTING

SCALE 1:50

PROTECTED STRUCTURE MILL HOUSE

LEGEND:

- DIRECTION OF FLOW
- EXISTING CARRIAGEWAY
- PROPOSED NEW KERBLINE
- PROPOSED DROPPED KERB
- PROPOSED SHARED SURFACE
- PROPOSED GRASS AREA
- PROPOSED CARRIAGEWAY OVERLAY
- PROPOSED CONTROLLED / UNCONTROLLED TACTILE PAVING
- PROPOSED FOOTPATH
- EXISTING PARAPET
- PROPOSED LIGHTING COLUMNS

Revision	Description	Initials	Date
PL06	Environmental notes added.	KF	12/04/17
PL05	General Adjustments	KF	13/03/17
PL04	Piles added	KF	29/11/16
PL03	General Adjustments	KF	03/11/16
PL02	General Adjustments	MC	27/05/16

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Client: Comhairle Bhaile na hUaimhe NAVAN TOWN COUNCIL

Project: PEDESTRIAN / CYCLE BRIDGE, NEWBRIDGE NAVAN, CO. MEATH

Dwg. Title: PART 8 PUBLIC DISPLAY DRAWING

Drawn By: KF Date: March 2016

Checked by: MC Scale: AS SHOWN @ A0

Dwg. Progress: PART 8

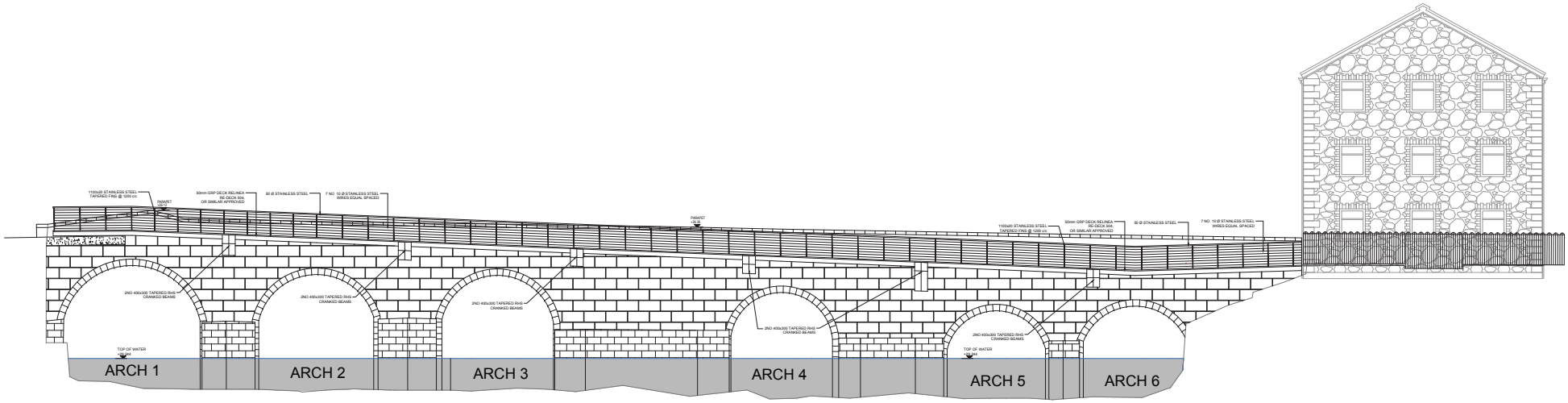
Dwg. No.: 11_079A_00_4002-PL05

Appendix B – Initial Options Considered

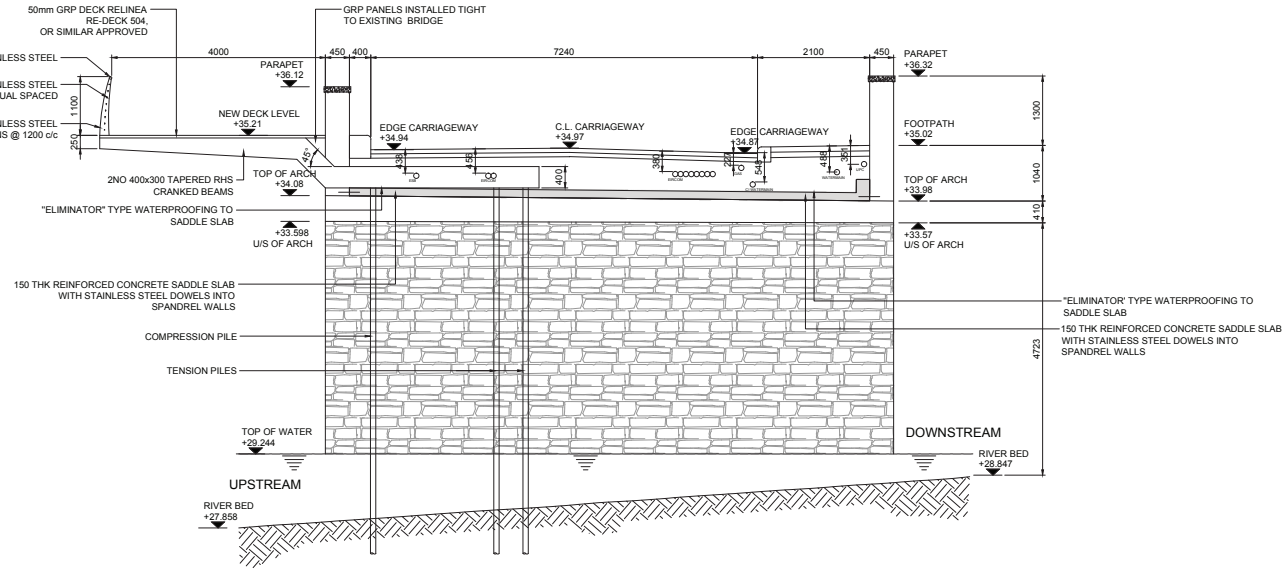
This drawing is produced using the Irish Grid Geographic Coordinate System

A1

comhairle bhaile na huaimhe
navan town council



PROPOSED ELEVATION - PART A



Revision	Description	Initials	Date

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Drawing Status: PRELIMINARY
Date: AUG 2013
Drawn by: CSEA

Comhairle Bhaile ma hUaimhe
Client: NAVAN TOWN COUNCIL
Project: PEDESTRIAN / CYCLE BRIDGE, NEWBRIDGE NAVAN, CO. MEATH
Dwg. Title: PROPOSED BRIDGE DECK ELEVATION - OPTION 1
Drawn By: DL
Date: 14.08.2013
Checked by: DB
Scale: 1:50 @ A1
Dwg. Progress: PRELIMINARY
Dwg. No.: 11_079A_022

IN PROGRESS

PROPOSED WORKS LEGEND:

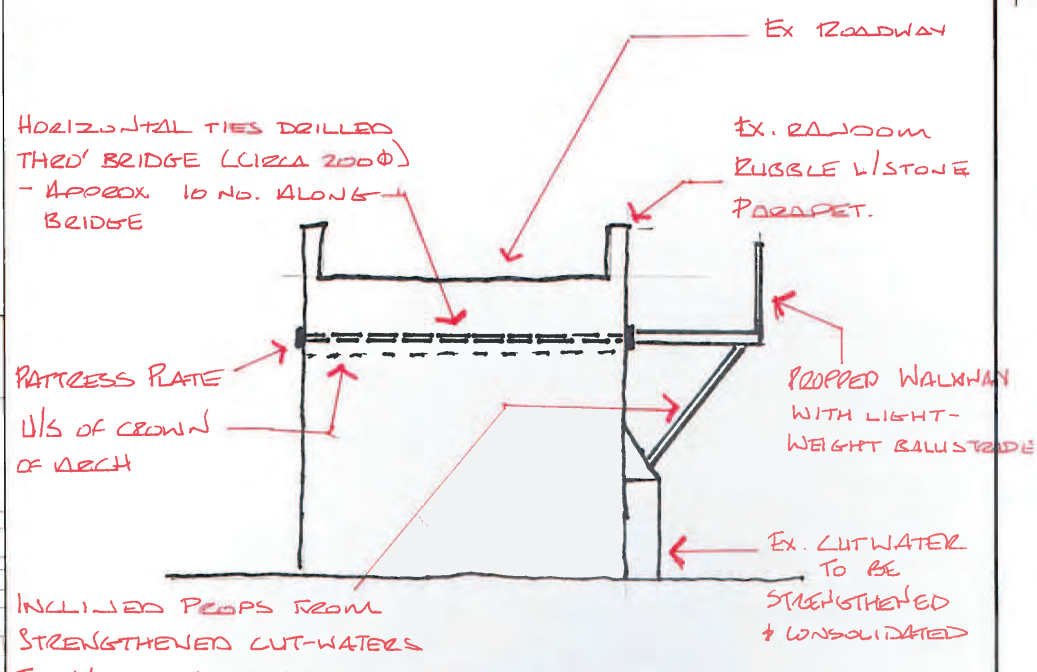
- PROPOSED NEW KERBLINE -
- PROPOSED DROPPED KERB -
- PROPOSED SHARED SURFACE -
- PROPOSED GRASS AREA -
- PROPOSED CARRIAGEWAY OVERLAY -
- PROPOSED NEW PL - PL
- PROPOSED CONTROLLED / UNCONTROLLED TACTILE PAVING -
- PROPOSED FOOTPATH -
- VIEWS AND PROSPECTS TO BE PRESERVED (REV. NAVAN - DEVELOPMENT PLAN 2009-2015) VPS
- EXISTING PARAPET -
- EXISTING FOOTPATH -

EXISTING MASONRY ARCH BRIDGE

NEW PEDESTRIAN WALKWAY

RIVER BOYNE

SIMILAR BRIDGE - CHAPELIZOD



SECTION A-A

- LESS OBTRUSIVE/INTRUSIVE THAN BALLAST BEAM OPTION
- SIGNIFICANTLY REDUCES LOAD IMPOSED ON EXISTING BRIDGE.

Revision	Description	Initials	Date

navan smarter travel

Údarás Náisiúnta Iompair National Transport Authority

comhairle bhaile na huaimhe navan town council

comhairle chontae na mí meath county council

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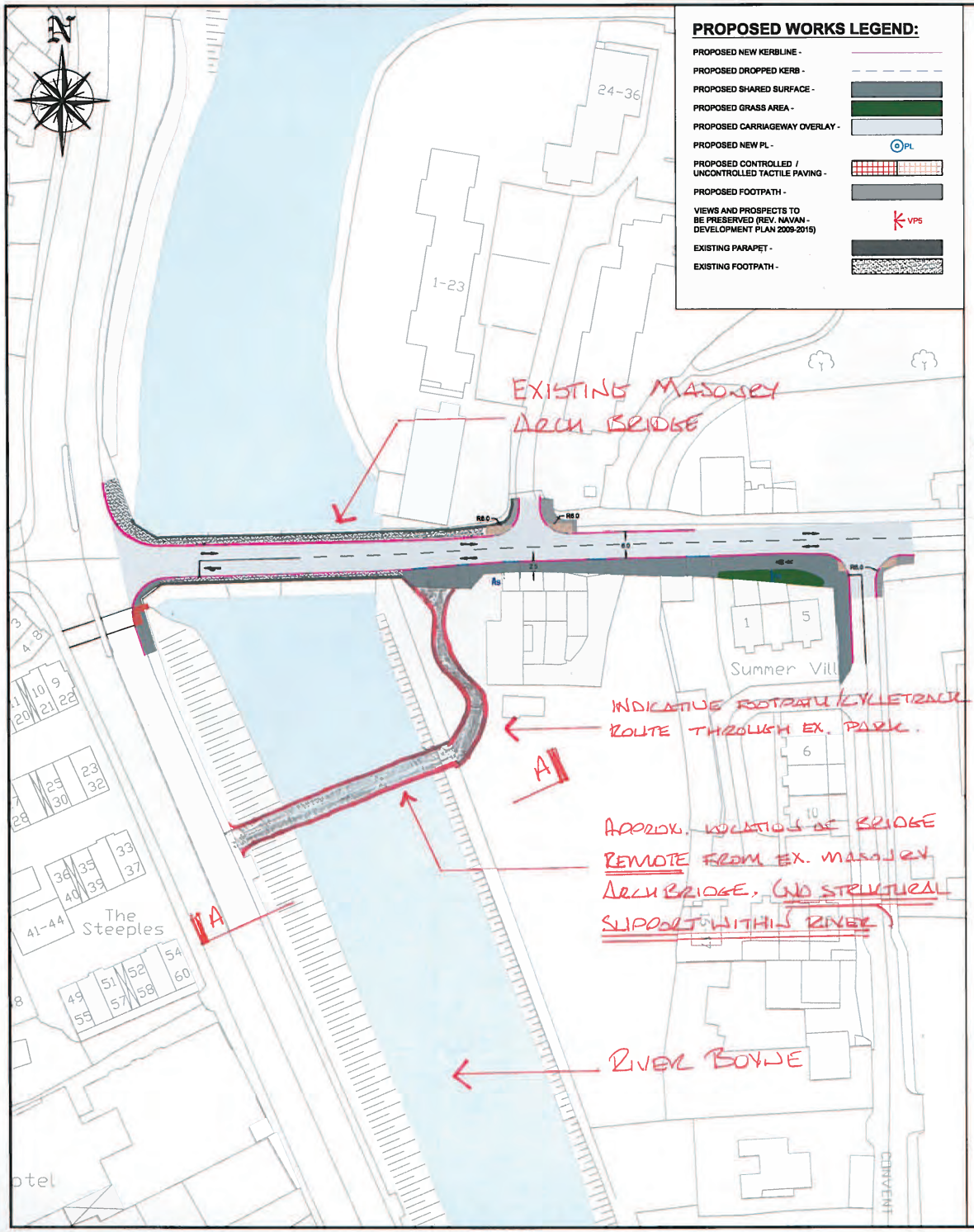
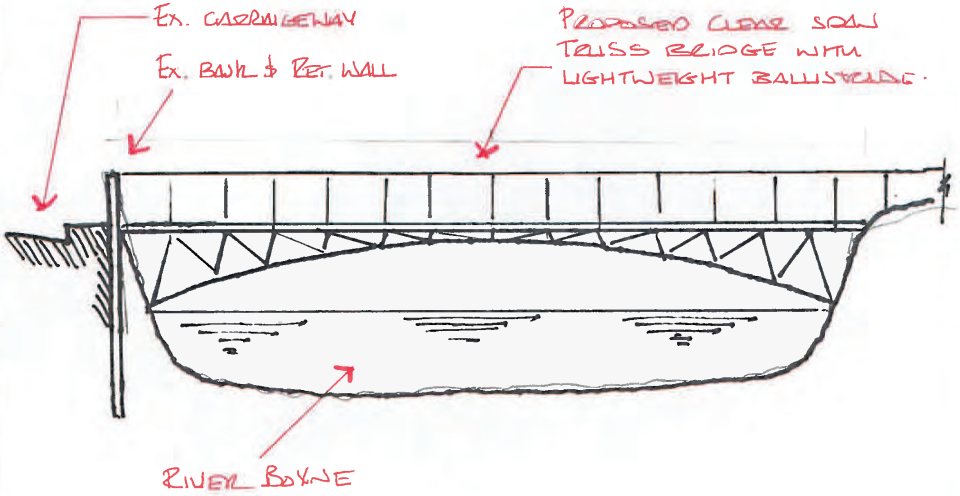
Client	Comhairle Chontae Na Mi Meath County Council
Project	Johnstown Quarter, Navan Smarter Travel Scheme
Dwg. Title	River Boyne Crossing at New Bridge Site Location Plan
Drawn By	DB
Date	JAN 2013
Checked by	GE
Scale	As Shown At A1
Dwg. No.	11_079_SK_001





VIEW A-A

- REMOTE FROM EXISTING BRIDGE HENCE MITIGATING ALL ISSUES RE: HERITAGE
- EXACT GEOMETRY TO BE CONFIRMED BUT ALL FREEBOARD GEOMETRY WOULD BE REPEATED
- ONLY INTERVENTION WOULD BE ON BOTH BANKS BUT REPORT SUGGESTS NO ISSUES HERE.

Revision	Description	Initials	Date

navan smarter travel

Údarás Náisiúnta Iompair
National Transport Authority

comhairle bhaile na huaimhe
navan town council

comhairle chontae na mi
meath county council

CLIFTON SCANNELL EMERSON ASSOCIATES
Consulting Engineers

Client	Comhairle Chontae Na Mi Meath County Council
Project	Johnstown Quarter, Navan Smarter Travel Scheme
Dwg. Title	River Boyne Crossing at New Bridge Site Location Plan
Drawn By	DB
Date	JAN 2013
Checked by	GE
Scale	As Shown At A1
Dwg. No.	11_079_SK-002

Appendix C – Ecology Reports

Appendix C - 1 – Appropriate Assessment Screening Report

New Bridge
Navan, Co. Meath

APPROPRIATE ASSESSMENT SCREENING REPORT

Competent Authority: Meath County Council
Author of AAS: Dr Niamh Roche MCIEEM

Contents

1. Introduction and Legislative Background

1.1 Background

This Appropriate Assessment Screening has been prepared by Dr Niamh Roche MCIEEM on behalf of Clifton Scannell Emerson Associates, Consulting Engineers, for their client Meath County Council. The Statement addresses a proposed cantilevered pedestrian bridge at New Bridge, Navan, Co. Meath. The purpose of this report is to determine the effects of the proposed development, if any, on European conservation designated site(s) (i.e. Natura 2000 sites). The report also aims to determine the appropriateness, or otherwise, of the proposed development in the context of the conservation status of such sites.

While a statutory Environmental Impact Statement is not necessary because the size and nature of the proposed development does not exceed the threshold whereby one would be required, an ecological study has been carried out and an Appropriate Assessment Screening has been written regarding the development due to its situation within the Boyne and Blackwater SAC and Boyne and Blackwater SPA, Natura 2000 sites.

1.2 Regulatory Context

The EU Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna, also known as The Habitats Directive, provides the framework for legal protection of habitats and species of European importance. Articles 3 to 9 of the Directive provide the legislative means to protect habitats and species of Community Interest through the establishment and conservation of an EU-wide network of sites known as Natura 2000. These are: Special Areas of Conservation (SACs) designated under the Habitats Directive; and Special Protection Areas (SPAs) designated under the Conservation of Wild Birds Directive (79/409/EEC) (also known as the Birds Directive).

Article 6(3) and 6(4) of the Habitats Directive set out the decision making tests for plans and projects likely to affect Natura 2000 sites (Annex 1.1). Article 6(3) establishes the requirement for Appropriate Assessment:

> *"Any plan or project not directly connected with, or necessary to, the management of the (Natura 2000) site but likely to have a significant effect thereon, either individually or in combination with other plans and projects, shall be subjected to appropriate assessment of its implications for the site in view of the site's conservation objectives. In light of the conclusions of the assessment of the implication for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public."*

1.3 Stages of Appropriate Assessment (AA)

The procedure has been undertaken in accordance with the European Commission Methodological Guidance on the provision of Article 6(3) and 6(4) of the Habitats Directive (EC2001) and the European Commission Guidance 'Managing Natura 2000 Sites' and the Guidance Document for Appropriate Assessment of Plans and Projects in Ireland by the National Parks and Wildlife Service (2009, revised 2010).

In complying with the obligations under Article 6(3) and following the above Guidelines, this report has been structured using a matrix approach as follows:

1. Screening stage
    - Description of the project
    - Identification of the Natura Sites potentially affected

- Identification and description of individual and cumulative impacts likely to result from the project.
- Assessment of the significance of the impacts identified above on site integrity. If it is objectively concluded that there will be no significant impacts the second stage (Appropriate Assessment or Natura Impact Stage) is not carried out.

2. Appropriate Assessment Stage (if necessary)
    - Description of the Natura 2000 site(s) that is (are) considered as part of the AA
    - Description of the significant impacts on the conservation of these sites likely to occur from the project
    - Recommendations.

The Habitats Directive promotes a hierarchy of avoidance, mitigation and compensatory measures. First, the project should aim to avoid any negative impacts on Natura 2000 sites by identifying possible impacts early in the planning stage, and designing the project in order to avoid such impacts. Secondly, mitigation measures should be applied, if necessary, during the AA process to the point where no adverse impacts on the site(s) remain. If the project is still likely to result in adverse effects, and no further practicable mitigation is possible, then it is rejected. If no alternative solutions are identified and the project is required for imperative reasons of overriding public interest (IROPI test) under Article 6(4) of the Habitats Directive, then compensation measures are required for any remaining adverse effect.

2.0 Project Description

2.1 Introduction

The proposed development site is a stone bridge (New Bridge) in Navan town that carries two lanes of vehicular traffic across the Boyne River. The River Boyne is designated a Natura 2000 site.

Plate 1: New Bridge with old stone walls (upstream view). The pedestrian bridge is proposed for this south facing side of the bridge (photo taken in 2013 prior to ivy removal and bridge cleaning in 2015).

Plate 2: New Bridge upstream, view from the bank opposite to that in Plate 1, above. Photo taken in February 2016, after cleaning works had taken place in 2015).

Plate 3: New Bridge with old stone walls (downstream view). Photograph taken in February 2016.

2.1 Existing Conditions

The existing 'New Bridge', a protected structure constructed in 1756, is a 7-span masonry arch bridge connecting Athlumney on the east bank of the River Boyne with Navan Town Centre on the west bank. Six of the arches are clearly visible and are located within the existing river channel; a seventh arch is located on the eastern side of the river and has been filled in on its southern elevation to facilitate a public park area.

The existing bridge carries a 7.0 metre wide single-lane carriageway over the River Boyne. The Navan end section of the R153 regional route which runs on the bridge is known as Athlumney Street. This road connects Navan with the N2 national route. The bridge is an important piece of infrastructure as it carries a large volume of traffic from the M3 to the N2 national route and onwards to the M1 Motorway; the main Dublin-Belfast road.

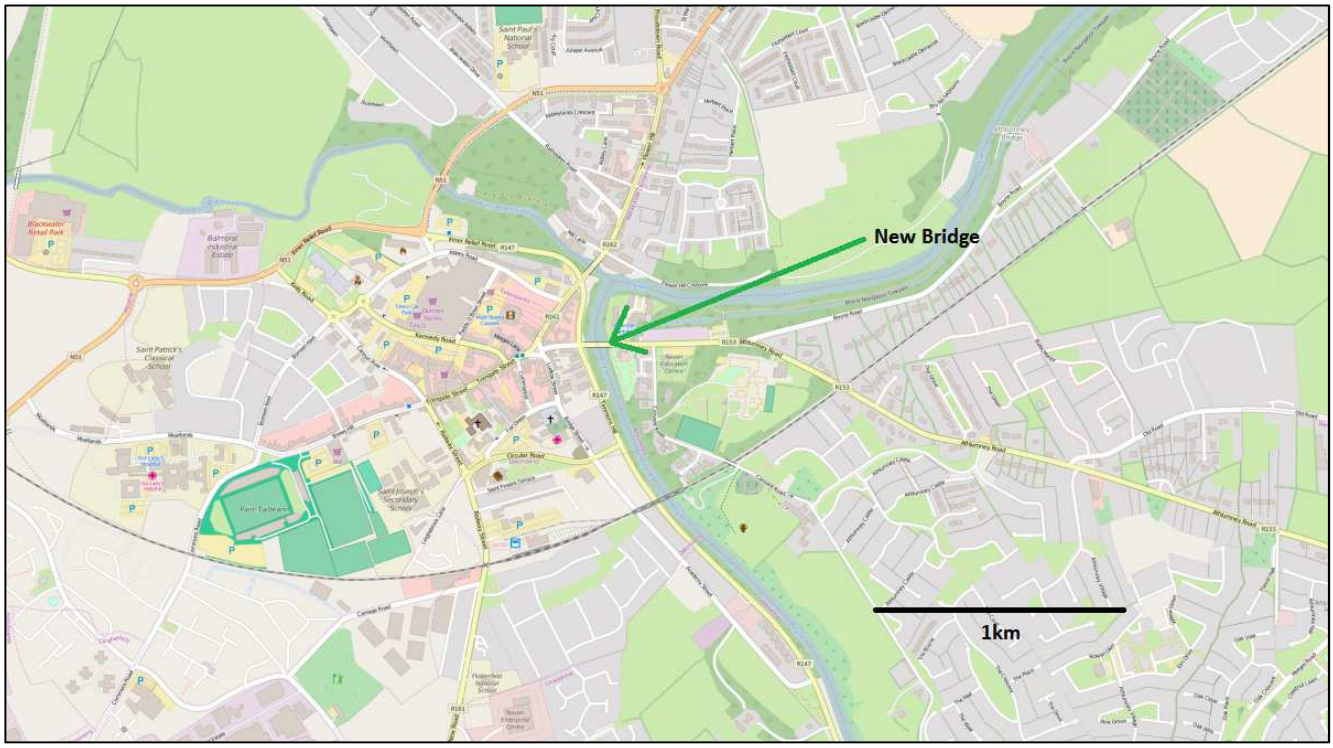


Figure 1: Location of New Bridge, Navan, Co. Meath. Map sourced from OpenStreetMap using QGIS under GNU General Public Licence.

2.2 Description of the proposed works

The proposed works comprise of the construction of a new bridge structure, located immediately upstream (south) of the existing bridge. The proposed bridge will not require new bridge piers or works in the river. Instead, the new bridge is proposed to be constructed using the existing structure of "New Bridge" for support; piles will be inserted into the existing "New Bridge" structure connected to a support beam which will prop the pedestrian / cyclist structure.

Works to the Existing Bridge; "New Bridge"

No realignment works are proposed to the existing bridge structure or its approaches. However, some minor surface works are proposed as follows:

- The existing footpath located on the north side of the bridge will be widened to 1.8 m in width.
- The existing line-marking on the carriageway will be removed and replaced. A total lane width of 6.0 m will be provided.
- The existing footpath located on the south side of the bridge will be removed; a kerb will be provided to restrict vehicle access to travel lanes.

- The existing lighting columns (6 no.) will be removed and replaced. The proposed new lighting columns will be designed in accordance with environmental protection measures as follows:
    - This lighting shall be designed to be sensitive to the needs of bats and specifically in accordance with the guidance set down in "Bats and Lighting", published by Bat Conservation Ireland in December 2010
    - Directional lighting will be provided to focus only on the bridge deck areas, with minimal light spillage onto the watercourse (limited to 1 lux)

Proposed Works; New Structure

The new bridge, proposed for the south side of the existing structure, will have the following features:

- Approximately 50 m in length and 4.0 m in width.
- The proposed structure will consist of tapered RHS cranked beams overlaid with a GRP Relinea deck or similar. Stainless steel fins and glass panels are proposed for the south parapet of the new bridge.
- Piles supporting the new structure shall be constructed within the body of the existing bridge piers thus removing the need for any works within the river. The location of the piers can be seen on Drawing 11_079A_00_4002PL05.

Proposed Works; Bridge Approaches

The following works are proposed on the approaches to the proposed bridge:

- A new pedestrian / cyclist crossing is proposed at the existing traffic signals located on the western approach to the bridge, at the intersection of the R147 (Kells Road) and the bridge. The new crossing is proposed on the south arm of the intersection.
- A shared path, minimum 4.0 m in width, is proposed on the eastern approach to the bridge, on the south side of Athlumney Street.

Key Construction Operations

The main construction operations which must be undertaken to construct the above works are identified in sequence below. The works shall be undertaken from the existing bridge deck/embankments. Any access over the water shall be from mobile access plant located on the existing bridge structure. No works will take place within the river itself.

- Closure of the bridge and diversion of traffic – A closure of the bridge shall be required to facilitate the construction of the bridge due to the impact on the existing road pavement.
- Excavation of trenches at the location of the proposed supporting beams – Trenches shall be opened within the road on the existing bridge to determine the location of the proposed beams to support the new pedestrian bridge and to prepare for the proposed piling operations.
- Drilling of supporting piles – These piles shall be installed within the body of the existing structure ie drilled through the existing bridge piers thus there shall be no disturbance of the river bed.
- Clearing vegetation at abutment locations – Existing vegetation shall be cleared to provide for the abutment/landing slab locations for the new bridge. All movement of vegetation and soil shall be undertaken within a timber framed hoarding erected at the embankment edge. All soil and vegetation shall be disposed of to an approved disposal facility.
- Casting pile caps – Pile Caps shall be cast above the proposed piles and within the existing bridge structure.

- Removal of part of the parapet wall to facilitate new steel frame – This will involve the removal of a small amount of stonework from the existing parapet to facilitate the installation of steel beams from the pile cap through the parapet wall to support the proposed bridge deck.
- Construction of abutment walls- Abutment walls shall be constructed outside of the river bed on the river embankments/existing retaining wall.
- Installation of beams – The cranked cantilever beams shall be installed through the holes opened up in the parapet walls. This steel shall be fixed to the pilecap to provide a connection to the supporting piles.
- Installation of temporary working platform- A temporary working platform may be required for connection of elements of the bridge prior to the deck installation. This shall be supported from the proposed main steel cantilever beams.
- Installation of secondary steel (e.g. handrails, bracing)- The secondary steel shall be installed from the temporary working platform.
- Installation of ducted services – Where additional ducted services are required they shall be supported from the proposed bridge structure or installed within the existing bridge deck.
- Reconstruction of stone in parapet walls – This will involve the replacement of a small amount of stone work around the newly installed steel cantilever beams.
- Installation of bridge deck – The Bridge Deck shall be installed above the river on to the supporting steelwork potentially replacing the temporary working platform.
- Filling of excavations on New Bridge and reconstruction of pavement – Once the piles, pilecaps and associated steel work are complete within the existing Bridge Structure reinstatement of the road will be undertaken. This will include filling with stone and the construction of a new road pavement and associated footpaths. These works shall all be undertaken within the confines of the existing parapet walls.
- Installation of lighting – New Lighting columns and Luminaires shall be installed on the existing bridge.
- Lining and marking – New road markings and signage shall be installed on the existing and new bridge to complete the works.

The successful contractor will be required to prepare a Construction Management Plan, in accordance with this Appropriate Assessment Screening document and the Environmental Management Plan prior to commencement of the works.

2.3 Avoidance Measures to be implemented during the proposed works

While no works proposed as part of the construction project will be carried out in the water, the proximity of the new development to the river and its situation within the boundary of Natura 2000 sites means that it could potentially impact on protected species.

The project works are estimated to be completed in approximately 11 weeks. The Environmental Management Plan (included in Appendix A) outlines the detailed avoidance measures which will avoid any likely impact on the qualifying interests. The following actions shall be implemented by the Contractor for the project's duration:

1. The Contractor will submit the following plans demonstrating their understanding and compliance with the environmental and ecological constraints of the project. These documents will be forwarded to the relevant Local Authority departments within Meath County Council for approval. The contents of these documents will form the basis of weekly audits to be carried out by the Employer's Representative during the construction works.
    a. Construction Management Plan

b. Site Management Plan

c. Waste Management Plan

d. Chemical / Toxic Material Management Plan

e. Earthworks Management Plan

2. An Ecological Clerk of Works shall be appointed to ensure that all avoidance measures are fully implemented in accordance with the approved Management Plans.
3. The Main Contractor will be required to demonstrate their accreditation under NSAI ISO 14000 "Environmental Management Systems" to be considered competent to carry out the project.
4. Works will be completed in accordance with the Fisheries Ireland guidance document "Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (2016)
5. The following conditions will be included in the contract issued to the successful tenderer. These clauses will also be included in the tender documentation issued:

    a. Construction vehicles are not permitted to enter the river; works are to be completed from the existing bridge structure which will be closed to traffic during construction.

    b. The Contractor must avoid degradation, contamination or pollution of the river from spills, construction materials or site spoil.

    c. Construction plant must be well maintained to avoid fuel spills to the river.

    d. Cleaning out of site plant must take place at a location isolated from the river, with no runoff to the river permitted.

    e. The contractor must install appropriate environmental screens to prevent any construction runoff or waste during works to the river. The contractor must also consider the existing bridge drainage system and ensure construction runoff or waste is not permitted to be collected by this system.

    f. The contractor will be required to notify Fisheries Ireland and the NPWS of the works seven days in advance of the works and within seven days of works completion.

6. Following the appointment of a successful contractor to undertake the work, reference must be made to this document, the Construction Management Plan and the AA Screening Report on all construction drawings.

The above measures are to be implemented by the contractor in with all other standard site regulations and legislative measures. The above list is not to be considered exhaustive by the contractor.

2.3.1 Deposition of Spoil or Rubbish within the SAC / SPA

There is potential during site preparation and construction for accidental deposition of spoil or rubbish within the SAC / SPA. Grout, concrete and cement are toxic to fish (Eastern Regional Fisheries Board, date unknown) and certain activities can only be carried out within SAC's with the permission of the Minister for Arts, Heritage and the Gaeltacht. These are called *Notifiable Actions* and the most relevant to the current proposed development is "Dumping rubbish or other materials or disposing of any chemicals or wastes in streams/rivers or into water-courses running into them".

Avoidance Measures and management procedures

It will be stated explicitly in the contract documents and on relevant drawings that the construction site is located within a protected site and that dumping of any kind is an offence. The contractor will be required to hold toolbox talks to ensure that all operatives are aware that this is the case and are aware of the measures for disposing of any waste from site.

Prefabricated members will be utilised where possible to limit the potential for loose debris / waste material from construction entering the watercourse.

The removal of stone material from the bridge spandrel walls shall be undertaken manually in a controlled manner and all debris / loose material transferred to a skip to be held on site for disposal to a licensed waste disposal facility.

External access to the existing bridge shall be undertaken using either an appropriate mobile platform operating from the existing bridge deck or by floating pontoon. In either case debris shall be placed into bags and transferred to the skip.

Where a steel structure has been put in place netting shall be supported from this below the structure to ensure that no debris enters the river during the course of the construction of the new pedestrian / cycle bridge.

2.3.2 Dust and Pollution

During construction if suitable preventative measures are not taken there is potential for pollution or dust to cause damage to the river. Construction site offices are likely to be set up in close proximity to the bridge. Any diesel or fuels stored here would be located very close to the river and therefore need to be prevented from accidentally spilling into the aquatic habitat.

Avoidance Measures and management procedures Dust minimisation measures will be enforced to ensure there is no deposition of dust on surrounding habitats. Appropriate measures during site clearance and development will be taken to prevent movement of dust into adjacent habitats.

These appropriate measures include the erection of nets under the cantilever structure and bunding of any waste prior to its removal from the site. All netting will be certified in accordance with IS EN 1263:1 2002 and nets will be fitted in accordance with IS EN 1263-2:2002. These standards will be contained with the Works Requirements (the Specification) to be issued with the Tender.

All fuel tanks will be fully bunded and located in a suitable area, away from the SAC.

All bunds will be tested in accordance with Environmental Protection Agency guidelines with tests being carried out under the supervision of the Employer's Representative.

The above measures will be stated explicitly in the contract documents and on relevant drawings.

2.3.3 Removal of Vegetation

Existing vegetation has been removed from the existing bridge structure as part of previous remedial works to the bridge. However, there remains small areas of vegetation to be removed at the eastern abutment of the proposed pedestrian / cycle bridge. Herbicidal sprays should not be used prior to vegetation removal, since these would introduce potential for herbicides to enter the river system.

Avoidance Measures and management procedures All site clearance and vegetation removal will be carried out with perimeter netting in place to prevent debris or material being removed from falling into the River Boyne. All netting will be certified in accordance with IS EN 1263:1 2002 and nets will be fitted in accordance with IS EN 1263-2:2002. These standards will be contained with the Works Requirements (the Specification) to be issued with the Tender.

All materials used on site require formal approval from the Employer's Representative via the submission of "Material Approval Requests". No herbicides will be used unless approved by the National Parks and Wildlife Service (NPWS) for use in proximity to the river.

The above measures will be stated explicitly in the contract documents and on relevant drawings.

2.3.4 Street Lighting / Artificial Lighting

In order to maximise the safety of pedestrians and cyclists, new lighting is required for the proposed bridge. Due to the sensitivity of the SAC and SPA it is recommended that mercury and metal halides should be avoided and the lighting scheme should be designed to focus on bridge deck areas only and to permit a *maximum* of 1 lux light spillage onto the water's surface.

Avoidance Measures and management procedures The lighting will be designed to be sensitive to the needs of bats feeding on the watercourse and specifically in accordance with the guidance set down in the publication "Bats and Lighting", as published by Bat Conservation Ireland in December 2010. Lighting will be directional and targeted to focus on the bridge deck areas, with minimal light spillage to the watercourse (<1 lux). All design and details will be agreed with the NPWS and clearly detailed in the Tender / contract documentation.

The engineer will ensure that a lighting design is produced by the contractors' lighting supplier which complies with the specification agreed with the NPWS. Confirmation and an inspection of the lighting shall be undertaken on commissioning to ensure that the lighting complies with the specified design.

Additionally, it will be recommended to the Local Authority that the lighting shall be inspected periodically as part of a maintenance regime to ensure that the lighting remains operational in compliance with the specified design.

2.3.5 Invasive Exotic Species

There is a risk associated with movements of soil in or near the SAC that invasive exotic species may be introduced to the waterway or riverbank.

Avoidance Measures and management procedures For these proposed works the only proposal for soil movement is to the east of the bridge, where landscaping is proposed at the corner of Athlumney Road and Convent Road. However, sterile soil or compost would be required at this location since it is currently paved.

Soil movements will not take place within the SAC / SPA.

Measures to prevent disturbance to bankside vegetation should be taken in order to prevent further spread of Himalayan balsam through disturbance of bank vegetation. A timber-framed plywood-faced hoarding will be constructed at the river bank to prevent spread of species through bank disturbance. All softwood timbers will be treated with suitable inert preservatives, as approved by the Employer's Representative, to protect them from deterioration in the wet environment. Similarly, the plywood facing will be constructed from 18 mm marine plywood to ensure maximum durability and robustness.

The successful contractors "Earthworks Management Plan" will outline as a minimum the disposal location of exported material, the source location of imported material, routes for haulage, methods for placing and stockpile locations / methods for the approval / appraisal of the Employer's Representative.

2.3.6 Reduction of Habitat Area

The project will have no impact on the Annex I habitat, riparian woodland, downstream at Oldbridge. The Annex I alkaline fen of the SAC is situated upstream near Clonmellon and will also not be impacted by the proposed development, either directly or hydrologically. Additionally, the area of aquatic or terrestrial semi-natural habitats in the vicinity of the site will not be impacted.
The stone wall habitat available for lichens, bryophytes and small vascular plants may be reduced during site works. Although this is not an Annex I habitat measures are nonetheless suggested to prevent loss of species diversity.

Avoidance Measures and management procedures Extensive repointing was undertaken as part of previously completed remedial works, out of necessity in order to protect the structural integrity of the bridge. The remedial works undertaken also indicate that the majority of necessary grouting has been completed. Therefore, there will be minimal requirement for additional grouting / pointing as part of these proposed works which limits the associated risks. Cleaning of the bridge façade has also been previously undertaken; without the use of chemicals.
The proposed works will not reduce the available stone wall habitat to any significant level. Only small portions of stonework will be removed in order to facilitate the insertion of the metal frame for the bridge. The remaining stone faces of the bridge shall remain intact.

2.3.7 Disturbance to Key Species

While no evidence for roosting bats was presented from bridge inspections in summer 2013 these mammals are mobile species and construction workers and engineers on-site should be aware that bats may still roost at the project's location on occasion.

Avoidance Measures and management procedures Where any works are to impact upon the existing bridge structure an inspection will be undertaken to ensure that bats are not roosting prior to commencement of the works. In the event that bats are found works shall cease and the NPWS ranger will be informed. No further works will be undertaken until mitigation measures as defined by the NPWS have been undertaken.
Should any bats be found or disturbed from the bridge during construction work, works will cease until a trained licensed bat specialist and / or the NPWS Wildlife Ranger has been contacted and provided instructions on how to proceed. Bats are protected mammals and intentional disturbance to these species or their roosts is an Offence under the Wildlife Acts.
The above measures will be stated explicitly in the contract documents and on relevant drawings.

3.0 Screening Matrix

3.1 Identification of Natura 2000 sites

Locations and boundaries of all Natura 2000 sites within 15km of the proposed works were identified and reviewed using the National Parks and Wildlife Service (NPWS) online map viewer (2013). Boundary shapefiles were also downloaded allow mapping of site boundaries.

The River Boyne and River Blackwater SAC (Site Code 2299) is a protected area that spans a large area, mainly in County Meath. The Boyne and Blackwater are also designated as a Special Protection Area (Site Code 4232).

The River Boyne and River Blackwater SAC is designated due to the presence of two habitats listed in Annex I of the EU Habitats Directive - alkaline fen and alluvial woodlands. The alkaline fen of the SAC is located at Lough Shesk, Feehan Lough and Newtown Lough, near Clonmellon on the Meath/Westmeath border. Alluvial woodlands are situated within the river channel downstream of Oldbridge, near Townley Hall, 2.5 kilometres west of Drogheda. The SAC is also selected for the presence of the following species listed on Annex II of the same Directive - Atlantic Salmon (*Salmo salar*), Otter (*Lutra lutra*) and River Lamprey (*Lampetra planeri*). These species occur along the length of the rivers. An additional Annex II Lamprey species is also known to occur in the Boyne – the brook lamprey (*Lampetra fluvialitis*).

Bird species listed in Annex I of the Birds Directive and noted in the SAC datasheet:

- *Cygnus cygnus* (Whooper swan), wintering population of 50-200 individuals

Other important species also found along the Boyne/Blackwater are:

- *Juncus compressus* (Round-fruited rush)
- *Poa palustris* (Swamp meadowgrass)
- *Pyrola rotundifolia* (Round leaved wintergreen)
- *Rana temporaria* (Common frog)
- *Lepus timidus hibernicus* (Irish hare)
- *Martes martes* (Pine marten)
- *Meles meles* (Badger)
- *Mustela erminea hibernica* (Stoat)
- *Dactylorhiza traunsteineri* (Narrow-leaved marsh orchid)

At New Bridge in Navan the Boyne river runs through a relatively narrow floodplain, there is very little semi-natural habitat here due to its urban setting. A full site synopsis for the Boyne Blackwater SAC and SPA is provided with the Flora and Fauna report (Roche, Unpub).

The rivers were designated as an SPA because of the presence of the following bird species that is listed in Annex I of the Birds Directive:

- Alcedo atthis (Kingfisher)

In 2010 an estimated 19 breeding pairs were recorded from the site and it is, therefore, considered a site of national significance for this species.

Additional regularly occurring migratory birds found on the Boyne/Blackwater that are of conservation importance but not listed on Annex I of the EU Birds Directive are:

- *Anas crecca* (Teal)
- *Anas platyrhynchos* (Mallard)
- *Phalacrocorax carbo* (Shag)
- *Ardea cinerea* (Grey Heron)

Other important species of Flora and Fauna

- *Cygnus olor* 90i (Mute swan)

Among the threats to the site's integrity are further drainage schemes and water pollution.

The Boyne is a designated salmonid water under the European Communities (Quality of Salmonid Waters) Regulations of 1988 (S.I. No. 293, 1988). The Boyne is one of the country's premier game fisheries, and both the Boyne and its tributaries offer a wide range of fishing for spring salmon and grilse, sea-trout and brown trout.

Figures 2 and 3 below shows the overlapping boundaries of both SPA (black outline) and SAC (red outline) designations around the greater Navan area and in more detail at the location of the New Bridge site.

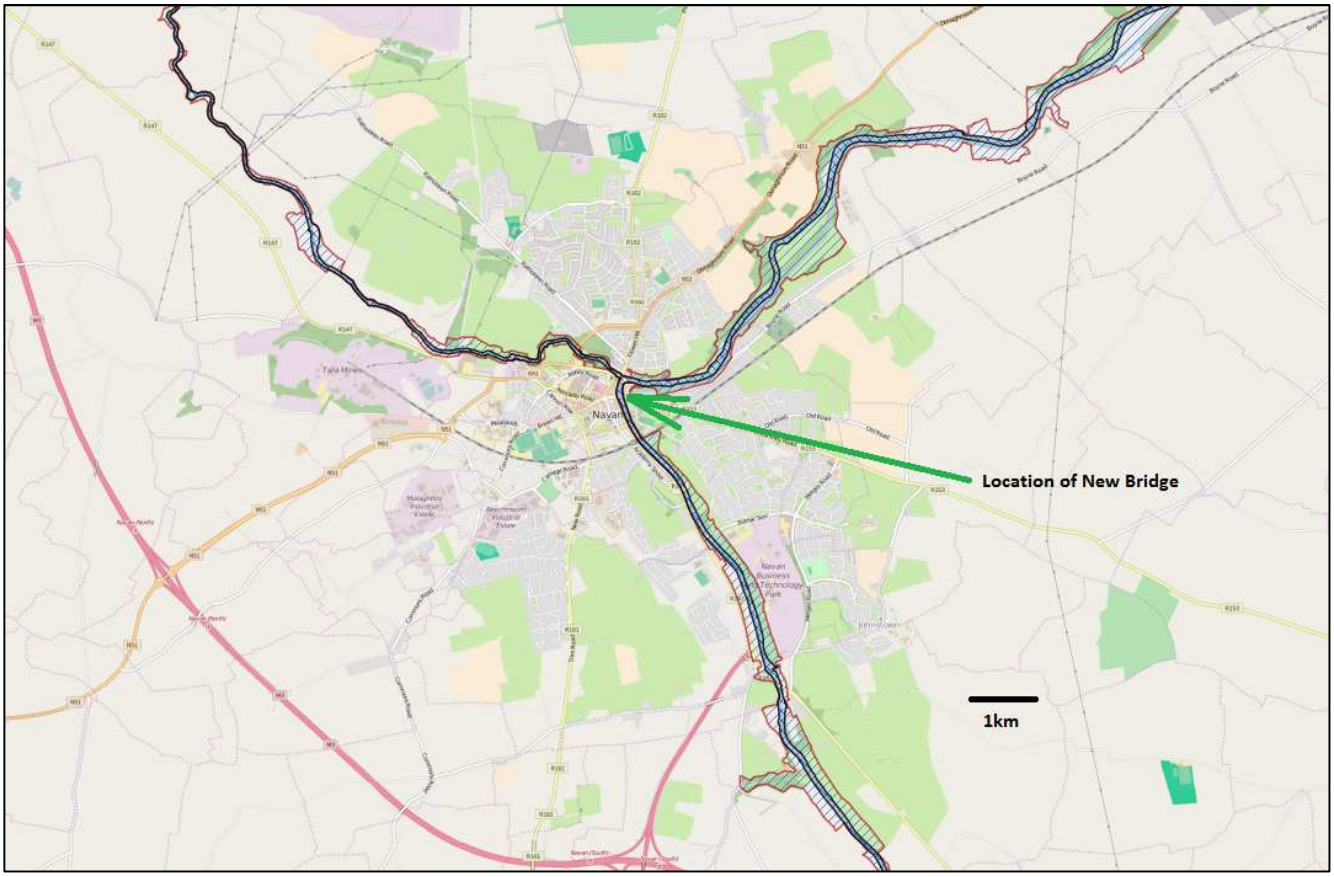


Figure 2: The context of the Boyne Blackwater SPA (black outline) and SAC (red outline) designations around Navan. Map sourced from OpenStreetMap using QGIS under GNU General Public Licence.

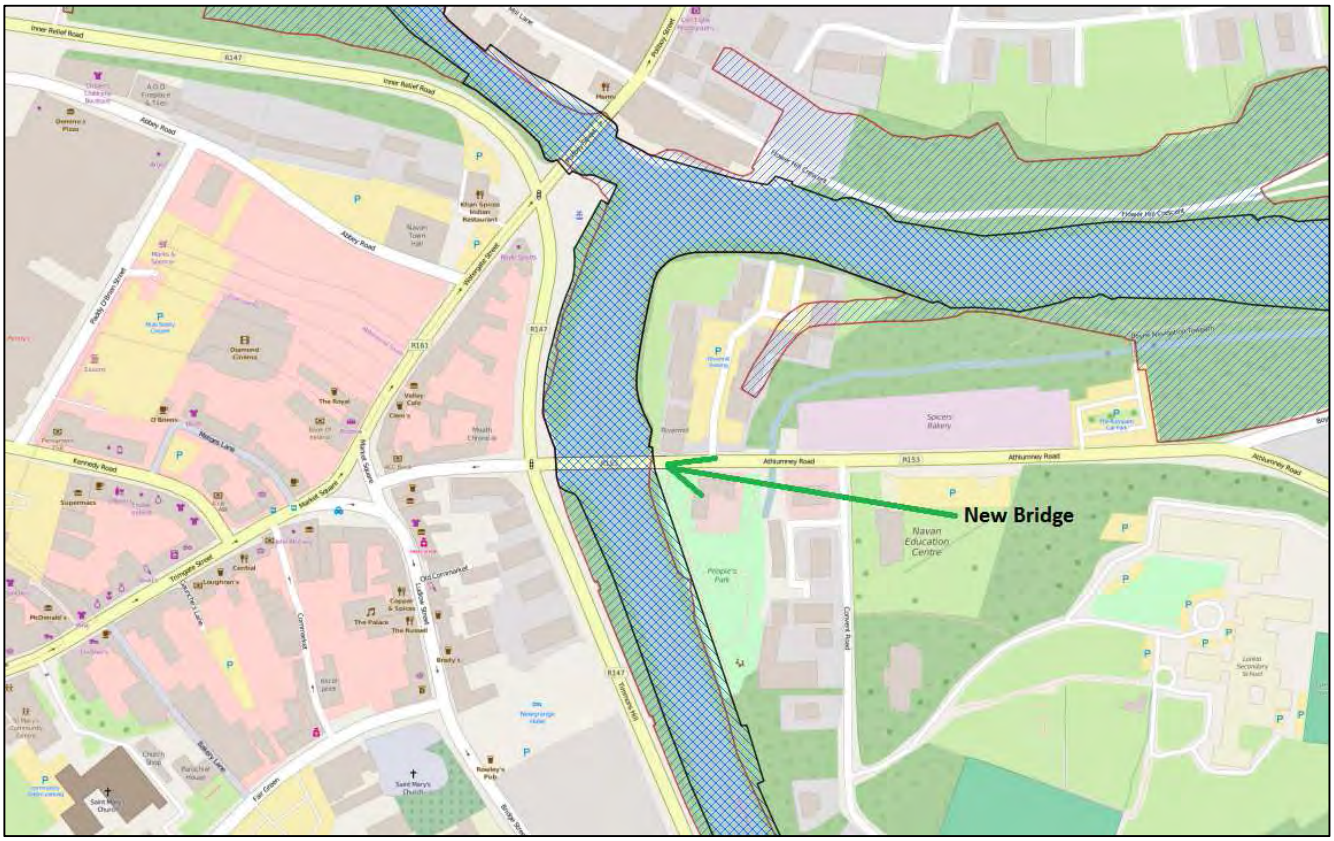


Figure 3: Location of SAC (red outline) and SPA (black outline) designations in Navan around New Bridge. Map sourced from OpenStreetMap using QGIS under GNU General Public Licence.

There are no additional SPA or SAC sites located within a 15km radius of the present proposed development.

Three other conservation designated sites are listed for a 15km radius of New Bridge these are:

Natural Heritage Areas

Jamestown Bog Site Code 1324. This bog is situated approximately 9-10km west of the present New Bridge site. It has been designated due to the presence of high bog and cutover raised bog. It is one of the most north-eastern remaining raised bog in the country and one of only two raised bogs in County Meath. Despite presence of raised bog habitat this site is not listed as a Special Area of Conservation.

Proposed Natural Heritage Areas

Thomastown Bog Site code 1593

There is little information available on this site since it has not been designated a Natural Heritage Area. Thomastown Bog is located approximately 12-13km east of the New Bridge site. This species rich site is a raised bog surrounded by wet woodland and grassland. There are also areas of reed beds. Sites with this level of habitat and species diversity in Meath are rare (cited from Anon 2008).

Balrath Wood Site code 1579

This woodland is situated 11km east of the New Bridge site. This complex of three separate woodlands near Duleek is of particular value in the county due to the rarity of mature deciduous woodland in Meath. In addition, the Common Wintergreen (*Pyrola minor*), a rare plant, has been recorded there recently (cited from Anon 2008).

These NHAs and proposed NHAs are situated a considerable distance to the present site and are unlikely to be affected by the proposed development at New Bridge either directly or indirectly, they are not therefore, considered any further in the present report.

3.2 Description of Proposed Development Site

At New Bridge, the river course is relatively restricted within an urban setting. The R147 (formerly the main Dublin to Cavan road) lines its west bank and old mill buildings are situated to the east. Bankside vegetation, and the river itself at this location have been subject to a long history of disturbance. The boundaries of both the SAC and SPA overlap at New Bridge, and the bridge is located within both designations' boundaries. The SPA includes a wider span of west facing river bank to the south of the bridge (upstream) than the SAC. In a regional context, both designations include these rivers and some tributaries, along with floodplains and parts of the river valley sides.

The habitats present at the bridge include old stone wall, buildings and artificial surfaces, depositing river, scrub and grass verge habitat. There is an amenity area with playground to the south east. Full site synopses for the Boyne Blackwater SAC and SPA are provided with the Flora and Fauna report (Roche, unpub.). A detailed description of the habitats and species present in the SAC at the site of the present proposed development site is also provided in the Flora and Fauna report (Roche, unpub.) and lichen report (Whelan, unpub.), see Figure 4.

Figure 4: Location of habitats at New Bridge, Athlumney Road, Navan in 2013. Approximate boundary of the river habitat (FL2) is indicated in blue, although this is variable depending on water level. Green horizontal stripes indicate scrub (WS1), pink lines indicate stone walls (BL1), yellow cross-hatching indicates location of grassy verge (GS2), garden habitats with amenity grassland (GA2) and flower beds (BC4) are indicated with orange vertical stripes. The remaining uncoloured habitat is mainly buildings and artificial surfaces (BL3).

No evidence for the presence of otter holts or kingfisher nests was found during dual-season surveys at the site in January and July 2013, along with an additional site visit on 18th February 2016. Aquatic species such as lamprey and salmon are likely to occur in the channel, or at least in the vicinity. The Annex IV protected bat species Daubenton's bat and soprano pipistrelle were observed foraging around the bridge but there was no evidence of bats roosting there. Small plant species such as bryophytes were identified to species level but no species of conservation importance were found, likewise for lichen species.

A kingfisher was observed in flight at the site on July 29th 2013. The single individual flew across New Bridge and along the Athlumney Road.

At this location in Navan the Boyne has been channelized, it is brightly lit with artificial lights at night and the locality is subject to pollution and disturbance from high levels of vehicular traffic. In addition, the non-native species, Himalayan balsam (*Impatiens glandulifera*) was recorded on the river banks here and this probably represents the early stage of colonization by this invasive plant species (for more details see Roche (unpub).

3.3 Conservation Objectives

SPA Conservation Objectives
To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

- *Alcedo atthis* [breeding]

SAC Conservation Objectives
To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:

- [1099] *Lampetra fluviatilis*
- [1106] *Salmo salar* (only in fresh water)
- [1355] *Lutra lutra*
- [7230] Alkaline fens
- [91E0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)

Conservation objectives of the specific NHAs and pNHAs in the area (Jamestown Bog, Thomastown Bog and Balrath Wood) are not available, although the general objectives to maintain or restore favourable conservation condition of species and habitats for which the sites have been designated can be applied.

3.4 Assessment of Likely Effects

Basis for Assessment	
Review of Available Information	Site synopses, mapping information from NPWS. Other available biodiversity records e.g. National Biodiversity Data Centre, Bat Conservation Ireland.
Site survey	Ecology survey carried out in January and July 2013 and updated in February 2016. Lichen survey in June 2013. Bat survey July 2013.
Consultation	National Parks and Wildlife Service, Inland Fisheries, Meath County Council Heritage Office.

Assessment Criteria	
Individual elements of the project (either alone or in combination with other plans or projects) likely to give rise to impacts on the Natura 2000 sites	Following implementation of best practice construction methods and measures outlined in the Environmental Management Plan, the proposed works are unlikely to have significant impacts on the Natura 2000 sites.
Describe any likely direct, indirect or secondary impacts of the project (either alone or in combination with other plans or projects) on the Natura 2000 sites by virtue of • size and scale • land take • distance from Natura 2000 sites or key features of the sites • resource requirements • emissions • excavation requirements • transportation requirements • duration of construction, operation, decommissioning etc. • other.	There are no likely direct, indirect or secondary impacts arising from the works that would have a significant impact on the Natura 2000 sites due to strict adherence to the site's Environmental Management Plan and the implementation of best practice construction methods. As no impacts will arise as a result of the proposed works, no cumulative impacts with other plans or projects will arise.
Describe any likely changes to the site arising as a result of • Reduction in habitat area • Disturbance to key species • Habitat or species fragmentation • Reduction in species density • Changes in key indicators of conservation value • Climate change	There are no likely changes to the site arising from the proposed works.
Describe any likely impacts on the Natura 2000 site as a whole in terms of • Interference with the key relationships that define the structure of the site • Interference with key relationships that define the function of the site	There will be no impact on structure or function of the site and/or on key relationships.
Provide indicators of significance as a result of the identification of effects set out above in terms of • Loss • Fragmentation • Disruption • Disturbance • Change to key elements of the site	No effects have been identified therefore this is not applicable.
Describe from the above those elements of the project, or combination of elements, where the above impacts are likely to be significant or where the scale of magnitude of impacts is not known	There will be no significant impacts on the Natura 2000 sites as a result of the proposed works.

Finding of No Significant Effects	
Name of Project	New Bridge Pedestrian and Cycle Bridge, Navan
Name and location of Natura site(s)	River Boyne and River Blackwater SAC and SPA
Brief description of the project	The proposed works comprise of the construction of a new pedestrian/cyclist bridge structure, located immediately upstream (south) of the existing "New Bridge". The proposed structure will not require new bridge piers or works in the river. Instead, the construction will be facilitated using the existing structure of "New Bridge" for support. Additional works on the existing bridge footpaths will also be carried out.
Is the project or plan directly connected with or necessary to the management of the site?	No
Are there other plans or projects that together with this project or plan being assessed count affect the site	No
Assessment of significance of effects	
Describe how the project or plan (alone or in combination) is likely to affect the Natura 2000 site(s)	The proposed works are located directly above and adjacent to the Natura 2000 sites but potential for negative impacts would only arise in the case of poor on-site practices such as pollutants entering the watercourse) or poor lighting design (however, see below).
Explain why the effects are not considered significant	The aim is to set a condition of the Contract that the appointed Contractor must operate on site in line with established industry best practice. The Contractor is not permitted to allow pollution of the watercourse, the Contractor must develop a Construction Management Plan summarizing their site-specific approach to pollution prevention at the site, must consult with Inland Fisheries Ireland and National Parks and Wildlife Services as to timing and nature of the works, define responsible roles, nominate personnel with responsibility for day-to-day monitoring and highlight emergency response procedures and available pollution prevention measures & emergency equipment to hand – all to be agreed before commencement of works. Following the implementation of the above best practice construction methods and practices, no impacts on the Natura 2000 sites are likely to occur.
List of Agencies Consulted	NPWS, IFI, Meath County Council Heritage Office
Response to Consultation	NPWS Developments Application Unit (13th February 2013) made various comments on requirement for ecological survey, invasive species, masonry bridges as rare moss/lichen and vascular plant habitat, bat and otter licensing if required, Appropriate assessment and sources of information and further consultation. All points were addressed in ecological survey and subsequent design and reporting.

		IFI responded 24th January 2013 with no specific concerns and provided IFI guidelines for construction. Meath County Council Heritage Office (by telephone) outlined requirement for bat survey. *Copies of Correspondence are appended in Appendix B*	
Data Collected to carry out the assessment			
Who carried out the assessment	Sources of data	Level of assessment completed	Where can the full results of the assessment be accessed and viewed?
Dr. Niamh Roche on behalf of Meath County Council.	Dual season field surveys by experienced ecologist with bat expertise. Lichen and bryophyte survey by experienced bryologist/lichenologist, existing records held by state agencies and NGOs, consultation with state agencies and local authority	Desktop study of existing records and information, dual season daylight (species and habitat) and single season overnight field survey (for bats), as well as detailed lichen and bryophyte survey of bridge masonry.	Clifton Scannell Emerson Associates Consulting Engineers Seafort Lodge, Castledawson Avenue, Blackrock, Co. Dublin

3.5 Overall Conclusions

Following thorough and robust ecological surveys, consultations, review of the SPA and SAC boundaries and the Natura 2000 sites' conservation objectives and threats, this Appropriate Assessment Screening determines that there will be no significant effects on the Natura 2000 sites, because no works will take place in the water of the Boyne River itself and the Contractor will implement best construction practice and strictly adhere to the site's Environmental Management Plan. Subsequent to construction work lighting of the pedestrian and cycle bridge will be designed and installed to minimise potential disturbance to bats.

4.0 References and Sources of Information

Anonymous (2008). The County Meath Biodiversity Action Plan 2008-2012: Nature Matters. Adopted April 2010. The Heritage Council and Meath County Council.

Anonymous (2009). The Navan Town Development Plan 2009-2015. Navan Town Council and Meath County Council.

Anonymous (2010). Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government.

Eastern Regional Fisheries Board (Unknown). Requirements for the protection of fisheries habitat during construction and development work at river sites. Fisheries Protection Guidelines.

European Commission Environment DG (2001). Assessment of plans and projects significantly affecting Natura 2000 sites Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.

Moore M.V., Kohler S.J., & Cheers M.S. (2006). Artificial light at night in freshwater habitats and its potential ecological effects. *In* Rich C. and Longcore T. (eds). Ecological Consequences of Artificial Night Lighting. Island Press, Washington. 365-384.

Roche N. (2013). New Bridge, Navan, Co. Meath: A Flora and Fauna Survey. Unpublished.

Whelan P. (2013). A lichen survey of New Bridge and immediate river bank area at Navan, Co. Meath. Unpublished Report.

Appendix A: Environmental Management Plan

Clifton Scannell Emerson Associates

Environmental Management Plan

Pedestrian/Cycle Bridge at New Bridge, Navan

Client: Meath County Council

Date: 11th January 2016

Job Number: 11_079A

CONSULTING ENGINEERS

Civil Engineering | Structural Engineering | Transport Engineering | Environmental Engineering | Project Management | Health and Safety

Clifton Scannell Emerson Associates Limited,

Consulting Engineers, Seafort Lodge, Castlesdawson Avenue, Blackrock, Co. Dublin, Ireland.

Document Control Sheet

Project Name:	Pedestrian/Cycle Bridge, New Bridge
Project Number:	11_079A
Report Title:	Environmental Management Plan
Filename:	RPT-11_079A-004

Issue No.	Issue Status	Date	Prepared by	Checked by
1st	DRAFT	11/01/2016	MC	GE
2nd	DRAFT Rev A	04/03/2016	CW	MC
3rd	ISSUE	10/03/2016	CW	MC
4th	ISSUE	28/11/2016	SP	MC
5th	ISSUE	17/01/2016	SP	MC
6th	ISSUE	12/04/2017	SP	MC

Table of Contents

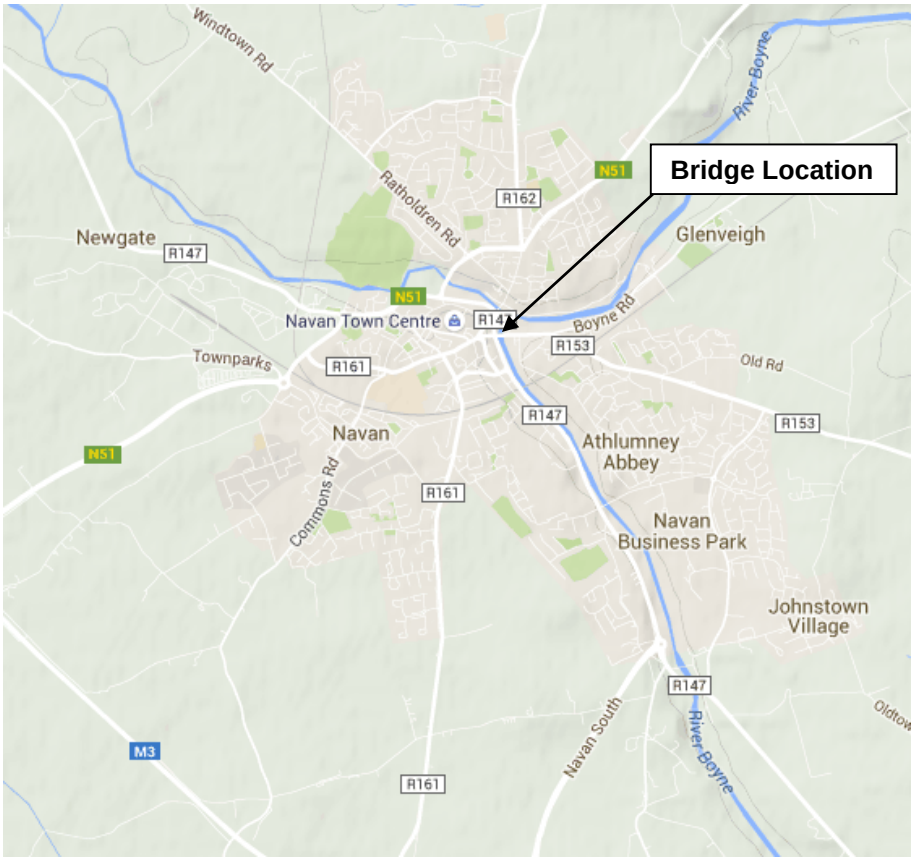
1 Introduction

1.1 Project Description

Clifton Scannell Emerson Associates (CSEA) has been appointed by Meath County Council (MCC) as Consulting Engineers for the design and construction of the proposed cycle / pedestrian bridge at 'New Bridge, Athlumney Street, Navan, Co. Meath. The scheme location is identified in Figure 1 and consists of the following features: (refer to Appendix A Drawings)

- Construction of a new 4.0 metre wide cycle / pedestrian bridge over the River Boyne immediately adjacent to and south of the existing "New Bridge".
- The construction of a new shared cyclist / pedestrian surface, of varying width due to existing constraints, along Athlumney Street on the approach to the proposed bridge.

Figure 1: 'New Bridge' Location



This plan has been prepared in order to:

- Detail the potential environmental impacts of the proposed works, with particular reference to impacts on the Natura 2000 Sites of the River Boyne and River Blackwater. These sites are designated as a Special Area of Conservation (SAC, Site Code 2299) and a Special Area of Protection (SAP, Site Code 4232).
- Detail the measures which shall be undertaken as part of the project planning and construction works to ensure that all risk of adverse impacts to these protected areas, resulting from the works, are avoided.

1.2 Existing Conditions

The existing 'New Bridge', a protected structure constructed in 1756, is a 7-span masonry arch bridge connecting Athlumney on the east bank of the River Boyne with Navan town centre on the west bank. Six of the arches are clearly visible and are located within the existing river channel; a seventh arch is located on the eastern side of the river and has been filled in on its southern elevation to facilitate a public park area.

Figure 2: Upstream View to 'New Bridge'

Figure 3: Downstream View to 'New Bridge'

The existing bridge carries a 7.0 metre wide single-lane carriageway over the River Boyne. The Navan end section of the R153 regional route which runs on the bridge is known as Athlumney Street. This road connects Navan with the N2 national route. The bridge is an important piece of infrastructure as it carries a large volume of traffic from the M3 to the N2 national route and onwards to the M1 Motorway; the main Dublin-Belfast road.

1.3 Environmental Context

1.3.1 Natura 2000 Sites

The River Boyne and River Blackwater SAC is a protected area that spans a large expanse, mainly in County Meath. The rivers were also recently designated as SPA's under the EU Birds Directive.

The River Boyne and River Blackwater SAC is designated due to the presence of two habitats listed in Annex I of the EU Habitats Directive - alkaline fen and alluvial woodlands. The alkaline fen of the SAC is located at Lough Shesk, Feehan Lough and Newtown Lough near Clonmellon on the Meath / Westmeath border. Alluvial woodlands are situated within the river channel downstream of Oldbridge, near Townley Hall, 2.5 kilometres west of Drogheda. The SAC is also designated for the presence of the following species listed on Annex II of the same Directive - Atlantic Salmon (*Salmo salar*), Otter (*Lutra lutra*) and River Lamprey (*Lampetra planeri*). These species occur along the length of the rivers. An additional Annex II Lamprey species is also known to occur in the Boyne – the brook lamprey (*Lampetra fluvialitis*).

The rivers were designated as an SPA because of the presence of the Kingfisher, a species that is listed in Annex I of the Birds Directive. In 2010 an estimated 19 breeding pairs were recorded from the site and it is, therefore, considered a site of national significance for this species.

There are no additional SPA or SAC sites located within a 15 km radius of the present proposed development.

1.3.2 Natural Heritage Area

Jamestown Bog (Site Code 1324)

This bog is situated approximately 9-10 km west of the present New Bridge site. It has been designated due to the presence of high bog and cutover raised bog. It is one of the most north-eastern remaining raised bogs in the country and one of only two raised bogs in County Meath. Despite presence of raised bog habitat this site is not listed as an SAC.

1.3.3 Proposed Natural Heritage Areas

Thomastown Bog (Site Code 1593)

There is little information available on this site since it has not been designated a Natural Heritage Area. Thomastown Bog is located approximately 12-13 km east of the New Bridge site. This species rich site is a raised bog surrounded by wet woodland and grassland. There are also areas of reed beds. Sites with this level of habitat and species diversity in Meath are rare (cited from Anon 2008).

Balrath Wood (Site Code 1579)

This woodland is situated 11 km east of the New Bridge site. This complex of three separate woodlands near Duleek is of particular value in the county due to the rarity of mature deciduous woodland in Meath. In addition, the Common Wintergreen (Pyrola minor), a rare plant, has been recorded there recently (cited from Anon 2008).

1.4 Need for the Scheme

The proposed scheme will involve the delivery of a cycle route that provides high quality linkage between residential areas and the key trip attractors (e.g. Schools / Colleges, Sports Clubs, Navan Town Centre). This will improve the cycling and pedestrian offer and encourage modal shift among the local population to cycling and walking as a safe and convenient means of making local trips (work, school / college, recreation trips).

As there are currently no dedicated cycle tracks over the River Boyne at this location the proposed works will substantially improve safety for pedestrians and cyclists.

The completed scheme will provide a safe, coherent and attractive route with a high Quality of Service that will form part of the overall Johnstown Quarter Cycle Network and form part of a wider strategic cycle network in the Navan area.

The level of take up will ultimately judge the success of the scheme (i.e. the number of cycle trips along the route). The route must provide a high Quality of Service and address the five needs of the cyclist (directness, safety, coherence, comfort and attractiveness). The route will aim to serve the broadest range of possible users (e.g. commuters, leisure cyclists, and children).

It is the policy of Meath County Council to support the implementation of the National Cycle Policy Framework 2009-2020 and the Dublin Transportation Office (DTO) Cycle Policy.

The proposed Scheme will support the objectives embodied in the National Transport Authority's Greater Dublin Area Transport Strategy in respect of improving safety for all road users, and facilitating increased cycle usage and walking.

1.5 Scoping of Bridge Form Options

As part of an options assessment and feasibility study process three options for the bridge were examined, taking into consideration the constraints imposed by the Boyne and Blackwater SAC and other criteria including safety, environment and ecology, cost, connectivity, cultural heritage and buildability.

The proposed scheme as outlined in Section 2 and illustrated in Appendix A was found to be the optimum design, providing the best solution to deliver the new pedestrian and cycle bridge.

2 Proposed Works

The proposed works comprise of the construction of a new bridge structure, located immediately upstream (south) of the existing bridge. The proposed bridge will not require new bridge piers or works in the river. Instead, the new bridge is proposed to be constructed using the existing structure of "New Bridge" for support; piles will be inserted into the existing "New Bridge" structure connected to a support beam which will prop the pedestrian / cyclist structure.

2.1 Works to the Existing Bridge; "New Bridge"

No realignment works are proposed to the existing bridge structure or its approaches. However, some minor surface works are proposed as follows:

- The existing footpath located on the north side of the bridge will be widened to 1.8m in width.
- The existing line-marking on the carriageway will be removed and replaced. A total lane width of 6.0 m will be provided.
- The existing footpath located on the south side of the bridge will be removed; a kerb will be provided to restrict vehicle access to travel lanes.
- The existing lighting columns (6 no.) will be removed and replaced. The proposed new lighting columns will be designed in accordance with environmental protection measures as follows:
    - This lighting shall be designed to be sensitive to the needs of bats and specifically in accordance with the guidance set down in "Bats and Lighting", published by Bat Conservation Ireland in December 2010
    - Directional lighting will be provided to focus only on the bridge deck areas, with minimal light spillage onto the watercourse (limited to 1 lux)

2.2 Proposed Works; New Structure

The new bridge, proposed for the south side of the existing structure, will have the following features:

- Approximately 50 m in length and 4.0 m in width.
- The proposed structure will consist of tapered RHS cranked beams overlaid with a GRP Relinea deck or similar. Stainless steel fins and glass panels are proposed for the south parapet of the new bridge.

2.3 Proposed Works; Bridge Approaches

The following works are proposed on the approaches to the proposed bridge:

- A new pedestrian / cyclist crossing is proposed at the existing traffic signals located on the western approach to the bridge, at the intersection of the R147 (Kells Road) and the bridge. The new crossing is proposed on the south arm of the intersection.
- A shared path, minimum 3.0 m in width, is proposed on the eastern approach to the bridge, on the south side of Athlumney Street.

2.4 Key Construction Operations

The main construction operations which must be undertaken to construct the above works are identified in sequence below. The works shall be undertaken from the existing bridge deck/embankments. Any access over the water shall be from mobile access plant located on the existing bridge structure. No works will take place within the river itself.

- Closure of the bridge and diversion of traffic – A closure of the bridge shall be required to facilitate the construction of the bridge due to the impact on the existing road pavement.
- Excavation of trenches at the location of the proposed supporting beams – Trenches shall be opened within the road on the existing bridge to determine the location of the proposed beams to support the new pedestrian bridge and to prepare for the proposed piling operations.
- Drilling of supporting piles – These piles shall be installed within the body of the existing structure ie drilled through the existing bridge piers thus there shall be no disturbance of the river bed.
- Clearing vegetation at abutment locations – Existing vegetation shall be cleared to provide for the abutment/landing slab locations for the new bridge. All movement of vegetation and soil shall be undertaken within a timber framed hoarding erected at the embankment edge. All soil and vegetation shall be disposed of to an approved disposal facility.
- Casting pile caps – Pile Caps shall be cast above the proposed piles and within the existing bridge structure.
- Removal of part of the parapet wall to facilitate new steel frame – This will involve the removal of a small amount of stonework from the existing parapet to facilitate the installation of steel beams from the pile cap through the parapet wall to support the proposed bridge deck.
- Construction of abutment walls- Abutment walls shall be constructed outside of the river bed on the river embankments/existing retaining wall.
- Installation of beams – The cranked cantilever beams shall be installed through the holes opened up in the parapet walls. This steel shall be fixed to the pilecap to provide a connection to the supporting piles.
- Installation of temporary working platform- A temporary working platform may be required for connection of elements of the bridge prior to the deck installation. This shall be supported from the proposed main steel cantilever beams.
- Installation of secondary steel (e.g. handrails, bracing)- The secondary steel shall be installed from the temporary working platform.
- Installation of ducted services – Where additional ducted services are required they shall be supported from the proposed bridge structure or installed within the existing bridge deck.
- Reconstruction of stone in parapet walls – This will involve the replacement of a small amount of stone work around the newly installed steel cantilever beams.
- Installation of bridge deck – The Bridge Deck shall be installed above the river on to the supporting steelwork potentially replacing the temporary working platform.
- Filling of excavations on New Bridge and reconstruction of pavement – Once the piles, pilecaps and associated steel work are complete within the existing Bridge Structure reinstatement of the road will be undertaken. This will include filling with stone and the construction of a new road pavement and associated footpaths. These works shall all be undertaken within the confines of the existing parapet walls.
- Installation of lighting – New Lighting columns and Luminaires shall be installed on the existing bridge.
- Lining and marking – New road markings and signage shall be installed on the existing and new bridge to complete the works.

The successful contractor will be required to prepare a Construction Management Plan, in accordance with this Appropriate Assessment Screening document and the Environmental Management Plan prior to commencement of the works.

3 Environmental Risks and Avoidance Measures

The environmental risks associated with the proposed works have been set out in the projects Appropriate Assessment (AA) Screening Report. These risks primarily relate to the construction tasks proposed in close proximity to the River Boyne which have the potential to impact on the rivers environment.

The risks and the avoidance measures which will be implemented for the project are outlined below. This document, in conjunction with the AA will be available to the successful contractor to facilitate the preparation of their Construction Management Plan for the project.

3.1 General Avoidance Measures

The project works are estimated to be completed in approximately 10 weeks. The following general avoidance measures will be required by the Contractor for implementation over the projects duration:

1. The Contractor will be required to submit the following plans demonstrating their understanding and compliance with the environmental and ecological constraints of the project. These documents will be forwarded to the relevant Local Authority departments within Meath County Council for approval. The contents of these documents will form the basis of weekly audits to be carried out by the Employer's Representative during the construction works.
    a. Construction Management Plan
    b. Site Management Plan
    c. Waste Management Plan
    d. Chemical / Toxic Material Management Plan
    e. Earthworks Management Plan
2. An Ecological Clerk of Works shall be appointed to ensure that all avoidance measures are fully implemented in accordance with the approved Management Plans.
3. The Main Contractor will be required to demonstrate their accreditation under NSAI ISO 14000 "Environmental Management Systems" to be considered competent to carry out the project.
4. Works will be completed in accordance with the Fisheries Ireland guidance document "Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (2016)
5. The following conditions will be included in the contract issued to the successful tenderer. These clauses will also be included in the tender documentation issued:
    a. Construction vehicles are not permitted to enter the river; works are to be completed from the existing bridge structure which will be closed to traffic during construction.
    b. The Contractor must avoid degradation, contamination or pollution of the river from spills, construction materials or site spoil.
    c. Construction plant must be well maintained to avoid fuel spills to the river.
    d. Cleaning out of site plant must take place at a location isolated from the river, with no runoff to the river permitted.
    e. The contractor must install appropriate environmental screens to prevent any construction runoff or waste during works to the river. The contractor must also consider the existing bridge drainage system and ensure construction runoff or waste is not permitted to be collected by this system.

f. The contractor will be required to notify Fisheries Ireland and the NPSW of the works seven days in advance of the works and within seven days of works completion.

6. Following the appointment of a successful contractor to undertake the work, reference must be made to this document, the Construction Management Plan and the AA Screening Report on all construction drawings.

The above mitigation measures are to be implemented by the contractor in addition to all standard site regulations and legislative measures. The above list is not to be considered exhaustive by the contractor.

3.2 Deposition of Spoil or Rubbish within the SAC / SPA

There is potential during site preparation and construction for accidental deposition of spoil or rubbish within the SAC / SPA. Grout, concrete and cement are toxic to fish (Eastern Regional Fisheries Board, date unknown) and certain activities can only be carried out within SAC's with the permission of the Minister for the Environment and Local Government.

These are called *Notifiable Actions* and the most relevant to the current proposed development is "Dumping rubbish or other materials or disposing of any chemicals or wastes in streams/rivers or into water-courses running into them".

3.2.1 Avoidance Measures

It will be stated explicitly in the contract documents and on relevant drawings that the construction site is located within a protected site and that dumping of any kind is an offence. The contractor will be required to hold toolbox talks to ensure that all operatives are aware that this is the case and are aware of the measures for disposing of any waste from site.

Prefabricated members will be utilised where possible to limit the potential for loose debris / waste material from construction entering the watercourse.

The removal of stone material from the bridge spandrel walls shall be undertaken manually in a controlled manner and all debris / loose material transferred to a skip to be held on site for disposal to a licenced waste disposal facility.

External access to the existing bridge shall be undertaken using either an appropriate mobile platform operating from the existing bridge deck or by floating pontoon. In either case debris shall be placed into bags and transferred to the skip.

Where a steel structure has been put in place netting shall be supported from this below the structure to ensure that no debris enters the river during the course of the construction of the new pedestrian / cycle bridge.

3.3 Dust and Pollution

During construction if suitable preventative measures are not taken there is potential for pollution or dust to cause damage to the river.

Construction site offices are likely to be set up in close proximity to the bridge. Any diesel or fuels stored here would be located very close to the river and therefore need to be prevented from accidentally spilling into the aquatic habitat.

3.3.1 Avoidance Measures

Dust minimisation measures will be enforced to ensure there is no deposition of dust on surrounding habitats. Appropriate measures during site clearance and development will be taken to prevent movement of dust into adjacent habitats.

These appropriate measures include the erection of nets under the cantilever structure and bunding of any waste prior to its removal from the site. All netting will be certified in accordance with IS EN 1263:1 2002 and nets will be fitted in accordance with IS EN 1263-2:2002. These standards will be contained with the Works Requirements (the Specification) to be issued with the Tender.

All fuel tanks will be fully bunded and located in a suitable area, away from the SAC.

All bunds will be tested in accordance with Environmental Protection Agency guidelines with tests being carried out under the supervision of the Employer's Representative.

The above measures will be stated explicitly in the contract documents and on relevant drawings.

3.4 Removal of Vegetation

Existing vegetation has been removed from the existing bridge structure as part of previous remedial works to the bridge. However, there remains small areas of vegetation to be removed at the eastern abutment of the proposed pedestrian / cycle bridge.

Herbicidal sprays should not be used prior to vegetation removal, since these would introduce potential for herbicides to enter the river system.

3.4.1 Avoidance Measures

All site clearance and vegetation removal will be carried out with perimeter netting in place to prevent debris or material being removed from falling into the River Boyne. All netting will be certified in accordance with IS EN 1263:1 2002 and nets will be fitted in accordance with IS EN 1263-2:2002. These standards will be contained with the Works Requirements (the Specification) to be issued with the Tender.

All materials used on site require formal approval from the Employer's Representative via the submission of "Material Approval Requests". No herbicides will be used unless approved by the National Parks and Wildlife Service (NPWS) for use in proximity to the river.

The above measures will be stated explicitly in the contract documents and on relevant drawings.

3.5 Street Lighting / Artificial Lighting

Due to the sensitivity of the SAC and SPA it is recommended that no new artificial night lighting should be installed if possible on the proposed pedestrian / cyclist bridge. The AA Screening Report notes that if there is a "very strong need for lighting for safety purposes" that mercury and metal halides should be avoided. The report also notes that "the lighting scheme should utilize similar units, dimmable and cowled, to those that were specified by Clifton Scannell Emerson Associates, the Employer's Representative for the proposed bridge, as part of the Grand Canal Green Route public lighting installation".

In order to maximise the safety of pedestrians and cyclist's new lighting is required for the proposed bridge.

3.5.1 Avoidance Measures

The lighting will be designed to be sensitive to the needs of bats feeding on the watercourse and specifically in accordance with the guidance set down in the publication "Bats and Lighting", as published by Bat Conservation Ireland in December 2010. Lighting will be directional and targeted to focus on the bridge deck areas, with minimal light spillage to the watercourse (<1 lux). All design and details will be agreed with the NPWS and clearly detailed in the Tender / contract documentation.

The engineer will ensure that a lighting design is produced by the contractors' lighting supplier which complies with the specification agreed with the NPWS. Confirmation and an inspection of the lighting shall be undertaken on commissioning to ensure that the lighting complies with the specified design.

Additionally, it will be recommended to the Local Authority that the lighting shall be inspected periodically as part of a maintenance regime to ensure that the lighting remains operational in compliance with the specified design.

3.6 Invasive Exotic Species

There is a risk associated with movements of soil in or near the SAC that invasive exotic species may be introduced to the waterway or riverbank.

3.6.1 Avoidance Measures

For these proposed works the only proposal for soil movement is to the east of the bridge, where landscaping is proposed at the corner of Athlumney Road and Convent Road. However, sterile soil or compost would be required at this location since it is currently paved.

Soil movements will not take place within the SAC / SPA.

Measures to prevent disturbance to bankside vegetation should be taken in order to prevent further spread of Himalayan balsam through disturbance of bank vegetation. A timber-framed plywood-faced hoarding will be constructed at the river bank to prevent spread of species through bank disturbance. All softwood timbers will be treated with suitable inert preservatives, as approved by the Employer's Representative, to protect them from deterioration in the wet environment. Similarly, the plywood facing will be constructed from 18 mm marine plywood to ensure maximum durability and robustness.

The successful contractors "Earthworks Management Plan" will outline as a minimum the disposal location of exported material, the source location of imported material, routes for haulage, methods for placing and stockpile locations / methods for the approval / appraisal of the Employer's Representative.

3.7 Reduction of Habitat Area

The project will have no impact on the Annex I habitat, riparian woodland, downstream at Oldbridge. The Annex I alkaline fen of the SAC is situated upstream near Clonmellon and will also not be impacted by the proposed development, either directly or hydrologically. Additionally, the area of aquatic or terrestrial semi-natural habitats in the vicinity of the site will not be impacted.

The stone wall habitat available for lichens, bryophytes and small vascular plants may be reduced during site works. Although this is not an Annex I habitat measures are nonetheless suggested to prevent loss of species diversity. Specifically recommendations relating to the protection/retention of the Lichen species on the bridge structure as detailed in the Lichen Survey of June 2013 are as follows;

- Repointing to be undertaken in patches preferably over a three to five year period.
- Use of Soft Lime Mortars in repointing.
- Use replacement stone similar in type to existing.
- Cleaning to be limited to parapet walls.
- Whole bridge should not be cleaned.
- Bridge to be kept free of ivy.

3.7.1 Avoidance Measures

3.7.1.1 Disturbance to Key Species

While no evidence for roosting bats was presented from bridge inspections in summer 2013 these mammals are mobile species and construction workers and engineers on-site should be aware that bats may still roost at the projects location on occasion. This risk has been lessened further to works having being undertaken during the summer of 2015, when repointing of the bridge was undertaken, which limited locations in which bats could roost on the existing structure.

3.7.1.2 Impact on Lichen Habitat

Repointing was undertaken as part of previously completed remedial works, out of necessity in order to protect the structural integrity of the bridge. Repointing was undertaken to approximately 40% of the bridge structure. The remedial works undertaken also indicate that the majority of necessary grouting has been completed. Therefore, there will be minimal requirement for additional grouting / pointing as part of these proposed works which limits the associated risks.

Where elements of the works require mortar pointing (where steel protrudes through the Parapet Wall) this shall be undertaken using lime mortar which is more suitable from a conservation point of view as well as a habitat impact viewpoint.

Existing stonework removed from the bridge for the purposes of integrating the steel structure shall be retained for reuse. In the event that a small amount of stone is required to complete works it shall be suitably sourced limestone which best matches the existing original material.

The bridge has been cleaned as part of the remedial works undertaken previously. It is not proposed to undertake any further cleaning of the bridge as part of the proposed works.

The proposed works will not reduce the available stone wall habitat to any significant level. Only small portions of stonework will be removed in order to facilitate the insertion of the metal frame for the bridge. The remaining stone faces of the bridge shall remain intact

3.7.2 Avoidance Measures

Where any works are to impact upon the existing bridge structure an inspection will be undertaken to ensure that bats are not roosting prior to commencement of the works. In the event that bats are found works shall cease and the NPWS ranger will be informed. No further works will be undertaken until mitigation measures as defined by the NPWS have been undertaken.

Should any bats be found or disturbed from the bridge during construction work, works will cease until a trained licensed bat specialist and / or the NPWS Wildlife Ranger has been contacted and provided instructions on how to proceed. Bats are protected mammals and intentional disturbance to these species or their roosts is an Offence under the Wildlife Acts.

The above measures will be stated explicitly in the contract documents and on relevant drawings.

Appendix A – Drawings

Appendix B: Copies of Correspondence with Statutory Bodies

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Our Ref: **G Pre00002/2013**

13 February 2013

Dr. Niamh Roche
Grangegeeth
Collon
Co. Meath
niamh.roche@demersal.net

Re: **Pre-Planning Consultation - Pedestrian Bridge at New Bridge, Athlumney Road, Navan, Ecological Survey and AA scoping and some queries.**

A Chara,

I refer to your correspondence in relation to the above. Outlined below are the recommendations of the **Department of Arts, Heritage and the Gaeltacht** in relation to nature conservation.

The ecological survey should be carried out of the proposed development site to survey the habitats and species present. Where ex-situ impacts are possible survey work may be required outside of the development sites. Such surveys should be carried out by suitably qualified persons at an appropriate time of the year depending on the species being surveyed for. With regard to any existing records the data of the National Parks and Wildlife Service (NPWS) should be consulted at www.npws.ie and the data of the National Biodiversity Data Centre at http://www.biodiversityireland.ie/. Reference should be made to the National Biodiversity Plan and any relevant County Biodiversity Plan. The ecological survey should also address the issue of invasive alien species, such as Japanese Knotweed, and detail the methods required to ensure they are not accidentally introduced or spread during construction.

The impact of the development on the flora, fauna and habitats present should be assessed. In particular the impact of the proposed development should be assessed, where applicable, with regard to:

- Natura 2000 sites, i.e. Special Areas of Conservation (SAC) designated under the EC Habitats Directive (Council Directive 92/43/EEC) and Special Protection Areas designated under the EC Birds Directive (Directive 2009/147 EC),
- Other designated sites, or sites proposed for designation, such as Natural Heritage Areas, Nature Reserves and Refuges for Fauna or Flora, designated under the Wildlife Acts of 1976 and 2000,
- Habitats listed on annex I of the Habitats Directive,
- Species listed on Annexes II and IV of the Habitats Directive,
- Habitats important for birds,
- Birds listed on Annex I of the EC Birds Directive,
- Species protected under the Wildlife Acts including protected flora,

- Habitats that can be considered to be corridors or stepping stones for the purpose of article 10 of the Habitats Directive,
- Red data book species,
- and biodiversity in general.

Where negative impacts are identified suitable mitigation measures should be detailed if appropriate. As this proposed development involves modifying an existing bridge, consideration should be given to bats that may roost in crevices in the bridge and flora that may live on the bridge itself.

Masonry bridges are a valuable habitat for a myriad of saxicolous vascular, bryophyte and lichen species. Many species have as their preferred habitat such structures whilst a smaller, restricted number of rarer species are dependant solely on such structures (usually on the mortar between the masonry). In reference to bryophytes, several Irish Red List species are found on walls or bridges, including *Grimmia orbicularis* on the NW side of Kilkenny town, *Funaria pulchella* at its only Irish site in Co Tipperary, *Funaria muhlenbergii* at its only Irish site in Co Cork, *Brachytheciastrum velutinum* on a bridge top in Co Wicklow etc. There are doubtless many other colonies of Red List species on walls and bridges, these are just a few. Should there be any need for maintenance of this bridge in advance of the proposed works there is a very good chance that cleaning mosses off bridges and walls could have a real impact on Irish biodiversity. Whilst there is no statutory protection for such species, the recommendations below are made in the interests of maintaining this aspect of Ireland's biodiversity (recently highlighted in the publication of 'The Rare and Threatened Bryophytes of Ireland'.

- Only lime mortar should be used for repointing, grouting etc. (as per NRA guidelines as stated).
- The "Removal of vegetation from the bridge surface, parapets and embankments", should be carried out judiciously so as to avoid the wholesale removal of small vascular plants, bryophytes and lichens – their removal should be deemed only necessary for imperatives reasons of engineering integrity.

Where there are impacts on protected species and their habitats, resting or breeding places, licenses may be required under the Wildlife Acts or derogations under the Habitats Regulations. In particular bats and otters are strictly protected under annex IV of the Habitats Directive and a copy of Circular Letter NPWS 2/07 entitled "Guidance on Compliance with Regulation 23 of the Habitats Regulations 1997 – strict protection of certain species/applications for derogation licences" can be found on our web site at http://www.npws.ie/media/npws/publications/circulars/media,6686,en.pdf.

In addition licenses will be required if there are any impacts on other protected species or their resting or breeding places, such as on protected plants, badger setts or birds nests. In order to apply for any such licenses or derogations as mentioned above a detailed survey should be submitted to NPWS which should have been carried out by appropriately qualified person/s.

In accordance with article 6.3 of the Habitats Directive, this project should be subject to appropriate assessment screening and if necessary appropriate assessment. You are referred to the Departmental guidance document on Appropriate Assessment, which is available on the NPWS web at http://www.npws.ie/media/npws/publications/codesofpractice/AA%20Guidance%2010-12-09.pdf .
You are also referred to the EU Commission guidance entitled "*Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC*" which can be downloaded from

http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/natura_2000_assess_en.pdf.

In order to carry out the appropriate assessment screening and/or prepare a NIS you will need to collect information about the relevant Natura 2000 sites including their conservation objectives. You have specifically requested conservation objectives for the River Boyne and River Blackwater cSAC and asked if we have a list of threats. You should note that there is also a River Boyne and River Blackwater SPA, site code 004232. Information about threats may be found on the Natura 2000 standard data forms on our web site www.npws.ie. Generic conservation objectives are also available on our web site. More detailed conservation objectives are being compiled and will appear on our web site in due course. If you require additional information you can request it by completing the data request form on our website at http://www.npws.ie/media/npws/publications/Data%20request%20form.doc.

Inland Fisheries Ireland should be consulted with regard to fish species and implications of any additional shading of the river bed.

It is recommended that you consult with the relevant Local Authorities to determine if there are any projects or plans which alone or in combination could impact on any Natura sites.

The above observations and recommendations are based on the papers submitted to this Department on a pre-planning basis and are made without prejudice to any observations the Minister may make in the context of any consultation arising on foot of any development application referred to the Minister, by the planning authority, in his role as statutory consultee under the Planning and Development Act, 2000, as amended

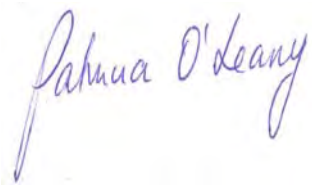
Kindly forward any further information to the following address:

The Manager,
Development Applications Unit,
Department of Arts, Heritage and the Gaeltacht,
Newtown Road,
Wexford

Alternatively, documentation associated with the above can be referred electronically to the DAU at the following address: manager.dau@ahg.gov.ie

Finally, the above observations and recommendations are based on the papers submitted to this Department on a pre-planning basis and are made without prejudice to any observations the Minister may make in the context of any consultation arising on foot of any development application referred to the Minister, by the planning authority, in his role as statutory consultee under the Planning and Development Act 2000, as amended.

Is mise le meas?



Patricia O'Leary
Development Applications Unit
Tel: (053) 911 7482

Dr Niamh Roche MIEEM
Ecologist
Grangegeeth, Collon, Drogheda, Co. Meath. Tel 041 9820864; 087 8173073
email niamh.roche@demersal.net

VAT Registration Number 5842581 O

19th December 2012

Noel McGloin
Environmental Officer (Drogheda District)
Inland Fisheries
15A Main Street
Blackrock
Co. Dublin

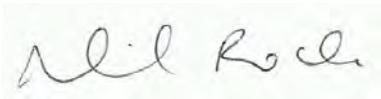
Dear Sir/Madam

I am an Ecologist commissioned by Clifton Scannell Emerson Associates, to carry out an Ecological Survey and Appropriate Assessment of a proposed pedestrian bridge at New Bridge, Athlumney Road, Navan, Co. Meath. New Bridge is a stone-built road bridge that spans the Boyne River, carrying pedestrian and vehicular traffic. It is proposed to construct a cantilever walkway (and cycleway) attaching it to the existing bridge over the Boyne River. This will involve fixing a new steel-framed bridge to the existing bridge piers/foundations. No direct emissions or impacts on the waterway are foreseen during or post-construction. A draft plan of the proposed pedestrian bridge is attached. A photographic example of the kind of construction proposed is shown in the second attached document, for illustrative purposes.

I would appreciate it if you could inform me whether Inland Fisheries has any comments regarding this proposal in relation to the River Boyne Fishery. Also, if Inland Fisheries has any comments on recommended construction methods I would be happy to take on board suggestions and pass them on to the Consulting Engineers, Clifton Scannell Emerson. I am also happy to discuss the proposal should you wish to contact me at the above telephone numbers or email address.

Thanking you in advance.

Yours Sincerely,



Dr Niamh Roche.

PROPOSED WORKS LEGEND:

- PROPOSED NEW KERBLINE -
- PROPOSED DROPPED KERB -
- PROPOSED SHARED SURFACE -
- PROPOSED GRASS AREA -
- PROPOSED CARRIAGEWAY OVERLAY -
- PROPOSED NEW PL - PL
- PROPOSED CONTROLLED / UNCONTROLLED TACTILE PAVING -
- PROPOSED FOOTPATH -
- VIEWS AND PROSPECTS TO BE PRESERVED (REV. NAVAN - DEVELOPMENT PLAN 2009-2015) VP5
- EXISTING PARAPET -
- EXISTING FOOTPATH -

EXISTING BRIDGE DATING FROM APPROX 1750

MILL HOUSE BUILDING (PROTECTED)

ATHLUMNEY STREET

ATHLUMNEY STREET

PROPOSED PEDESTRIAN /CYCLIST BRIDGE

POSSIBLE ALTERNATIVE LOCATION FOR BRIDGE (NOT PREFFERED)

WATERGATE STREET

LUDLOW STREET

NEW CORNMARKET

The Steeples

Summer Vill

Medical Centre
Area under construction

CONVENT

Hotel

Bank

CLIFTON SCANNELL EMERSON ASSOCIATES

Drawing Status: **TENDER**

Date: 2 NOVEMBER 2012

Issued By: CSEA

Revision	Description	Initials	Date

navan smarter travel

Údarás Náisiúnta Iompair
National Transport Authority

comhairle bhaile na huaimhe
navan town council

comhairle chontae na mí
meath county council

CLIFTON SCANNELL EMERSON ASSOCIATES
Consulting Engineers
Seafort Lodge, Castledawson Ave, Blackrock, Co. Dublin, Ireland.
Tel. +353 (0)1 288 5006 Fax. +353 (0)1 283 3496 Email. info@csea.ie

Client: Comhairle Chontae Na Mi
Meath County Council

Project: Johnstown Quarter, Navan
Smarter Travel Scheme

Dwg. Title: River Boyne Crossing at New Bridge
Site Location Plan

Drawn By: DB Date: Oct 2012

Checked by: GE Scale: As Shown At A1

Dwg. No.: 11_079_303

Subject: FW: New Bridge, Navan
Date: Thu, 24 Jan 2013 10:34:38 +0000
From: Noel McGloin <Noel.McGloin@fisheriesireland.ie>
To: Niamh Roche <niamh.roche@demersal.net>
CC: Francis Carolan <fjcarolan@eircom.net>

Hi Niamh

Sorry for delay in replying to this. IFI have no issues regarding the above as described once any local vegetation is respected. I enclose a copy of our Guidelines regarding relevant works that you can refer to.

Please note that the Boyne is a prominent salmonid watercourse and a cSAC.

Regards

Noel McGloin

Noel McGloin
Senior Fisheries Environmental Officer - Eastern River Basin District
---
Iascach Intíre Éireann
Inland Fisheries Ireland

Tel (01) 2787230 (direct line)
Tel (01) 2787022 (switch)
Fax (01) 2787025
Email noel.mcgloin@fisheriesireland.ie
Web www.fisheriesireland.ie

15a Main Street, Blackrock, County Dublin, IRELAND.

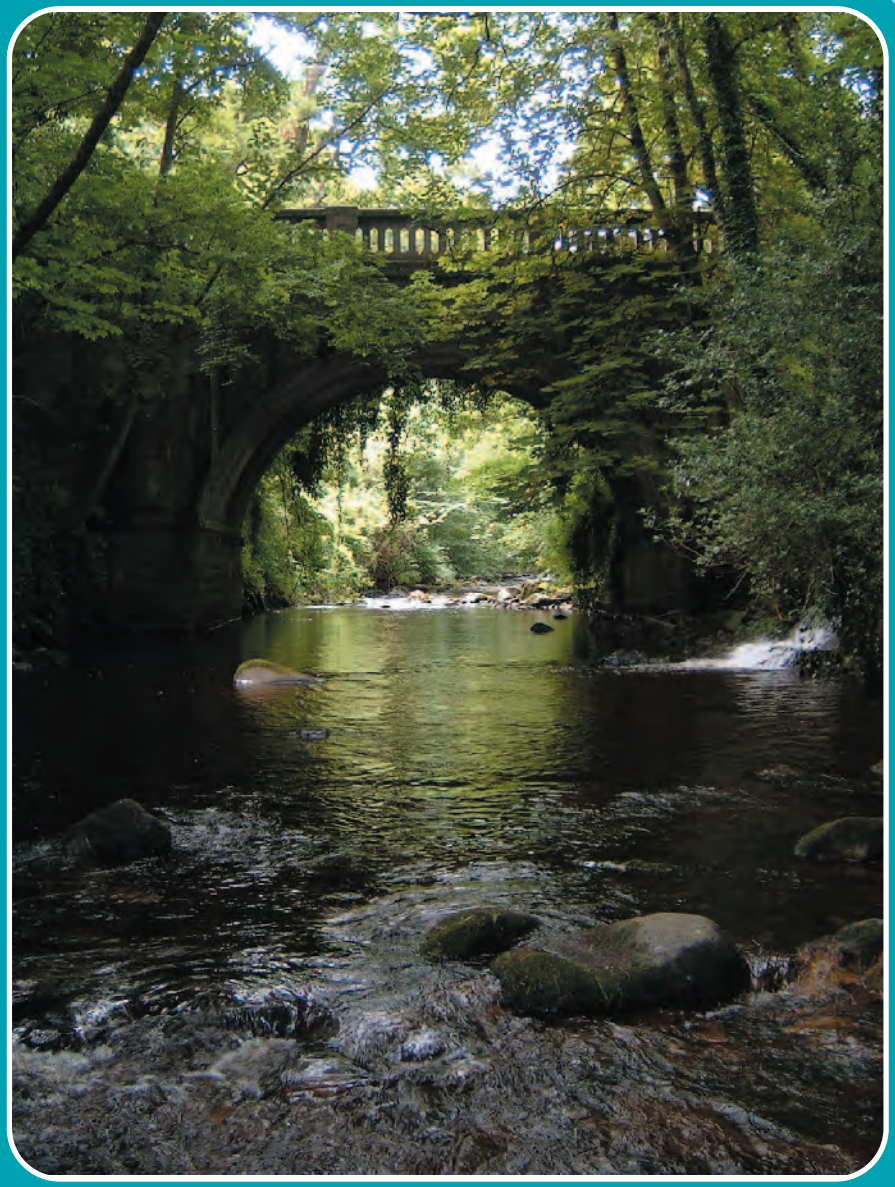
-----Original Message-----
From: Niamh Roche [mailto:niamh.roche@demersal.net]
Sent: 24 January 2013 10:23
To: Noel McGloin
Subject: New Bridge, Navan

Hi Noel
further to our phone conversation just there, please find attached a copy of my letter on the proposed cantilevered bridge at New Bridge, Navan. I'd appreciate it if you can let me know your comments on the matter.
Many thanks
Niamh

Eastern Regional Fisheries Board

Bord Iascaigh Réigiúnach an Oirthir

FISHERIES



Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites

EASTERN REGIONAL FISHERIES BOARD

Fisheries Protection Guidelines

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Introduction

The Fisheries Board is charged under the Fisheries Acts with the responsibility to protect and conserve all freshwater fisheries within its area of jurisdiction.

Every river, stream, canal, lake, pond and reservoir within this area must be regarded as constituting and/or supporting a Fishery under the meaning of the Acts unless otherwise regarded by the Boards.

The fisheries resource is also protected under national and EU legislation. Some notes on the legal protection given to fishery habitats are contained in Appendix I.

While general and specific requirements for the conservation and protection of the fisheries habitat may be set out in the planning conditions under which a project is approved, many issues regarding the timing, management, organisation, and methods of execution of the works inevitably arise during the construction phase.

These Guidance Notes are aimed to identify the likely impact on fisheries habitat in the course of construction and development work, and to outline practical measures for the avoidance and mitigation of damage.

These guidelines should not be regarded as all-embracing. Each project must be assessed on a case by case basis. It is, therefore, essential to consult with the Board. It may also be necessary to seek professional expert advice.

All information contained in these guidelines were up to date at time of print.

Fish
and Their Requirements

Fish need unpolluted water and abundant food in a habitat that provides spawning areas, shelter and freedom of movement. The bed and soil of a natural river and the associated aquatic and riparian vegetation combine to provide the food chain on which fish depend. A natural river channel is characterised by the morphological features which are vital for the life cycle of fish: gravel shoals or reed beds for spawning, pools and riffles where fish rest and feed, and turbulent reaches which enhance oxygenation.

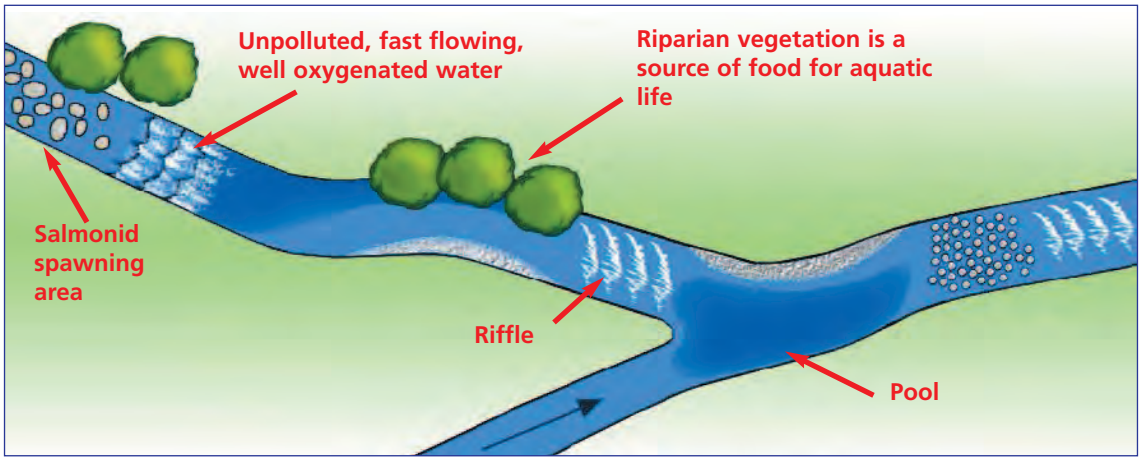

Fig. 1. Overview of River System

All elements of this natural environment must be protected. These guidance notes outline important practical measures to minimise the impact of construction and development works on fisheries habitat.

Potential Impacts on Fish and Fish Habitat from Roads and Watercourse Crossings

Barriers to fish passage	■ Blockages in watercourses – physical or hydraulic.
Water pollution	■ Sedimentation – impacts include smothering fish eggs and causing mortalities in fish of all ages, reducing abundance of food and impeding movement of fish. ■ Cement, grout and concrete – toxic to fish. ■ Oil and fuels – direct impacts on fish, fish food and fish habitats.
Removal of bed material	■ Causes loss of instream vegetation and food. May destroy spawning or nursery habitats.
Disturbance of riparian vegetation	■ Loss of shelter and cover, loss of food (plant debris and invertebrates).

Design Stage

Permanent river crossings

1. Bridges

Clear span bridging is the preferable option, causing no changes to bed and banks and no impact on fish migration. If piers are required keep them slim-line to minimise changes to the channel. Bed and bank work should be executed in natural materials.

Adequate clearance should be allowed under bridges for angler access and mammal passage, if required, particularly in the case of a motorway project.

2. Culverts

Culverts are likely to obstruct or delay upstream fish passage unless the depths and velocities of flow in them are within the swimming capabilities of the species to be catered for. Entry and exit conditions are also critical for ease of fish passage.

- Where possible, arch-type, “bottomless” units should be used so that the natural stream bed can be retained.
- The next best option is to use box culverts incorporating the design principles set out hereafter.
- The use of round/oval culverts should be limited to short runs and temporary crossing.

Design principles

1. Culvert should be as short as possible
2. Where the topography allows, they should be laid so as to remain backwatered in drought flow to a depth of not less than 500mm at the upstream invert, thereby providing a fishway over their full length.
3. In all cases, provisions must be made to ensure that the velocity of flow will be less than the swimming speed which can be comfortably maintained by the weakest upstream migrants.
4. Transition pools should be formed at each end to allow upstream migrants to enter and exit without stress or delay.
5. Culverts should be daylit over their full length: if necessary, light-ports should be provided at suitable intervals.
6. The use of trash screens should be avoided.

Fig. 2. Over-sized box culvert permanently backwatered

Design Options

1. To conform to the principles set out above, culverts always need to be oversized and, generally, laid below the river-bed grade level by about 500 mm.
2. Where the bed gradient is too steep for full backwatering, the best option for achieving low velocity and adequate fishway is to provide a fish-pass at the downstream end, as shown in Figure 3.

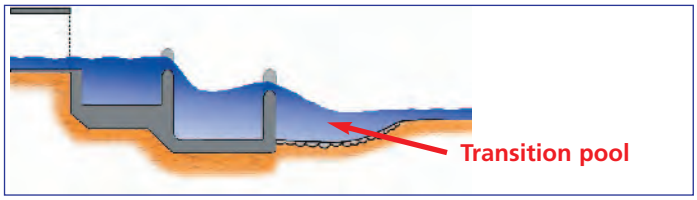

Fig. 3. Fish pass and transition pool at downstream end of culvert

3. Alternatively, the downstream water-level may be raised by providing one or more ponding weirs below the outfall. Such weirs should have fish notches to facilitate upstream movement. The pools formed by them should provide adequate resting and take-off conditions for fish.
4. In some cases it may be acceptable to use notched baffles to control the velocity and provide fishway in the culvert. As already recommended the culverts should be over-sized to compensate for flood conditions.
5. More rarely, shaping and roughening of the invert may serve to provide flow conditions suitable for fish passage, especially during low flow. The objective is to create a low flow channel along the centre of the culvert.

Permanent River Diversions and/or Realignments

While permanent diversions are not encouraged, in limited circumstances they will be permitted. The new channel should display hydraulic and morphological characteristics fulfilling the requirements of fisheries habitats. Bed and bank work should be executed in natural materials.

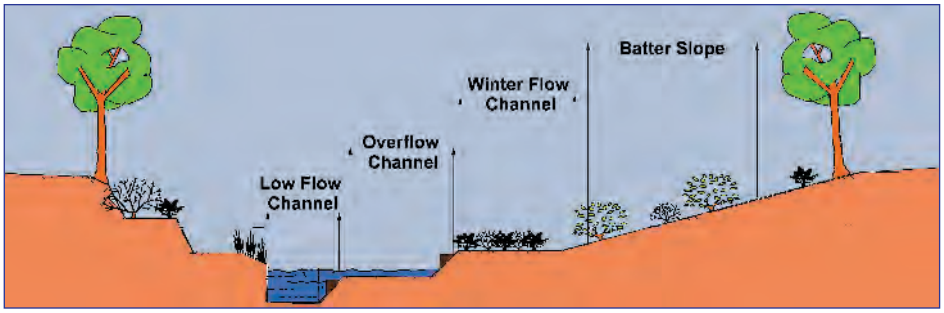

Fig. 4. Example of realignment design

Road run-off

All surface water collected from the road drainage should be treated in a sustainable manner to minimize the impact on water quality and prevent habitat degradation. Treatment should be designed with adequate storage capacity and in a manner to facilitate maintenance.

Construction Stage

Minimising impact: Site Layout and Organisation

The following measures are critical for preserving water quality and aquatic habitats.

1. Fuels, oils, greases and hydraulic fluids must be stored in bunded compounds well away from the watercourse. Refuelling of machinery, etc., should be carried out in bunded areas.
2. Runoff from machine service and concrete mixing areas must not enter the watercourse.
3. Stockpile areas for sands and gravel should be kept to minimum size, well away from the watercourse.
4. Runoff from the above should only be routed to the watercourse via suitably designed and sited settlement ponds/filter channels.
5. Settlement ponds should be inspected daily and maintained regularly.
6. Temporary crossings should be designed to the criteria laid down for permanent works.
7. Watercourse banks should be left intact if possible. If they have to be disturbed, all practicable measures should be taken to prevent soils from entering the watercourse.

Instream works

1. Instream works may only be carried out in accordance with the Board's general requirements set out below.
2. Preparatory works – such as constructing temporary crossings, forming cofferdams, creating diversions, - must be carried out in accordance with an approved Method Statement and under supervision by the Board's officers. Similar requirements apply during removal and reinstatement.
3. Instream machine works should be minimised, and any machines working in the watercourse must be protected against leakage or spillage of fuels, oils, greases and hydraulic fuels.
4. Instream earthworks must be executed so as to minimise the suspension of solids.
5. Construction works, especially ones involving the pouring of concrete, must be conducted in the dry.
6. When cofferdams are being kept dry by pumping, the discharge must be routed to an approved settlement facility before return to the river.
7. Every care must be taken to insure against spillage of concrete or leakage of cement grout within cofferdams.
8. Temporary diversions may be used to facilitate working in the dry, subject to permission by the Board. Advance notice must be given and a Method Statement must be furnished and approved. Such approval will be subject to the Board's officers being satisfied that the diversion channel can be so designed as to accommodate fish migration.
9. The diversion channel should be formed in the dry, and arrangements should be made for authorised personnel to remove all fish from the natural channel before the flow is diverted.

Summary of the Board's General Requirements:

- In salmonid catchments, all in-stream works should be carried out during the period May to September (see table on next page).
- In the event that these waters contain Lamprey it is necessary to contact National Parks and Wildlife Service for their requirements.
- No instream works shall be carried out without the written approval of the Board. A method statement must be agreed well in advance.
- The Board should be given sufficient notice before pre-approved in-stream works commence.
- If a section of watercourse is to be de-stocked work must be carried out by authorised personnel. If this work is to be carried out by Fishery Board staff, two to three weeks notice must be given and the cost will be recouped by the Board.
- There must be no discharge of suspended solids or any other deleterious matter to watercourses.
- Fish passage conditions must be maintained at all times.

MONTH	INSTREAM WORK	FISH LIFE CYCLE
January	**Instream works not permitted**	Some late spawning Incubation of eggs continues Kelts descending
February		Incubation of eggs continues Kelts descending Spring Salmon runs
March		Incubation of eggs continues and swim-up of young salmonids begins Spring Salmon runs Coarse fish spawning
April		Incubation ending Swim-up on-going Young salmonids dispersing Smolts migrating to sea Coarse fish spawning
May	**Instream works permitted**	Young salmonids migrating downstream into nursery areas Smolts migrating to sea Coarse fish spawning and fry dispersing
June		Young salmonids in nursery areas Adult Sea Trout returning to rivers Coarse fish spawning and fry feeding
July		Grilse and Set Trout moving upstream
August		Low river flows Sea Trout run tailing off
September		Low River flows
October	**Instream works not permitted**	Spawning run commences as flows increase
November		Spawning and incubation of eggs underway
December		Spawning and incubation of eggs continues

APPENDIX I

Some notes on the legal protection given to fishery habitats in legislation

- The enforcement authority for inland fisheries is the relevant Regional Fisheries Board and the legislation charges them with the protection of fisheries and the general enforcement of the Fisheries (Consolidation) Act 1959 (as amended).
- Since the Fisheries (Amendment) Act 1999 the Board was additionally required to have regard for the need for sustainable development. This includes:
  - the conservation of fish and other species of fauna and flora habitat.
  - biodiversity of inland fisheries and ecosystems.
  - to protection of national heritage within the meaning of the Heritage Act 1995.
- The Fisheries Act provides a wide range of measures to protect fish; however the protection of fishery habitat is limited to a number of sections of the Acts.
- Section 131 of the Fisheries (Consolidation) Act 1959 protects spawning salmon and trout and creates the offence that where any person during the annual close season:
  - *wilfully obstructs the passage of salmon or trout or the smolts or fry thereof.*
  - *or injures or disturbs any salmon or trout, or any spawn, fry or smolts thereof.*
  - *or injures or disturbs any spawning bed, bank shallow where such spawn of fry or smolts may be,……* commits an offence with a maximum penalty of 12 months in jail and €635 fine may be imposed.
- Section 171 of the Fisheries (Consolidation) Act 1959 creates the offence of *throwing, emptying, permitting or causing to fall onto any waters deleterious matter. Deleterious matter* is defined as not only *as any substance* that *is liable* to injure fish but is also *liable* to injure their *spawning grounds or the food of any fish or to injure fish in their value as human food or to impair the usefulness of the bed and soil of any waters as spawning grounds or other capacity to produce the food of fish.*
- In addition to a maximum fine of €1,270 and six months imprisonment by the District Court, the full cost of the damage done and restoration is also chargeable against the offender – Section 10 of the Water Pollution Act 1977 (as amended by Section 7 of the Water Pollution Act 1990).
- Section 173 of the Fisheries Consolidation Act 1959 creates a number of offences which including that where any person:
  - *wilfully obstructs the passage of the smolts or fry of salmon, trout, or eels, or*
  - *injures or disturbs the spawn or fry of salmon, trout or eels, or*
  - *injures or disturbs any spawning bed, bank or shallow where the spawn or fry of salmon or trout or eels.……* Commits an offence as well as a penalty of €635 there is an additional provision *that any engine device used in the commission of the offence shall as a statutory consequence of conviction stand forfeit.*
- Fishery habitat protection has been further enhanced by other national and EU legislation including the provisions under the Freshwater Fish Directive and the Habitats Directive. The Planning and Development Act 2000 also affords an opportunity for the pro-active protection of fisheries and fisheries habitat.

Summary of Relevant Legislation

- The Fisheries (Consolidation) Act 1959 (as amended).
- The Fisheries (Amendment) Act 1999 (No. 35 of 1999).
- The Freshwater Fish Directive – *Council Directive on the quality of fresh waters needing protection or improvement in order to support fish life* (78/659/EC) as transposed into Irish law under the *E.C. (Quality of Salmonid Waters) Regulations 1988* (S.I. No. 293 of 1988).
- The Habitats Directive – *Council Directive on the conservation of the natural habitats of wild fauna and flora* (92/43/EEC) as transposed into Irish law under the *E. C. (Natural Habitats Regulations 1997* (S.I. No. 94 of 1997).
- The Local Government (Water Pollution) Act 1977 (as amended).
- The Local Government (Planning and Development) Act 2000 (No. 30 of 2000).

Note

Full text of the above legislation can be accessed at www.irlgov.ie

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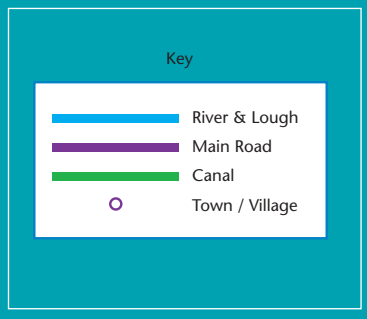
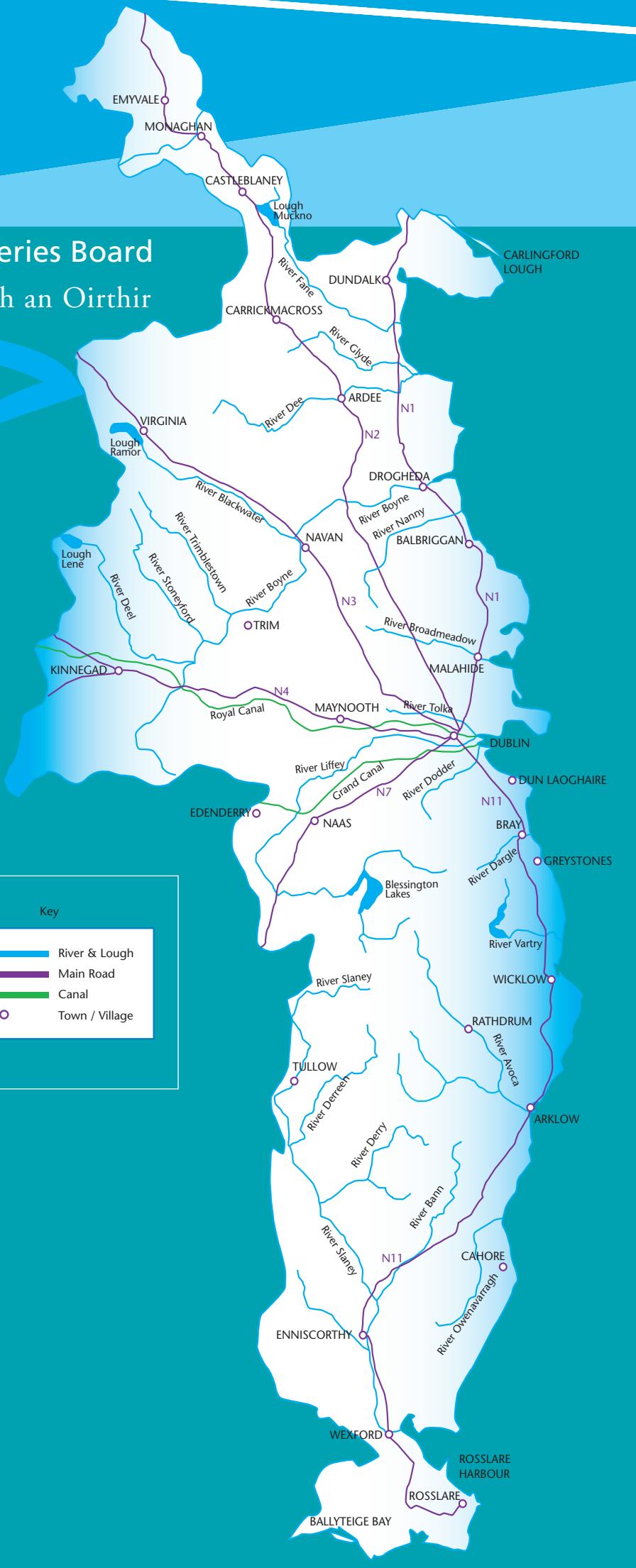
Our Natural Heritage





Appendix C - 2 – Flora & Fauna Survey Report

New Bridge, Navan, Co. Meath

Flora and Fauna Survey

Field work and report completed by

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Report completed in 2013 and updated in 2016.

Non-technical summary

In January and July 2013, and February 2016, flora and fauna surveys were carried out at New Bridge, Navan, Co. Meath. An additional lichen survey was carried out in June 2013. New Bridge in Navan is situated within the Boyne Blackwater Special Area of Conservation (SAC) and Special Protection Area (SPA). The aim of the survey was to determine whether a proposed cantilevered pedestrian bridge would have any impact on the designated conservation site. Two additional, less-preferred options for construction of a walkway are also discussed. A report is presented on the findings and recommendations to mitigate against potential negative impacts of the preferred option are provided.

The designated areas at New Bridge consist of the Boyne River and its banks. The site was walked and all native and naturalised plants were identified to species level where possible. Bryophyte specimens were identified post-survey using a microscope. Vegetation types were assessed and assigned to categories according to the Heritage Council habitat classification system. The site was carefully searched for signs of mammal activity. Signs of mammal activity include tracks, scats, discarded prey items, burrows or resting places. Birds were identified to species level. A bat roost and activity survey of the site was carried out in July 2013 and a lichen survey was carried out in June 2013.

Apart from a kingfisher in flight across the bridge, and foraging Daubenton's bats and soprano pipistrelles over the water, as well as song birds in the vicinity of the bridge, no protected species were recorded during field surveys. There are records for other protected species such as common frog and badger, for the 2km grid square in which New Bridge is located.

At this location the River Boyne SAC and SPA is considerably modified and is negatively impacted by urban development, vehicular traffic and high levels of artificial night lighting. In addition, the early stages of colonization by the invasive Himalayan balsam can be observed on the river banks here. This is likely to lead to a significant loss of native flora along the river banks within a number of years, but this matter is unrelated to the proposed development,

excepting there may be potential for further spread of Himalayan balsam seed material if any clearance works for walkway construction are carried out along the river bank.

The proposed cantilevered walkway is not predicted to impact negatively on the SAC or SPA conservation designations or any conservation designated area within a 15km radius, or any protected habitats, species or species of conservation importance. Mitigation measures to prevent damage to the ecosystem, which could potentially occur as a result of clearance and construction works, are, however, included in the present report.

1.0 REPORT

1.1 Limitations

1.1.1 Survey timing

The ecology surveys were carried out in January, June and July 2013 and the site was revisited in February 2016. The lichen survey was carried out by Paul Whelan. Summer is considered the optimal time to carry out a vegetation survey. This combination of survey dates is considered ideal since it includes the time of year when many vascular plants are in leaf and flowering so can be identified most easily. Winter surveys are useful for identifying presence of over-wintering birds as well as determining habitat types.

2.0 ASSESSMENT OBJECTIVES

The objective of the present ecology survey was to assess the habitats/species within and adjacent to a site proposed for a cantilevered pedestrian bridge development at New Bridge, Athlumney Road, Navan.

The proposed pedestrian bridge is located within the Boyne and Blackwater Special Area of Conservation (site code 2299) and Special Protection Area (site code 4232), while some areas proposed for hard landscaping are outside the conservation designation boundaries. The main preferred option (Option 1 - Piled) is the main option that is discussed at length in the present report, a full discussion of site sensitivity, potential impacts and mitigation measures is included with regard to this option. Other options (Option 2 - Propped; Option 3 – Independent Bridge) are reviewed with regard to potential sensitivity.

The survey and report aim to assess likely impact of the proposed development on the SAC and SPA and to provide mitigation against potential negative impacts. In addition, an Appropriate Assessment Screening Report for the

proposed pedestrian bridge has also been prepared. This flora and fauna survey and lichen survey and reports form the basis for the Screening Report.

Consultation with the National Parks and Wildlife Service highlighted the potential for the presence of rare and infrequent bryophyte and lichen species occurring on old stonework. As a result of this consultation a lichenologist, Paul Whelan was contracted to carry out a detailed lichen survey of the bridge (see Whelan, Unpublished). Bryophytes were surveyed by taking small samples for microscopial identification.

The EU Habitats Directive (1992), 92/43/EEC, obliges Member States to protect species and habitats that are of importance on a Europe-wide scale. The River Boyne and River Blackwater SAC has been designated due to the presence of two habitats listed in Annex I of the EU Habitats Directive - alkaline fen and alluvial woodlands. The SAC is also selected for the presence of the following species listed on Annex II of the same Directive - Atlantic Salmon (*Salmo salar*), Otter (*Lutra lutra*) and River Lamprey (*Lampetra planeri*). An additional Annex II Lamprey species is also known to occur in the Boyne – the brook lamprey (*Lampetra fluvialitis*). A full site synopsis is provided in Appendix II.

The EU Birds Directive (79/404/EEC) lists bird species that are of importance on a Europe-wide scale. The River Boyne and Blackwater SPA has been designated due to the presence of a population of breeding kingfisher (*Alcedo atthis*) which is listed on Annex I of the Birds Directive.

3.0 ASSESSMENT METHODOLOGY

3.1 General Flora and Fauna

The proposed pedestrian bridge site was walked systematically, while noting plant species, habitat types, and searching for signs of mammal activity or live mammals. Signs of mammal activity include tracks and footprints, discarded prey items, scats and burrows or other resting places. Bird species were noted whenever encountered. Samples of bryophytes from the bridge were removed for later identification using a microscope. For details of lichen survey methodology see Whelan (unpub).

3.1.1 Bat Survey

A bat survey was carried out in July 2013. Crevices in bridges are sometimes used by roosting bats. Roosts can be located under arches, within bridge facades, or behind dense ivy. However, the river at New Bridge is particularly fast flowing and the underside of the bridge could not be safely surveyed for bat roosts. Therefore, the bridge was surveyed using bat detectors at dusk and dawn to determine whether any bats emerged from roosts under the bridge or returned to it at dawn.

The evening and early morning bat survey was carried out using bat detectors (that convert bats' high frequency echolocation calls into sounds audible to the human ear). The survey was done on the evening of July 16th for approximately 2 hours after sundown and approximately 1.5 hours prior to sunrise on July 17th 2013. Two bat detectors were used, a Bat Box III heterodyne detector tuned to various frequencies from 40kHz to 55kHz, and an Eco-Tranquility detector, that was tuned to the same frequency range, thereby maximising the chances of picking up any bat species that may fly or roost in the vicinity. Emergence was watched on both sides of the bridge by two surveyors who were in constant communication.

3.1.2 Lichen Survey

Lichens were surveyed in June 2013 and a full description of the survey methods and results can be found in Whelan (unpub.).

3.1.3 Desk Survey: Biodiversity Records

The 2km grid where New Bridge is situated was checked for records for species of conservation importance, using the National Biodiversity Data Centre website mapping service.

Historical records for bats in the area were searched-for (www.batconservationireland.org).

The National Parks and Wildlife Service (NPWS) website mapping service was also checked to determine locations of historical records of species of conservation importance, as well as boundaries of conservation designated areas. Additional conservation designations within a 15km range of the present site were also noted and potential for impacts (either direct or indirect) on these designations are assessed.

4.0 EXISTING ENVIRONMENT

4.1 Flora

The habitats of the SAC and SPA at the proposed development site are listed below and are assigned to categories (and given codes) according to the Heritage Council classification system (Fossitt 2000).

A number of habitat types are present in the SAC/SPA site at this location. These include willow scrub (WS1), verge grassland (GS2) and stone walls (BL1). The River Boyne at the present location can be described as a lowland depositing river (FW2). The most common habitat of the area in general, outside the conservation designations, is buildings and artificial surfaces (BL3). Locations of habitats are shown in Figure 1.

4.1.1 Scrub (WS1)

Willow scrub has developed in places along the river bank here and includes grey willow (*Salix cinerea*) and osier willow (*S. viminalis*). Alder (*Alnus glutinosa, A. incana*), ash (*Fraxinus excelsior*), sycamore (*Acer pseudoplatanus*), dogwood (*Cornus alba*) and bramble (*Rubus fruticosus*) are also present. Among field layer species here are vetch (*Vicia sepium*), hedge woundwort (*Stachys sylvatica*), cow parsley (*Anthriscus sylvestris*), creeping buttercup (*Ranunculus repens*) and nettles (*Urtica dioica*). Scrub occurs in mosaic with rough grassland/grassy verge habitat. During the July 2013 visit, a number of specimens of Himalayan balsam (*Impatiens glandulifera*) were observed. This represents the initial stage of invasion by this species along the banks of the river Boyne. Himalayan balsam is considered a highly invasive non-native species in Ireland.

4.1.2 Grass verge (GS2)

Dry meadow/grassy verge habitat is found on the banks of the Boyne here, in mosaic with scrub and more inundated wetland habitats. Species present include

rough grasses such as false oat (*Arrhenatherum elatius*), Yorkshire-fog (*Holcus lanatus*), cocksfoot (*Dactylis glomerata*). Other species include dove's foot crane's bill (*Geranium molle*), creeping cinquefoil (*Potentilla reptans*), ribwort plantain (*Plantago lanceolata*), spear thistle (*Cirsium vulgare*), nipplewort (*Lapsana communis*), robin-run-the-hedge (*Galium aparine*), lesser hogweed (*Heraclium sphondylium*), broad dock (*Rumex obtusifolius*), broad willowherb (*Epilobium montanum*) and hoary willowherb (*E. parviflorum*). In very waterlogged areas grassland grades into swamp-like vegetation (FS1) which includes common reed (*Phragmites australis*), reed canary grass (*Phalaris arundinacea*), yellow loosestrife (*Lysimachia vulgaris*) and flag iris (*Iris pseudacorus*).

4.1.3 Stone wall (BL1)

The bridge at New Bridge was constructed in the late 1700s. A number of species that are typically found growing on old stone walls were recorded from the bridge in January 2013. These include ivy leaved toadflax (*Cymbalaria muralis*), pellitory of the wall (*Parietaria judaica*), fern grass (*Desmazeria rigida*), maidenhair spleenwort (*Asplenium trichomanes*), wall rue (*Asplenium ruta-muraria*) and western polypody (*Polypodium interjectum*). Other vegetation also found on the bridge includes ivy (*Hedera helix*), particularly on the southern façade. Common figwort (*Scrophularia nodosa*), rose species (*Rosa* sp.), ragwort (*Senecio jacobaea*) and dandelion (*Taraxacum officinales* agg.) are also present. Ledges of the bridge buttresses are matted with grass, possibly *Poa pratensis* subsp *irrigata* which was identified from a higher ledge on the bridge in July 2013. Additional species growing on walls of the bridge and identified in July include red valerian (*Centranthus ruber*) and hemp agrimony (*Eupatorium cannabinum*).

Some cushion mosses are also present including rigid beard moss (*Didymodon rigidulus*), grey cushioned grimmia (*Grimmia pulvinata*), *Orthotrichum anomalum*, and *Orthotrichum diaphanum,* along with *Homalothecium sericeum* and rough stalked feather moss (*Bracythecium rutabulum*). None of the Red Listed mosses

highlighted by the NPWS (such as *Funaria muhlenbergii* or *Grimmia orbicularis*) were identified from the bridge.
The bridge had been cleaned prior to the follow up visit in February 2016 and many of these species, with the exception of ivy-leaved toadflax, were no longer present.

A full assessment of lichens present is provided separately in a supplementary report by Whelan (unpub). In summary, however, 23 lichen species were recorded from accessible parts of the bridge and the area around it. None of these are protected or considered of conservation importance. Many specimens were poorly developed, which may be attributable to pollution from high levels of vehicular traffic.

4.1.4 Buildings and Artificial Surfaces (BL3)
Very few plants are found on paved or artificial surfaces. Occasional annual weedy species may be present at road edges or between paving slabs. These include pineappleweed (*Matricaria discoidea*), annual meadowgrass (*Poa annua*), dandelion, knotgrass (*Polygonum aviculare*) and bittercress (*Cardamine flexuosa*).

4.1.5 Depositing/lowland River
Among the species in the water at this location are bur reed (*Sparganium erectum*), yellow water lily (*Nuphar lutea*), common clubrush (*Schoenoplectus lacustris*) and common reed (*Phragmites australis*).

4.1.6 Adjacent habitats
The playground area can be categorized as amenity grassland (GA2) and flower beds and borders (BC4). The most abundant habitat in the immediate area is buildings and artificial surfaces (BL3).

4.1.7 Other Records: Flora

There are historical records (19th Century) for hairy St John's wort (*Hypericum hirsutum*) within the 10km square that includes the current site (www.npws.ie). This is a tall perennial that can be found in woodland and scrub. Its exact former location is unknown. This species is rare in Ireland and is protected under the Flora Protection Order.

The scrub habitats of the riverbank at this location have been modified substantially and are unlikely to support this species, even if it has been present in the past.

According to available data from the National Parks and Wildlife Service and from the National Biodiversity Data Centre, no other rare or protected plant species have been recorded from the 2km grid square within which the site is situated. None were found during multiple field visits to the site from January to July 2013.

4.2 Fauna

4.2.1 Mammals

No wild animal track or signs were discovered during January or July survey work. No signs of otter were found on the bank of the river here but this species is likely to occur, at least in passing and has been recorded in the area by the Otter Survey of Ireland (data provided by the National Biodiversity Data Centre). There is no evidence for an otter's resting place or holt in the area. The otter (*Lutra lutra*) is protected under Annex II of the EU Habitats Directive, under the Irish Wildlife Acts (1976 and 2000) and listed in the Irish Red Data Book of Vertebrates (While 1993).

No signs of badger (*Meles meles*) (e.g. snuffle-holes, diggings, tracks, sett) were found. Badgers are protected under the Wildlife Acts 1976 and 2000. Badger has been recorded within the 2km grid square by the Road Kill Survey (data provided by the National Biodiversity Data Centre).

No signs of Irish hare (*Lepidus timidus hibernicus*), also protected, were found.

Other mammals protected under the Wildlife Acts that may occur on river banks at the site include stoat (*Mustela erminea*), pygmy shrew (*Sorex minutus*), and hedgehog (*Erinaceous europeaus*). Hedgehogs have been recorded from the 2km square by the Road Kill Survey (data provided by the National Biodiversity Data Centre).

The unprotected brown rat (*Rattus norvegicus*) was observed swimming in the river at this location. The grey squirrel (*Sciurus carolinensis*) has also been recorded by the National Invasive Species Database (data provided by The National Biodiversity Data Centre). Fox (*Vulpes vulpes*), an unprotected mammal, was not confirmed but may occur on the site. No evidence was found for the presence of a fox's earth. Field mice (*Apodemus sylvaticus*) are also likely to occur but these species are not protected under conservation legislation.

4.2.1.1 Bats

Weather conditions were very suitable for a bat survey on the night of July 16th. Met Eireann recorded an air temperature at nearby Dunsany of approximately 18°C at dusk, low windspeeds and no rain on this date.

The bridge was surveyed by two bat surveyors each with a tuneable bat detector tuned to various frequencies usually between 40-50kHz, depending on the presence of an echolocating bat. Each surveyor was situated at opposite sides of the bridge at dusk and dawn.

On the night of the survey large swarms of emerging aquatic insects were observed swarming around artificial yellow (high pressure sodium) night lights at and around the bridge (see Figure 10).

Bats are protected under the Wildife Act (1976 and subsequent amendments) and listed in Annex IV of the EU Habitats Directive as requiring strict protection. Ireland is also signatory to the Eurobats Agreement. The common and soprano pipistrelle (*Pipistrellus pipistrellus, P. pygmaeus*) are probably Ireland's commonest bat species and are found in urban and rural areas. The Leisler's bat (*Nyctalus leisleri*), though relatively frequent, is considered to be of international importance due to its rarity in other European countries. All are listed in the Red Data Book (Whilde, 1993) and the conservation status of the Leisler's bat is considered Near Threatened (Marnell *et al*., 2009), mainly because Ireland is considered the world stronghold for the species. Seven bat species have been recorded from various locations around the ramparts and railway bridge at Navan, on various dates over the past ten years. The species that have been recorded are:

- Common pipistrelle
- Soprano pipistrelle
- Leisler's bat
- Brown long-eared bat (*Plecotus auritus*)
- Natterer's bat (*Myotis nattereri*)
- Daubenton's bat (*M. daubentonii*)
- Whiskered bat (*M. mystacinus*)

A diversity of bats species is likely to occur along the Boyne Valley here because there is abundant suitable woodland and riparian habitat. There are no records for bats flying or roosting at New Bridge itself, however. This may be because it has not been surveyed to date, rather than an absence of bats, per se.

On the evening of the bat survey Daubenton's bats were observed in flight around the two most easterly arches of New Bridge. No bats were confirmed emerging from the bridge, however. The eastern side of the river is less brightly lit by artificial night lights than the western side, hence it is favoured by Daubenton's bats for foraging around compared to the other side. Daubenton's bats avoid waterways lit by artificial lights at night (e.g. Roche *et al*., 2012).

After sundown the most common species recorded in the area was Daubenton's bat, although occasional pipistrelle calls were noted, although these could have been of either the common or soprano pipistrelle.

For 1.5hrs prior to sunrise the bridge was again surveyed. No bats were observed returning to the bridge at this time. A soprano pipistrelle was observed in flight in the vicinity but there was no evidence for the bat roosting in the bridge.

Therefore, New Bridge was not considered to be used a bat roost, as determined by bat detector survey in mid-July 2013. However, it should be noted that bats are highly mobile animals and can move from one roost to another.

4.2.2 Birds

Very few bird species were observed during January field work. Table 3 shows a list of bird species confirmed and likely to occur on the site at times. Most of these are common in agricultural and urban garden situations, e.g. blackbirds, robins, jackdaws and wood pigeons. Songbirds such as blue tits and wrens are protected under the Wildlife Acts 1976 and 2000. In July, a number of additional species were recorded, such as swifts and sand martins, but the built-over nature of the site and relatively small areas of vegetation mean that the potential habitat for nesting birds is rather limited around the bridge. The presence of kingfisher in the area is of conservation importance since this species is listed in Annex I of the Birds Directive. This was confirmed on July 29th 2013 when a single

individual was observed flying across the bridge and along the Athlumney Road for approximately 50m before turning off it. There was no evidence that the bird rested, foraged or nested at this location, however.

4.2.3 Amphibians

The Boyne at New Bridge is not likely to be suitable for frogs (*Rana temporaria*) or newts (*Triturus vulgaris*) to spawn in due to its strong current at the location. Frogs have been recorded from the 2km square by the Irish National Frog Database (data provided by the National Biodiversity Data Centre). Newts have been recorded from the wider 10km square. Both species are protected under the Wildlife Acts (1976 and 2000). No ponds or ditches are proposed for disturbance by the development.

4.2.4 Invertebrates

Few large aerial invertebrates were observed. The shell of a common brown lipped snail (*Cepaea nemoralis*) was recovered from the bridge. Large numbers of swarming diptera were observed around street lights in the vicinity during the July bat survey. The near-threatened large red-tailed bumble bee (*Bombus lapidiarus*) was recorded from the 2km square by Bees of Ireland (data provided by the National Biodiversity Data Centre). This bumble bee species is widespread and common in Ireland. No butterflies were recorded from the site during the July survey.

4.2.5 Fish

It is possible that populations of both *Lampetra planeri* and *Lampetra fluvialitis* are present in the Boyne here. While the overall status of Lamprey along this stretch of river is considered to be favourable (O'Connor 2006), lampreys are less abundant along this stretch of river compared to the lower Boyne. This may be a result of the drainage history of the river which resulted in the removal of the alcove habitats which lampreys prefer. Lampreys and their habitats in this area are, however, under threat from pollution and drainage maintenance. At Kilcarn

Bridge in 2005 young trout (*Salmo trutta*), salmon (*Salmo salar*) and sticklebacks (*Gasterosteus aculeatus*) were all caught during an electrofishing survey for Lamprey (O'Connor 2006).

4.3 CONSERVATION DESIGNATIONS

The River Boyne at this location consists of a relatively channelized and disturbed aquatic ecosystem. The high level of artificial night lighting on the bridge and along streets and roadways adjacent cause significant overspill of lighting onto the river surface and disrupt the lifecycles of emerging aquatic insects (see Figure 10). In addition, the banks at this location show early stages of colonization by Himalayan balsam (see Figure 12), a highly invasive non-native vascular plant that crowds out native flora and forms monodominant stands. Nonetheless, a number of Annex I protected species such as lamprey, salmon and otter have been recorded from the vicinity of New Bridge and a kingfisher has been recorded in flight across it.

Additional conservation designated areas and proposed conservation sites are found within 15km of the present site. These are:

Natural Heritage Areas

Jamestown Bog Site Code 1324. This bog is situated approximately 9-10km west of the present New Bridge site. It has been designated due to the presence of high bog and cutover raised bog. It is one of the most north-eastern remaining raised bog in the country and one of only two raised bogs in County Meath (see Appendix II).

Proposed Natural Heritage Areas

Thomastown Bog Site code 1593

There is little information available on this site since it has not been designated a Natural Heritage Area. Thomastown Bog is located approximately 12-13km east of the New Bridge site. This species rich site is a raised bog surrounded by wet

woodland and grassland. There are also areas of reed beds. Sites with this level of habitat and species diversity in Meath are rare (cited from Anon 2008).

Balrath Wood Site code 1579

This woodland is situated 11km east of the New Bridge site. This complex of three separate woodlands near Duleek is of particular value in the county due to the rarity of mature deciduous woodland in Meath. In addition, the Common Wintergreen (*Pyrola minor*), a rare plant, has been recorded there recently (cited from Anon 2008).

There are no features (aquatic, terrestrial or hydrological) that link the present New Bridge site to the above proposed and designated NHAs.

5.0 OVERALL EVALUATION OF SITE

5.1 Flora

No plant species were found on the site that are listed for protection under the Flora Protection Order or on Annex II of the EU Habitats Directive. No species listed in the Red Data Book were confirmed. No rare or protected bryophytes or lichens were found. The presence of the vascular plant, hairy St. John's Wort was not confirmed from this location, nor is it likely to occur.

A mosaic of grassland verge habitat and scrub are found on the river banks here, while the bridge is a combination of dry stone wall habitat and buildings and artificial surfaces.

Scrub is important for providing shelter and food for song-birds, a number of which occur in the area.

The river Boyne at this location has a long history of drainage and disturbance although common aquatic plants are present.

The river banks here are in the early stages of colonisation by the invasive species Himalayan balsam. Therefore, native flora is likely to become significantly reduced in the coming years along the Boyne river.

Paul Whelan, lichenologist, assessed the bridge for lichen flora and found that the high levels of pollution and disturbance of stonework has resulted in a poorly developed lichen flora (see Appendix I). Similarly for bryophytes, the few species found are common and typical of stonework in urban areas.

5.2 Fauna

Daubenton's bats, protected under the Wildlife Acts and Annex IV of the Habitats Directive, were observed flying and foraging over water in the darker areas around the bridge. The waterway at this point is extensively lit at night by overspill from street lights. This reduces the potential for foraging areas for Daubenton's bats because they prefer to forage in darkness, hence they tend to forage on the waterway at the east side and in the shadows cast by the bridge itself. There is no evidence of any bats roosting in New Bridge itself from survey work completed in mid-July 2013.

No signs of an otter resting place (holt) were found. River and brook lamprey may occur along the Boyne at this location and they have been confirmed both upstream and downstream of this site. Lamprey are vulnerable to pollution and drainage works.

A kingfisher was observed in flight across New Bridge on July 29th 2013. The species not thought to nest at this location due to the lack of suitable available nesting sites.

The artificial night lighting in the area also causes large swarms of insects to emerge and leave the waterway (as observed in July 2013). Artificial night lighting has been found to disrupt aquatic ecosystems by interfering with stream drift and other ecosystem mechanisms (Moore *et al.*, 2006). The full impacts of street lighting on Irish waterway ecosystems and food chains are unresearched and unquantified.

The density of built land in the vicinity of the river at this location, combined with bright artificial night lighting and high levels of vehicular traffic, restricts and degrades potential habitat availability for mammals, birds and invertebrates in the immediate area.

5.3 Designations

The site is within the Boyne Blackwater Special Area of Conservation (SAC) and Special Protection Area (SPA).

There are no features linking the New Bridge site to any of the NHAs or pNHAs situated within a 15km radius.

5.4 Sensitivity: Option 1 (Piled)

This construction option involves the erection of a 3.5metre wide boardwalk to the upstream elevation of New Bridge. This would be achieved by inserting a series of pile foundations through each pier to the underlying bedrock. The pile foundations will be sleeved so as to not induce additional loading on New Bridge itself. A cantilever cross-head beam would project through the spandrel wall via the careful removal of a small number of stones. The new boardwalk would then supported on these projections.

Habitats beside the site are not particularly diverse, excepting the fact that the river and banks here are situated within the SAC/SPA boundaries they are not, in this location, of high conservation importance. However, there are no plans to remove or disturb any of these semi-natural habitats as part of the proposed development (Option 1).

There are no mature trees that may be impacted by the proposed Option 1 development.

The soprano pipistrelle bat is a species that can adapt to urban environments. Daubenton's bat occurs along the river here but tends to select unlit areas of the waterway for foraging. Since there is no proposal for increasing the level of lighting of the waterway Daubenton's foraging availability should not be impacted.

No bat roosts were found under the bridge in mid-July 2013 therefore roosting bats should not be impacted.

Kingfishers occur in the area but do not nest here. The proposed walkway will not impact kingfisher habitat availability.

Most of the remaining bird species present can adapt to garden or urban environments provided green spaces and scrub around the bridge are retained.

The River Boyne at this location is a relatively disturbed aquatic ecosystem, although protected species such as Lamprey have been found nearby. The proposed cantilevered walkway will not introduce any new disturbance to the river channel at this point. Sensitive species such as lamprey, salmon and otter will not, therefore, be disturbed by the proposed development.

The proposed Option 1 development will not affect the river itself, accessibility to river banks, river vegetation or the river sediments.

5.5 Sensitivity: Option 2 (Propped)

Option 2 also involves the erection of a 3.5metre wide boardwalk to the upstream elevation of New Bridge, however the means of support differs from that of option 1. This option would involve supporting the proposed steel bridge via a combination of tie roads drilled horizontally through the bridge and restrained by pattress plates on the downstream, protected, elevation and inclined props to the existing cutwaters below. This option requires consolidation/strengthening of the existing cutwaters which would involve working within the River Boyne.

Habitats beside the site are not particularly diverse, excepting the fact that the river and banks here are situated within the SAC/SPA boundaries they are not, in this location, of high conservation importance. However, there are no plans to

remove or disturb any of these semi-natural habitats as part of the proposed development (Option 2).

There are no mature trees that may be impacted by the present proposed development.

The soprano pipistrelle bat is a species that can adapt to urban environments. Daubenton's bat occurs along the river here but tends to select unlit areas of the waterway for foraging. Since there is no proposal for increasing the level of lighting of the waterway Daubenton's foraging availability should not be impacted.

No bat roosts were found under the bridge in mid-July 2013 therefore roosting bats should not be impacted.

Kingfishers occur in the area but do not nest here. The proposed walkway will not impact kingfisher habitat availability.

Most of the remaining bird species present can adapt to garden or urban environments provided green spaces and scrub around the bridge are retained.

The River Boyne at this location is a relatively disturbed aquatic ecosystem, although protected species such as Lamprey have been found nearby. The proposed propped walkway would, however, introduce disturbance to the river channel at this point. Sensitive species such as lamprey, salmon and otter may, therefore, be disturbed by the proposed development.

This option would cause greater disturbance to the bridge façade and would require removal of all vegetation from bridge cutwaters. This option would also require work to be carried out within the waterway itself, as well as an increased need for strengthening and consolidating work on the bridge, compared with

Option 1 above. Such works, particularly working within the river channel, would increase risk of sediment and/or construction materials falling into the waterway and therefore causing pollution and is less favoured for these as well as engineering and heritage considerations. This option will not, therefore, be carried forward in the present report.

5.6 Sensitivity: Option 3 (Independent Bridge)

Option 3 involves the construction of a clear span bridge upstream of New Bridge. This option avoids any interruption or intervention into the fabric of New Bridge but would require substantial works to the existing river banks to construct the required abutments and foundations.

Habitats at the site here are not particularly diverse, excepting the fact that the river and banks here are situated within the SAC/SPA boundaries they are not, in this location, of high conservation importance.

However, while with Options 1 and 2 there would be no plans to remove or disturb any of these semi-natural habitats as part of the proposed development, with Option 3, an Independent Bridge, the river bank would be disturbed by construction of the new bridge. Vegetation removal would take place and bankside soil and materials would be removed. Bankside vegetation and sediments would continue to be disturbed for the duration of site works, potentially a number of months thereby increasing the risk of sedimentation.

The River Boyne at this location is a relatively disturbed aquatic ecosystem, although protected species such as Lamprey have been found nearby. The construction of the proposed independent bridge could potentially cause new disturbance to the river channel at the points of construction. Sensitive species such as lamprey, salmon and otter could, therefore, be disturbed by the proposed development.

Construction of a new bridge across the river channel would increase the risk of sediment and/or construction materials falling into the waterway and is less favoured for the above ecological constraints as well as financial and engineering considerations. This option will not, therefore, be carried forward in the present report.

6.0 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The proposed development site is a stone bridge (New Bridge) that carries two lanes of vehicular traffic across the Boyne River in Navan. The proposal is for a pedestrian bridge that will be constructed on the existing southern façade of New Bridge. The pedestrian bridge will be cantilevered and will not, therefore cause any disturbance to the river bed or river bank. An area of stone wall on either side of the existing bridge parapet will be removed to allow entrance and exit from the walkway. A small amount of stonework is also be removed to facilitate the insertion of a cantilevered cross-head beam. Stone wall habitat here is highly polluted (from vehicular traffic) and has been subject to disturbance so is not considered of conservation significance.

6.1 PREDICTED IMPACTS OF THE PROPOSED DEVELOPMENT

6.1.1 "Do Nothing" Impact

The current flora and fauna composition will remain roughly the same in the short to medium term. Rank grassland on the river banks is likely to gradually develop into scrub. The non-native species, Himalayan balsam is likely to continue its colonisation along the river banks here. Immature trees will continue to develop. Vehicular traffic and artificial night lighting will remain at similar levels.

6.2 Construction Phase

The proposed development will result in the loss of the following habitats:

- Stone wall at points of entry to the cantilevered walkway and points of insertion of cross-head beam.

Foraging area for bats will not be impacted.

Potential nesting and foraging habitat for various song and other bird species will not be impacted.

Ivy will be removed from parts of the bridge where the cantilevered structure is to be constructed. If herbicides are used to aid vegetation clearance there is potential for damage to Boyne ecosystem.

There is potential for dust arising during the construction phase to deposit in the river system.

There is potential for cement/concrete/mortar to drop into the river system.

There may be potential for sediment run-off during construction.

There will be no increase in storm water run off or drainage.

Should vegetation along the river bank be disturbed by machinery there is potential for further spread of the invasive Himalayan balsam.

Potential loss of stonewall habitat for lichen, bryophyte and small vascular plant species through loss of stonewall and/or bridge cleaning.

6.3 Operational Phase

Some areas of paving along the Athlumney Road will be replaced by planting.

Street lighting will not be changed.

7.0 MITIGATION MEASURES

7.1 Comply with all regulations pertaining to Special Area of Conservation and Special Protection Area designation.

Certain activities can only be carried out within SACs with the permission of the Minister for the Environment and Local Government. These are called Notifiable Actions and those relevant to river habitats and the Annex II listed fish species found in the Boyne Blackwater are shown below. Among the most relevant to the current proposed development are the following:

- **dumping rubbish or other materials or disposing of any chemicals or wastes in streams/rivers or into water-courses running into them**

7.2 Construction Phase

7.2.1 Removal of vegetation

Ivy will need to be removed from the southern façade of the bridge. Removed vegetation and any associated debris arising during clearance works should not be allowed to enter the river system. Herbicidal sprays should not be used on the bridge prior to vegetation removal, since there would be potential for herbicides used on the bridge to enter the river system. Netting designed to catch any loose materials should be used across the construction site.

7.2.2 Dumping

Dumping of spoil, rubbish or any materials into the SAC/SPA is prohibited under the Litter Acts and under the regulations provided below. Dumping could have a detrimental effect on the river. Concrete and cement are toxic to fish. Suitable

netting should be used to prevent accidental deposition of harmful materials in the river during construction. Also, all site contractors will be made aware that the river valley is a protected site and that dumping is an offence.

7.2.3 Drainage

The proposed development should not impact or cause any increase in storm water runoff from the site.

7.2.4 Invasive Exotic Species

The only proposal for soil movement is to the east of the bridge where landscaping is suggested at the corner of Athlumney Road and Convent Road. Sterile soil or compost would be required at this location since it is currently paved-over. Soil movements will not take place at the SAC/SPA.

Measures to prevent disturbance to bankside vegetation (by erecting a plywood barrier around the construction site at the river bank) should be taken in order to prevent further spread of Himalayan balsam through disturbance of bank vegetation.

7.2.5 Dust and Pollution

During site construction, if suitable preventative measures are not taken, there is potential for pollution or dust arising and causing damage in the river. Dust minimisation measures will be carried out to ensure there is no deposition of dust on surrounding habitats. Appropriate measures should be taken to prevent movement of dust into adjacent habitats during site clearance and development. Appropriate measures include erection of nets under the cantilever structure and bunding any waste prior to its removal from the site.

Construction site offices are likely to be set up close to the bridge. Any diesel or fuels stored here would be located very close the river so need to be prevented from causing accidental spills into the aquatic habitat. A petrol/oil interceptor

should be incorporated into the surface water system to prevent petrol or oil runoff into the Boyne River. All fuel tanks should be located in a suitable area, away from the SAC and fully bunded. Inlets and outlets for these should be located within the bunded area.

7.2.6 Mitigate against loss of stone wall habitat for lichens, bryophytes and small vascular plants

Grouting should be carried out with soft lime mortar (as per NPWS consultation, citing NRA guidelines, and Whelan, unpublished). Cleaning of bridge façade where the cantilevered walkway is due to be constructed is not recommended (see Whelan, unpublished). In addition, when repointing is necessary for routine maintenance it is recommended that repointing take place in patches, with no more than one third of the bridge being repointed in a given year. Cleaning of the main part of the bridge, if carried out, should not include chemicals (see Whelan, unpublished).

7.2.7 Wildlife Awareness

While no evidence for roosting bats were confirmed from the bridge in summer 2013 these mammals are mobile species and construction workers and engineers on-site should be aware that bats may still roost there on occasion. Should any bats be found or disturbed from the bridge during construction work, works should cease until a trained licensed bat specialist and/or the National Parks and Wildlife Service Wildlife Ranger has been contacted and provided instructions on how to proceed. Bats are protected mammals and intentional disturbance to these species or their roosts is an Offence under the Wildlife Acts.

7.3 Site Commissioning

7.3.1 Lighting

Due to the sensitivity of the SAC and SPA, it is recommended that no new artificial night lighting should be used on the pedestrian bridge. If there is a very strong need for lighting for safety purposes, mercury or metal halide should be

avoided and the lighting scheme should utilize similar units, dimmable and cowled, to those that were used during the Grand Canal Lighting scheme (http://www.csea.ie/quality-bus-corridors-green-routes/grand-canal-green-route-2/more). However, the greater height of the current proposed pedestrian bridge location above the water surface should be borne in mind. Excessive lighting of the River Boyne at Navan has current observable negative impacts on the river ecosystem and these should not be added-to by the present proposed development.

8. MONITORING

Since the proposed development will not impact on the SAC/SPA and there are no bat roosts that will be disturbed as part of the proposed development there are no recommendations made for further monitoring.

9. REINSTATEMENT

N/A

Table 1: Bird species recorded and likely to occur at New Bridge site, Athlumney Road, January & July 2013, plus additional species from the 2km grid square recorded by The Atlas of Breeding Birds and other surveys (data downloaded from the National Biodiversity Data Centre).

Scientific Name	**Common Name**	**Record Attributable to**	**Protection/ Conservation**
Actitis hypoleucos	Common Sandpiper	Kingfisher Survey 2010	Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Alcedo atthis	Common Kingfisher	The Second Atlas of Breeding Birds in Britain and Ireland: 1988-1991	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive >> Annex I Bird Species || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Anas platyrhynchos	Mallard	Kingfisher Survey 2010	Protected Species: Wildlife Acts || Protected Species: EU Birds Directive >> Annex II, Section I Bird Species || Protected Species: EU Birds Directive >> Annex III, Section I Bird Species
Apus apus	Common Swift	N. Roche & The Second Atlas of Breeding Birds in Britain and Ireland: 1988-1991	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Ardea cinerea	Grey heron	N. Roche	Protected Species: Wildlife Acts
Carduelis cannabina	Common Linnet	The Second Atlas of Breeding Birds in Britain and Ireland: 1988-1991	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern -

			Amber List
Corvus frugilegus	Rook	N. Roche	Protected Species: Wildlife Acts
Corvus monedula	Jackdaw	N. Roche	Protected Species: Wildlife Acts
Delichon urbicum	House Martin	The Second Atlas of Breeding Birds in Britain and Ireland: 1988-1991	Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Erithacus rubecula	Robin	N. Roche	Protected Species: Wildlife Acts
Fringilla coelebs	Chaffinch	N. Roche	Protected Species: Wildlife Acts
Hirundo rustica	Barn Swallow	Kingfisher Survey 2010	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Larus ridibundus	Black-headed Gull	The Second Atlas of Breeding Birds in Britain and Ireland: 1988-1991	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Red List
Parus caeruleus	Blue tit	N. Roche	Protected Species: Wildlife Acts
Parus major	Great tit	N. Roche	Protected Species: Wildlife Acts
Passer montanus	Sparrow	N. Roche	Protected Species: Wildlife Acts
Pica pica	Magpie	N. Roche	Protected Species: Wildlife Acts
Riparia riparia	Sand Martin	N. Roche & Kingfisher Survey 2010	Protected Species: Wildlife Acts || Threatened Species: Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Sturnus vulgaris	Common Starling	N. Roche & The Second Atlas of	Protected Species: Wildlife Acts || Threatened Species:

		Breeding Birds in Britain and Ireland: 1988-1991	Birds of Conservation Concern >> Birds of Conservation Concern - Amber List
Troglodytes troglodytes	Wren	N. Roche	Protected Species: Wildlife Acts
Turdus merula	Blackbird	N. Roche	Protected Species: Wildlife Acts

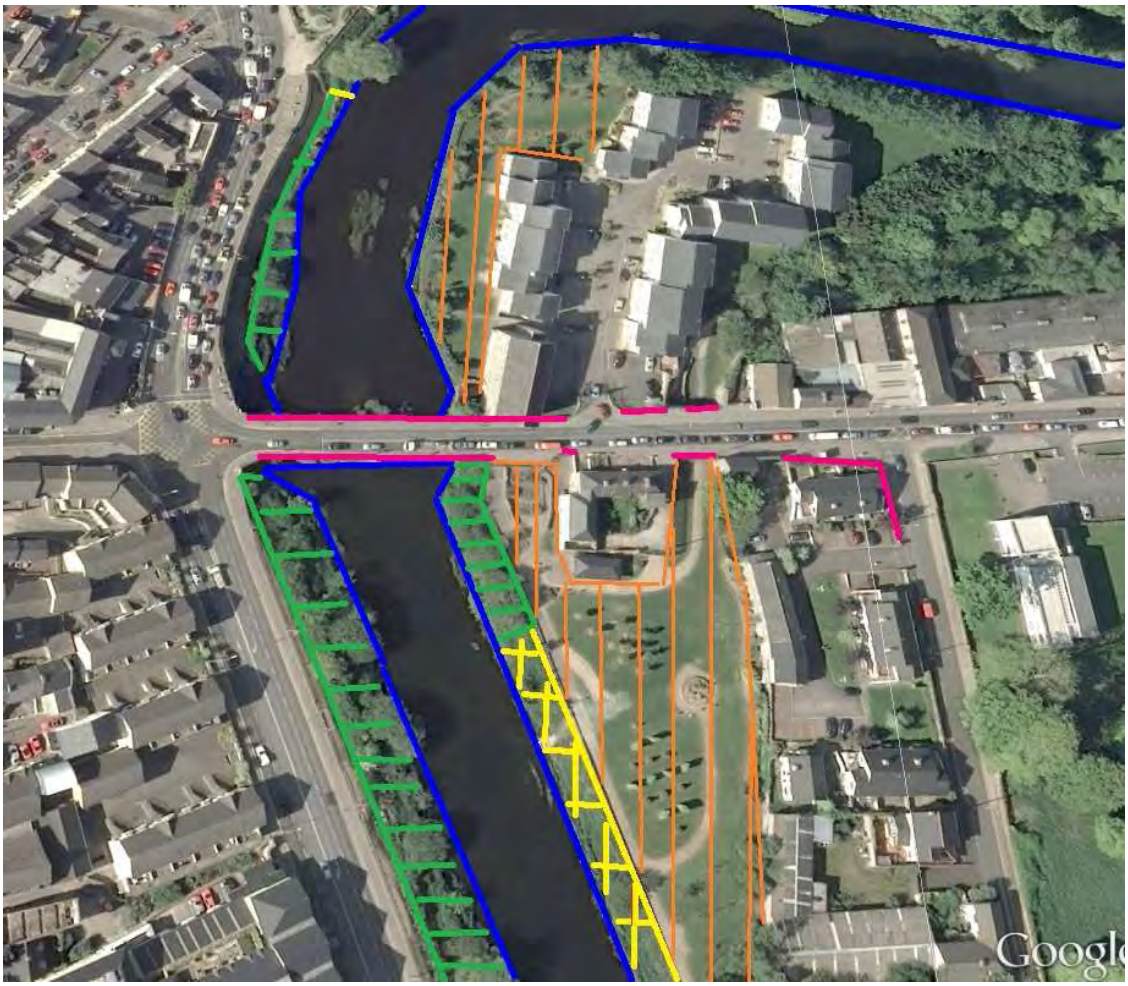

Figure 1: Habitat Map. Approximate boundary of the river habitat (FL2) is indicated in blue, although this is variable depending on water level. Green horizontal stripes indicate scrub (WS1), pink lines indicate stone walls (BL1), yellow cross-hatching indicates location of grassy verge (GS2), garden habitats with amenity grassland (GA2) and flower beds (BC4) are indicated with orange vertical stripes. The remaining uncoloured habitat is mainly buildings and artificial surfaces (BL3).

↑North

Figure 2: Location of the SAC boundaries at Navan

Figure 3: Location of the SPA boundaries (indicated with blue) at Navan

Figure 4: Scrub habitat (WS1) at New Bridge Navan, January 2013.

Figure 5: View of the west facing bank with grassy verge habitat (GS2), amenity grassland (GA2) and flower beds (BC4) on the flood plain beyond. Scrub and rough grasses in the foreground.

Figure 6: New Bridge with old stone walls (BL1), ivy and other species are found here. The pedestrian bridge is proposed for this south facing side of the bridge. The bridge was cleaned after this photograph was taken in 2013 and as at March 2016 there was no ivy present.

Figure 7: New Bridge, north facing.

Figure 8: To the east of New Bridge, this paved area is proposed for landscaping within the present proposed development. The habitat is categorized as Buildings and Artificial Surfaces (BL3).

Figure 9: New Bridge deck, apart from stone walls lining the parapets this habitat is categorized as Buildings and Artificial Surfaces (BL3).

Figure 10: Insects swarming at yellow (high pressure sodium) street lights on the deck of New Bridge, Navan, Co. Meath, July 2013.

Figure 11: New Bridge (north facing façade) and the River Boyne, lit at night by direct, diffuse and reflected artificial lighting.

Figure 12: Bankside vegetation at New Bridge July 2013 – note presence of pink-flowered Himalayan balsam in centre – a highly invasive non-native plant species

that is likely to dominate bankside vegetation along the river here within a short number of years.

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APPENDIX 1: SITE SYNOPSES & NOTIFIABLE ACTIONS

SITE SYNOPSIS
SITE NAME: RIVER BOYNE AND RIVER BLACKWATER
SITE CODE: 002299

This site comprises the freshwater element of the River Boyne as far as the Boyne Aqueduct, the Blackwater as far as Lough Ramor and the Boyne tributaries including the Deel, Stoneyford and Tremblestown Rivers. These riverine stretches drain a considerable area of Meath and Westmeath and smaller areas of Cavan and Louth. The underlying geology is Carboniferous Limestone for the most part with areas of Upper, Lower and Middle well represented. In the vicinity of Kells Silurian Quartzite is present while close to Trim are Carboniferous Shales and Sandstones. There are many large towns adjacent to but not within the site. Towns both small and large, include Slane, Navan, Kells, Trim, Athboy and Ballivor.

The site is a candidate SAC selected for alkaline fen and alluvial woodlands, both habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected for the following species listed on Annex II of the same directive – Atlantic Salmon, Otter and River Lamprey.

The main areas of alkaline fen are concentrated in the vicinity of Lough Shesk, Freehan Lough and Newtown Lough. The hummocky nature of the local terrain produces frequent springs and seepages which are rich in lime. A series of base-rich marshes have developed in the poorly-drained hollows, generally linked with these three lakes. Open water is usually fringed by Bulrush (*Typha latifolia*), Common Club-rush (*Scirpus lacustris*) or Common Reed (*Phragmites australis*) and this last species also extends shorewards where a dense stand of Great Fen Sedge or Saw Sedge (*Cladium mariscus*) frequently occurs. This in turn grades into a sedge and grass community (*Carex* spp., *Molinia caerulea*) or one dominated by the Black Bogrush (*Schoenus nigricans*). An alternative direction

for the aquatic/terrestrial transition to take is through a floating layer of vegetation. This is normally based on Bogbean (*Menyanthes trifoliata*) and Marsh cinquefoil (*Potentilla palustris*). Other species gradually become established on this cover, especially plants tolerant of low nutrient status e.g. bog mosses (*Sphagnum* spp.). Diversity of plant and animal life is high in the fen and the flora, includes many rarities. The plants of interest include Narrow-leaved Marsh Orchid (*Dactylorhiza traunsteineri*), Fen Bedstraw (*Galium uliginosum*), Cowbane (*Cicuta virosa*), Frogbit (*Hydrocharis morsus-ranae*) and Least Bur-reed (*Sparganium minimum*). These species tend to be restricted in their distribution in Ireland. Also notable is the abundance of aquatic Stoneworts (*Chara* spp.) which are characteristic of calcareous wetlands. The rare plant, Round-leaved Wintergreen (*Pyrola rotundifolia*) occurs around Newtown Lough. This species is listed in the Red Data Book and is protected under the Flora Protection Order, 1999, and this site is its only occurrence in Co. Meath.

Wet woodland fringes many stretches of the Boyne. The Boyne River Islands are a small chain of three islands situated 2.5 km west of Drogheda. The islands were formed by the build up of alluvial sediment in this part of the river where water movement is sluggish. All of the islands are covered by dense thickets of wet, Willow (*Salix* spp.) woodland, with the following species occurring: Osier (*S. viminalis*), Crack Willow (*S. fragilis*), White Willow (*S. alba*), Purple Willow (*Salix purpurea*) and Grey Willow (*S. cinerea*). A small area of Alder (*Alnus glutinosa*) woodland is found on soft ground at the edge of the canal in the north-western section of the islands. Along other stretches of the rivers of the site Grey Willow scrub and pockets of wet woodland dominated by Alder have become established, particularly at the river edge of mature deciduous woodland. Ash (*Fraxinus excelsior*) and Birch (*Betula pubescens*) are common in the latter and the ground flora is typical of wet woodland with Meadowsweet (*Filipendula ulmaria*), Angelica (*Angelica sylvestris*), Yellow Iris, Horsetail (*Equisetum* spp.) and occasional tussocks of Greater Tussocksedge (*Carex paniculata*).

The dominant habitat along the edges of the river is freshwater marsh - the following plant species occur commonly here: Yellow Flag (*Iris pseudacorus*),

Creeping Bent (*Agrostis stolonifera*), Canary Reed-grass (*Phalaris arundinacea*), Marsh Bedstraw (Galium palustre), Water Mint (*Mentha aquatica*) and Water Forget-me-not (*Myosotis scorpioides*). In the wetter areas of the marsh Common Meadow-rue (*Thalictrum flavum*) is found. In the vicinity of Dowth, Fen Bedstraw (*Galium uliginosum*), a scarce species mainly confined to marshy areas in the midlands, is common in this vegetation. Swamp Meadow-grass (*Poa palustris*) is an introduced plant which has spread into the wild (naturalised) along the Boyne approximately 5 km south-west of Slane. It is a rare species which is listed in the Red Data Book and has been recorded among freshwater marsh vegetation on the banks of the Boyne in this site. The only other record for this species in the Republic is from a site in Co. Monaghan.

The secondary habitat associated with the marsh is wet grassland and species such as Tall Fescue (*Festuca arundinacea*), Silverweed (*Potentilla anserina*), Creeping Buttercup (*Ranunculus repens*), Meadowsweet (*Filipendula ulmaria*) and Meadow Vetchling (*Lathyrus pratensis*) are well represented. Strawberry Clover (*Trifolium fragiferum*), a plant generally restricted to coastal locations in Ireland, has been recorded from wet grassland vegetation at Trim. At Rossnaree river bank on the River Boyne, is Round-Fruited Rush (*Juncus compressus*) found in alluvial pasture, which is generally periodically flooded during the winter months. This rare plant is only found in three counties in Ireland.

Along much of the Boyne and along tributary stretches are areas of mature deciduous woodland on the steeper slopes above the floodplain marsh or wet woodland vegetation. Many of these are planted in origin. However the steeper areas of King Williams Glen and Townley Hall wood have been left unmanaged and now have a more natural character. East of Curley Hole the woodland has a natural appearance with few conifers. Broad-leaved species include Oak (*Quercus* spp.), Ash (*Fraxinus excelsior*), Willows, Hazel (*Corylus avellana*), Sycamore (*Acer pseudoplatanus*), Holly (*Ilex aquifolium*), Horse chestnut (*Aesculus* sp.) and the shrubs Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*) and Elder (*Sambucus nigra*).

South-west of Slane and in Dowth, the addition of some more exotic tree species such as Wych Elm (*Ulmus glabra*), Beech (*Fagus sylvatica*), and occasionally Lime (*Tilia cordata*), are seen. Coniferous trees, Larch (*Larix* sp.) and Scots Pine (*Pinus sylvestris*) also occur. The woodland ground flora includes Barren Strawberry (*Potentilla sterilis*), Enchanter's Nightshade (*Circaea lutetiana*) and Ground-ivy (*Glechoma hederacea*), along with a range of ferns. Variation occurs in the composition of the canopy, for example, in wet patches alongside the river, White Willow and Alder form the canopy.

Other habitats present along the Boyne and Blackwater include lowland dry grassland, improved grassland, reedswamp, weedy wasteground areas, scrub, hedge, drainage ditches and canal. In the vicinity of Lough Shesk, the dry slopes of the morainic hummocks support grassland vegetation which, in some places, is partially colonised by Gorse (*Ulex europaeus*) scrub. Those grasslands which remain unimproved for pasture are species-rich with Common Knapweed (*Centaurea nigra*), Creeping Thistle (*Cirsium arvense*) and Ribwort Plantain (*Plantago lanceolata*) commonly present. Fringing the canal alongside the Boyne south-west of Slane, are Reed Sweet-grass (*Glyceria maxima*), Great Willowherb (*Epilobium hirsutum*) and Meadowsweet.

The Boyne and its tributaries is one of Ireland's premier game fisheries and it offers a wide range of angling from fishing for spring salmon and grilse to seatrout fishing and extensive brown trout fishing. Atlantic Salmon (*Salmo salar*) use the tributaries and headwaters as spawning grounds. Although this species is still fished commercially in Ireland, it is considered to be endangered or locally threatened elsewhere in Europe and is listed on Annex II of the Habitats Directive. Atlantic Salmon run the Boyne almost every month of the year. The Boyne is most important as it represents an eastern river which holds large three-sea-winter fish from 20 –30 lb. These fish generally arrive in February with smaller spring fish (10 lb) arriving in April/May. The grilse come in July, water permitting. The river gets a further run of fish in late August and this run would appear to last well after the fishing season. The salmon fishing season lasts from 1st March to 30th September. The Blackwater is a medium sized limestone river

which is still recovering from the effects of the arterial drainage scheme of the 70's. Salmon stocks have not recovered to the numbers pre drainage. The Deel, Riverstown, Stoneyford and Tremblestown Rivers are all spring fed with a continuous high volume of water. They are difficult to fish in that some are overgrown while others have been affected by drainage with the resulting high banks.

The site is also important for the populations of two other species listed on Annex II of the E.U. Habitats Directive, namely River Lamprey (*Lampetra fluviatilis*) which is present in the lower reaches of the Boyne River while the Otter (*Lutra lutra*) can be found throughout the site. In addition, the site also supports many more of the mammal species occurring in Ireland. Those which are listed in the Irish Red Data Book include Pine Marten, Badger and Irish Hare. Common Frog, another Red Data Book species, also occurs within the site. All of these animals with the addition of the Stoat and Red Squirrel, which also occur within the site, are protected under the Wildlife Act.

Whooper Swans winter regularly at several locations along the Boyne and Blackwater Rivers. Parts of these areas are within the cSAC site. Known sites are at Newgrange (c. 20 in recent winters), near Slane (20+ in recent winters), Wilkinstown (several records of 100+) and River Blackwater from Kells to Navan (104 at Kells in winter 1996/97, 182 at Headfort in winter 1997/98, 200-300 in winter 1999/00). The available information indicates that there is a regular wintering population of Whooper Swans based along the Boyne and Blackwater River valleys. The birds use a range of feeding sites but roosting sites are not well known. The population is substantial, certainly of national, and at times international, importance. Numbers are probably in the low hundreds.

Intensive agriculture is the main landuse along the site. Much of the grassland is in very large fields and is improved. Silage harvesting is carried out. The spreading of slurry and fertiliser poses a threat to the water quality of this salmonid river and to the lakes. In the more extensive agricultural areas sheep grazing is carried out. Fishing is a main tourist attraction on the Boyne and Blackwater and there are a number of Angler Associations, some with a number

of beats. Fishing stands and styles have been erected in places. The Eastern Regional Fishery Board have erected fencing along selected stretches of the river as part of their salmonid enhancement programme. Parts of the river system have been arterially dredged. In 1969 an arterial dredging scheme commenced and disrupted angling for 18 years. The dredging altered the character of the river completely and resulted in many cases in leaving very high banks. The main channel from Drogheda upstream to Navan was left untouched, as were a few stretches on the Blackwater. Ongoing maintenance dredging is carried out along stretches of the river system where the gradient is low.

This is extremely destructive to salmonid habitat in the area. Drainage of the adjacent river systems also impacts on the many small wetland areas throughout the site. The River Boyne is a designated Salmonid Water under the EU Freshwater Fish Directive. The site supports populations of several species listed on Annex II of the EU Habitats Directive, and habitats listed on Annex I of this directive, as well as examples of other important habitats. Although the wet woodland areas appear small there are few similar examples of this type of alluvial wet woodland remaining in the country, particularly in the north-east. The semi-natural habitats, particularly the strips of woodland which extend along the river banks and the marsh and wet grasslands, increase the overall habitat diversity and add to the ecological value of the site as does the presence of a range of Red Data Book plant and animal species and the presence of nationally rare plant species.

6.10.2006

SITE SYNOPSIS

SITE NAME: RIVER BOYNE AND RIVER BLACKWATER SPA

SITE CODE: 004232

The River Boyne and River Blackwater SPA is a long, linear site that comprises stretches of the River Boyne and several of its tributaries; most of the site is in Co. Meath, but it extends also into Cos Cavan, Louth and Westmeath. It includes the following river sections: the River Boyne from the M1 motorway bridge, west of Drogheda, to the junction with the Royal Canal, west of Longwood, Co Meath; the River Blackwater from its junction with the River Boyne in Navan to the junction with Lough Ramor in Co. Cavan; the Tremblestown River/Athboy River from the junction with the River Boyne at Kilnagross Bridge west of Trim to the bridge in Athboy, Co. Meath; the Stoneyford River from its junction with the River Boyne to Stonestown Bridge in Co. Westmeath; the River Deel from its junction with the River Boyne to Cummer Bridge, Co. Westmeath. The site includes the river channel and marginal vegetation.

Most of the site is underlain by Carboniferous limestone but Silurian quartzite also occurs in the vicinity of Kells and Carboniferous shales and sandstones close to Trim.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive of special conservation interest for the following species: Kingfisher.

A survey in 2010 recorded 19 pairs of Kingfisher (based on 15 probable and 4 possible territories) in the River Boyne and River Blackwater SPA. A survey conducted in 2008 recorded 20-22 Kingfisher territories within the SPA. Other species which occur within the site include Mute Swan (90), Teal (166), Mallard (219), Cormorant (36), Grey Heron (44), Moorhen (84), Snipe (32) and Sand Martin (553) – all figures are peak counts recorded during the 2010 survey.

The River Boyne and River Blackwater Special Protection Area is of high ornithological importance as it supports a nationally important population of Kingfisher, a species that is listed on Annex I of the E.U. Birds Directive.

25.11.2010

NOTICE OF NOTIFIABLE ACTIONS

HABITAT TYPE 7.1

Under STATUTORY INSTRUMENT 94 of 1997, made under the EUROPEAN COMMUNITIES ACT 1972 and in accordance with the obligations inherent in the COUNCIL DIRECTIVE 92/43/EEC of 21 May 1992 (the Habitats Directive) on the conservation of the natural habitats and species of wild fauna and flora, all persons must obtain the written consent, (in circumstances prescribed at section A and B below) of the Minister for The Environment and Local Government before performing any of the operations on, or affecting, the following habitats where they occur on lands / waters within the candidate Special Area of Conservation.

Please note that where a landowner has a current approved plan under the Rural Environmental Protection Scheme or any scheme which the Minister considers to be equivalent s/he need only notify the Minister of activities not covered in the plan.

HABITAT TYPE

ditches, hedges, cereals and intensive grasslands, walls, buildings, waste ground, bare soil, parkland grassland, bracken, caves, or quarries

SECTION A	SECTION B
Please note that the activities listed in *Section A overleaf* are required to be notified to the Minister for The Environment and Local Government (see attached form) and should not be undertaken	Please note that the activities listed in *Section B* overleaf may, and in most cases do, require a license or consent from another statutory authority (e.g. the local

before consent. disturbance of bats operation of commercial recreation facilities (e.g. bird watching tours) introduction (or re-introduction) into the wild of plants or animals of species not currently found in the area any other activity of which notice may be given by the Minister from time to time	planning authority, the Minister for the Marine and Natural Resources, or the Minister for Agriculture and Food). If so, these notifiable actions do not apply. However, if such activities are <u>not</u> regulated by another statutory authority, the said activities are required to be notified to the Minister for The Environment and Local Government (see attached form). **SECTION B** developing leisure facilities including sports pitches, caravan or camping facilities. developing roads or car parks construction of fences, buildings and embankments afforestation

NOTICE OF NOTIFIABLE ACTIONS

HABITAT TYPE 6.1

Under STATUTORY INSTRUMENT 94 of 1997, made under the EUROPEAN COMMUNITIES ACT 1972 and in accordance with the obligations inherent in the COUNCIL DIRECTIVE 92/43/EEC of 21 May 1992 (the Habitats Directive) on the conservation of the natural habitats and species of wild fauna and flora, all persons must obtain the written consent, (in circumstances prescribed at section A and B below) of the Minister for The Environment and Local Government before performing any of the operations on, or affecting, the following habitats where they occur on lands / waters within the candidate Special Area of Conservation.

Please note that where a landowner has a current approved plan under the Rural Environmental Protection Scheme or any scheme which the Minister considers to be equivalent s/he need only notify the Minister of activities not covered in the plan.

HABITAT TYPE
RIVERS OR STREAMS

SECTION A	SECTION B
Please note that the activities listed in *Section A overleaf* are required to be notified to the Minister for The Environment and Local Government (see attached form) and should not be undertaken before consent.	Please note that the activities listed in *Section B* overleaf may, and in most cases do, require a license or consent from another statutory authority (e.g. the local planning authority, the Minister for the Marine and Natural Resources, or the

	Minister for Agriculture and Food). If so, these notifiable actions do not apply. However, if such activities are <u>not</u> regulated by another statutory authority, the said activities are required to be notified to the Minister for The Environment and Local Government (see attached form).

Section A	Section B
THE MINISTER FOR THE ENVIRONMENT AND LOCAL GOVERNMENT IS REQUIRED TO BE NOTIFIED IN RELATION TO THE FOLLOWING ACTIVITIES AND SUCH ACTIVITIES SHOULD NOT PROCEED WITHOUT PRIOR CONSENT **:** grazing of livestock above a sustainable density (as defined in approved farm plans) within 30m of the river or stream/grazing by livestock treated within the previous week with a pesticide which leaves persistent residues in the dung within 30m of the river or stream supplementary feeding of stock within 30m of the river or stream/adding lime within 30m of the river or stream/adding fertiliser of any sort within 30m of the river or stream extracting water for irrigation or other purposes operation of boat angling or shore angling business/ restocking with fish reclamation, infilling, ploughing or land drainage within 30m of the river or stream/ reseeding, planting of trees or any other species within 30m of the river or stream/ removal of trees or any aquatic vegetation within 30m of the river/stream/ use of any pesticide or herbicide in the river or stream or within 30m of the river or stream dumping rubbish or other materials or disposing of any chemicals or wastes in streams/rivers or into water-courses running into them dumping, burning or storing any materials within 30m of the river/stream including the land spreading of used pesticides (e.g. sheep dip)./alteration of the banks, channel, bed or flow of the river or stream harvesting or burning of reed or willow. causing siltation/ operation of commercial recreation facilities (e.g. bird watching tours)	(NO REQUIREMENT TO NOTIFY IF ALREADY LICENSED BY ANOTHER MINISTER/BODY) developing leisure facilities including golf courses, sports pitches, caravan or camping facilities. any activity which might cause pollution of the river or stream removal of soil, mud, gravel, sand or minerals developing roads or car parks construction of fences, buildings or embankments construction or operation of an aquaculture facility. fishing for eels or salmon bank maintenance and grading creation of weirs and dams

introduction (or re-introduction) into the wild of plants or animals of species not currently found in the area any other activity of which notice may be given by the Minister from time to time	

NOTICE OF NOTIFIABLE ACTIONS

HABITAT TYPE 8.3

Under STATUTORY INSTRUMENT 94 of 1997, made under the EUROPEAN COMMUNITIES ACT 1972 and in accordance with the obligations inherent in the COUNCIL DIRECTIVE 92/43/EEC of 21 May 1992 (the Habitats Directive) on the conservation of the natural habitats and species of wild fauna and flora, all persons must obtain the written consent, (in circumstances prescribed at section A and B below) of the Minister for The Environment and Local Government before performing any of the operations on, or affecting, the following habitats where they occur on lands / waters within the candidate Special Area of Conservation.

Please note that where a landowner has a current approved plan under the Rural Environmental Protection Scheme or any scheme which the Minister considers to be equivalent s/he need only notify the Minister of activities not covered in the plan.

HABITAT OF SPECIES

RIVER LAMPREY, SEA LAMPREY, BROOK LAMPREY, SALMON, TWAITE SHAD, WHITE-CLAWED CRAYFISH, FRESH WATER PEARL MUSSEL

(It is an offence under Wildlife Act 1976 to kill, injure or disturb these species)

SECTION A

Please note that the activities listed in *Section A overleaf* are required to be notified to the Minister for The Environment and Local Government (see attached form) and should not be undertaken before consent.

Section A

THE MINISTER FOR THE ENVIRONMENT AND LOCAL GOVERNMENT IS REQUIRED TO BE NOTIFIED IN RELATION TO THE FOLLOWING ACTIVITIES AND SUCH ACTIVITIES SHOULD NOT PROCEED WITHOUT PRIOR CONSENT **:**

fishing for fresh-water pearl mussels

grazing of livestock above a sustainable density (as defined in approved farm plans) within 30m of the river or stream

grazing by livestock treated within the previous week with a pesticide which leaves persistent
residues in the dung

Section A (continued)

supplementary feeding of stock within 30m of the river or stream/adding lime within 30m of the river or stream adding fertiliser of any sort within 30m of the river or stream
extracting water for irrigation or other purposes

operation of boat angling or shore angling business, restocking with fish

reclamation, infilling, ploughing or land drainage within 30m of the river or stream

reseeding, planting of trees or any other species within 30m of the river or stream

SECTION B

Please note that the activities listed in *Section B* overleaf may, and in most cases do, require a license or consent from another statutory authority (e.g. the local planning authority, the Minister for The Marine and Natural Resources, or the Minister for Agriculture and Food).

If so, these notifiable actions do not apply.

However, if such activities are not regulated by another statutory authority, the said activities are required to be notified to the Minister for The Environment and Local Government (see attached form).

Section B

(NO REQUIREMENT TO NOTIFY IF ALREADY LICENSED BY ANOTHER MINISTER/BODY)

culture of crayfish

construction or operation of an aquaculture facility.

Fishing for eels or salmon

bank maintenance and grading

creation of weirs and dams

removal of trees or any aquatic vegetation within 30m of the river/stream use of any pesticide or herbicide in the river or stream or within 30m of the river or stream dumping rubbish or other materials or disposing of any chemicals or wastes in streams/rivers or into water-courses running into them dumping, burning or storing any materials within 30m of the river/stream including the land spreading of used pesticides (e.g. sheep dip). alteration of the banks, channel, bed or flow of the river or stream/harvesting or burning of reed or willow./causing siltation operation of commercial recreation facilities (e.g. bird watching tours) introduction (or re-introduction) into the wild of plants or animals of species not currently found in the area any other activity of which notice may be given by the Minister from time to time	

SITE SYNOPSIS

SITE NAME: JAMESTOWN BOG NHA

SITE CODE: 001324

Jamestown Bog NHA is situated approximately 8 km west of Navan, mainly in the townlands of Tullaghanstown, Herbertstown and Jamestown in County Meath. The site comprises a raised bog that includes both areas of high bog and cutover bog. The site is bounded on all sides by coniferous forestry and old cutover. The raised bog consists of two flat, elongated lobes, separated by areas of cutover bog and coniferous forestry. The eastern lobe is the largest and contains areas which are quaking, with small, infilling pools and also some dry hummocks. There are large areas of both abandoned and active cutting around the high bog, along with areas of coniferous forestry. There are a number of tracks in the site. This raised bog is of particular interest as it is one of the most north-eastern of the remaining raised bogs in the country, and one of only two raised bogs in County Meath. Much of the high bog vegetation is typical of raised bogs in Ireland, with species such as Ling Heather (Calluna vulgaris), Cross-leaved Heath (Erica tetralix), Cottongrasses (Eriophorum spp.) and bog mosses (including Sphagnum capillifolium, S. magellanicum, S. cuspidatum and S. papillosum). In addition, Bog Asphodel (Narthecium ossifragum) and White Beak-sedge (Rhynchospora alba) are commonly found. There is quite high lichen (Cladonia spp.) cover in parts of the high bog, and there are a number of young Downy Birch (Betula pubescens) plants scattered over the surface of the high bog.

The Irish Hare, a Red Data Book species, has been recorded at the site. Current landuse on the site consists of intensive peat-cutting around the edge of the high bog, and the drainage associated with this. There are large areas of coniferous forestry all around the margins of the site. These areas have also been significantly drained. Large portions of the bog have been burned in the past. These activities have resulted in loss of habitat and damage to the hydrological status of the site, and pose a continuing threat to its viability.

Jamestown Bog NHA is a site of considerable conservation significance comprising as it does a raised bog, a rare habitat in the E.U. and one that is becoming increasingly scarce and under threat in Ireland. Its location makes it especially important as it is representative of the north-eastern extreme of the geographic range of raised bogs in Ireland. Ireland has a high proportion of the total E.U. resource of raised bog (over 50%) and so has a special responsibility for its conservation at an international level.

15.11.2002

Appendix C - 3 – Lichen Survey Report

A lichen survey of New Bridge and immediate river bank area at Navan, Co. Meath

(with reference to proposed cantilevered pedestrian bridge)

Paul Whelan

4 The Crescent,
Cobh,
Co. Cork.

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June 2013

Report for Clifton Emerson Scannell Associates

Lichen survey of New Bridge and immediate river bank area at Navan, Co. Meath

(with reference to proposed cantilevered pedestrian bridge)

Contents

Introduction

The New Bridge (1756) over the river Boyne at Navan Co. Meath was surveyed for lichens in view of the proposed construction of a pedestrian bridge on the south facing aspect of the bridge. The bridge is within both an SAC (Special Area of Conseration) and SPA (Special Protection Area).

Ireland has one of the richest biodiversity of lichens in the Nothern Hemisphere. Currently over 1165 species have been recorded on both the mainland and several of the larger islands. Many of these species are of international importance (Woods, R.G. & Coppins, B.J. (2003)).

A Red Data book of Irish lichens was drawn up in the early 1990s by Howard Fox (OPW, Botanic Gardens, Glasnevin, Dublin) but this remained unpublished. The publication of an updated Lichen Red Data book is immenent at the time of writing this report. This report was checked against a draft copy. None of the species found at the bridge are listed in this Red Data book.

Twenty three species of lichen were recorded on the bridge, none of which are rare, nationally scarce or of international importance.

Recommendations for the protection and promotion of the existing lichen flora are included below.

Methodology

The survey was carried out by lichenologist Paul Whelan (www.lichens.ie) and involved a detailed investigation of the accessible habitats on the bridge. These include the structural material itself (the hard limestone and mortar) but also niches determined by the availability of water and light along the top of the bridge. Other niches on the bridge were inaccessible for safelty reasons. A more thorough survey of these niches would have required safe access to aspects of the bridge nearer the water and under the arches.

Hand lenses (x10 & x20) and a UV (ultraviolet) lamp were used to aid identification on site. Binoculars were also used to help get an overall evaluation of the lichen flora of the bridge and river banks. Some specimens were taken away for identification or confirmation from spores using a compound microscope.

A Conservation Evaluation of British Lichens. London, British Lichen Society; Woods, R.G. & Coppins, B.J. (2003) is applicable to Ireland and was applied to the species found on the bridge and surrounding area.

Relevant Background

Bridges and Monuments

Old bridges and monuments are often important refuges for rare and interesting lichens. This is partly due to the variety of rock used in their construction, but also because their great age has allowed time for diverse lichen communities to develop. Many lichens are sensitive to air pollution and can indicate a change in air quality, which may be an important factor in the deterioration of ancient monuments.

The view that the natural heritage of the living organisms present on bridges and monuments is of equal importance to the cultural and historic heritage of the structure itself, is becoming much more of an accepted view, with Biodiversity Action Plans (BAPs) helping to re-enforce this idea.

There is also current debate as to whether lichens can help protect rock surfaces or if they actually enhance weathering. Lichen removal is often destructive to the rock surface and usually only speeds up natural weathering processes. Each case needs to be viewed separately taking into consideration such factors as rock type, lichen species and coverage, surface exposure, and present condition of the stone.

The ecological importance of lichens

Lichens form the basis of several specialised ecosystems involving many forms of invertebrates, such as snails, slugs, bark lice (psocids), moths and mites. Hard bodied oribatid mites living among the lichens, for example, are predated upon by *Hemiptera*, which in turn may be eaten by birds. Lichens also provide refuge and camouflage for a wide range of other invertebrates and are often used by birds to camouflage nests (Gilbert 2000: 45 – 53; Chester 1997: 1-2). Lichens themselves sometimes support fungal parasites, called lichenicolous fungi.

On a much larger scale, the loss of lichen cover from rock surfaces may be detected using remote sensing, for example in the Canadian Arctic, where this surface loss has been attributed to increasing atmospheric pollution. The loss of lichen cover alters the rock's reflectance (albedo) and could make a significant contribution to global warming (Seaward in Fletcher 2001: 15 .4).

Chemical and biochemical weathering of rock

It is well known that the geology of the rock type has a major influence on lichen communities and that those growing on granite (neutral pH) are very different from those that are found on limestone (alkaline pH). In a similar way the pH of rainwater or groundwater can influence lichen floras and affect nutrient availability, for example under acid conditions aluminium becomes soluble which results in calcicolous species suffering. In addition, nitrification takes place slowly. Phosphorus uptake is inhibited at both ends of the pH scale. (Gouldsborough 2002: 338-339; Nash 1996: 139; Gilbert 2000: 96 – 97).

Detailed Results

Twenty three species of lichen were recorded on the acessable parts of the bridge and river bank, most of which are common and none of which were of national or international importance. Most of the species were in poor condition because of high air pollution levels from traffic flow in the area. The trees on the riverside were surprisingly low in species, again probably because of the high levels of traffic and associated air pollution. Most species on the bridge were also covered in grime from the passing traffic.

The bridge is constructed from hard limestone blocks and a mix of calcareous cement. Little old mortar remains. This structural limestone is a very good substrate for lichens in Ireland, but repairs to the bridge over the years have shown little respect for it, cement being skimmed over the limestone add neither structural support or improved aethetics to the bridge. Indeed the repairs have removed potentially high quality lichen niches from the structure. This is a matter of some concern.

Accessable parts of the bridge have a poor lichen biodiversity. Much lichen growth in this area is also stunted. The specimens are in poor health and struggling to maintain a presence.

Table 1. Lichen species list for New Bridge and nearby river bank, Navan, Co. Meath, 18th June, 2013.

Species name	Example Location	Conservation Evaluation Status (Woods, R.G. & Coppins, B.J. (2003).
Aspicilia calcarea	Bridge: Top and side of walls	Least Concern
Aspicilia contorta subsp. contorta	Bridge: Top and side of walls	Least Concern
Caloplaca citrina	Bridge: Top of walls	Least Concern
Caloplaca flavescens	Bridge: Top and side of walls	Least Concern
Caloplaca flavocitrina	Bridge: Top of walls	Least Concern
Collema auriforme	Bridge: Top and side of walls	Least Concern
Collema tenax	Bridge: Top and side of walls	Least Concern
Graphis elegans	Riverside vegetation	Least Concern
Graphis scripta	Riverside vegetation	Least Concern
Graphis species	Ash and Willow on side banks	Least Concern
Lecanora albescens	Bridge: Top and side of walls	Least Concern
Lecanora chlarotera	Ash and Willow on side banks	Least Concern
Lecidella elaeochroma	Ash and Willow on side banks	Least Concern
Lepraria species	Bridge: Side of walls	Least Concern
Nostoc species (cyanobacteria)	Gravel by river's edge	-
Opegrapha atra	Ash and Willow on side banks	Least Concern
Opegrapha species	Riverside vegetation	Least Concern

Physcia adscendens	Ash and Willow on side banks	Least Concern
Placidium squamulosum	Bridge: Side of walls	Least Concern
Placynthium nigrum	Bridge: Side of walls	Least Concern
Protoblastina rupestris	Bridge: Top of walls	Least Concern
Verrucaria baldenesis	Bridge: Top and side of walls	Least Concern
Verrucaria nigrescens	Bridge: Top and side of walls	Least Concern
Xanthoria parietina	Side of walls & trees on river bank	Least Concern
Total: 23 species plus one cyanobacteria		

Figure 1: Main species on the bridge limestone blocks are species from the groups *Caloplaca* (yellow), *Verrucaria* (brown) and *Aspicilia* (white).

Figure 2: Few and poorly developed *Caloplaca flavescens* on the vertical aspect of the bridge walls. Normally a lot more of this species would be expected.

Figure 3: *Collema* species are rare on the bridge. Again, more of this group should be present if mortar had not been replaced by cement.

Figure 4: ***Protobastina rupestris*** **(orange dots) on poor cement pointing.**

Recommendations

The use of biocides to remove lichens from stone is generally not recommended, as this often has a destructive effect on the stone surfaces. Biocides may cause staining and physical changes to the stone itself, and can also be detrimental to human health and the wider environment (Silver and Wolbers in St. Clair and Seaward 2004: 116). They may also leave behind contaminants, which can skew scientific methods for dating. Enzyme mixtures containing a lysing enzyme, cellulase, protease and chininase, have been used to remove lichens with some success. However, this method may also produce contaminants (Silver and Wolbers in St. Clair and Seaward 2004: 115 - 128).

A method of lichen removal which does not involve contamination of the stone, is the use of hot water vapour (over 60^0 C). Power hosing should be carried out with care.

The inaccessable parts of the bridge (the lower part of the arches, and under the arches) looked at from a distance (through binoculars) appear to have a healthier lichen population but species diversity could not be determined without safe access.
The following recommendations are suggested for any future renovation work on or around the bridge.

- When re-pointing is necessary it is better to re-point in patches, each covering no more than one third of the bridge at a time. A three to five year period should be allowed to elapse between each re-pointing episode to allow for lichen re-colonisation.
- Soft lime mortar is recommended as this is more conducive to lichen re-colonisation. Hard modern mortars may create frost vulnerable joints, which may exacerbate weathering processes.
- Any replacement with new stone should ensure that it is of a similar type used in the original construction and that this stone is correctly bedded.
- Cleaning of the bridge stonework on the side where the walkway is proposed is not recommended. However the main walls of the bridge itself (pedestrian pathway) should be cleaned (as it is covered in grime) , but not with chemicals.
- Construction of the walkway should not be used as an excuse to clean the whole bridge.
- The bridge should be kept free of ivy.

The river bank is generally populated with willow and ash. These species are young and contain a typical list of 'background' lichen species, although their populations are low. As much of this vegetation as possible should be left. The more mature of the trees should take priority over the younger vegetation if a clearing of the river bank is necessary.
Limestone gravel along the river bank itself has a dense population of the cyanobacteria *Nostoc*. This is of no consequence.

Conclusion

It is hoped that the management recommendations set out above are taken into account when any renovations are required for the walkway. As a precautionary principle the removal of lichens is not recommended, in the light of present knowledge of the processes involved, and the importance of lichens in their own right. These quotes from current researchers re-enforce this message:

> 'The presence of lichens on stone, natural or man-made, is due to the natural relationship between the lithosphere and the biosphere. It should probably be accepted in the artificial struggle to keep the surfaces of the stones free from colonisation by the continuous application of biocides.' (Arino & Saiz-Jimenze in St. Clair and Seaward 2004:177).

Supporting Images

Figure 5: North-facing aspect of the bridge showing large growths of *Aspicilia* and *Verrucaria*.

Figure 6: South-facing aspect of the bridge. Removal of the (mostly) ivy will enhance lichen growth provided the structure is not chemically cleaned.

Figure 7: Pathway beside the river colvered in the cyanobacteria *Nostoc*.

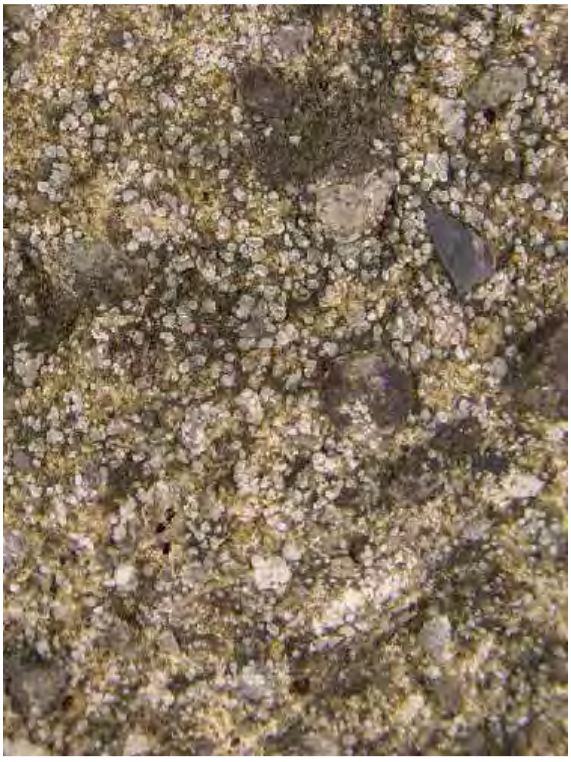

Figure 8: *Aspicilia contorta subspp. contorta* on the poor render on the bridge.

Appendix D – Cultural Heritage Assessment

Navan Pedestrian Bridge, Co. Meath

Cultural Heritage Assessment

Client:	Clifton Scannell Emerson Associates
	Seafort Lodge,
	Castledawson Avenue,
	Blackrock, Co. Dublin.
Licence No:	n/a
Archaeologists:	Rob O'Hara
Building Surveyor:	Rob Goodbody
Authors:	O' Hara & Goodbody
Report Date:	18th January 2013
Our Ref:	2012_33

Archer Heritage Planning

Navan Pedestrian Bridge, Co. Meath

Cultural Heritage Assessment

SITE NAME	Navan Pedestrian Bridge
CLIENT	Clifton Scannell Emerson Associates
INVESTIGATION TYPE	Cultural Heritage Assessment
LICENCE NO	n/a
PLANNING REF	n/a
TOWNLANDS	Athlumney, Townparks
IRISH TRANSVERSE MERCATOR	687140, 767866
RMP NO	Partially within ME025–044
RPS NO	115
ARCHAEOLOGICAL CONSULTANT	Archer Heritage Planning Ltd.
ARCHAEOLOGIST	Rob O'Hara
ARCHITECTURAL HERITAGE	Rob Goodbody
DATE OF ISSUE	18th January 2013
JOB REF.	2012_33

CONTENTS

List of Tables

List of Figures

List of Plates

SUMMARY

This report has been prepared by Archer Heritage Planning Ltd for Clifton Scannell Emerson Associates, Seafort Lodge, Castledawson Avenue, Blackrock, Co. Dublin. The Cultural Heritage Assessment was undertaken in December 2012 by Rob O'Hara of Archer Heritage Planning Ltd and Rob Goodbody, Historic Buildings Consultants. The report will form part of a Part 8 application for the scheme. A desk-based study and field survey was carried out on the site of a proposed pedestrian and cycle path adjacent to new Bridge Navan, a protected structure (no. 115).

The site is not a Recorded Monument, but lies immediately adjacent to Zone of Archaeological Potential for Navan (ME025–044), as established by the Urban Archaeological Survey for Co. Meath. The Rivers Boyne and Blackwater are also Zones of Archaeological Interest (under the Navan Development Plan 2009–2015). There are no historical or cartographic references to a bridge at this location before the mid-eighteenth century AD. Earlier stone bridges across the Boyne were located away from the town at Babes Bridge (towards Donaghmore) and Kilcarn Bridge, both of which are recorded in late medieval documents. There are eighteenth century references to the river between Kilcarn Bridge and Navan being crossed by foot when water levels dropped. The toponym Athlumney, suggests an ancient ford in this general location. There have been no previous excavations adjacent to the bridge, however there have been a number of underwater or river bank assessments of the Boyne within the town. These have never identified archaeological remains, with test trenches generally revealing alluvial silts or dredged river deposits.

It is proposed to construct a new pedestrian/ cycling path adjacent to New Bridge, Navan, Co. Meath, as part of the Johnstown Quarter, Smarter Travel Scheme. There are 3 options being considered for the bridge at present.

Option 1: A new pedestrian/cycle walkway to be constructed immediately adjacent to the New Bridge, on the upstream side. The bridge will be a stainless steel tubular structure fixed (bolted) directly to the New Bridge at road level and props down to the cut-waters at the water level (see Figure 2a).The construction will require the construction of a temporary scaffold/floating pontoon in the river to provide access.

Option 2: This is similar to Option 1, with horizontal ties from the upstream to downstream side of the bridge to which the new walkway could be fixed. This option would require dropping inclined props onto the cutwaters to support the bridge as a truss. The cutwaters would require substantial strengthening/consolidation as part of this option (see Figure 2b).

Option 3: A new crossing completely separate from the New Bridge, approximately 30 metres upstream. The new crossing would clear span from bank to bank, with no supports placed within the Boyne (see Figure 2c).

The survey has shown that New Bridge is in very poor condition and is badly in need of repairs and maintenance. Most obvious is the substantial quantity of vegetation growing from the two facades of the bridge; the upstream side the cutwaters are coming apart; parts of the vaulting have been repaired with cement-based mortars which can adversely affect the behaviour of the masonry; substantial areas of the vaults are severely deficient in pointing to the extent that there is danger in the short to medium term

of stones detaching from the vault and falling, thereby weakening the arch effect on which the stability of the bridge depends; in places the arch rings are detaching from the main body of the masonry and will collapse in the short to medium term. Most alarming is a substantial diagonal crack through one of the piers of the original bridge, which presents as a wide and deep crack up one side of the vault, crossing the crown of the vault diagonally, and fading out just beyond the crown. There is a crack in the adjacent arch on the opposite side of the pier, though this is not as severe.

RECOMMENDATIONS:

Archaeological Recommendations

The site is adjacent to Zone of Archaeological Potential for Navan (ME025–044) and within a Zone of Archaeological Importance for the River Boyne (under the Navan Development Plan 2009–2015). All three options have the potential to disturb buried or previously unknown archaeological sites or features. It is therefore recommended that any associated groundwork on the banks of the river be monitored by a suitably qualified archaeologist.

It is unlikely that there will be any significant impact on river deposits at this location. Option 3 specifically avoids disturbing river deposits. A number of underwater archaeological surveys in this area have not identified archaeological deposits, rather providing evidence of significant dredging (including the Boyne Drainage Scheme). Consequently, there is no specific recommendation for further underwater archaeological survey.

Architectural Recommendations

It is recommended that no work be carried out to implement the proposal for the pedestrian and cycle bridge until a full programme of repair has been carried out to conservation specifications on New Bridge, including the removal of all vegetation, the repair of all cracks and loose masonry and the repointing of the bridge wherever necessary, including, in particular the vaults of each of the arches. It is also recommended that the works be monitored during the construction of the proposed pedestrian and cycle-bridge so as to identify any hidden elements of the bridge that may emerge.

Rev.	Status	Date	Prepared by	Reviewed by	Approved by
1	Submitted	Jan 2013	O' Hara & Goodbody	O' Connell (Archer) SENIOR ARCHAEOLOGIST	O' Connell (Archer) SENIOR ARCHAEOLOGIST

1. INTRODUCTION

This report on a proposed pedestrian/ cycling path adjacent to New Bridge, Navan, Co. Meath (Figure 1) has been prepared by Archer Heritage Planning Ltd for Clifton Scannell Emerson Associates, Seafort Lodge, Castledawson Avenue, Blackrock, Co. Dublin. The Archaeological Impact Assessment of the bridge and its immediate environs was undertaken in December 2012 by Rob O'Hara of Archer Heritage Planning Ltd, in association with Rob Goodbody of Historic Building Consultants as part of a Part 8 application in preparation for the scheme.

1.1 Proposed Development

It is proposed to construct a new pedestrian/ cycling path adjacent to New Bridge, Navan, Co. Meath, as part of the Johnstown Quarter, Smarter Travel Scheme. There are 3 options being considered for the bridge at present.

Option 1: A new pedestrian/cycle walkway to be constructed immediately adjacent to the New Bridge, on the upstream side. The bridge will be a stainless steel tubular structure fixed (bolted) directly to the New Bridge at road level and props down to the cut-waters at the water level (see Figure 2a).The construction will require the construction of a temporary scaffold/floating pontoon in the river to provide access.

Option 2: This is similar to Option 1, with horizontal ties from the upstream to downstream side of the bridge to which the new walkway could be fixed. This option would require dropping inclined props onto the cutwaters to support the bridge as a truss. The cutwaters would require substantial strengthening/consolidation as part of this option (see Figure 2b).

Option 3: A new crossing completely separate from the New Bridge, approximately 30 metres upstream. The new crossing would clear span from bank to bank, with no supports placed within the Boyne (see Figure 2c).

1.2 Archaeological Requirement

This report will be included in a Part 8 application.

2. SITE DESCRIPTION

The proposed works will be located adjacent to New Bridge, Navan, Co. Meath, an eighteenth century bridge that carries the R153 across the River Boyne, which at this location forms the boundary between Townparks Td (Lower Navan Barony, Navan Parish) and Athlumney Td (Skreen Barony, Athlumney Parish; Meath OS sheet 25, ITM 687140, 767866; see Figure 1).

3. METHOD STATEMENT

The following sources were consulted in the preparation of this report:

- Record of Monuments and Places (RMP)/ Sites and Monuments Record[1]

The RMP is a list of archaeological sites known to the National Monuments Section, which are afforded legal protection under Section 12 of the 1994 National Monuments Act and are published as a record. The SMR holds documentary evidence and field inspections of all known archaeological sites and monuments which for some reason are not currently afforded legal protection.

- National Monuments in State Care, Preservation Orders List and Register of Historic Monuments.

(i) National Monuments in State guardianship or ownership may not be interfered with without the written consent of the Minister of Arts, Heritage and the Gaeltacht. (ii) Sites deemed to be in danger of injury or destruction can be allocated Preservation Orders under the 1930 Act or Temporary Preservation Orders under the 1954 Act. Preservation Orders make any interference with a site illegal and work may only be undertaken on or in the vicinity of sites under Preservation Orders with the written consent, and at the discretion, of the Minister. (iii) A Register of Historic Monuments was established under Section 5 of the 1987 National Monuments Act. Monuments and archaeological areas present on the register are afforded statutory protection under the 1987 Act and include sites under PO/ TPO.

- Record of Protected Structures; National Inventory of Architectural Heritage

(i) Local Development Plans contain a Record of Protected Structures and archaeological sites within a county/ area. The Navan Development Plan (2009–2015) and local area plans were consulted to obtain information on cultural heritage sites in and within the immediate vicinity of the proposed route. (ii) The National Inventory of Architectural Heritage is a government based organisation tasked with making a nationwide record of significant local, regional, national and international structures, which in turn provides county councils with a guide as to what structures to list within the Record of Protected Structures.

- Topographical Files of the National Museum of Ireland

A national archive of all archaeological finds recorded by the National Museum, this archive relates primarily to artefacts but also includes references to monuments and unique records of previous excavations. The find spots of artefacts are important sources of information on the discovery of sites of archaeological significance.

- Aerial photography

This is an important source of information regarding the precise location of sites and their extent. It also provides initial information on the terrain and its likely potential for archaeology. Various collections including National Museum of Ireland, Geological Survey of Ireland and/or Ordnance Survey Ireland were consulted.

- Historical maps

These are important sources in tracing land use development within the development area as well as providing important topographical information on areas of archaeological potential and the development of buildings. Cartographic analysis of all relevant maps has been made to identify any topographical anomalies or structures that no longer remain within the landscape. Sources include early edition Ordnance Survey (OS) maps and pre-Ordnance Survey held at Trinity College Map Library.

- Documentary research

Journals, papers, books etc. held by the National Library of Ireland, local libraries and/or on-line search facilities/collections (e.g. JSTOR) were consulted to gain background information on the archaeological, architectural and cultural heritage landscape of the proposed development area. These include previous archaeological and cultural heritage assessments that may have been carried out within the receiving environment, as well as academic texts on the archaeology and history of the landscape.

- Relevant on-line databases (e.g. Excavation Bulletin; NRA Archaeological Database).

The Excavations Bulletin is a summary publication that has been produced every year since 1970, summarising every archaeological excavation that has taken place in Ireland during that year up until 2008 and is vital when examining the archaeological content of any area, which may not have been recorded under the SMR and RMP.

[1] Archive Unit National Monuments Service, Department of Arts, Heritage and the Gaeltacht, Floor 2, Block 6, Irish Life Centre

4. CULTURAL HERITAGE ASSESSMENT

4.1 General Archaeological Background

A small group of prehistoric objects known from the Navan indicate that it was probably used in early prehistory as a natural fording point of the Blackwater and Boyne Rivers (see Bradley 1985). Prehistoric material within the town is unusual, however a large number of prehistoric settlements/sites (Neolithic–Iron Age) have been identified to the south and east of the town (on the route of the M3 motorway; see O'Connor 2008, 83–95) and also in Athlumney townland (see Section 4.8 below). Athlumney (*Áth Luimnigh*), suggests a river ford in this general location (see Section 4.9 below), and there are historical references to the River Boyne being forded during the early eighteenth century, before New Bridge was constructed (see Section 4.2 below). Navan has traditionally been identified with *Nuachongbail*, an early medieval monastery established by St Fechín (Gwynn & Hadcock 1970, 399). The Abbey of St Mary was in existence before the arrival of the Anglo-Normans, probably c.1147 AD (O'Murchadha, 1992-3, 117), and was subsequently patronised by the Anglo-Normans.

Jocelin de Angulo was granted the baronies of Navan and Ardbraccan by Hugh de Lacy before 1186 (Orpen 1911–20, 84), and quickly fortified both territories, at Navan their motte was situated at Moathill, west of the town and apparently built on top of the originally mound of *Odhba* (O'Murchadha ibid, 119). It was the de Angulo's (the family later adopted the surname Nangle) who were responsible for the initial foundation of the town at the confluence of the Boyne and Blackwater Rivers. The medieval settlement was located on a triangular ridge overlooking the river junction, with a three streets (Trimgate Street, Ludlow Street and Watergate Street) converging on Market Square in a Y-shaped pattern. On the basis of a largely intact burgage plot pattern, the area of medieval town is estimated at about 5.2 hectares (Bradley 1985; see Figure 3). The nature of the walls up to the fifteenth century is a matter of speculation (Thomas 1992, 172-3), however there is clear documentary evidence in 1462, of a parliamentary grant to continue collecting murage taxes levied during the reign of Henry VI (1422–61; Berry 1914, 25).

Very little is known of the early development of the Anglo-Norman town of Navan and the first reference to its status as a borough is in 1423 when the provost and community were among those asked to assist the town of Trim which was coming under threat from the depredations of native Irish clans (Murphy 2007). A sixteenth-century market cross bears the arms of the Nangle and Dowdall families and has an inscription which refers to the grant of Navan to the first de Angulo baron (Bradley 1985, 97), which may reflect a genuine historical association of the first barons of Navan with the foundation of a market in the town. In 1409 Nicholas Fleming, Archbishop of Armagh granted forty days indulgence from penance to everyone who contributed towards the cost of rebuilding the bridge of Navan which had recently been broken down by a flood (Smith 2003, 90).

Corporate charters were granted in 1494, 1605 and 1679 that refer to markets and fairs and there is little doubt that the importance of the town in the medieval period rested on its function as the market place for its hinterland (Cogan 1862, 223). In 1470 King Edward IV issued letters patent authorizing the burgesses of Navan to levy tolls on all goods coming for sale into the town, or for three miles around in order to build the walls and maintain the pavements (Moore 1863 1, 59). Navan and surrounding areas received a significant setback in 1539 when the locality came under attack by the Irish forces of O'Neill and O' Donnell. The dissolution extents made the following year report many buildings burnt and lands wasted (Murphy 2007). A letter of the period described the destruction of Navan, described as 'the wealthiest…English market town' in Meath (Moore *ibid*) It appears that the walls of the town were never properly repaired and it seems likely that some surrounding settlements were deserted in the wake of this attack.

The 18th century witnessed the removal of the town gates and the demolition of much of the walls which heralded the industrialisation of the town and its environs, with the construction of the various mills and associated industries along the Boyne and Blackwater, and also the construction of the Boyne Navigation Canal in the second half of the eighteenth century between Drogheda and Navan (Coyne 1902). The town's growth through the early nineteenth century was certainly due to its importance as a trading centre, in particular as a corn market. In these early decades of the nineteenth century, Navan's mills (including Fay's 6-storey mill on the Blackwater, and Delaney's 7-storey mill on the Boyne adjacent to New Bridge) were sending 5000 tons of corn per annum to Drogheda, and a further 900 ton to Dublin (Connell 2004, 112). Further industries included one of Ireland's first mechanised flax mills in Athlumney (built 1806), two whiskey distilleries and a paper mill. Despite the increase in industry, there remained a relatively small number of wealthy families in Navan in this period, with over 85% of households living in one storey houses (Connell 2004, 113). This is reflected in descriptions of the town in this period; in 1809 for example, the centre of the town was described as 'tolerably well-built…but the extremities are chiefly composed of a line of mud cabins". Wilde (1849) also described the town as a "dirty, ill-built straggling collection of houses", perhaps reflecting his visit to the town being chiefly concerned with the banks of the Boyne and Blackwater (see Ellison 1963, 33–56). Lewis (1837, 421-2) records a thriving market town of over four thousand people, with flour, oat, flax and paper mills on the river banks, as well as a whiskey distillery and an extensive weaving industry.

4.2 The New Bridge

The early importance of Navan was largely due to its situation controlling crossings of the Rivers Boyne and Blackwater. In the medieval period there was probably just one bridge over the Blackwater (Bradley 1985, 97). This is recorded in the seventeenth century Civil Survey as *Swynes* Bridge (Simington 1940, 222; Thomas 1992, 170), although the contemporary Down Survey map (see Section 4.4 below) calls it 'Navan Bridge', at the location of the eighteenth century Pollboy Bridge. The crossing of the Boyne was originally at Babes Bridge (between Athlumney and Donaghmore) and later at Kilcarn Bridge. Babes Bridge was built between AD 1199–1216 (O'Keeffe 1991, 115; O'Keeffe & Simington, 1991, 27). Babes Bridge was certainly the principal crossing of the Boyne in this area during the medieval period, though smaller wooden bridges may have existed. The *Annales Hibernia* notes a 'great flood [in 1330] … by which all the bridges on … [the Boyne] except Babes Bridge, were carried away'. By the late fifteenth century, the bridge, 'a great ease to all the commons of [the] county' had become 'ruinous and likely to fall speedily' (Statute Rolls of Ireland 3 Edw. IV c.82), and was subsequently replaced by Kilcarn Bridge (depicted and labelled on the mid-sixteenth century Down Survey map). In 1462, King Henry VI (1422-61) granted funds towards murage, pavage and repair of bridges in several Meath towns, including '*the Navan*' (Berry 1914, 25).

The 'New Bridge' across the Boyne was constructed between 1733 and 1754. In 1733 Bishop Ellis, Bishop of Meath (1732–4) noted parishioners from Athlumney Parish could come to Navan via Kilcarn Bridge or 'by the ford when the waters are down' (Moore 1864, 157). In 1754, a political pamphlet for the Navan Corporation elections of that year berated the Corporation of Navan who 'constantly opposed all schemes for its convenience and interest…particularly the navigation of the Boyne and a bridge over that river, by which a communication has been opened between the town and a large tract of a fine, improved, and well inhabited country'[2]. By 1756, 'New Bridge' appears on a map of the town by Thomas Williams showing the tenants of Richard, Earl of Ranelagh (French 1986, 60). Thomas (1992, 171) notes there was no bridge over the Boyne within Navan until 1752, suggesting river ferries or the 'ford' at Athlumney was used. The Record of Protected Structures (Navan Development Plan 2009–2015; see Section 4.6 and Section 5 below) also records the construction of the bridge as 1752. The survey of the bridge (see Section 6.1 below) has shown that the original mid-eighteenth century bridge has been widened twice since it was constructed. It is clear from the nature of the stonework on the bridge that the original is on the northern or downstream side, while the southern or upstream side is the latest. At least one of these phases was perhaps connected with the construction of the adjacent Somerville Bridge over the Boyne Navigation Canal.

[2] See http://www.navanhistory.ie/index.php?page=the-corporation-2 [accessed 14 December 2012]

The Williams map shows the configuration of the bridge with two additional arches than is visible today. The mid-stream island to the north of the bridge was a major feature of the river into the twentieth century. Goodbody (see below) is suggests New Bridge originally had eight arches, but the most eastern and western are no longer visible, being incorporated into mill races shown on early Ordnance Survey maps. The western arch is now under the road on the Navan side of the river, while the eastern arch would have served the mill that survives as apartments on the Athlumney side.

A previous inspection of New Bridge (by Rob Goodbody) indicated the piers of New Bridge rest on plinths. The nature of these plinths was not certain, but it would be consistent with major drainage schemes that the river bed would be dropped and hence there would be a need for underpinning the piers of the bridges. The Boyne Drainage Scheme, undertaken between 1969 and 1986 resulted in substantial alterations to the river topography around Navan, including the removal of river islands seen on early Ordnance Survey maps, as well as a weir that spanned the river upstream of New Bridge (see Section 6 below).

There is no tradition of a bridge at this location prior to the mid-eighteenth century AD. If there were any other archaeological features or deposits present at this location, it is unlikely that they would have survived the effects of the Boyne Drainage Scheme on river deposits

4.3 Record of Monuments & Places

The Record of Monuments and Places (RMP) is a statutory inventory of archaeological sites protected under the National Monuments Acts 1930-2004 (Section 12, 1994 Act), compiled and maintained by the Archaeological Survey of Ireland (ASI). The inventory concentrates on pre-1700 AD sites and is based on a previous inventory known as the Sites and Monuments Record (SMR) which does not have legal protection or status. A publicly accessible website (www.archaeology.ie) contains details of the recorded holdings of the Archaeological Survey of Ireland (ASI), and includes recently discovered archaeological sites, as well as the on-going work of the ASI. Sites on this emerging list do not have the same statutory protection as those in the published RMP.

The proposed works are located adjacent to the Zone of Archaeological Potential for the town established by the Urban Archaeological Survey and designated a Zone of Archaeological Importance (Navan Development Plan 2009–2015). It would also fall under the Zone of Archaeological Importance for the Boyne River. In terms of Built Heritage, it is the policy of Meath County Council and Navan Town Council (HER POL 9c) to require that all applications for development within these zones of

archaeological potential be accompanied by a professional archaeological impact assessment. **The New Bridge is not listed in the records of the Archaeological Survey of Ireland**. There are a number of archaeological monuments within 250m of the proposed works, all connected with settlement in the medieval period (see Table 1 below[3]; Figure 3).

SMR No	Class	Townland	ITM
ME025-044----	Historic town	Abbeyland South, Townparks, Blackcastle Demesne	686982, 767839
No information at www.archaeology.ie (see Section 4.1 above)			
ME025-044002	Cross	Townparks	686994, 767828
Fragment of cross, dated late sixteenth century, originally perhaps from Market Square but now in NMI (King 1984, 109).			
ME025-044003	Town defences	Townparks	686931, 767810
Enclosed an area of c. 13 acres and probably dates to early fifteenth century. Walls run west from Boyne and crossed Ladlow Street short of junction with Church Hill. Ran along the south side of properties on Trimgate Street, crossed grounds of the Roman Catholic church and turned north at back of properties on the north side of Trimgate Street. A portion of the wall and tower (ME025-044007-) survive at north end of this section where the wall turned east to the Boyne, just short of Barrack Lane.			
ME025-044008	Bridge	Townparks	687132, 768045
No information at www.archaeology.ie (see Section 4.2 above)			
ME025-044009	Font	Townparks	687052, 767669
In St. Mary's Church of Ireland church is early-fifteenth-century font with two shields, one bearing Butler or Le Poer arms (Roe 1968, 88-91).			
ME025-044010	Cross	Townparks	687051, 767669
Fragment of late medieval cross shaft with figure sculpture in false relief on two faces (King 1984, 112). In grounds of St Mary's Church of Ireland church.			
ME025-044013	Well	Townparks	687022, 767741
No information at www.archaeology.ie			

Table 1: Archaeological sites within 250m of the proposed development

[3] These descriptions are derived from the published 'Archaeological Inventory of County Meath' (Dublin: Stationery Office, 1987) which in certain instances have been revised and updated in the light of recent research (date of upload/revision: 10 July 2007)

4.4 Topographical Files

The Topographical Files is the national archive of all known antiquities recorded by the National Museum listed by county and townland/ street. These files relate primarily to artefacts but also include references to monuments and contain a unique archive of records of previous archaeological excavations. Entries were sought for Abbeyland South, Abbeyland, Athlumney, Blackcastle Demesne, Dillonsland, Townparks and the Blackwater and Boyne Rivers. Relevant entries are listed in Table 2 above. **There are no specific entries dealing with the New Bridge**.

Townland	Museum No.	Description
Abbeyland South	1977-6	Post medieval tile found near medieval Abbey in "Spicers Field"
Abbeyland South	1977-11	Human remains from site of abbey
Abbeyland South	1976-643	Green bottle glass found in sewage scheme trench
Abbeyland South	1976-644	Glazed earthenware potsherd found in sewage scheme trench
Abbeyland South	1976-645	Clay marble found in sewage scheme trench
Abbeyland	1977-7	Stone medieval font in possession of family from Abbeyland
Athlumney	2004-170	Stone axehead found in garden
Athlumney	1977-8	Pottery found at Convent school extension
Athlumney	1977-9	Pottery found at Convent school extension
Athlumney	1977-10	Pottery found at Convent school extension
Athlumney	1976-621	Black ware Pottery found near Athlumney Motte
Athlumney	1976-622	Black ware Pottery found near Athlumney Motte
Athlumney	1976-623	Black ware Pottery found near Athlumney Motte
Athlumney	1976-624	Vitreous material found near Athlumney Motte
Blackcastle Dsmesne	N/A	Reference in newsletter from 15 Feb 1813 to human bones and urn found near tower at Donaghmore
Dillonsland	N/A	No entries for this townland
Townparks	N/A	No entries for this townland

Table 2: Entries in the Topographical Files for the area

4.5 Cartographic Sources

Analysis of historic mapping can show human impact on landscape over a prolonged period. Large collections of historical maps (pre- and early Ordnance Survey maps as well as estate or private maps) are held at the Glucksman Map Library, Trinity College and other sources (UCD Library, Ordnance Survey Ireland, local libraries and published material). The development of the bridge and its vicinity recorded through the seventeenth to nineteenth century cartography are described in Table 3 below.

Map	Date	Description
Down Survey	1654	A bridge recorded north of walled town, at location of modern Pollboy Bridge (labelled 'Navan Bridge'. *Kilcarne bridge* crosses the Boyne in Kilcarn townland to the south of the town. There are no structures recorded at the location of New Bridge (see Figure 4)
Moll	1714	The area is shown in no clear detail. Notable however is no road network noted to the east of Navan in Athlumney. Road networks are noted crossing the Blackwater in the area of Pollboy Bridge and across the Boyne at Kilcarn (see Figure 4)
Thomas Williams	1756	New Bridge is indicated at the location of the current bridge on a road labelled 'Drogheda Road'. The bridge crosses the Boyne immediately south of its confluence with the Blackwater, at which point the Boyne takes a sharp turn to the east (see Sections 4.2 and 6.1 for further details; Figure 5)
Taylor & Skinner	1777	The New Bridge over the Boyne is indicated, the road labelled the road to Slane (see Figure 5)
William Larkin	1812	New Bridge is depicted on a road leading towards Ferganstown & Ardmulchan.
1st ed. Ordnance Survey (OS)	1837	New Bridge is indicated and labelled. Somerville Bridge over the Boyne Navigation Canal to the east is also depicted. South of Newbridge is an '*old*' corn mill, with a large flour and corn mill to the north (see Figure 6)
2nd ed. OS	1882	No significant change to environs of bridge since the previous edition.
3rd ed. OS	1912	No significant change to environs of bridge since the previous edition (see Figure 7).
3rd ed. OS revision	1955	As previous. Level on bridge indicated 125.4 ft.

Table 3: Cartographic sources relating to the site

4.6 Aerial Photographs

Aerial photography (or other forms of remote sensing) may reveal certain archaeological features or sites (earthworks, cropmarks, soil marks) that for many reasons may not be appreciated at ground level. There are a number of available collections including the National Monuments Section, Geological Society of Ireland (1970–73), Ordnance Survey of Ireland (1995, 2000, 2005), National Museum of Ireland (St Joseph CUCAP Collection) and Air Corps (1950's–1970's).

Photo	Year	Height	Description
OSI Orthophotography	1995	Satellite	Current site layout noted. No archaeological features recorded
	2000		
	2005		

Table 4: Aerial photograph sources relating to the site

No archaeological features were recorded in the aerial photographs of the site.

A photograph of '*Boyne Bridge'* by photographer Robert French (taken between 1865–1914) in the Lawrence Photograph Collection in the National Library (L_ROY_07774) would appear to be the Pollboy Bridge, taken from the Blackwater River).

4.7 Record of Protected Structures

Local Authorities have a statutory responsibility to safeguard architectural heritage in accordance with Part IV of the Planning and Development Act 2000. Under S.51 (1), a County Council must compile a Record of Protected Structures (RPS), which lists all structures which are of special *architectural*, *historical*, *archaeological*, *artistic*, *cultural*, *scientific*, *social* or *technical* interest. The protection, unless otherwise stated, includes the exterior and interior of the structure, lands lying within its curtilage (boundary), other structures and their interiors within the curtilage, plus all fixtures and fittings which form part of the interior or exterior of any of these structures. Buildings can be added to, or deleted from the RPS at any time, though generally this occurs when the county development plan is being reviewed.

New Bridge is a Protected Structure on the Navan Development Plan 2009-2015 (**No. 115**) and is listed on the National Inventory of Architectural Heritage (**No. 14010086**). It is described in the Record of Protected Structures as a 'six arch road bridge over river, built 1752 (possibly after Thomas (1992); see Section 4.2 above) with cutwaters and coursed rubble masonry parapet walls' (see Section 5 below).

4.8 Previous Archaeological Excavations

The Excavation Bulletin is a database of summary accounts of archaeological excavations in Ireland and Northern Ireland from 1970 to 2008. Summaries relating to archaeological excavations undertaken by the National Roads Authority (M3) are also available on-line and were consulted for any relevant sites. Reports on licensed archaeological works are also held by the Archive Unit of the National Monuments Section. Numerous archaeological investigations have been undertaken in Navan and have identified a range of medieval sites and features. No excavations have occurred adjacent to Newbridge; the closest or other relevant excavations are listed in Table 5 below.

No previous excavations have taken place at the location of the proposed works. A number of archaeological investigations (both excavation and riverbed surveys) have taken place adjacent to the subject site and have not identified archaeological sites or artefacts. Archaeological investigations of the riverbed and bank (of both the Boyne and Blackwater) within Navan have yet to identify buried archaeological material. While the impact on the riverbank is unlikely to be extensive in area, the River Boyne is nonetheless regarded as a Zone of Archaeological Importance (Navan Development Plan 2009–2015), owing to its potential for associated archaeological remains to be present.

4.9 Toponyms

Navan is often associated with *Nuachongbhail*, an early medieval monastery recorded in contemporary annals. John O'Donovan, in the Ordnance Survey Field Names Book (1837) suggested *Nuachongbhail* (pronounced Noo-hong-val) *w*as softened to Noughaval or Nohoval, with the *l* changed to *n* and the *h* sound discarded, forming the name *Novan*; a name which appears in early Anglo-Norman references to the town (Murphy 2007). Joyce (1913) suggested Navan was a corruption of a*n uaimh*, 'the cave', which recounted the legend of *Odhbha* (pronounced Ova), who's burial mound was reputedly the site of Jocelin de Angelo's motte in Moathill Td (see Section 4.1 above).

The Ordnance Survey Field Names Book suggested Athlumney was *Áth Luimnech*, 'the ford of *Luimnech*, noting also that the parish was known as *Ard Muimneach*, 'the ford of *Muimneach'*. Neither place name appears in Irish sources (Connon 2012). Joyce (*ibid*) translates *luimneach* is 'a bare or barren spot of land'. Lommainech appears in vernacular sources as a king of *Mugdornae,* a foster-father of a later king of Tara, Diarmait Ruanaid (d. 665). *Mugdornae* was the territory directly opposing Athlumey on the north side of the Boyne, and *Áth Lommainig* could be a viable alternative suggestion for the Irish original of Athlumney (Connon ibid).

Licence	RMP No	OS Ref	Townland/ Street	Ex. Bull. Ref.	Author
98E602	ME025-44	Various	Various	1998:514 1999:698	C. Mullins K. Hanley
Monitoring of the Navan Sewerage Augmentation Scheme. Works occurred along Boyne Road and Convent Road and at the River Boyne. No features of archaeological interest were identified.					
03E0532	ME025-44	286794 267607	Old Cornmarket, Trimgate Street	2003:1439	R. O'Hara
On the western side of Old Cornmarket, a laneway connecting Trimgate Street to Church Hill. The site contained building rubble to 1.9m deep. No significant archaeological remains survived at this site.					
03E0613	n/a	28810 26670	Athlumney & Limekiln	2003:1356	G. Hull
Test-trenching on the banks of the River Boyne in advance of a bridge construction 2km east of Navan linking the R161 and R153. Made-up ground and alluvial silts were recorded, but not archaeological deposits/ artefacts.					
03D081 03R157	n/a	28702, 26805	River Boyne/ River Blackwater	2003:1431	R. Bangerter
An assessment of a 50m stretch of the River Boyne at its confluence with the River Blackwater prior to the construction of a concrete slipway. A visual inspection and magnetometry survey by hand-held metal detection was carried out at the site. No archaeologically significant material was encountered.					
03E1649	n/a	N872680	Pollboy Street, Navan	2004:1304	C. Walsh
Test excavation to the rear of an 18th-century building which abutted Pollboy Bridge. No archaeological features were present.					
02D091	n/a	287948 26666	River Boyne	2003:1432	D. McCullough
An underwater visual assessment and metal-detector survey of riverbed sediments in advance of the above bridge did not reveal archaeological features or artefacts. Numerous metal-detector hits were recorded, with all identified hits being modern debris. The riverbed was composed of bedrock on the upstream (south-east) and sand and river gravels downstream (north-west).					
05E0353	n/a	288553 265693	Athlumney	2005:1149	R. Clutterbuck
Assessment and test excavation on the Kilcarn to Johnstown Sewerage Scheme required excavation along the Boyne River. River-deposited silts and sands were recorded but no archaeological material was found. Trenching revealed modern land drainage features, evidence for land improvement and modern dumped deposits likely to be associated with dredging of the River Boyne.					
05D075 05R058	n/a	285950 268200	River Blackwater	2005:1219	R. Bangerter
A visual inspection and magnetometry survey of 210m of the River Blackwater in Abbeylands South did not reveal any archaeologically significant material/features.					
97E322	n/a	288358 266708	Athlumney	2007:1254	M. McQuade
A multiperiod archaeological site at the IDA Navan Business & Technology Park. Three main periods of activity were identified on site: Final Neolithic/Early Bronze Age; Bronze Age and the early medieval period. Final Neolithic/Early Bronze Age activity was characterised by cooking pits and fire debris dated to 2851–2463 cal BC An early medieval structure was dated to cal. AD 551–643.					
07E892	ME025–049	288266 266722	Athlumney	2007:1255	J. Hession
A multiperiod archaeological site at the IDA Navan Business & Technology Park. Four phases of occupation at the site dating to the Final Neolithic/Early Bronze Age, Bronze Age and early medieval periods (see above). The archaeological site was an early medieval multivallate cemetery/settlement with associated field system and a souterrain complex.					
07E1117	ME025–039	288445 262645	Balreask Old/Athlumney	2008:974	E. O'Carroll
Testing of pipeline crossing of River Boyne at Kilcarn, Navan. No features of archaeological significance were discovered.					

Table 5: Previous archaeological excavations adjacent to the site

4.10 Site Visit

The site was visited in January and February 2013. The results of the architectural survey are outlined in Section 5 below. The approaches to the bridge and the downstream banks were surveyed for cultural heritage or archaeological features potentially impacted upon by Options 1–3. No such features were noted. Eighteenth century documents suggest the land to the east of New Bridge was largely undeveloped at that time, and were only opened up to settlement and development after the construction of New Bridge. Previous assessments along the river banks in the Navan urban area and hinterland indicate either riverine sands and gravels, or dredged deposits piled along the banks (see Section 4.8 above; Table 5).

4.11 River Bed Survey (Apex Surveys)

A topographical survey of the river bed immediately adjacent to New Bridge on both the upstream and downstream side was carried out by Apex Surveys in December 2012. The accuracy of the survey results were affected by fast river currents. The survey indicated a generally level river bed within the channels on both sides, with build-up of river carried deposits between the arches, in particular on the downstream side. There was no indication of previous bridge structures, which concurs with the historical research that suggests there was no bridge at this location before the mid eighteenth century AD when the current bridge was constructed.

5. ARCHITECTURAL ASSESSMENT

New Bridge is a six-arched masonry bridge that runs east-west to connect Athlumney on the right bank of the Boyne with the town of Navan on the left bank. The bridge was inspected for the purposes of this report on the morning of 9th January 2013. The weather was dry, calm and cool with some bright intervals at the time of the inspection, and there was a significant level of mist that remained all morning, making photography difficult, particularly from a distance. Although rainfall had been moderate over the period preceding the survey the river was relatively high and fast flowing. As a result of this detailed inspections beneath the arches was difficult and only a small number of measurements were taken in the interest of safety.

Plate 1: Downstream elevation of bridge (north)

Plate 2: Upstream elevation of bridge (south)

The ground on the eastern side of the bridge is at a lower level than that on the west, as a consequence of which the bridge deck slopes towards the east. This is visible in the bridge elevations, but is barely perceptible, as the parapets are higher above the deck on the eastern side. This feature explains in part why the bridge arches are lower towards the east. The highest and broadest of the arches is the westernmost, the next two being slightly smaller and all three being semi-circular. There is then a very broad pier before the fourth arch, which is significantly smaller than the first three and also semicircular. Another broad pier follows, though not quite so broad as the previous. Finally there are two segmental

arches at the eastern side of the bridge, both with crowns significantly lower than the other four arches. Unusually, the fifth arch is smaller than the sixth, a reverse of the norm in which arches nearer to the banks are usually the same size or smaller than those nearer the centre.

Plate 3: Downstream side of western arch

The westernmost arch is shown in the photograph above and to the right is the mass concrete retaining wall along the river margin. A splay has been provided between the bridge deck and the adjacent road and this is carried on the triangular bridge extension seen at right in the photograph. On the downstream side of the bridge there are substantial prismatic cutwaters on the abutment against the concrete river wall and on the westernmost two piers. There are no cutwaters on the two very wide piers. The substantial cutwaters rise to the same height as the crown of the arches, and above this there are prismatic cappings.

Plate 4: Detail of arch ring on downstream side

The voussoirs on the downstream side of the bridge are of squared limestone blocks, brought to shape, but not dressed. The arch ring is parallel. The cutwaters, spandrels and parapet are of rubble limestone.

Plate 5: Upstream side of fourth arch from west

The bridge design is different on the upstream side as compared with downstream. Most noticeably, the arch ring is comprised of regular voussoirs of dressed limestone. The keystone is raised slightly above the other voussoirs, while the arch ring is otherwise parallel. The spandrels and parapet are of rubble limestone.

The cutwaters on the upstream side are lower than those downstream. The two cutwaters on the western side rise to the spring of the arch and have a prismatic capping above this. The easternmost cutwater rises only 300 or 400mm above the spring of the arch before terminating with a prismatic capping. These cutwaters are faced with hammer dressed limestone of similar quality to the stones in the arch ring.

Plate 6: Easternmost cutwater on upstream side

Plate 7: Upstream side of bridge, looking eastwards

The two larger cutwaters on the upstream side are massive. They are of similar height to the others, rising from the spring of the arch and having a prismatic capping, while the thickness of the piers ensures that there is a broad expanse between the ends that is faced on the river side by a vertical wall of hammer-dressed limestone, above which the capping slopes back to the bridge.

Plate 8: Barrel of vault inside the fourth arch from the west

The reason for the difference in the nature of the arches and cutwaters on the two sides of the bridge is seen on the interior of the arches. There are two vertical joints through the masonry running from one side of each arch to the other and in some cases the joint is several centimetres wide. There are slight differences in the curvature of the arches on either side of the joints. These joints represent two extensions to the original bridge in the years after its original construction.

Plate 9: View eastwards across bridge from Navan towards Athlumney

The bridge deck slopes towards the east, as noted above, with the parapet on the eastern end rising 1280mm, while at the western end it is 925mm. The road crossing the bridge is single-carriageway with one lane in each direction. There are footpaths on each side, both surfaced with concrete paviors and both relatively narrow.

Plate 10: Detail of parapet wall and coping stones

The parapet walls are of rubble limestone and are approximately 450mm thick, with a capping of limestone copings. At one point on the northern parapet, above the second arch from the eastern end, there is a length of mass concrete capping in place of the limestone.

6. IMPACT

6.1 Archaeological Impact

The site is not a Recorded Monument, but lies immediately adjacent to Zone of Archaeological Potential for Navan (ME025–044), as established by the Urban Archaeological Survey for Co. Meath. The Rivers Boyne and Blackwater are also Zones of Archaeological Interest (under the Navan Development Plan 2009–2015). There are no historical or cartographic references to a bridge at this location before the mid-eighteenth century AD. Earlier stone bridges across the Boyne were located away from the town at Babes Bridge (towards Donaghmore) and Kilcarn Bridge, both of which are recorded in late medieval documents.

There are eighteenth century references to the river between Kilcarn Bridge and Navan being crossed by foot when water levels dropped. The toponym Athlumney, suggests an ancient ford in this general location. There have been no previous excavations adjacent to the bridge, however there have been a number of underwater or river bank assessments of the Boyne within the town. None of these assessments have identified archaeological material, with test trenches along the river bank generally encountering alluvial silts and dredged river deposits.

The New Bridge, Navan is not listed in the Record of Monuments and Places, but is located within the Zone of Archaeological Importance of the Navan Development Plan (2009–2015). It is a Protected Structure (no. 115).

There have been no previous excavations adjacent to the bridge, however there have been a number of underwater or river bank assessments of the Boyne within the town. These have never identified archaeological remains, with test trenches generally revealing alluvial silts and dredged river deposits.

6.2 Architectural Impact

The survey of the bridge has shown that the bridge has been widened twice since it was built. It is clear from the nature of the stonework on the bridge that the original is on the northern or downstream side, while the southern or upstream side is the last of the three phases. The historical background has indicated that the bridge was built by 1754, though documentary evidence for the widening has not come to light. Measurements taken during the survey suggest that the original bridge was approximately 5 metres wide. If it had parapet walls, which would have been usual by the eighteenth century, the carriageway would have been a little over 4 metres wide, which is also consistent with many bridges surveyed by the present author. The first widening of the bridge was by approximately 2350mm, bringing the total width to about 7400mm. The second widening was by approximately 3300mm, bringing the total width to around 10.7 metres, with a carriageway width of a little less than 9.8 metres. These measurements may shed light on the timing of the first widening. Somerville Bridge, which is just to the east of New Bridge, on the same road, was built in 1792 to carry the road over the new canal that was completed in 1800 as part of the Boyne navigation. This connected Navan with the port of Drogheda, permitting canal barges to carry bulk goods for export. This was a time of boom in agricultural produce due to the ongoing war with France and the canal facilitated the export of grain as well as the supply of grain to Dublin via the coastal route through Drogheda. Somerville Bridge was originally about 7.6 metres wide, and this is very close to the 7.4 metres of New Bridge following its first widening. Two scenarios are possible here, firstly that New Bridge had been widened to 7.4 metres prior to 1792 and Somerville Bridge was built to the same dimension. Following this, New Bridge could have been widened to its present width to carry the additional freight traffic to and from the canal harbour on the eastern side of New Bridge. The second scenario is that New Bridge was widened to 7.4 metres at the same time that the canal was built, in anticipation of the need once the canal opened, but that it needed to be further widened at a later date.

The survey and the historical background have indicated another element in the history of the bridge design. The map produced by Thomas Williams in 1756 and reproduced in figure 5 shows the bridge to have eight arches. The accuracy of such a depiction needs to be considered with care, particularly as the bird's eye view in the margin of the same map shows the bridge to have only six arches. However, the main map has an interesting configuration of arches.

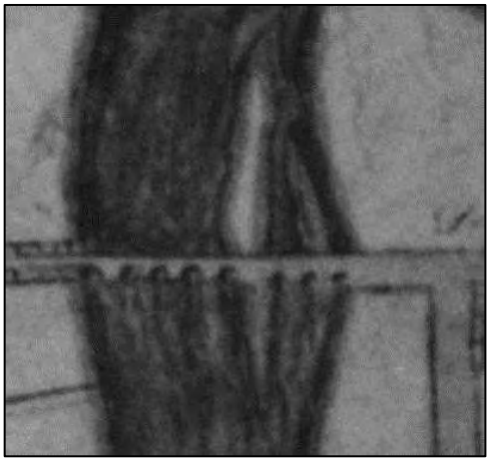

Plate 11: Detail of Williams's map of 1756

Taken from left to right, which is west to east, there is one arch, then a relatively wide pier, then three arches, then a wider pier with what may be a sand bank or island, then another arch, then a wide pier spanning an island, to the right of which are three more arches, all of them smaller than those to the west. There is a hint of another island or sandbank to the left of the right-hand arch. If the first and last arches are ignored, this is a reasonable depiction of the bridge. The major island stretching to the north of the bridge is known to have existed and was shown on maps into the twentieth century. What is suggested here is that the bridge originally had eight arches, but that the first and last are no longer visible. Each of these became an arch for a mill race and this is clearly shown on the nineteenth and early twentieth century Ordnance Survey maps, which show a V-shaped weir upstream from the bridge, with mill races running on each side to feed mills. These mill races would have utilised the arches at each end of the bridge. The western arch is now under the road on the Navan side of the river, while the eastern arch would have served the mill that survives as apartments on the Athlumney side. These apartments are gated and access was not gained for the purpose of this survey.

The survey and historical background also indicate that there has been a major intervention into the form of the river at this location. This probably took place as part of the Boyne Drainage Scheme, which commenced in 1969 and was completed in 1986. The result of the intervention in this stretch of the river has been the removal of the islands that were seen on earlier Ordnance Survey maps, as well as the weir that spanned the river upstream of the bridge. The current level of the water at the time of the survey for this report was such that it was not possible to see the base of the bridge. However, previous inspections of the bridge by the present author, as seen from the banks of the river, indicate that the piers rest on plinths. The nature of these plinths is not certain, given that inspection was from a distance, but it would be consistent with major drainage schemes that the river bed would be dropped and hence there would be a need for underpinning the piers of the bridges. The Boyne Drainage Scheme resulted in works to some 450 bridges in the catchment area and it seems likely that New Bridge was one of these, given the change in the topography in the vicinity of the bridge.

Three options are proposed. The first option would be to hang a steel pedestrian and cycle bridge onto the southern face of New Bridge. This would be achieved by inserting nine concrete ballast beams into the fill of the bridge, projecting through the spandrels. The steel bridge would be fixed to these beams. There would be four potential effects on the bridge arising from this proposal:

1. The physical effect of the intervention into the fabric of the bridge
2. The visual effect of adding a steel bridge onto the side of the bridge
3. The potential for disturbing hidden elements of the bridge within the river banks
4. The potential for damage to the bridge through loads and vibrations during the works.

The second option would also be to hang a steel pedestrian and cycle-bridge onto the southern face of New Bridge, but the means of fixing the steel bridge would differ. This option would involve supporting the proposed steel bridge to about ten steel ties to be drilled through the spandrels of the bridge and fixed to pattress plates on the opposite side of the New Bridge. Additional support would be achieved by means of struts spanning from the under-side of the proposed steel bridge to the cutwaters. This option would require the consolidation and strengthening of the cutwaters.

The third option would be to avoid any intervention into the fabric of New Bridge by erecting the proposed steel pedestrian and cycle-bridge some thirty metres upstream from New Bridge. This would run in a clear span between the river banks with no intermediate support in the river.

6.2.1 The physical effect on New Bridge

The first proposal would involve a radical intervention into the fabric of the bridge, with each concrete ballast beam running 4.7 metres back into the bridge fill, with a depth of 1.25 metres. These would be located in the spandrels as they would lie deeper than the crowns of the vaults in the bridge.

Conservation implications:
As it happens, the works would be confined to the newer part of the bridge and would not extend back far enough to encroach on the original mid-eighteenth century bridge structure. Nonetheless, the bridge is a protected structure and the works would affect the protected fabric directly.

Plate 12: Upstream side of New Bridge, seen from the western bank

The second option would require the drilling of about ten cores some 200mm in diameter through the masonry of the bridge. This would be affected by the presence of the spandrel walls of the two earlier phases of the bridge, increasing the time required for drilling. Pattress plates would be fixed to the downstream side of the bridge.

Conservation implications

The intervention into the fabric of the bridge would be less severe with this option than with the previous option. The works would require the consolidation of the cutwaters, which would be desirable regardless of the proposal to erect a pedestrian/cycle bridge.

The third option would involve the erection of a new pedestrian and cycle bridge upstream from New Bridge.

Conservation implications

There would be no significant implications for architectural heritage arising from the third option.

6.2.2 The visual effect on New Bridge

The proposed works under the first two options would screen the majority of the southern side of the bridge from public view. The designs would be such as to ensure that the steel pedestrian/cycle bridge would avoid covering the arches, so as to maintain a significant part of the elevation uncovered, while ensuring also that the flow of water in flood times is not impeded. The second option would also include struts to support the bridge deck on the cutwaters, though the structure of the bridge itself would be simpler and would obscure less of the face of the stone bridge. Only a minority of people would see the bridge from the river, however, and the most frequent view of this side is seen in the photograph above. The growth of trees and other vegetation on the river margin obstructs much of the view of this side of the bridge. The addition of a steel bridge onto the side of New Bridge and projecting 3.5 metres from the face of the bridge would ensure that the steelwork would conceal most of the view of the bridge from this angle. The second option would have the added effect of placing ten pattress plates on the northern face of the bridge. The third option would not obscure the face the stone bridge.

Conservation implications

The visual effect of either of the first two options on the bridge would detract from the character of the protected structure. It is noted that the bridge would be fixed on the southern side of the bridge, which is the latest phase of construction, probably dating from the nineteenth century. However, the addition of pattress plates to the northern side would detract from the character of the original face of the mid-

eighteenth-century bridge. There would be no significant visual impacts arising out of the third option. The decision as to whether to proceed with the proposed bridge will of necessity be a balance between the needs of the cycling and walking public balanced against the visual effect on the protected structure.

6.2.3 Potential for disturbing hidden elements

While the analysis of this bridge and its history has shown that there appear to be two arches of the bridge that are buried, one on either side of the bridge, the likelihood that any damage to these parts of the bridge would occur must be seen as slight.

Conservation implications

Provided the works are monitored to ensure that any hidden portions of the bridge are identified there should be no issues arising with this matter.

6.2.4 Potential for damage to the bridge

The survey has shown that New Bridge is in very poor condition and is badly in need of repairs and maintenance. Most obvious is the substantial quantity of vegetation growing from the two facades of the bridge, at least some of which would have been weakening the stonework of the bridge. On the upstream side the cutwaters are coming apart and while no stone appears to be missing thus far it is only a matter of time before some of the dressed limestone is lost into the river. Even more serious issues are visible beneath the arches, where parts of the vaulting have been repaired with cement-based mortars, which can adversely affect the behaviour of the masonry. Substantial areas of the vaults are severely deficient in pointing to the extent that there is danger in the short to medium term of stones detaching from the vault and falling, thereby weakening the arch effect on which the stability of the bridge depends. In places the arch rings are detaching from the main body of the masonry and will collapse in the short to medium term. Most alarming is a substantial diagonal crack through one of the piers of the original bridge, which presents as a wide and deep crack up one side of the vault, crossing the crown of the vault diagonally, and fading out just beyond the crown. There is a crack in the adjacent arch on the opposite side of the pier, though this is not as severe.

Conservation implications

Given the state of the bridge there is a serious and realistic concern regarding the first option that the vibrations that would result from the heavy machinery that would be necessary in order to dig down into the bridge to set the ballast beams in place would result in a worsening of the problems identified above. It is possible that any worsening could lead to the loss of stones from the fabric of the bridge,

and could possibly have catastrophic consequences. It is recommended, therefore, that if the first option is selected no work should commence on the provision of the proposed pedestrian and cycle-bridge until a comprehensive programme of repair has been carried out to the masonry of New Bridge and that this work should be carried out to full conservation specification and supervision.

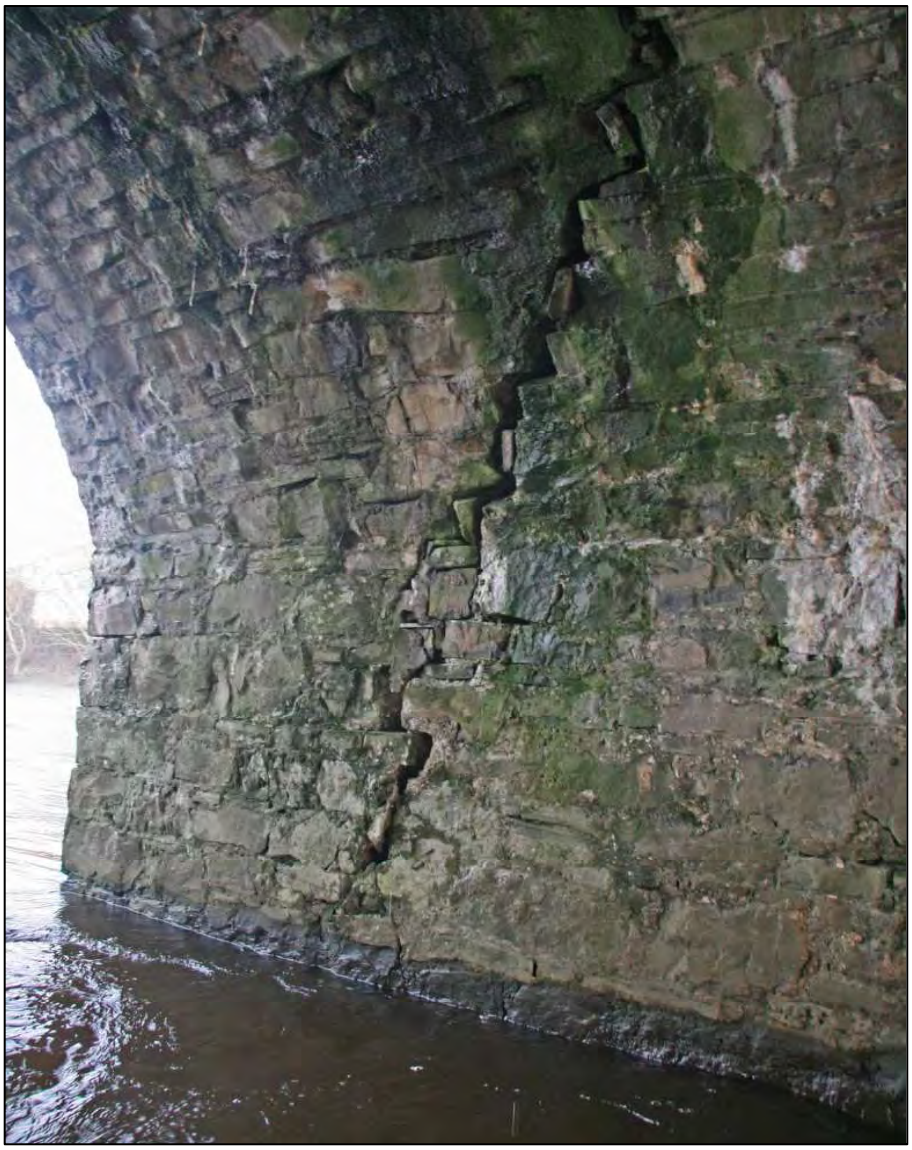

Plate 13: Crack in third arch from western side of bridge

The implications for the structural integrity of the bridge arising from the second option would be less than for the first option due to the less intrusive nature of the works. There would be some potential effect, particularly when the coring reaches the original southern spandrels of the bridge, resulting in vibration in the masonry and potentially increasing the level of damage at the crack shown in the photograph above. There would be no structural implications arising from the third option.

7. RECOMMENDATIONS

7.1 Archaeological Recommendations

The site is adjacent to Zone of Archaeological Potential for Navan (ME025–044) and within a Zone of Archaeological Importance for the River Boyne (under the Navan Development Plan 2009–2015). All three options have the potential to disturb buried or previously unknown archaeological sites or features. It is therefore recommended that any associated groundwork on the banks of the river be monitored by a suitably qualified archaeologist.

It is unlikely that there will be any significant impact on river deposits at this location. Option 3 specifically avoids disturbing river deposits. A number of underwater archaeological surveys in this area have not identified archaeological deposits, rather providing evidence of significant dredging (including the Boyne Drainage Scheme). Consequently, there is no specific recommendation for further underwater archaeological survey.

7.2 Architectural Recommendations

In the light of the findings set out above, it is recommended that if either the first or the second option is selected no work be carried out to implement the proposal for the pedestrian and cycle bridge until a full programme of repair has been carried out to conservation specifications on New Bridge, including the removal of all vegetation, the repair of all cracks and loose masonry and the repointing of the bridge wherever necessary, including, in particular the vaults of each of the arches. These works should be such as to ensure that the masonry fabric of the bridge is stabilised. It is also recommended that the works be monitored during the construction of the proposed pedestrian and cycle bridge so as to identify any hidden elements of the bridge that may emerge. This monitoring could be carried out by the archaeologist that would be fulfilling the archaeological recommendations.

NOTE: All conclusions and recommendations expressed in this report are subject to the approval of The Department of Arts, Heritage and the Gaeltacht (DAHG) and the relevant local authorities. As the statutory body responsible for the protection of Ireland's archaeological and cultural heritage resource, the DAHG may issue alternative or additional recommendations.

8. Option Appraisal

Impact level	Option 1	Option 2	Option 3
Profound	--	--	--
Negative Significant	Radical intervention into the fabric of the bridge, with each concrete ballast beam running 4.7 metres back into the bridge fill, with a depth of 1.25 metres.	--	--
Negative Moderate	The addition of a steel bridge onto the side of New Bridge would conceal most of the view of the upstream side of the bridge detracting from the character of a protected structure.	Use of horizontal ties instead of ballast beams, and inclined support props onto the cutwaters. The cutwaters would require substantial strengthening/consolidation. Limited ground-works on either bank. The addition of a steel bridge onto the side of New Bridge would conceal the view of the downstream side of the bridge detracting from the character of a protected structure. The addition of pattress plates to the northern side of the bridge would detract from the mid-eighteenth century character of the bridge.	--
Potentially Significant	Limited ground-works on either bank has low potential to disturb archaeological remains	Limited ground-works on either bank has low potential to disturb archaeological remains	Limited ground-works on either bank has low potential to disturb archaeological remains
Preference Level	**Third Preference**	**Second Preference**	**First Preference**

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Online Archaeological Survey of Ireland www.archaeology.ie [accessed 14 December 2012]
Placename information from www.logainm.ie [accessed 14 December 2012]

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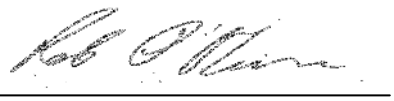


Rob O' Hara MA, BA MIAI

04 February 2012

APPENDIX 1 Summary of legislative background

The 1992 European Convention on the Protection of Archaeological Heritage was ratified by Ireland in 1997. The convention provides the basic framework for policy on the protection of the archaeological heritage. The obligations on the State under the convention relate to providing statutory protection measures of archaeological sites, including authorisation and supervision of archaeological activities and physical protection of archaeological heritage.

Irish Legislation
Irish legislation for the protection of archaeological heritage is based on the National Monuments Acts 1930-l 994. This is in accordance with the Valletta Convention (as above). The Minister for Arts, Heritage and the Gaeltacht has a specific role in relation to the protection of the archaeological heritage through powers provided by these acts and the National Cultural Institutions Act 1997. Section 2 of the 1930 Act (as amended) provides that 'monument' includes any artificial building or structure, cave, stone or any natural object that has been altered or moved into purposefully put in position, any prehistoric tomb, grave or burial or any ritual, industrial or habitation site or any traces of the above. There are a number of mechanisms which can be applied to secure the protection of archaeological monuments and areas, including The Record of Monuments and Places, The Register of Historic Monuments, and Preservation Orders/ Temporary Preservation Orders.

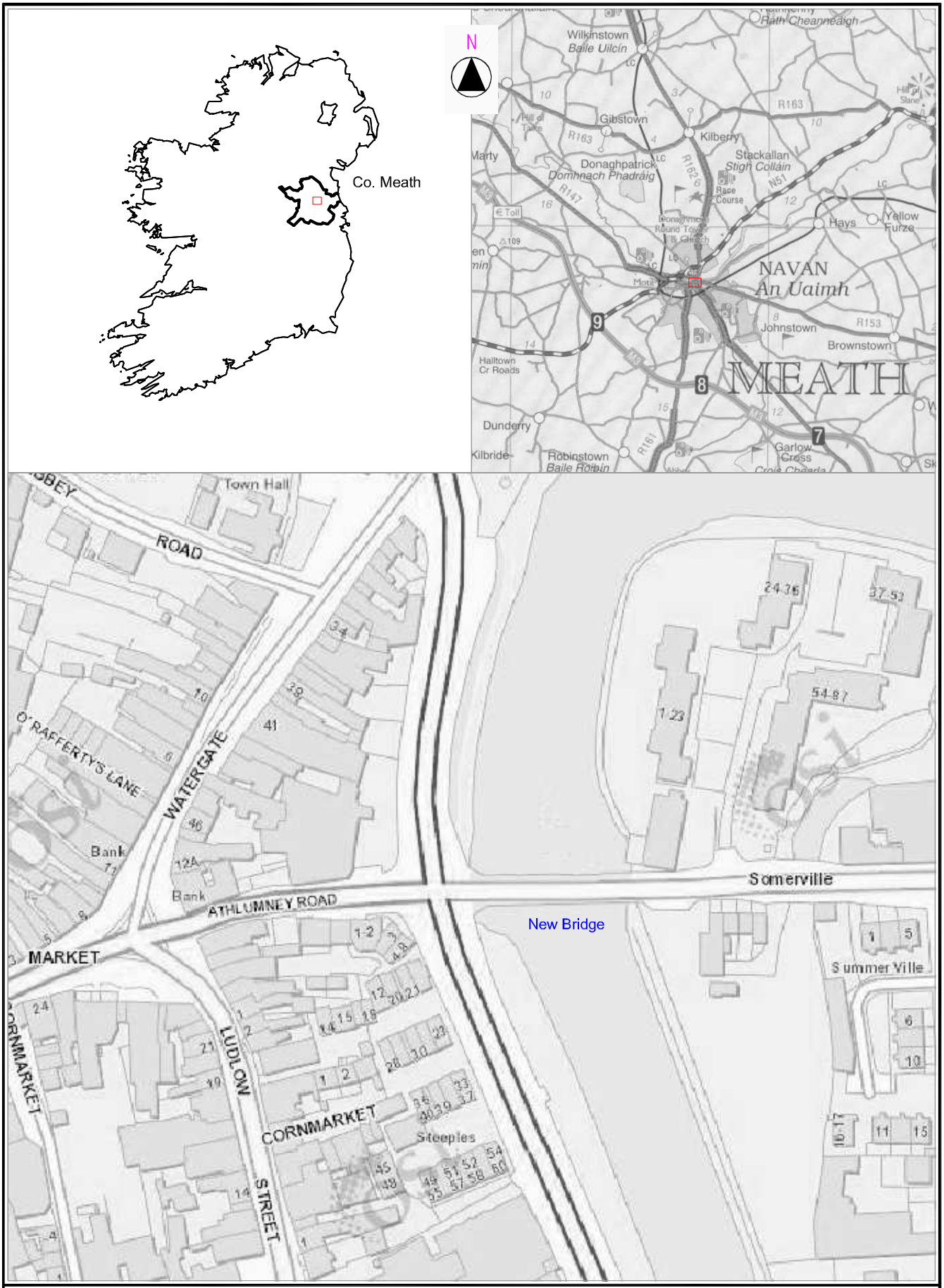
The Protection of Archaeological Objects
Section 2 of the 1930 Act (amended) defines an archaeological object as (in summary) any chattel in a manufactured or partly manufactured state or an unmanufactured state but with an archaeological or historical association. This includes ancient human, animal or plant remains. The National Museum of Ireland advises the Minister on the protection of archaeological objects. Archaeological objects must not be altered by any person unless issued with a licence to do so by the Minister. This includes cleaning, restoring, sampling, cutting or drilling. No archaeological object found after 1930 may be purchased or otherwise acquired or sold unless designated by the director of the Museum. It is unlawful to export or attempt to export archaeological objects other than with an export licence.

The Control of Archaeological Excavation
It is unlawful for any person to dig or excavate in or under any land for the purpose of searching for archaeological objects or particular structure or thing of archaeological interest known or believed to be under such land unless issued with, or in accordance with a licence issued by the Minister.

The Control of Detection Devices
Section 2 of the 1987 Act defines a detecting device as a device designed or adapted for detecting or locating any metal or mineral on the ground and under water. This does not include a camera. It is unlawful to use or be in possession of such a device at the site of a monument subject to a preservation order, at a monument in the ownership or guardianship of the Minister, at a monument entered in the Record of Monuments and Places or at a monument entered in the Register of Historic Monuments

The Planning and Development Act 2000

Under planning legislation, each local authority is obliged to draw up a Development Plan setting out their aims and policies with regard to the growth of the area over a five-year period. They cover a range of issues including archaeology and built heritage, setting out their policies and objectives with regard to the protection and enhancement of both. These policies can vary from county to county. The Planning and Development Act 2000 recognises that proper planning and sustainable development includes the protection of the archaeological heritage. Conditions relating to archaeology may be attached to individual planning permissions.



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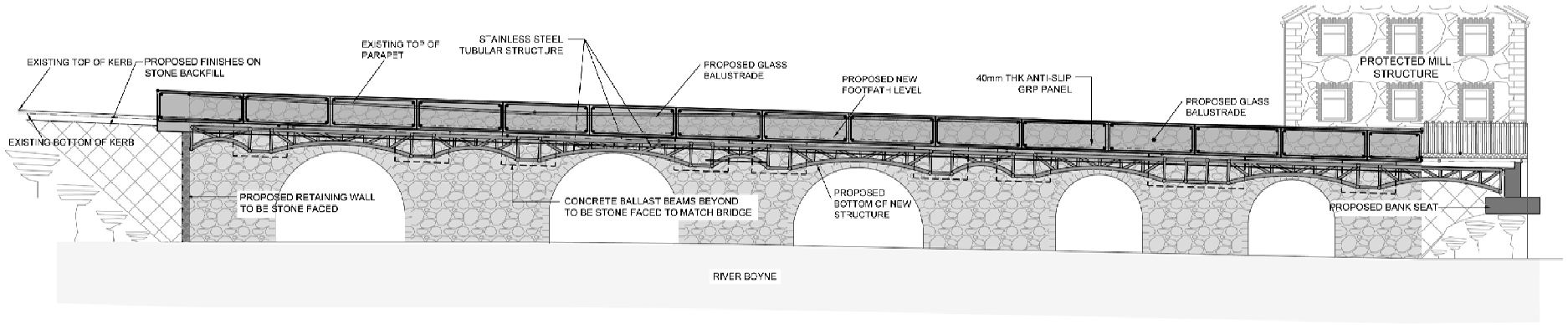
			Date: December 2012
		Client: Clifton Scannell Emerson Associates	Origin: Various
			Ref: 2012_33_Fig 1

Figure 1: Site Location



PROPOSED FOOTPATH / CYCLETRACK BRIDGE ELEVATION

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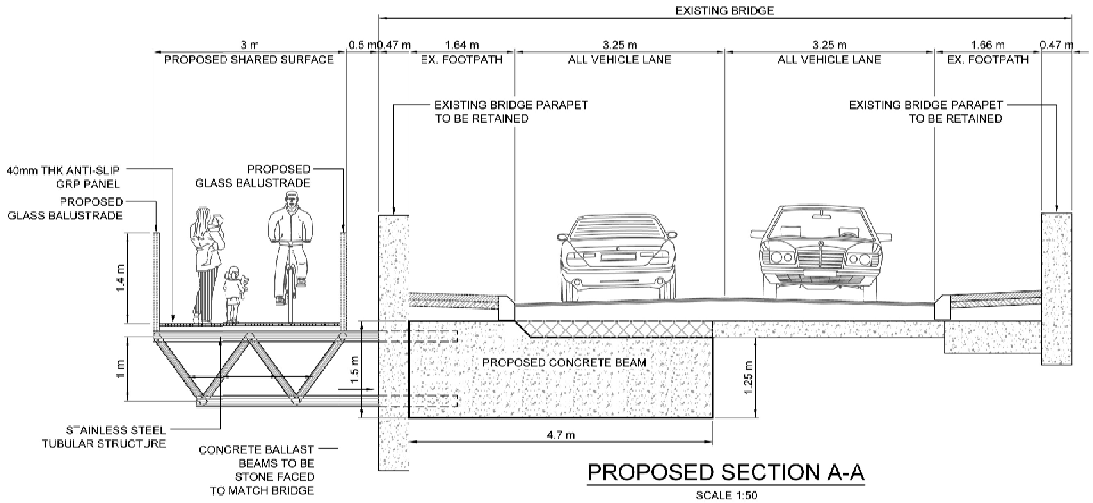

PROPOSED SECTION A-A

SCALE 1:50

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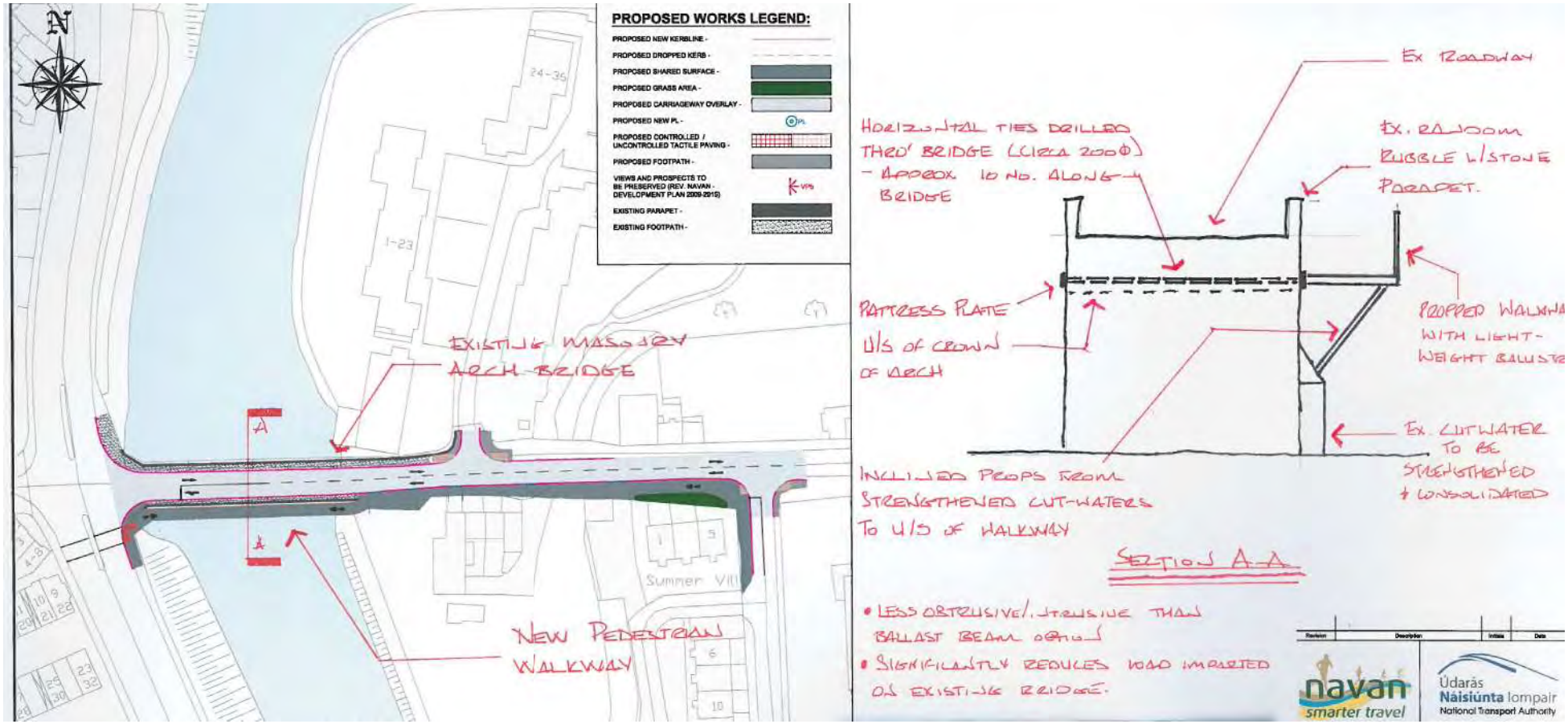
Figure 2a: Proposed Development (Option 1)



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		Client: Clifton Scannell Emerson Associates	Origin: Client
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Figure 2b: Proposed Development (Option 2)

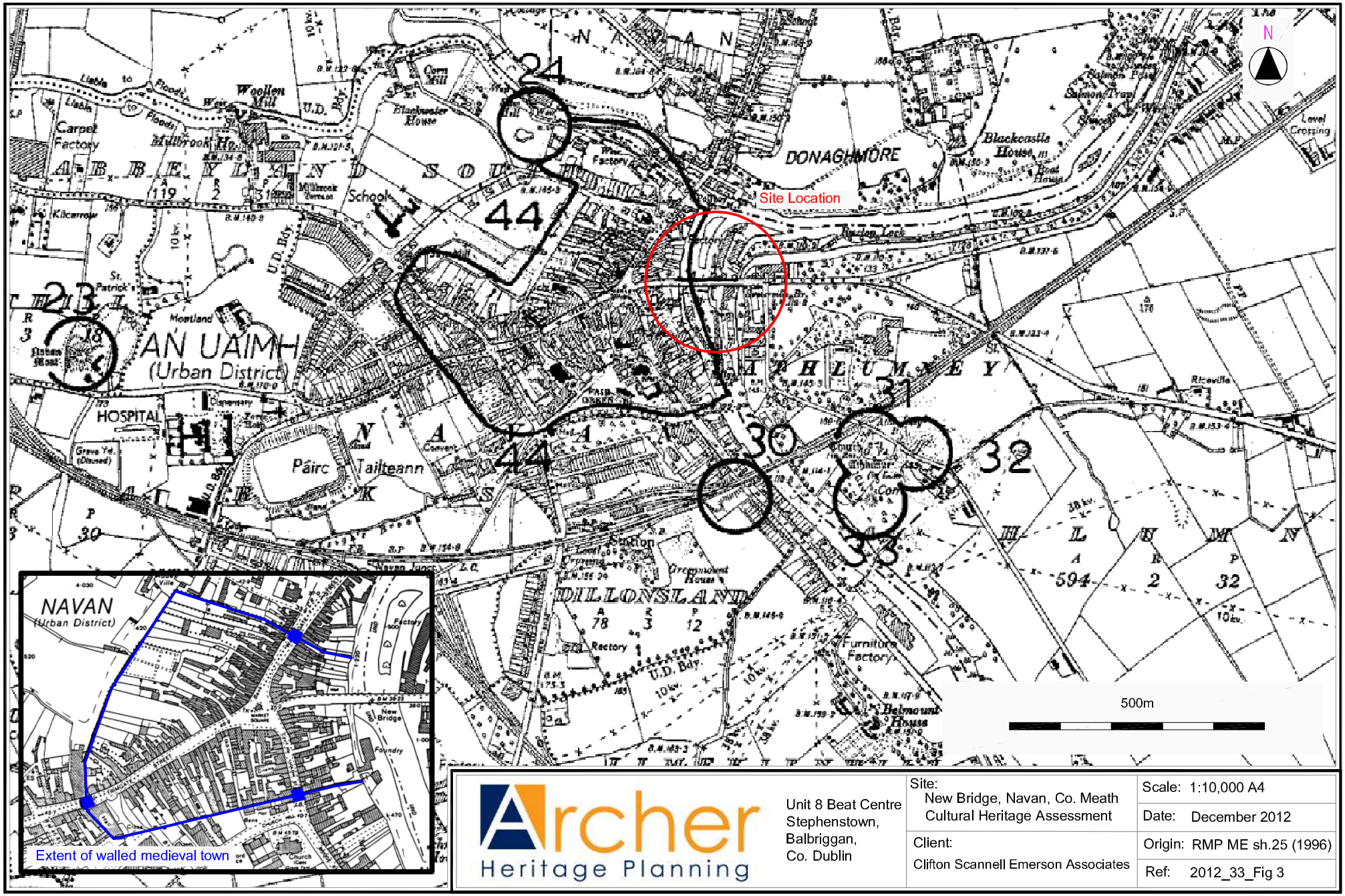
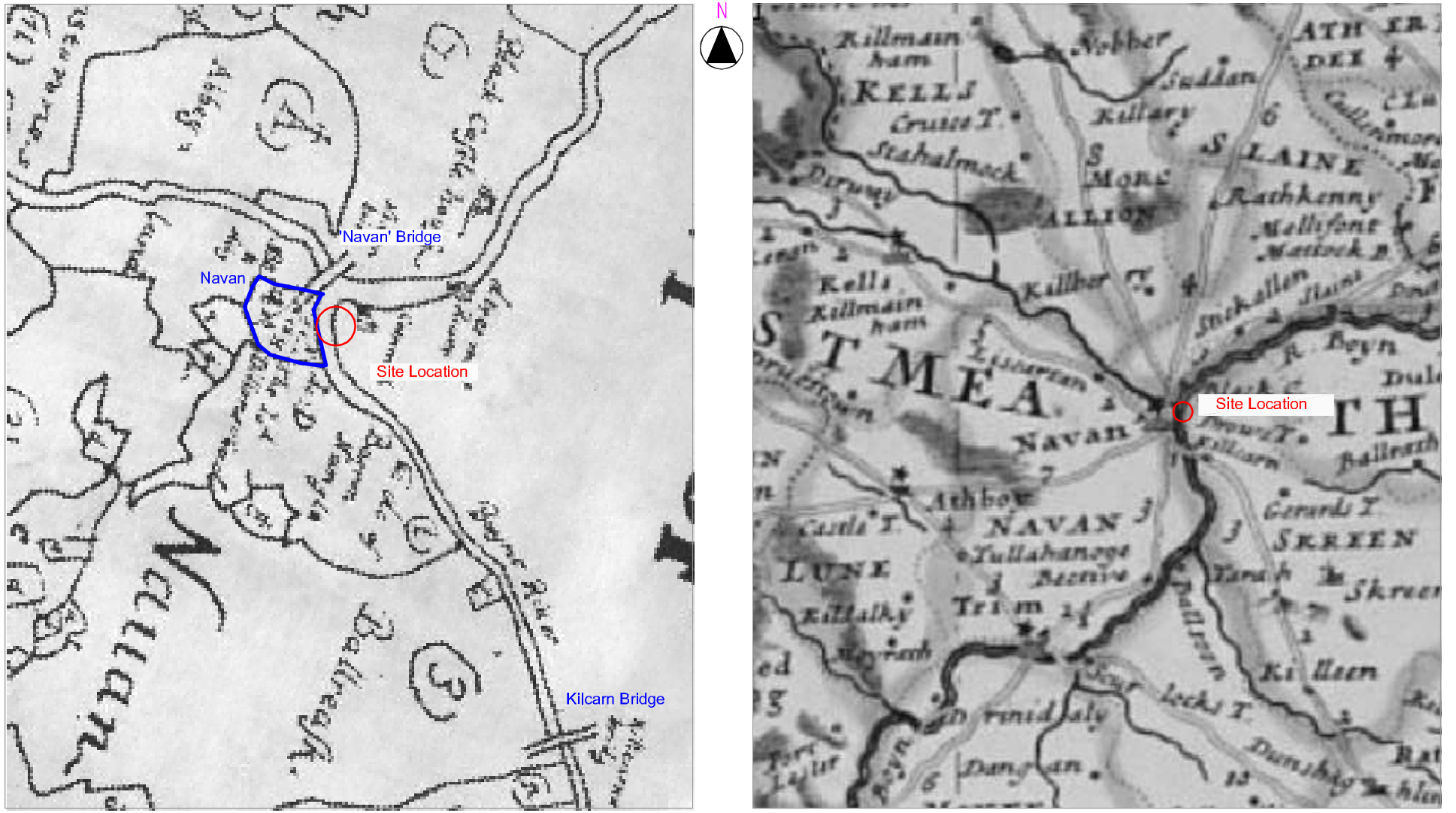


Figure 3: Record of Monuments and Places



(l) Down Survey map, 1656

(r) Herman Moll map, 1714

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Co. Dublin

Site: New Bridge, Navan, Co. Meath Cultural Heritage Assessment	Scale: Not to scale
	Date: December 2012
Client: Clifton Scannell Emerson Associates	Origin: Various
	Ref: 2012_33_Fig 4

Figure 4: Pre-Ordnance Survey maps (1)

(l) Thomas Williams map, 1756

(r) Taylor & Skinner map, 1777

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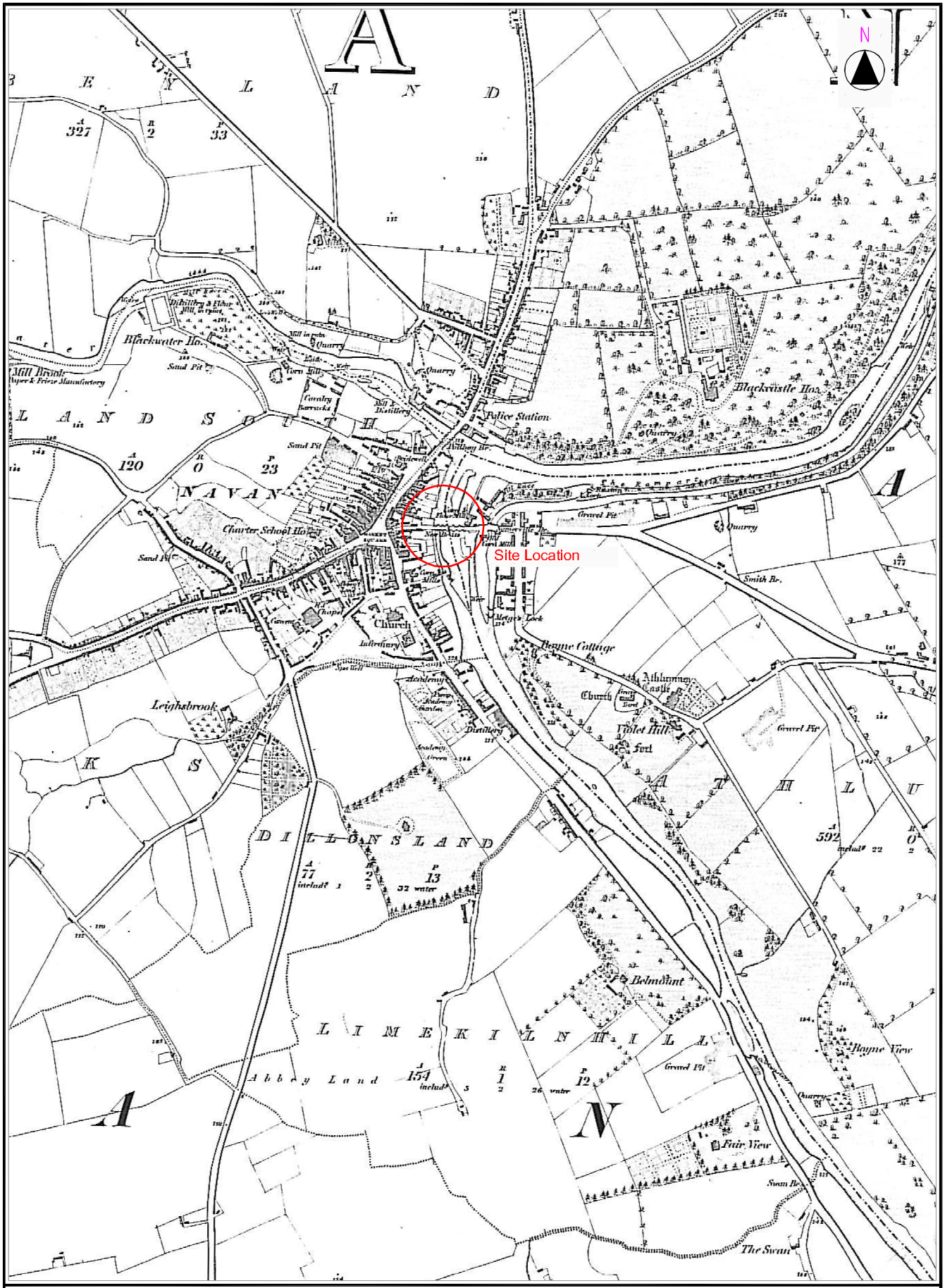
			Date: December 2012
		Client: Clifton Scannell Emerson Associates	Origin: Various
			Ref: 2012_33_Fig 4

Figure 5: Pre-Ordnance Survey maps (2)



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			Ref: 2012_33_Fig 6

Figure 6: 1st edition Ordnance Survey map (1837)

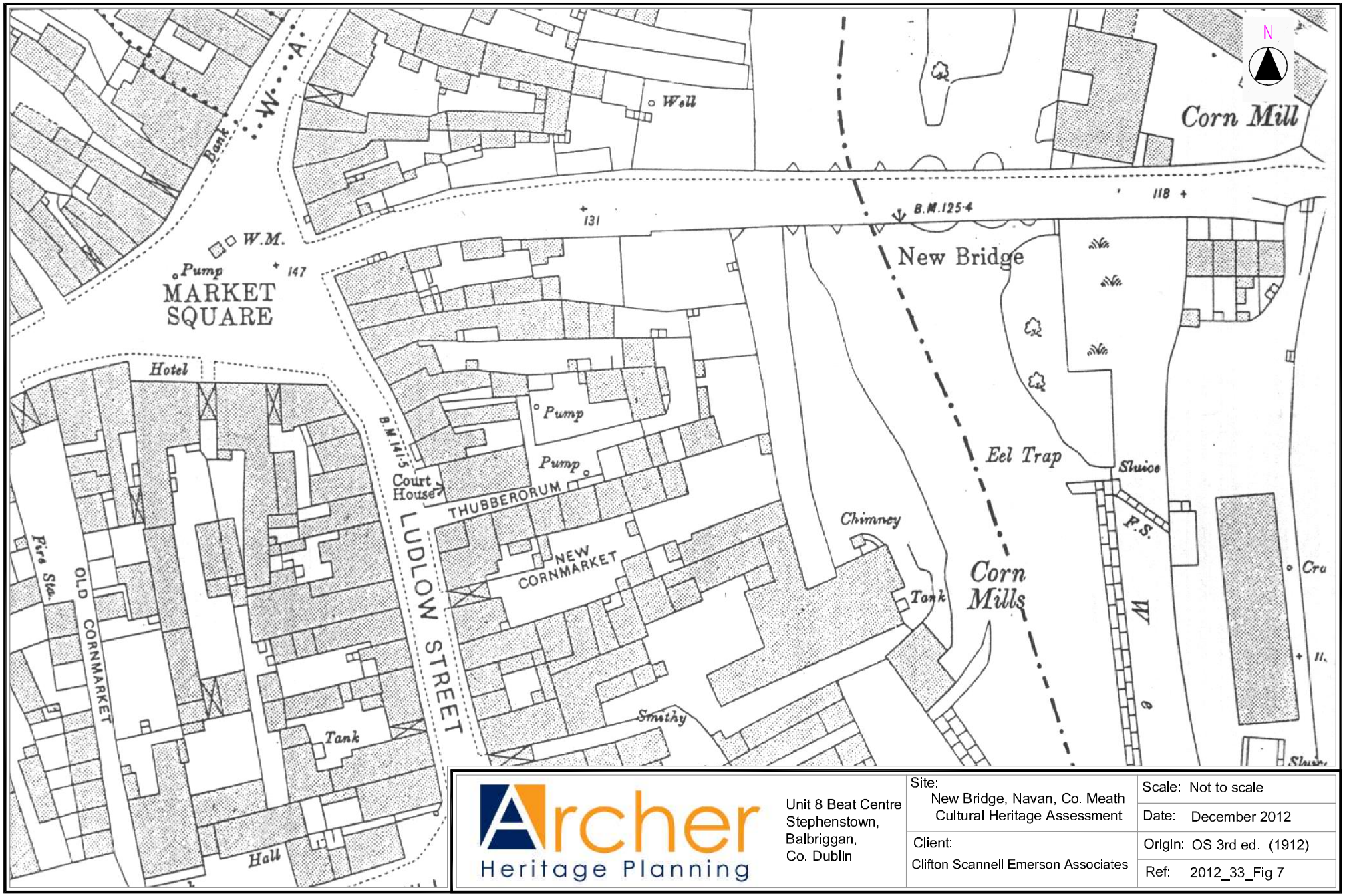

Figure 7: 3rd edition Ordnance Survey map (1912)

Appendix E – Register of Report Changes

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