



# Athlone Pedestrian and Cycleway Bridge

## Environmental Impact Statement

Volume 4 : Appendices | May 2017



smartertravel >>>



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## Environmental Impact Statement

### Volume 4 Appendices

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## **Appendix 6.1**

### *Conservation Objectives and Site Synopsis*

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## Conservation Objectives for Middle Shannon Callows SPA [004096]

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

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

◆ <i>Cygnus cygnus</i>	[wintering]
◆ <i>Anas penelope</i>	[wintering]
◆ <i>Crex crex</i>	[breeding ]
◆ <i>Pluvialis apricaria</i>	[wintering]
◆ <i>Vanellus vanellus</i>	[wintering]
◆ <i>Limosa limosa</i>	[wintering]
◆ <i>Chroicocephalus ridibundus</i>	[wintering]
◆ Wetlands	[]

### Citation:

NPWS (2011) Conservation objectives for Middle Shannon Callows SPA [004096]. Generic Version 4.0.  
Department of Arts, Heritage & the Gaeltacht.

For more information please go to: [www.npws.ie/protectedsites/conservationmanagementplanning](http://www.npws.ie/protectedsites/conservationmanagementplanning)

**Site Name: Lough Ree SAC**

**Site Code: 000440**

Lough Ree is the third largest lake in Ireland and is situated in an ice-deepened depression in Carboniferous limestone on the River Shannon system between Lanesborough and Athlone. The site spans Counties Longford, Roscommon and Westmeath. Some of its features (including the islands) are based on glacial drift. It has a very long, indented shoreline and hence has many sheltered bays. Although the main habitat, by area, is the lake itself, interesting shoreline, terrestrial and semi-aquatic habitats also occur.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (\* = priority; numbers in brackets are Natura 2000 codes):

- |  |
|--|
| [3150] Natural Eutrophic Lakes           |
| [6210] Orchid-rich Calcareous Grassland* |
| [7120] Degraded Raised Bog               |
| [7230] Alkaline Fens                     |
| [8240] Limestone Pavement*               |
| [91A0] Old Oak Woodlands                 |
| [91D0] Bog Woodland*                     |
| [1355] Otter ( <i>Lutra lutra</i> )      |

The greater part of Lough Ree is less than 10 m in depth, but there are six deep troughs running from north to south, reaching a maximum depth of about 36 m just west of Inchmore. The lake has been classified as mesotrophic in quality, but the size of the system means that a range of conditions prevail depending upon, for example, rock type. This gives rise to local variations in nutrient status and pH, which in turn results in variations in the phytoplankton and macrophyte flora. Therefore species indicative of oligotrophic, mesotrophic, eutrophic and base-rich situations occur. The water of Lough Ree tends to be strongly peat-stained, restricting macrophytes to depths of less than 2 m, and as a consequence, macrophytes are restricted to sheltered bays, where a typical Shannon flora occurs. Species present include Intermediate Bladderwort (*Utricularia intermedia*), pondweeds (*Potamogeton* spp.), Quillwort (*Isoetes lacustris*), Greater Duckweed (*Spirodela polyrhiza*), stoneworts (*Chara* spp., including *C. pedunculata*) and Arrowhead (*Sagittaria sagittifolia*). The latter is a scarce species which is almost confined in its occurrence to the Shannon Basin.

Reedbeds of Common Reed (*Phragmites australis*) are an extensive habitat in a number of more sheltered places around the lake, but single-species 'swamps'



consisting of such species as Common Club-rush (*Scirpus lacustris*), Slender Sedge (*Carex lasiocarpa*), Great Fen-sedge (*Cladium mariscus*) and two scarce species of sedge (*Carex appropinquata* and *C. elata*) also occur in suitable places. Some of these grade up into species-rich alkaline fen with Black Bog-rush (*Schoenus nigricans*) and Whorl-grass (*Catabrosa aquatica*), or freshwater marsh with abundant Water Dock (*Rumex hydrolapathum*) and Hemp-agrimony (*Eupatorium cannabinum*).

Lowland wet grassland is found in abundance around the shore and occurs in two types. One is 'callowland', grassland which floods in winter. This provides feeding for winter waterfowl and breeding waders. The other is an unusual community on stony wet lake shore which is found in many places around the lake, and is characterized by Water Germander (*Teucrium scordium*), a scarce plant species almost confined to this lake and Lough Derg.

Dry calcareous grassland occurs scattered around the lake shore. This supports typical species such as Yellow-wort (*Blackstonia perfoliata*), Carlina Thistle (*Carlina vulgaris*) and Quaking-grass (*Briza media*). Orchids also feature in this habitat e.g. Bee Orchid (*Ophrys apifera*) and Common Spotted-orchid (*Dactylorhiza fuchsii*).

Limestone pavement occurs occasionally around the lake shore. The most substantial area is at Rathcline in the extreme north-east. While this has been planted with commercial forestry since the 1950s, it still displays a diverse representation of pavement types, from the typical clint-gryke system to large blocky pavements and scattered boulders. In all cases the pavement is covered by a bryophyte-rich flora, with abundant Ivy (*Hedera helix*), and a scrub layer dominated by Ash (*Fraxinus excelsior*), Hazel (*Corylus avellana*) and some Spindle (*Euonymus europaeus*). The ground flora is variable, though in places it is species-rich.

Dry broadleaved semi-natural woodland occurs in several places around the lake, most notably at St John's Wood and on Hare Island. St John's Wood is recognised as the largest and most natural woodland in the Midlands. Its canopy is dominated by Hazel, Pedunculate Oak (*Quercus robur*), Holly (*Ilex aquifolium*) and Ash, but a range of other trees and shrubs occur, including Wych Elm (*Ulmus glabra*), Yew (*Taxus baccata*), Wild Cherry (*Prunus avium*) and Irish Whitebeam (*Sorbus hibernica*). The ground flora of St. John's Wood is species-rich, and is remarkable for the presence of two species, Toothwort (*Lathraea squamaria*) and Bird's-nest Orchid (*Neottia nidus-avis*), which tend to occur in sites with a long history of uninterrupted woodland cover. The tree species composition on Hare Island is similar to that in St. John's Wood, with additional non-native species such as Sycamore (*Acer pseudoplatanus*) and Beech (*Fagus sylvatica*). This wood also has an exceptionally rich ground flora. Some of the smaller areas of woodland around Lough Ree are mixed woodland with a high percentage of exotics such as Beech. Some areas of well-developed Hazel scrub also occur.

Pockets of wet woodland occur around the lake. Most of these are dominated by willows (*Salix* spp.), Alder (*Alnus glutinosa*) and Downy Birch (*Betula pubescens*). In one such wood, at Ross Lough, the terrestrial alga, *Trentopohlia* sp., has a specialised

niche on the willow trunks. The ground layer has a rich bryophyte flora (*Calliergon* spp. and *Sphagnum* spp.), scattered clumps of Greater Tussock-sedge (*Carex paniculata*) and a good diversity of herb species, including Water Dock and Fen Bedstraw (*Galium uliginosum*).

Small examples of raised bog occur, which are of interest in that they show a natural transition through wet woodland and/or swamp to lakeshore habitats. Also present are examples of degraded raised bog capable of regeneration, with the most extensive areas occurring at Clooncraft/Clonlarge, along the north-western shores of the lake. In general the vegetation of these degraded areas is dominated by typical raised bog species such as Cross-leaved Heath (*Erica tetralix*), Heather (*Calluna vulgaris*), Hare's-tail Cottongrass (*Eriophorum vaginatum*), Bog Asphodel (*Narthecium ossifragum*) and Deergrass (*Scirpus cespitosus*). Typically the degraded bog areas have a low cover of peat-forming bog mosses (*Sphagnum* spp.).

Associated with the extensive raised bog system at Clooncraft/Clonlarge are areas of bog woodland. At least two small areas of woodland occur on the raised bog domes. However it would appear that this habitat is in the early stages of development. The largest area is dominated by low trees of Downy Birch and Lodgepole Pine (*Pinus contorta*). Occasional trees of Scots Pine (*Pinus sylvestris*) also occur. The ground layer is wet and quaking with a lush carpet of mosses present, including various species of *Sphagnum*, *Pleurozium schreberi* and *Aulacomium palustre*. The main vascular plant species in the ground flora are Bog-rosemary (*Andromeda polifolia*), Cranberry (*Vaccinium oxycoccos*), Bog-myrtle (*Vaccinium myrtillus*), Hare's-tail Cottongrass and Deergrass. Bog woodland is of particular conservation importance and is listed with priority status on the E.U. Habitats Directive.

At St. John's Wood, there is an interesting area of woodland that grows on cut-away peat. This is dominated by Downy Birch and Alder Buckthorn (*Frangula alnus*). The occurrence of the latter species in such abundance is unusual in Ireland.

Smaller lakes occur around the lake shore, especially on the east side, and these often have the full range of wetland habitats contained within and around them. A number of small rivers also pass through the site.

The site supports a number of rare plant species which are listed in the Irish Red Data Book. Alder Buckthorn and Bird Cherry (*Prunus padus*) are woodland components at St. John's Wood and elsewhere. Narrow-leaved Helleborine (*Cephalanthera longifolia*) and Betony (*Stachys officinalis*), both of which are also legally protected under the Flora (Protection) Order, 1999, occur among the ground flora of Hare's Island (where the former occurs in notable abundance). They also occur in a number of other woods. The stonewort *Chara tomentosa* is present in shallow water around the lake, and Marsh Pea (*Lathyrus palustris*) occurs on some of the callowland. The rare Myxomycete fungus, *Echinostelium colliculosum*, has been recorded from St John's Wood.

The lake itself contains one of only two populations in Ireland of the endangered fish species, Pollan (*Coregonus autumnalis*), which is genetically different from Continental European stock. The shrimp *Mysis relicta* (Class Crustacea) occurs in this lake and is a relict of the glacial period in Ireland.

Small flocks of Greenland White-fronted Goose, an Annex I species on the E.U. Birds Directive, use several areas of callowland around the lake in winter. An average spring count of 92 individuals was obtained for this species over the six seasons 1988/89 to 1993/94, indicating that Lough Ree is a nationally important site for the species. The following bird counts are derived from 6 counts during the period 1984/85 to 1986/87: nationally important populations of Golden Plover (1,350), an Annex I species; Wigeon (1,306); Teal (584); Tufted Duck (1,317) and Coot (798). Other winter visitors are Whooper Swan (32), an Annex I species, Mute Swan (91), Little Grebe (48), Cormorant (91), Mallard (362), Shoveler (40), Pochard (179), Goldeneye (97), Curlew (178), Lapwing (1,751) and Dunlin (48). The callowland is also used by Black-tailed Godwit and other species on migration.

Some of the lake islands provide nesting sites for Common Tern, a species listed on Annex I of the E.U. Birds Directive. The Lough Ree colony, 86 pairs in 1995, is estimated as one of the largest of this species on midland lakes. The lake also provides excellent breeding habitat for wildfowl, including Common Scoter (30-40 pairs), a rare breeding species listed as "Endangered" in the Red Data Book, and Tufted Duck (>200 pairs). The woodlands and scrub around the lake and on the islands are a stronghold of the Garden Warbler (74 territories in 1997), a bird species mainly confined to the Shannon lakes in Ireland.

There is a population of Otter around the lake. This species is listed in the Red Data Book as being threatened in Europe and is protected under Annex II of the E.U. Habitats Directive.

Land uses within the site include recreation in the form of cruiser hire, angling, camping, picnicking and shooting. Chalet accommodation occurs at a few locations around the lake. Low-intensity grazing occurs on dry and wet grassland around the shore, and some hay is made within the site. Some of these activities are damaging, but in a very localised way, and require careful planning. The main threat to the aquatic life in the lake comes from artificial enrichment of the waters by agricultural and domestic waste, and also by peat silt in suspension which is increasingly limiting the light penetration, and thus restricting aquatic flora to shallower waters. At present Lough Ree is less affected by eutrophication than Lough Derg.

Lough Ree and its adjacent habitats are of major ecological significance. Some of the woodlands around the lake are of excellent quality and include some of the best examples of this habitat in Ireland. St. John's Wood is particularly important; it is considered to be one of the very few candidates for ancient woodland in Ireland. The lake itself is an excellent example of a mesotrophic to moderate-eutrophic system, supporting a rare fish species and a good diversity of breeding and wintering birds.

## Conservation objectives for Lough Ree SAC [000440]

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- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Objective: 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:

Code	Description
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco Brometalia) (* important orchid sites)*
7120	Degraded raised bogs still capable of natural regeneration
7230	Alkaline fens
8240	Limestone pavements*
91A0	Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles
91D0	Bog woodland*

\* denotes a priority habitat



<b>Code</b>	<b>Common Name</b>	<b>Scientific Name</b>
1355	Otter	<i>Lutra lutra</i>

**Citation:** NPWS (2015) Conservation objectives for Lough Ree SAC [000440]. Generic Version 4.0.  
Department of Arts, Heritage and the Gaeltacht.

## SITE SYNOPSIS

**SITE NAME: RIVER SHANNON CALLOWS**

**SITE CODE: 000216**

The River Shannon Callows is a long and diverse site which consists of seasonally flooded, semi-natural, lowland wet grassland, along and beside the river between the towns of Athlone and Portumna. It is approximately 50 km long and averages about 0.75 km wide (reaching 1.5 km wide in places). Along most of its length the site is bordered by raised bogs - many, but not all, in the process of large-scale harvesting - esker ridges and limestone-bedrock hills. The soils grade from silty-alluvial to peat. This site has a common boundary, and is closely associated, with two other sites of similar habitats, River Suck Callows and Little Brosna Callows.

The River Shannon Callows is mainly composed of lowland wet grassland. Different plant communities occur, depending on elevation, and therefore their flooding patterns. Two habitats listed on Annex I of the EU Habitats Directive are well represented within the site – *Molinia* meadows and lowland hay meadows. The former is characterised by the presence of the Meadow Thistle (*Cirsium dissectum*) and Purple Moor-grass (*Molinia caerulea*), while typical species in the latter include Meadow Fescue (*Festuca pratensis*), Rough Meadow-grass (*Poa trivialis*), Downy Oat-grass (*Avenula pubescens*), Common Knapweed (*Centaurea nigra*), Ribwort Plantain (*Plantago lanceolata*) and Common Sorrel (*Rumex acetosa*). In places these two habitats grade into one another.

Low-lying areas of the callows with more prolonged flooding are characterised by Floating Sweet-grass (*Glyceria fluitans*), Marsh Foxtail (*Alopecurus geniculatus*) and wetland herbs such as Yellow Cress (*Rorippa* spp.), Water Forget-me-not (*Myosotis scorpioides*) and Common Spike-rush (*Eleocharis palustris*). Most of the callows consist of a plant community characterised by Creeping Bent (*Agrostis stolonifera*), Brown Sedge (*Carex disticha*), Common Sedge (*Carex nigra*), and herbs such as Marsh Marigold (*Caltha palustris*) and Marsh Bedstraw (*Galium palustre*). While the more elevated and peaty areas are characterised by low-growing sedges, particularly Yellow Sedge (*Carex flava* agg.) and Star Sedge (*Carex echinata*). All these communities are very diverse in their total number of plant species, and include the scarce species Meadow-rue (*Thalictrum flavum*), Summer Snowflake (*Leucojum aestivum*), and Marsh Stitchwort (*Stellaria palustris*).

Two further Annex I habitats, both listed with priority status, have a minor though important presence within the site. Alluvial forest occurs on a series of alluvial islands just below the ESB weir near Meelick. Several of the islands are dominated by well grown woodland of mainly Ash (*Fraxinus excelsior*) and Willows (*Salix* spp.). The islands are prone to regular flooding from the river.

At Clorhane, an area of limestone pavement represents the only known example in Co Offaly. It is predominantly colonised by mature hazel woodland, with areas of open limestone and calcareous grassland interspersed. The open limestone pavement comprises bare or moss covered rock or rock with a very thin calcareous soil cover

supporting a short grassy turf. The most notable plant in the grassy area is a substantial population of Green-winged Orchid (*Orchis morio*), which occurs with such species as Sweet Vernal-grass (*Anthoxanthum odoratum*), Quaking Grass (*Briza media*), sedges (*Carex caryophylla*, *C. flacca*), Common Bird's-foot-trefoil (*Lotus corniculatus*), Common Knapweed (*Centaurea nigra*), and Narrow-leaved Plantain (*Plantago lanceolata*). Ferns associated with the cracks in the paving include *Asplenium trichomanes*, *A. ruta-muraria*, *A. adiantum-nigrum*, *Polypodium australe*. Bryophytes include *Grimmia apocarpa* and *Orthotrichum cf. anomalum*. Anthills are common within the open grassland. The Hazel wood is well-developed and has herbaceous species such as Primrose (*Primula vulgaris*), Common Dog-violet (*Viola riviniana*), Wood Sorrel (*Oxalis acetosella*) and Herb Robert (*Geranium robertianum*). The wood is noted for its luxuriant growth of epiphytic mosses and liverworts, with such species as *Neckera crispa* and *Hylocomium brevirostre*. Yew (*Taxus baccata*) occurs at one area.

Other habitats of smaller area but equal importance within the site are lowland dry grassland, drainage ditches, freshwater marshes and reedbeds. The dry grassland areas, especially where they exist within hay meadows, are species-rich, and of two main types: calcareous grassland on glacial material, and dry grassland on levees of river alluvium. The former can contain many Orchid species, Cowslip (*Primula veris*), abundant Adder's-tongue Fern (*Ophioglossum vulgatum*) and Spring-sedge (*Carex caryophylla*), and both contain an unusually wide variety of grasses, including False Oatgrass (*Arrhenatherum elatius*), Yellow Oatgrass (*Trisetum flavescens*), Meadow Foxtail (*Alopecurus pratense*), and Meadow Brome (*Bromus commutatus*). In places Summer Snowflake also occurs.

Good quality habitats on the edge of the callows included in the site are wet broad-leaved semi-natural woodland dominated by both Birch (*Betula pubescens*) and Alder (*Alnus glutinosa*) and dry broad-leaved woodland dominated by Hazel (*Corylus avellana*). There are also areas of raised bog, fen on old cut-away bog with Black Bog-rush (*Schoenus nigricans*), and a 'petrifying stream' with associated species-rich calcareous flush which supports Yellow Sedge (*Carex lepidocarpa*), Blunt-flowered Rush (*Juncus subnodulosus*) and Stoneworts (*Chara* spp.).

Two legally-protected plant species (Flora (Protection) Order 1999) occur in the site: Opposite-leaved Pondweed (*Groenlandia densa*) in drainage ditches, and Meadow Barley (*Hordeum secalinum*) on dry alluvial grassland. This is one of only two known inland sites for the Meadow Barley in Ireland. The Red Data Book plant Green-winged Orchid (*Orchis morio*) is known from dry calcareous grasslands within the site, while the site also supports a healthy population of Marsh Pea (*Lathyrus palustris*).

The site is of International Importance for wintering waterfowl as numbers regularly exceed the 20,000 threshold (mean of 34985 for 5 winters 1994/94-1998/99). Of particular note is an Internationally Important population of Whooper Swans (287). A further five species have populations of national importance (all figures are means for 5 winters 1995/96-1999/00): Mute Swan (349), Wigeon (2972), Golden Plover (4254), Lapwing (11578) and Black-tailed Godwit (388). Species which occur in numbers of regional or local importance include Bewick's Swan, Tufted Duck, Dunlin, Curlew and Redshank. The population of Dunlin is notable as it is one of the few regular inland flocks in Ireland. Small flocks of Greenland White-fronted Goose

use the Shannon Callows; these are generally associated with larger flocks which occur on the adjacent Little Brosna Callows and River Suck Callows.

Shoveler (an estimated 12 pairs in 1987) and Black-tailed Godwit (Icelandic race) (one or two pairs in 1987) breed within this site. These species are listed in the Red Data Book as being threatened in Ireland. The scarce bird Quail is also known to breed within the area. The Callows continues to hold over 40% of the Irish population of the globally endangered Corncrake, although numbers have declined in recent years. A total of 66 calling birds were recorded in 1999. The total population of breeding waders (Lapwing, Redshank, Snipe and Curlew) in 1987 was one of three major concentrations in Ireland and Britain. The breeding Redshank, numbers was estimated at 10% of the Irish population, making it Nationally significant. Also, the Annex I species Merlin and Hen Harrier are regularly reported hunting over the callows during the breeding season and in autumn and winter.

This site holds a population of Otter, a species listed on Annex II of the EU Habitats Directive, while the Irish Hare, which is listed in the Irish Red Data Book, is a common sight on the callows.

The Shannon Callows are used for summer dry-stock grazing (mostly cattle, with some sheep and a few horses), and permanent hay meadow. About 30 ha is a nature reserve owned by voluntary conservation bodies. The River Shannon is used increasingly for recreational purposes with coarse angling and boating accounting for much of the visitor numbers. Intermittent and scattered damage to the habitats has occurred due to over-deepening of drains and peat silt deposition, water-skiing, ploughing and neglect of hay meadow (or reversion to pasture). However, none of these can as of yet be said to be serious. Threats to the quality of the site may come from the siting of boating marinas in areas away from centres of population, fertilising of botanically-rich fields, the use of herbicides, reversion of hay meadow to pasture, neglect of pasture and hay meadow, disturbance of birds by boaters, anglers, birdwatchers and the general tourist. The maintenance of generally high water levels in winter and spring benefits all aspects of the flora and fauna, but in this regard, summer flooding is a threat to breeding birds, and may cause neglect of farming.

The Shannon Callows has by far the largest area of lowland semi-natural grassland and associated aquatic habitats in Ireland and one in which there is least disturbance of natural wetland processes. Botanically, it is extremely diverse with two legally protected species of plants and many scarce species. Excellent examples of two habitats listed on Annex I of the EU Habitats Directive occur within the site – *Molinia* meadows and lowland hay meadows with good examples of a further two Annex habitats (both with priority status). In winter the site is internationally important for numbers and species of waterfowl. In spring it feeds large numbers of birds on migration. And in summer it holds very large numbers of breeding waders, rare breeding birds and the endangered Corncrake, as well as a very wide variety of more common grassland and wetland birds. The presence of Otter, an Annex II species, adds further importance to the site.



## Conservation Objectives for River Shannon Callows SAC [000216]

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

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- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Objective: 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:

- ◆ [1355] *Lutra lutra*
- ◆ [6410] *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)
- ◆ [6510] Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*)
- ◆ [8240] \* Limestone pavements
- ◆ [91E0] \* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)

### Citation:

NPWS (2011) Conservation objectives for River Shannon Callows SAC [000216]. Generic Version 3.0. Department of Arts, Heritage & the Gaeltacht.

For more information please go to: [www.npws.ie/protectedsites/conservationmanagementplanning](http://www.npws.ie/protectedsites/conservationmanagementplanning)

## SITE SYNOPSIS

**SITE NAME: MIDDLE SHANNON CALLOWS SPA**

**SITE CODE: 004096**

The Middle Shannon Callows SPA is a long and diverse site which extends for approximately 50 km from the town of Athlone (at southern point of Lough Ree) to the town of Portumna (northern point of Lough Derg). The site averages about 0.75 km in width though in places is up to 1.5 km wide. Water levels on the site are greatly influenced by the very small fall between Athlone and Portumna and by the weir at Meelick. The Shannon Callows has a common boundary with two other sites of similar habitats, the River Suck Callows and the Little Brosna Callows, both of which are also Special Protection Areas.

The site has extensive areas of callow, or seasonally flooded, semi-natural, lowland wet grassland, along both sides of the river. The callows are mainly too soft for intensive farming but are used for hay or silage or for summer grazing. Other habitats of smaller area which occur alongside the river include lowland dry grassland, freshwater marshes, reedbeds and wet woodland. Along most of its length the site is bordered by raised bogs, now mostly exploited for peat, esker ridges and limestone-bedrock hills. The diversity of semi-natural habitats and the sheer size of the site attracts an excellent diversity of bird species and significant populations of several species.

The composition of the lowland wet grassland varies, depending on elevation and flooding patterns. Two habitats listed on Annex I of the EU Habitats Directive are well represented within the site – *Molinia* meadows and lowland hay meadows. The former is characterised by the presence of the Meadow Thistle (*Cirsium dissectum*) and Purple Moor-grass (*Molinia caerulea*), while typical species in the latter include Meadow Fescue (*Festuca pratensis*), Rough Meadow-grass (*Poa trivialis*), Downy Oat-grass (*Avenula pubescens*) and Common Sorrel (*Rumex acetosa*). In places these two habitats grade into one another.

Low-lying areas of the callows with more prolonged flooding are characterised by Floating Sweet-grass (*Glyceria fluitans*), Marsh Foxtail (*Alopecurus geniculatus*) and wetland herbs such as Yellow Cress (*Rorippa* spp.), Water Forget-me-not (*Myosotis scorpioides*) and Common Spike-rush (*Eleocharis palustris*). Most of the callows, however, consist of a plant community characterised by Creeping Bent (*Agrostis stolonifera*), Brown Sedge (*Carex disticha*), Common Sedge (*Carex nigra*), and herbs such as Marsh Marigold (*Caltha palustris*) and Marsh Bedstraw (*Galium palustre*). Scarce plant species associated with the grassland include Meadow-rue (*Thalictrum flavum*), Summer Snowflake (*Leucojum aestivum*) and Marsh Stitchwort (*Stellaria palustris*).

The dry grassland areas, especially where they exist within hay meadows, are species-rich, and can contain many orchid species and such species as Cowslip (*Primula*

*veris*), Adder's-tongue Fern (*Ophioglossum vulgatum*) and Spring-sedge (*Carex caryophyllea*), as well as an unusually wide variety of grasses. In places along the edge of the callows there occurs wet broad-leaved woodland dominated by both Birch (*Betula pubescens*) and Alder (*Alnus glutinosa*) and dry broad-leaved woodland dominated by Hazel (*Corylus avellana*). There are also areas of raised bog and fen on old cut-away bog with species such as Black Bog-rush (*Schoenus nigricans*).

Two legally-protected plant species (Flora (Protection) Order 1999) occur in the site: Opposite-leaved Pondweed (*Groenlandia densa*) in drainage ditches, and Meadow Barley (*Hordeum secalinum*) on dry alluvial grassland. The Red Data Book plant Green-winged Orchid (*Orchis morio*) is known from dry calcareous grasslands within the site, while the site also supports a healthy population of Marsh Pea (*Lathyrus palustris*).

The Middle Shannon Callows qualifies as a site of International Importance for wintering waterfowl both on the total numbers regularly exceeding 20,000 birds (for example 27,581 in winter 1998/99) and for the Whooper Swan population (287 – average peak count 1995/96-1999/00). Whooper Swan is listed on Annex I of the EU Birds Directive. Five further species occur in numbers of national importance (all figures are average peaks for winters 1995/96-1999/00) - Mute Swan 349, Wigeon 2,972, Golden Plover (listed on Annex I of the EU Birds Directive) 4,254, Lapwing 11,578 and Black-tailed Godwit 388. For some of these species, peak counts in the period have been considerably higher than the averages, such as 1,096 Black-tailed Godwits and 23,839 Lapwings. The importance of the site for species like Black-tailed Godwit and Whimbrel may have been underestimated if count coverage missed the brief spring peaks for these species. A wide range of other species occur in numbers of regional or local importance, including Bewick's Swan (listed on Annex I of the EU Birds Directive) 7, Teal 77, Tufted Duck 33, Dunlin 369, Curlew 129, Redshank 31 and Black-headed Gull 1,061. Small numbers of Greenland White-fronted Goose (listed on Annex I of the EU Birds Directive) use the Shannon Callows (average 21, peak 55) and these are generally associated with larger flocks which occur on the adjacent Little Brosna Callows and River Suck Callows. The callow grasslands provide optimum feeding grounds for these various species of waterfowl, while many of the birds also roost or rest within the site.

The site is also of national importance for breeding waterfowl. The total population of breeding waders (Lapwing, Redshank, Snipe and Curlew) on the Shannon and Little Brosna Callows in 1987 was one of three major concentrations in Ireland and Britain. Since then, however, numbers of at least Lapwing and Redshank have shown serious declines (a full survey of the callows is being carried out in 2002). For example, at a monitoring site at the callows at Shannon Harbour, numbers of Lapwing fell from 29 to 10 pairs and Redshank from 26 to 10 pairs between 1987 and 1994. Black-tailed Godwit, a very rare breeding species in Ireland, nests or attempts to nest in small numbers each year within the site. A further scarce breeding species, Shoveler, also nests in small numbers each year (an estimated 12 pairs in 1987).

The Shannon Callows continues to hold approximately 40% of the Irish population of Corncrake, a species of global conservation concern that is also listed on Annex I of the EU Birds Directive. Between 1997 and 2001, the average number of calling birds

was 60, with a peak of 69. BirdWatch Ireland, in association with Dúchas and the RSPB, operate a grant scheme to encourage farming practices that favour the Corncrake and this has probably been responsible for the stabilisation of numbers in recent years. A related scarce species, the Quail, is also known to breed within the callow grasslands.

A good variety of other bird species are attracted to this site. Birds of prey, including scarce species such as Merlin (listed on Annex I of the EU Birds Directive) and wintering Hen Harrier (listed on Annex I of the EU Birds Directive), are regularly reported hunting over the callows. A range of passerine species associated with grassland and swamp vegetation breed, including Sedge Warbler, Grasshopper Warbler, Skylark and Reed Bunting. Kingfisher (listed on Annex I of the EU Birds Directive) is also regularly seen within the site. Whinchat, an uncommon breeding species, occur in small numbers.

The wintering waterfowl within the Shannon Callows are difficult to monitor due to the size and inaccessibility of large parts of the site. In each winter there is usually one complete aerial census, as well as partial land-based counts. The population of Corncrake within the site is monitored each year and research is carried out on various aspects of the species' ecology. The breeding waders are also surveyed at intervals. About 30 ha of the callows is a nature reserve owned by voluntary conservation bodies.

The Shannon Callows has by far the largest area of lowland semi-natural grassland and associated aquatic habitats in Ireland and one in which there is least disturbance of natural wetland processes. Botanically, it is extremely diverse. In winter the site is internationally important for the total numbers of birds (regularly exceed 20,000) and for Whooper Swan in particular. It also holds nationally important populations of a further five species. Some of the wintering species are listed on Annex I of the EU Birds Directive, including Whooper Swan, Greenland White-fronted Goose and Golden Plover. In summer the site supports important populations of breeding waders. Perhaps the most important species which occurs in the site is Corncrake (the site holds 40% of the national total), as this is listed on Annex I of the EU Birds Directive and is Ireland's only globally endangered species.

20.6.2002

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**Appendix 6.2**  
*Appropriate Assessment  
Screening Report*

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# Article 6(3) Appropriate Assessment Screening Report

Proposed Athlone Pedestrian and Cycleway Bridge over  
River Shannon



Planning & Environmental Consultants

## DOCUMENT DETAILS

Client: Westmeath County Council

Project title: Athlone Pedestrian and Cycleway Bridge over River Shannon

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Prepared By:

Planning & Environmental Consultants  
Block 1, G.F.S.C.  
Moneenageisha Road, Galway



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# 1 INTRODUCTION

## 1.1 Background

McCarthy Keville O'Sullivan Ltd. has been appointed to prepare a report to provide the information necessary to allow the competent authority to conduct an Article 6(3) Screening for Appropriate Assessment of a proposed pedestrian and cycleway bridge crossing of the River Shannon in Athlone, County Westmeath.

This report provides the information necessary to allow the competent authority to conduct an Article 6(3) Appropriate Assessment Screening of the proposed development.

This cycleway project is not directly connected with or necessary for the management of any European Site.

This Report has been prepared in accordance with the European Commission guidance document 'Assessment of Plans and Projects Significantly affecting Natura 2000 Sites: Methodological Guidance on the provisions of Article 6(3) and 6(4) of the Habitats Directive 92/43/EEC' (EC, 2001) and the Department of the Environment's Guidance on the Appropriate Assessment of Plans and Projects in Ireland (December 2009, amended February 2010).

In addition to the guidelines referenced above, the following relevant guidance was considered in preparation of this report:

1. *DoEHLG (2010) Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government,*
2. *European Communities (2000) Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg. European Commission,*
3. *Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg. European Commission,*
4. *EC (2007) Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC – Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the commission. European Commission,*
5. *EC (2013) Interpretation Manual of European Union Habitats. Version EUR 28. European Commission,*
6. *EPA (2002) Guidelines on the information to be contained in Environmental Impact Statements. Environmental Protection Agency,*
7. *EPA (2003), Advice Notes on current practice in the preparation of Environmental Impact Statements. Environmental Protection Agency, and*
8. *CIEEM (2016) Institute of Ecology and Environmental Management Guidelines for Ecological Impact Assessment.*
9. *NRA (2009) Guidelines for Assessment of Ecological Impacts of National Roads Schemes, National Roads Authority, Dublin.*

## 1.2 Appropriate Assessment

### 1.2.1 Screening for Appropriate Assessment

Screening is the process of determining whether an Appropriate Assessment is required for a plan or project. Under Part XAB of the Planning and Development Act, 2000, as amended, screening must be carried out by the Competent Authority to assess, in view of best

scientific knowledge, if a land-use plan or proposed development, individually or in combination with another plan or project, is likely to have a significant effect on a European site. The Competent Authority's determination as to whether an Appropriate Assessment is required must be made on the basis of objective information and should be recorded. The competent authority may request information to be supplied to enable it to carry out screening.

Consultants or project proponents may undertake a form of screening to establish if an Appropriate Assessment is required and provide advice, or may submit the information necessary to allow the Competent Authority to conduct a screening with an application for consent. Where it cannot be excluded beyond reasonable scientific doubt, that a proposed plan or project, individually or in combination with other plans and projects, would have a significant effect on the conservation objectives of a European site, an Appropriate Assessment (Natura Impact Statement (NIS)) of the plan or project is required.

### **1.2.2 Appropriate Assessment (Natura Impact Statement)**

The term Natura Impact Statement (NIS) is defined in legislation<sup>1</sup>. An NIS, where required, should present the data, information and analysis necessary to reach a definitive determination as to 1) the implications of the plan or project, alone or in combination with other plans and projects, for a European site in view of its conservation objectives, and 2) whether there will be adverse effects on the integrity of a European site. The NIS should be underpinned by best scientific knowledge, objective information and by the precautionary principle.

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<sup>1</sup> As defined in Section 177T of the Planning and Development Act, 2000 as amended, an NIS means a statement, for the purposes of Article 6 of the Habitats Directive, of the implications of a proposed development, on its own and in combination with other plans and projects, for a European site in view of its conservation objectives. It is required to include a report of a scientific examination of evidence and data, carried out by competent persons to identify and classify any implications for the European site in view of its conservation objectives

## 2 DESCRIPTION OF THE PROPOSED DEVELOPMENT

### 2.1 Site Location

The site of the proposed development is located within the urban centre of Athlone town at Grid reference IG: 203821, 241634. The site location is shown on the OSI Discovery Series Map in Figure 1.1. The map also shows the site location relative to European Sites located within the zone of likely impact.

### 2.2 Characteristics of Proposed Development

The bridge will be mixed use, and shared by pedestrians and cyclists. The width of the link is generally a minimum of 3m, with the exception of the ramp on the west side of the river which will be reduced to 2.8m in order to avoid extensive removal of the tree line between Grace Road and the river.

Otherwise the link widens out to 13m at the two landing areas on either end of the bridge, the purpose of the increased widths at these locations is to create a civic space where users can linger and experience the new views of Athlone's built heritage that will be opened up.

The following works will take place between Athlone Castle and Marina Lane and have been considered as part of this assessment:

- Removal of 13 parking spaces to the east of the castle and south of Custume Bridge;
- Removal of 3 or 4 existing ornamental trees to the east of the castle;
- Streetscape works to the east of the castle and south of the pedestrian arch under Custume Bridge, including paving to emphasise a pedestrian and cyclist environment;
- Widening of the existing riverside promenade/boardwalk to the east of the Luan Gallery;
- Removal of the existing stairway and ramp between Grace Road and the riverside promenade to the north of the Luan Gallery;
- Removal of a tree and the existing bust of Count John McCormack along Grace Road, on the west side of the river;
- Construction of an extensive ramp layout for the exclusive mixed use of pedestrians and cyclists linking the riverside promenade to the east side footpath on Grace Road;
- Modifications to the existing riverside promenade for approximately 75m north of the Luan Gallery and widening of the promenade into the river by 1.8m generally but by up to 2.8m at one location;
- Construction of a new bridge over the river between the Luan Gallery and the Radisson Hotel and apartments for the exclusive mixed use of pedestrians and cyclists, consisting of a two span bridge which includes a central pier at the midpoint of the river;
- Provision of boardwalks on the eastern and western banks;
- Modifications to the roof of the service area to the Luan Gallery to accommodate the west landing area of the new bridge;
- Temporary removal of a number of berths of the Athlone Marina to facilitate construction of the proposed development;
- Construction of a landing area at the east side of the bridge to tie in to the existing terrace of the Radisson Hotel;
- Construction of a new ramp for the exclusive mixed use of pedestrians and cyclists on the line of the existing riverside promenade on the west side of the Radisson Hotel and apartments in order to provide mobility access north from the east landing area to the existing promenade, close to Marina Lane;

- Construction of stairs on the line of the existing riverside promenade to the south side of the east landing area to the existing promenade in order to provide mobility access south to Methodist Church Lane;
- Removal of the existing security gate between Marina Lane and the existing riverside promenade on the west side of the Radisson Hotel and apartments;
- Removal of the two existing gates on the existing eastern promenade along the riverside of the Radisson Hotel; and
- Provision of a new security gate at the gangway between the existing riverside promenade on the west side of the Radisson Hotel and apartments and the marina.

A temporary construction compound will be created adjacent to the river at the southern end of Wansboro Park. The purpose of this temporary compound is to allow for on-site assembly of sections of the proposed bridge deck prior to floating downstream on river barges.

### 3 IDENTIFICATION OF RELEVANT EUROPEAN SITES

#### 3.1 Background to European Sites

The Habitats Directive (92/43/EEC) together with the Birds Directive (2009/147/EC) form the cornerstone of Europe's nature conservation policy. It is built around two pillars: the Natura 2000 network of protected sites and the strict system of species protection. All in all, the Habitats Directive protects over 1,000 animal and plant species and over 200 "habitat types" (e.g. special types of forests, meadows, wetlands, etc.), which are of European importance.

With the introduction of the EU Habitats Directive and Birds Directive which were transposed into Irish law as S.I. No. 94/1997 *European Communities (Birds and Natural Habitats) Regulations 1997*, the European Union formally recognised the significance of protecting rare and endangered species of flora and fauna, and importantly, their habitats. The 1997 Regulations and their amendments were subsequently revised and consolidated in S.I. No. 477/2011- *European Communities (Birds and Natural Habitats) Regulations 2011*. This legislation requires the establishment and conservation of a network of sites of particular conservation value that are to be termed 'European Sites'.

#### 3.2 Identification of the Designated Sites within the Likely Zone of Impact of the Proposed Development

The most up to date GIS spatial datasets for European designated sites were downloaded from the NPWS website ([www.npws.ie](http://www.npws.ie)) on the 20/04/2017.

The following rationale was used to identify the likely zone of impact. Firstly, sites within a 15km radius of the proposed development were identified (as per the DoEHLG Guidance (2010)).

Secondly, using the precautionary principle, European sites located outside the 15km radius of the proposed development were identified. However, no pathway for impact on such sites was identified because of the size and scale of the development, the site location in the center of Athlone town, and the intervening buffer and distance from any European Site.

Figure 3.1 shows the location of the proposed development in relation to all European sites within the likely Zone of Impact as identified according to the criteria described above.

Table 3.1 below, lists all European Sites that were considered to be within the Likely Zone of Impact. The site synopses and conservation objectives of these sites, as per the NPWS website ([www.npws.ie](http://www.npws.ie)), were considered at the time of preparing this report (20/04/2017). Details of these sites, including their distance from the proposed development, are provided in Table 3.1.

Table 3.1 European Sites within the Zone of Impact of the Proposed Works

European Site	Distance from Proposed works	Qualify Interests and Special Conservation Interests for which the European Site has been designated	Conservation Objectives
<b>Special Areas of Conservation</b>			
River Shannon Callows SAC (000216)	0.67 km downstream of the proposed bridge	<ul style="list-style-type: none"> <li>• <i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinia caerulea</i>) [6410]</li> <li>• Lowland hay meadows (<i>Alopecurus pratensis</i>, <i>Sanguisorba officinalis</i>) [6510]</li> <li>• Limestone pavements [8240]</li> <li>• Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0]</li> <li>• <i>Lutra lutra</i> (Otter) [1355]</li> </ul>	<p>This site has the generic conservation objective:                      '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.' (NPWS Generic version 5.0, 2016)</p>
Lough Ree SAC (000440)	1 km upstream (approx. 500 metres upstream from the temporary construction compound)	<ul style="list-style-type: none"> <li>• Natural eutrophic lakes with <i>Magnopotamion</i> or <i>Hydrocharition</i> - type vegetation [3150]</li> <li>• Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210]</li> <li>• Degraded raised bogs still capable of natural regeneration [7120]</li> <li>• Alkaline fens [7230]</li> <li>• Limestone pavements [8240]</li> <li>• Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]</li> <li>• Bog woodland [91D0]</li> <li>• <i>Lutra lutra</i> (Otter) [1355]</li> </ul>	<p>Detailed conservation objectives for this site (Version 1, August 2016) were reviewed as part of the assessment and are available at <a href="http://www.npws.ie">www.npws.ie</a></p>
Crosswood Bog SAC (002337)	4 km	<ul style="list-style-type: none"> <li>• Active raised bogs [7110]</li> <li>• Degraded raised bogs still capable of natural regeneration [7120]</li> </ul>	<p>Detailed conservation objectives for this site (Version 1, February 2016) were reviewed as part of the assessment and are available at <a href="http://www.npws.ie">www.npws.ie</a></p>
Carn Park Bog SAC (002336)	6 km	<ul style="list-style-type: none"> <li>• Active raised bogs [7110]</li> <li>• Degraded raised bogs still capable of natural</li> </ul>	<p>Detailed conservation objectives for this site (Version 1, November 2015) were</p>

European Site	Distance from Proposed works	Qualify Interests and Special Conservation Interests for which the European Site has been designated	Conservation Objectives
Castlesampson Esker SAC (001625)	8.3 km	<ul style="list-style-type: none"> <li>regeneration [7120]</li> <li>Turloughs [3180]</li> <li>Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210]</li> </ul>	<p>reviewed as part of the assessment and are available at <a href="http://www.npws.ie">www.npws.ie</a></p> <p>This site has the generic conservation objective: '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'. (NPWS Generic version 5.0, 2016)</p>
Ballynamona Bog and Corkip Lough SAC (002339)	9 km	<ul style="list-style-type: none"> <li>Turloughs [3180]</li> <li>Active raised bogs [7110]</li> <li>Degraded raised bogs still capable of natural regeneration [7120]</li> <li>Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]</li> <li>Bog woodland [91D0]</li> </ul>	<p>Detailed conservation objectives for this site (Version 1, September 2016) were reviewed as part of the assessment and are available at <a href="http://www.npws.ie">www.npws.ie</a></p>
Pilgrim's Road Esker SAC (001776)	9.8 km	<ul style="list-style-type: none"> <li>Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210]</li> </ul>	<p>This site has the generic conservation objective: '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'. (NPWS Generic version 5.0, 2016)</p>
Mongan Bog SAC (000580)	10.1 km	<ul style="list-style-type: none"> <li>Active raised bogs [7110]</li> <li>Degraded raised bogs still capable of natural regeneration [7120]</li> <li>Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]</li> </ul>	<p>Detailed conservation objectives for this site (Version 1, April 2016) were reviewed as part of the assessment and are available at <a href="http://www.npws.ie">www.npws.ie</a></p>
Fin Lough (Offaly) SAC (000576)	11.6 km	<ul style="list-style-type: none"> <li>Alkaline fens [7230]</li> <li><i>Vetigo geyeri</i> (Geyer's Whorl Snail) [1013]</li> </ul>	<p>This site has the generic conservation objective: 'To maintain or restore the favourable</p>



European Site	Distance from Proposed works	Qualify Interests and Special Conservation Interests for which the European Site has been designated	Conservation Objectives
Lough Funshinagh SAC (000611)	12.3 km	<ul style="list-style-type: none"> <li>Turloughs [3180]</li> </ul>	<p>conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected'. (NPWS Generic version 5.0, 2016)</p> <p>This site has the generic conservation objective:                      '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'. (NPWS Generic version 5.0, 2016)</p>
<b>Special Protected Areas</b>			
Middle Shannon Callows SPA (004096)	0.67 km downstream of the proposed bridge location	<ul style="list-style-type: none"> <li>Whooper Swan (<i>Cygnus cygnus</i>) [A038]</li> <li>Wigeon (<i>Anas penelope</i>) [A050]</li> <li>Corncrake (<i>Crex crex</i>) [A122]</li> <li>Golden Plover (<i>Pluvialis apricaria</i>) [A140]</li> <li>Lapwing (<i>Vanellus vanellus</i>) [A142]</li> <li>Black Tailed Godwit (<i>Limosa limosa</i>) [A156]</li> <li>Black Headed Gull (<i>Chroicocephalus ridibundus</i>) [A179]</li> </ul>	<p>The generic conservation objectives of this designated site as per the Conservation Objectives Document (NPWS Generic version 5.0, 2016) are:</p> <ul style="list-style-type: none"> <li>To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA</li> <li>To maintain or restore the favourable conservation condition of the wetland habitat at Middle Shannon Callows SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.</li> </ul>
Lough Ree SPA (004064)	1.1 km upstream (approx. 600 metres upstream from the	<ul style="list-style-type: none"> <li>Little Grebe (<i>Tachybaptus ruficollis</i>) [A004]</li> <li>Whooper Swan (<i>Cygnus cygnus</i>) [A038]</li> <li>Wigeon (<i>Anas penelope</i>) [A050]</li> </ul>	<p>The generic conservation objectives of this designated site as per the Conservation Objectives Document (NPWS Generic</p>

European Site	Distance from Proposed works	Qualify Interests and Special Conservation Interests for which the European Site has been designated	Conservation Objectives
	temporary construction compound	<ul style="list-style-type: none"> <li>• Teal (<i>Anas crecca</i>) [A052]</li> <li>• Mallard (<i>Anas platyrhynchos</i>) [A053]</li> <li>• Shoveler (<i>Anas clypeata</i>) [A056]</li> <li>• Tufted Duck (<i>Aythya fuligula</i>) [A061]</li> <li>• Common Scoter (<i>Melanitta nigra</i>) [A065]</li> <li>• Goldeneye (<i>Bucephala clangula</i>) [A067]</li> <li>• Coot (<i>Fulica atra</i>) [A125]</li> <li>• Golden Plover (<i>Pluvialis apricaria</i>) [A140]</li> <li>• Lapwing (<i>Vanellus vanellus</i>) [A142]</li> <li>• Common Tern (<i>Sterna hirundo</i>) [A193]</li> <li>• Wetland and Waterbirds [A999]</li> </ul>	<p>version 5.0, 2016) are:</p> <ul style="list-style-type: none"> <li>• To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA</li> <li>• To maintain or restore the favourable conservation condition of the wetland habitat at Lough Ree SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.</li> </ul>
Mongan Bog SPA (004017)	10.3km	<ul style="list-style-type: none"> <li>• Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395]</li> </ul>	<p>The generic conservation objective of this designated site is:</p> <p>To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA (NPWS Generic version 5.0, 2016)</p>

## 4 ASSESSMENT OF LIKELY EFFECTS ON EUROPEAN SITES

### 4.1 Article 6(3) Assessment Criteria

The Screening Assessment criteria examined in the impact assessment section of this document follows the suggested screening matrix structure detailed in '*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*' (EC, 2001).

### 4.2 Description of Individual Elements of the Project with Potential to give Rise to Impacts on the Natura 2000 Site

Elements of the works in the preparation/construction phase with potential to give rise to effects on European sites include the following:

- Site preparation and earthworks
- Machinery access to the construction locations
- Excavations and construction of structural foundations
- Erection of the bridge
- Drainage
- Construction of other site infrastructure.
- Construction compound and temporary works.

Aspects of the project in the operational phase with potential to result in effects on European sites include the following:

- Operation of the bridge

#### 4.2.1.1 Description of any Likely Direct, Indirect or Secondary Impacts of the Project on the European Sites

Any likely direct, indirect or secondary impacts of the proposed development, both alone and in combination with other plans or projects, on European Sites are assessed. These are assessed by virtue of the following criteria: size and scale, land-take; distance from the European Site or key features of the site; resource requirements (such as water abstraction); emissions (disposal to land, water or air); excavation requirements; transportation requirements and; duration of construction, operation and decommissioning. The likely impacts are presented in Table 4.1 below.

**Table 4.1 Likely Impacts of the Proposed Development on the European Sites**

Likely Direct, Indirect or Secondary Impacts of the Project on the European Sites	
	No direct impacts on any European sites are predicted.
Size and Scale	The proposed development consists of the construction of a small-scale bridge crossing of the River Shannon in Athlone town centre. There is an existing marina and two existing road/railway bridges in close proximity. Impacts on any European Sites resulting from the small size and scale of this bridge are not anticipated.
Land-take	There will be no land take associated with the proposed development within any European Site. No potential for effects in regard of land take arise.

Likely Direct, Indirect or Secondary Impacts of the Project on the European Sites	
Distance from the European Sites or Key Features of the Site	<p>The works are located a minimum distance of 0.67 km (0.5 km from the construction compound) from the nearest European Site and will not directly impact on any European Site as a result of proximity.</p> <p>Potential pathway for indirect impacts are described below with regard to emissions.</p>
Resource Requirements	<p>There will be no exploitation of any resources within any European Site as part of the proposed development and therefore impacts in this regard on any of the sites within the zone of impact can be discounted at this stage of the assessment process.</p>
Emissions	<p>No direct effects on any European sites are predicted.</p> <p>Emissions from the construction of the proposed development which may have the potential to indirectly effect European Sites in the likely zone of impact. These include emissions to surface and ground water such as silt laden run off, hydrocarbons or other pollutants during both construction and operational phases and noise resulting in displacement (where species occur outside the boundaries of the European sites)</p> <p>In the case of the Middle Shannon Callows SPA (004096) and River Shannon Callows SAC (000216) the potential for the proposed development to result in effects on the Qualifying Interests (QIs), in the form of deterioration of surface and ground water quality resulting from pollution, could not be discounted at this stage of the assessment process. Pathways for impact with regard to emissions to air and noise are not anticipated given the size and scale of the development, the site location in the center of Athlone town, and the intervening buffer and distance from any European Site.</p> <p>No pathways for impact on additional European sites were identified.</p>
Excavation Requirements	<p>There will be no works undertaken within any European Site and therefore no direct impacts relating to excavation are predicted. A potential indirect impact is emissions to surface water. This potential impact is considered above in relation to emissions.</p>
Transportation Requirements	<p>As the proposed development is located entirely outside any European Site, there will be no direct impacts on any such site. All transportation requirements to the development will be conducted within the existing public road network where possible. Where material are to be assembled at the temporary construction compound located adjacent to the river at the southern end of Wansboro Park, they will be transported downstream to the development site by barge.</p> <p>In the case of the Middle Shannon Callows SPA (004096) and River Shannon Callows SAC (000216) the potential for the proposed development to result in effects on the Qualifying Interests (QIs), in the form of deterioration of surface and ground water quality resulting from pollution, could not be discounted at this stage of the assessment process.</p>
Duration of Construction, Operation, Decommissioning	<p>No potential impacts that relate directly to the duration of each phase of the project were identified (the duration of the construction phase is approximately 19 months and the operational phase is assumed permanent). Impacts resulting from disturbance and emissions are affected by the duration of each phase of the project but are considered above under those headings with no additional potential for impacts arising specifically as a result of the duration of each phase identified.</p> <p>No pathways for impact on additional European sites were identified.</p>

Likely Direct, Indirect or Secondary Impacts of the Project on the European Sites	
Cumulative Impacts with other Projects or Plans	<p>Searches in relation to plans and projects that may have the potential to result in cumulative impacts on European sites were carried out. Data sources included the following:</p> <ul style="list-style-type: none"> <li>• Westmeath County Council Website (Planning and roads sections)</li> <li>• An Bord Pleanála Website (Planning Searches)</li> <li>• Web Search for major infrastructure projects in Co. Westmeath</li> <li>• Proposed upgrade of the Athlone Main Drainage including the construction of a sewer beneath the River Shannon</li> <li>• Westmeath County Development Plan 2014 – 2020</li> <li>• Dublin to Galway Cycleway project</li> </ul> <p>Where potential pathways for impact were identified on European Sites within the zone of likely impact, it cannot be concluded that there is no potential for cumulative effects when assessed alongside other plans and projects without further analysis and information with regard to the project.</p> <p>Therefore the potential for cumulative impacts requires further assessment with regard to Middle Shannon Callows SPA (004096) and River Shannon Callows SAC (000216).</p> <p>Potential for impact was not identified with regard to any additional European sites.</p>

#### 4.2.1.2 Description of any Likely Changes to European Sites

Whilst no changes to European sites are considered likely as a result of the proposed development, various pathways for potential impacts were identified during the screening process. The potential for changes could not be entirely excluded in relation to a number of sites. Any potential changes to the European Sites are described below in Table 4.2 with reference to the following criteria: reduction of habitat area; disturbance to key species; habitat or species fragmentation; reduction in species density; changes in key indicators of conservation value (*e.g.* water quality *etc.*) and; climate change.

**Table 4.2 Likely Changes to European Sites**

Likely Changes to the European Sites	
Reduction of Habitat Area	<p>There will be no reduction in habitat area within any European Sites as a result of the development.</p> <p>In the case of the Middle Shannon Callows SPA (004096) and River Shannon Callows SAC (000216) the potential for the proposed development to result in effects on the Qualifying Interests (QIs), in the form of deterioration of surface and ground water quality resulting from pollution, could not be discounted at this stage of the assessment process.</p>
Disturbance to Key Species	<p>The nearest European Site is located more than 670m from the proposed development and over 200 metres from the construction compound. Supporting habitat for QI species within European Sites is buffered from the proposed development by existing bridges and urban infrastructure. The potential for disturbance to key species within any European Site can be excluded.</p> <p>The development site is located in Athlone Town centre and on a busy waterway navigation channel which is subject to regular use. There is no potential breeding or resting habitat for key species at the proposed development location. Significant disturbance effects on key species of European sites, should such species occur outside the designated site, are not anticipated.</p>
Habitat or Species Fragmentation	<p>The proposed bridge is located between two existing bridge structures in Athlone. The bridge has been designed to be of similar height and to incorporate an under clearance similar to the existing bridge structures. In addition, there are no protruding wires, cables or arch structures associated with the bridge that are likely to form any kind of obstruction to birds. Therefore, no impacts with regard to any potential fragmentation of commuting routes have been identified.</p> <p>Similarly the bridge has been designed retain aquatic habitat connectivity and will not result in habitat or species fragmentation.</p> <p>The potential for habitat or species fragmentation can be excluded at this stage in the development process.</p>
Reduction in Species Density	<p>Where pathways for impacts on European Sites have been identified in the preceding sections, the potential for reduction in species density on these identified European Sites cannot be excluded at this stage in the development process.</p>
Changes in Key Indicators of Conservation Value	<p>Where pathways for effects on a European Site has been identified in the preceding sections, the potential for changes in key indicators of conservation value at the identified European Site cannot be excluded without further assessment; i.e. Middle Shannon Callows SPA (004096) and River Shannon Callows SAC (000216). No other European Sites within the Likely Zone of Impact were considered to be at any risk from impact given the nature and scale of the development, distance and/or lack of connectivity.</p>
Climate Change	<p>Given the nature and scale of the works, climate change as a result of the proposed development is not anticipated.</p>

#### 4.2.1.3 Description of any Likely Impacts on any European Site

The development will avoid any direct impacts on any European Sites. However, the potential pathways for indirect impacts and effects on some European Sites has been identified therefore an AA in relation to these sites is required.

No Direct Impacts on European Sites will occur as a result of the proposed development. Indirect Impacts on European Sites are not considered likely but potential for such impacts has been identified as described above and can therefore not be excluded. Table 4.3 describes the nature of any indirect impacts in terms of the structure and function of the identified European Sites.

Table 4.3 Assessment of Potential Impacts on the Structure and Function of European Sites

Likely Changes to the European Sites	
Interference with the key relationships that define the structure of a European Site	<p>Potential impacts as identified in the preceding sections which could result in interference with the Structure of a European Site include:</p> <ul style="list-style-type: none"> <li>• Potential surface water pollution, which may result in the deterioration of habitat within the identified European sites.</li> </ul>
Interference with key relationships that define the function of the European site	<p>Potential impacts as identified in the preceding sections which could result in interference with the Function of a European Site include:</p> <ul style="list-style-type: none"> <li>• Potential for reduction in habitat area outside the European Sites but affecting populations of QIs that may be associated with the sites</li> </ul>

#### 4.2.1.4 Indicators of Significance as a Result of the Identification of Effects

Indicators of significance are provided in Table 4.4 below. Indicators are provided for any impacts identified above in terms of loss, fragmentation, disruption, disturbance and changes to key elements of the European Sites, such as water quality.

Table 4.4 Indicators of Significance as a Result of the Identification of Effects

Indicators of Significance as a Result of the Identification of Effects	
Loss	There will be no loss of habitats within European sites as a result of the proposed development. Potential for reduction in habitat area outside the European Sites but affecting populations of QIs that may be associated with the identified sites cannot be discounted at this stage in the assessment process and would be measured in terms of loss of utilised or suitable supporting habitat.
Fragmentation	There will be no fragmentation of habitats and species within any European sites as a result of the development. Potential for habitat fragmentation outside the European Sites can be discounted taking into consideration the design of the proposed development which retains habitat connectivity.
Disruption	Disruption to the ecological processes within the European Sites where pathways for impact were identified above cannot be discounted at this stage of the development and would be measured in terms of changes to the baseline environment.
Disturbance	The nearest European Site is located more than 670m from the proposed development (200 metres from the construction compound). Supporting habitat for QI species within European Sites is buffered from the proposed development by existing bridges and urban infrastructure. The potential for disturbance to key species within any European Site can be excluded.
Changes to Key Elements of the Site	The potential for changes to key elements of the European Sites where pathways for impact were identified above cannot be discounted at this stage of the development and would be measured in terms of changes to the baseline environment.





## 5 ARTICLE 6(3) SCREENING STATEMENT AND CONCLUSIONS

The findings of this Screening Assessment are presented following the European Commission guidance document 'Assessment of Plans and Projects Significantly affecting Natura 2000 Sites: Methodological Guidance on the provisions of Article 6(3) and 6(4) of the Habitats Directive 92/43/EEC' (EC, 2001) and the Department of the Environment's Guidance on the Appropriate Assessment of Plans and Projects in Ireland (December 2009, amended February 2010).

### 5.1 Sites that are 'Screened In'

Where the potential for impacts on any particular European Site cannot be excluded without further analysis, a summary of such potential impacts is provided in Table 5.1.

Where in view of best scientific knowledge and on the basis of objective information it cannot be excluded that the proposed development, individually or in combination with other plans and projects, will be likely to have a significant effect on any European Sites, they are considered to be 'Screened In'. As a result, an appropriate assessment of the proposed development is required with regard to these European Sites.

Those European Sites for which the potential for significant effects could not be excluded are presented in Table 5.1 below. The site synopsis of the Screened-In European Sites is provided as Appendix 1 of this document.

Table 5.1 European Sites that have been 'Screened In'

European Site	Distance from Proposed Development	Screening Summary
River Shannon Callows SAC (000216)	0.67 km downstream of the proposed bridge crossing location.	<p>There will be no direct impacts as the site of the proposed development is located approximately 670 m metres from the SAC.</p> <p>The Annex I surface water dependent habitat Alluvial Forests [91E0] does not occur at the proposed development site in Athlone. As per the NPWS site synopsis and Natura 2000 Data Form the habitat has a "minor though important presence within the SAC". The Alluvial Forest [91E0] for which the SAC has been designated occurs on a series of alluvial islands just below the Electricity Supply Board (ESB) weir near Meelick. Several of the islands are dominated by well-grown woodland consisting mainly of Ash (<i>Fraxinus excelsior</i>) and Willows (<i>Salix</i> spp.). The islands are prone to regular flooding from the river. The Alluvial Forest is located greater than 40 km downstream of the proposed development therefore no potential for significant indirect effect exists.</p> <p>The remaining Annex I habitats for which the SAC are designated are terrestrial in nature and no potential pathway for effect exists.</p>

European Site	Distance from Proposed Development	Screening Summary
Middle Shannon Callows SPA (004096)	0.67 km downstream of the proposed bridge crossing location.	<p>With regard to Otter, potential pathways for impact have been identified in the form of emissions to surface water which has the potential to affect the supporting habitat of the species downstream of the proposed development site.</p> <p>Thus the potential for significant effects on this European Site, with regard to Otter, cannot be excluded at this stage and it is 'Screened In' and will be assessed further in an NIS.</p> <p>There will be no direct impacts as the site of the proposed development is located approximately 0.67 km downstream of the SPA. Potential pathway for impact on OI species have not been identified given the design of the development, the site location and the nature of the OI species and the existing environment.</p> <p>Potential pathways for impact have been identified in the form of emissions to surface water potential effect on the OI Wetland and Waterbirds [A999]. The potential for significant effects on this European Site cannot be excluded at this stage and it is 'Screened In' and will be assessed further in NIS.</p>

## 5.2 Sites that are 'Screened out'

Where it is concluded that, in view of best scientific knowledge and on the basis of objective information, the proposed development either individually or in combination with other plans or projects, is not likely to have significant effects on the European Sites that were assessed as part of the screening exercise as described above, they are considered to be 'Screened Out'. The sites that have been 'Screened Out' are shown in Table 5.2. As a result, an Appropriate Assessment of the proposed development is not required with regard to these European Sites.

Table 5.2. European Sites that have been 'Screened Out'

European Site	Distance from Proposed development	Screening Summary
Special Areas of Conservation Lough Ree SAC (000440)	1 km (approx. 500 metres from the temporary construction)	The designated site is located approximately 1km upstream of the bridge location, 0.5km from the site compound and has no hydrological connectivity with Annex I habitats for which the SAC has been designated. Similarly no potential pathway for impact on the supporting /commuting habitat of Otter in the SAC (See Map 9 of NPWS Conservation Objective document), has been identified.

European Site	Distance from Proposed development (compound)	Screening Summary
		<p>Given the distance and intervening buffer between the SAC and the development site, there is no potential for displacement of Otter within the SAC. There are no Otter breeding or resting places present at the development site therefore the potential for displacement of the SAC Otter population, should individuals occur outside the SAC boundary, is considered insignificant. There development has been designed to retain habitat connectivity and will not result in the fragmentation of potential Otter habitat outside the SAC.</p> <p>Significant effects on the European Site resulting from the proposed development can be excluded at this stage of the assessment and it is 'Screened Out'.</p>
Lough Ree SPA (004064)	1.1 km (approx. 600 metres from the temporary construction compound)	<p>The designated site is located approximately 1.1km upstream of the bridge location and 0.6km from the site compound and has no hydrological connectivity with the supporting wetland habitat of waterbirds [A999] for which the SPA has been designated.</p> <p>Given the distance and intervening buffer between the SPA and the development site, there is no potential for displacement of OI species within the SPA.</p> <p>The development site is located in Athlone town and does not provide potential breeding, roosting or foraging habitat of OI species should they occur outside the SPA boundary. The development will not result in any habitat fragmentation within the SPA and has been designed to retain habitat connectivity and minimise barrier effect outside the SPA.</p> <p>Significant effects on the European Site resulting from the proposed development can be excluded at this stage of the assessment and it is 'Screened Out'.</p>
Crosswood Bog SAC (002337)	4 km	<p>Given the nature and scale of the development and distance from it, it is considered that there is no potential for impacts on the peatland habitats of qualifying interest of this site. No complete impact source-pathway-receptor chain was identified during the Screening Assessment as provided in Section 4 of this report. Significant impacts on the European Site resulting from the proposed development can be excluded at this stage of the development and it is 'Screened Out'.</p>
Carn Park Bog SAC (002336)	6 km	<p>Given the nature and scale of the development and distance from it, it is considered that there is no potential for impacts on the peatland habitats of qualifying interest of this site. No complete impact source-pathway-receptor chain was identified during the Screening Assessment as provided in Section 4 of this report. Significant impacts on the European Site resulting from the proposed development can be excluded at this stage of the assessment and it is 'Screened Out'.</p>
Castlesampson Esker SAC (001625)	8.3 km	<p>Given the nature and scale of the development and distance from it, it is considered that there is no potential for impacts on the Turfough and grassland habitats of qualifying interest of this site. No complete impact source-pathway-receptor chain was identified during the Screening Assessment as provided in Section 4 of this report. Significant impacts on the European Site resulting from the proposed development can be excluded at this stage of the assessment and it is</p>

European Site	Distance from Proposed development	Screening Summary
Ballynamona Bog and Corkip Lough SAC (002339)	9 km	'Screened Out'. Given the nature and scale of the development and distance from it, it is considered that there is no potential for impacts on the Turlough and peatland habitats of qualifying interest of this site. No complete impact source-pathway-receptor chain was identified during the Screening Assessment as provided in Section 4 of this report. Significant Impacts on the European Site resulting from the proposed development can be excluded at this stage of the assessment and it is 'Screened Out'.
Pilgrim's Road Esker SAC (001776)	9.8 km	Given the nature and scale of the development and distance from it, it is considered that there is no potential for impacts on the grassland habitat of qualifying interest of this site. No complete impact source-pathway-receptor chain was identified during the Screening Assessment as provided in Section 4 of this report. Significant Impacts on the European Site resulting from the proposed development can be excluded at this stage of the assessment and it is 'Screened Out'.
Mongan Bog SAC (000580)	10.1 km	Given the nature and scale of the development and distance from it, it is considered that there is no potential for impacts on the peatland habitats of qualifying interest of this site. No complete impact source-pathway-receptor chain was identified during the Screening Assessment as provided in Section 4 of this report. Significant Impacts on the European Site resulting from the proposed development can be excluded at this stage of the assessment and it is 'Screened Out'.
Fin Lough (Offaly) SAC (000576)	11.6 km	Given the nature and scale of the development and distance from it, it is considered that there is no potential for impacts on the fen habitat and supporting habitat of <i>Vertigo geyeri</i> listed among of qualifying interests of this site. No complete impact source-pathway-receptor chain was identified during the Screening Assessment as provided in Section 4 of this report. Significant Impacts on the European Site resulting from the proposed development can be excluded at this stage of the assessment and it is 'Screened Out'.
Lough Funshinagh SAC (000611)	12.3 km	Given the nature and scale of the development and distance from it, it is considered that there is no potential for impacts on the Turlough habitat of qualifying interest of this site. No complete impact source-pathway-receptor chain was identified during the Screening Assessment as provided in Section 4 of this report. Significant Impacts on the European Site resulting from the proposed development can be excluded at this stage of the assessment and it is 'Screened Out'.
Mongan Bog SPA (004017)	10.3 km	Given the nature and scale of the development, the nature of the site location, the lack of supporting habitat and the distance .impacts to the population of Greenland White-fronted Goose for which the SPA has been designated is not anticipated. Significant Impacts on the European Site resulting from the proposed development can be excluded at this stage of the assessment and it is 'Screened Out'.

### 5.3 Data Collected to Carry Out Assessment

In preparation of the assessment, the following sources were used to gather information:

- Review of NPWS published information on European Sites including Site Synopses, European Site mapping and Conservation Objectives for European Sites
- Field surveys completed in August 2013 and July 2015. Surveys were multidisciplinary in nature and identified the habitats present and their potential to support protected species associated with European Sites
- Desk study, field studies and associated reporting prepared by John Hynes and Pat Roberts, McCarthy Keville O'Sullivan Ltd.

### 5.4 Overall Conclusions

It is concluded beyond reasonable scientific doubt that the proposed development is not likely to have significant effects on the following European Sites either individually or in combination with other plans or projects. They have therefore been screened out.

- Crosswood Bog SAC (002337)
- Carn Park Bog SAC (002336)
- Castlesampson Esker SAC (001625)
- Ballynamona Bog and Corkip Lough SAC (002339)
- Pilgrim's Road Esker SAC (001776)
- Mongan Bog SAC (000580)
- Fin Lough (Offaly) SAC (000576)
- Lough Funshinagh SAC (000611)
- Mongan Bog SPA (004017)
- Lough Ree SPA (004064)
- Lough Ree SAC (000440)

It cannot be excluded, on the basis of objective scientific information, that the proposed development individually or in combination with other plans or projects, will not have a significant effect on the following European sites:

- River Shannon Callows SAC (000216)
- Middle Shannon Callows SPA (004096)

As a result, an Appropriate Assessment of the proposed development is required and a Natura Impact Statement (NIS) shall be prepared. The NIS will be submitted to the competent authority as part of the proposed development application.

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# Appendix I

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NPWS Site Synopses

## Conservation Objectives for River Shannon Callows SAC [000216]

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Objective: 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:

- ◆ [1355] *Lutra lutra*
- ◆ [6410] *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)
- ◆ [6510] Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*)
- ◆ [8240] \* Limestone pavements
- ◆ [91E0] \* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)

### Citation:

NPWS (2011) Conservation objectives for River Shannon Callows SAC [000216]. Generic Version 3.0. Department of Arts, Heritage & the Gaeltacht.

For more information please go to: [www.npws.ie/protectedsites/conservationmanagementplanning](http://www.npws.ie/protectedsites/conservationmanagementplanning)

## SITE SYNOPSIS

**SITE NAME: RIVER SHANNON CALLOWS**

**SITE CODE: 000216**

The River Shannon Callows is a long and diverse site which consists of seasonally flooded, semi-natural, lowland wet grassland, along and beside the river between the towns of Athlone and Portumna. It is approximately 50 km long and averages about 0.75 km wide (reaching 1.5 km wide in places). Along most of its length the site is bordered by raised bogs - many, but not all, in the process of large-scale harvesting - esker ridges and limestone-bedrock hills. The soils grade from silty-alluvial to peat. This site has a common boundary, and is closely associated, with two other sites of similar habitats, River Suck Callows and Little Brosna Callows.

The River Shannon Callows is mainly composed of lowland wet grassland. Different plant communities occur, depending on elevation, and therefore their flooding patterns. Two habitats listed on Annex I of the EU Habitats Directive are well represented within the site – *Molinia* meadows and lowland hay meadows. The former is characterised by the presence of the Meadow Thistle (*Cirsium dissectum*) and Purple Moor-grass (*Molinia caerulea*), while typical species in the latter include Meadow Fescue (*Festuca pratensis*), Rough Meadow-grass (*Poa trivialis*), Downy Oat-grass (*Avenula pubescens*), Common Knapweed (*Centaurea nigra*), Ribwort Plantain (*Plantago lanceolata*) and Common Sorrel (*Rumex acetosa*). In places these two habitats grade into one another.

Low-lying areas of the callows with more prolonged flooding are characterised by Floating Sweet-grass (*Glyceria fluitans*), Marsh Foxtail (*Alopecurus geniculatus*) and wetland herbs such as Yellow Cress (*Rorippa* spp.), Water Forget-me-not (*Myosotis scorpioides*) and Common Spike-rush (*Eleocharis palustris*). Most of the callows consist of a plant community characterised by Creeping Bent (*Agrostis stolonifera*), Brown Sedge (*Carex disticha*), Common Sedge (*Carex nigra*), and herbs such as Marsh Marigold (*Caltha palustris*) and Marsh Bedstraw (*Galium palustre*). While the more elevated and peaty areas are characterised by low-growing sedges, particularly Yellow Sedge (*Carex flava* agg.) and Star Sedge (*Carex echinata*). All these communities are very diverse in their total number of plant species, and include the scarce species Meadow-rue (*Thalictrum flavum*), Summer Snowflake (*Leucojum aestivum*), and Marsh Stitchwort (*Stellaria palustris*).

Two further Annex I habitats, both listed with priority status, have a minor though important presence within the site. Alluvial forest occurs on a series of alluvial islands just below the ESB weir near Meelick. Several of the islands are dominated by well grown woodland of mainly Ash (*Fraxinus excelsior*) and Willows (*Salix* spp.). The islands are prone to regular flooding from the river.

At Clorhane, an area of limestone pavement represents the only known example in Co Offaly. It is predominantly colonised by mature hazel woodland, with areas of open limestone and calcareous grassland interspersed. The open limestone pavement comprises bare or moss covered rock or rock with a very thin calcareous soil cover

supporting a short grassy turf. The most notable plant in the grassy area is a substantial population of Green-winged Orchid (*Orchis morio*), which occurs with such species as Sweet Vernal-grass (*Anthoxanthum odoratum*), Quaking Grass (*Briza media*), sedges (*Carex caryophyllea*, *C. flacca*), Common Bird's-foot-trefoil (*Lotus corniculatus*), Common Knapweed (*Centaurea nigra*), and Narrow-leaved Plantain (*Plantago lanceolata*). Ferns associated with the cracks in the paving include *Asplenium trichomanes*, *A. ruta-muraria*, *A. adiantum-nigrum*, *Polypodium australe*. Bryophytes include *Grimmia apocarpa* and *Orthotrichum cf. anomalum*. Anthills are common within the open grassland. The Hazel wood is well-developed and has herbaceous species such as Primrose (*Primula vulgaris*), Common Dog-violet (*Viola riviniana*), Wood Sorrel (*Oxalis acetosella*) and Herb Robert (*Geranium robertianum*). The wood is noted for its luxuriant growth of epiphytic mosses and liverworts, with such species as *Neckera crispa* and *Hylocomium brevirostre*. Yew (*Taxus baccata*) occurs at one area.

Other habitats of smaller area but equal importance within the site are lowland dry grassland, drainage ditches, freshwater marshes and reedbeds. The dry grassland areas, especially where they exist within hay meadows, are species-rich, and of two main types: calcareous grassland on glacial material, and dry grassland on levees of river alluvium. The former can contain many Orchid species, Cowslip (*Primula veris*), abundant Adder's-tongue Fern (*Ophioglossum vulgatum*) and Spring-sedge (*Carex caryophyllea*), and both contain an unusually wide variety of grasses, including False Oatgrass (*Arrhenatherum elatius*), Yellow Oatgrass (*Trisetum flavescens*), Meadow Foxtail (*Alopecurus pratense*), and Meadow Brome (*Bromus commutatus*). In places Summer Snowflake also occurs.

Good quality habitats on the edge of the callows included in the site are wet broad-leaved semi-natural woodland dominated by both Birch (*Betula pubescens*) and Alder (*Alnus glutinosa*) and dry broad-leaved woodland dominated by Hazel (*Corylus avellana*). There are also areas of raised bog, fen on old cut-away bog with Black Bog-rush (*Schoenus nigricans*), and a 'petrifying stream' with associated species-rich calcareous flush which supports Yellow Sedge (*Carex lepidocarpa*), Blunt-flowered Rush (*Juncus subnodulosus*) and Stoneworts (*Chara* spp.).

Two legally-protected plant species (Flora (Protection) Order 1999) occur in the site: Opposite-leaved Pondweed (*Groenlandia densa*) in drainage ditches, and Meadow Barley (*Hordeum secalinum*) on dry alluvial grassland. This is one of only two known inland sites for the Meadow Barley in Ireland. The Red Data Book plant Green-winged Orchid (*Orchis morio*) is known from dry calcareous grasslands within the site, while the site also supports a healthy population of Marsh Pea (*Lathyrus palustris*).

The site is of International Importance for wintering waterfowl as numbers regularly exceed the 20,000 threshold (mean of 34985 for 5 winters 1994/94-1998/99). Of particular note is an Internationally Important population of Whooper Swans (287). A further five species have populations of national importance (all figures are means for 5 winters 1995/96-1999/00): Mute Swan (349), Wigeon (2972), Golden Plover (4254), Lapwing (11578) and Black-tailed Godwit (388). Species which occur in numbers of regional or local importance include Bewick's Swan, Tufted Duck, Dunlin, Curlew and Redshank. The population of Dunlin is notable as it is one of the few regular inland flocks in Ireland. Small flocks of Greenland White-fronted Goose

use the Shannon Callows; these are generally associated with larger flocks which occur on the adjacent Little Brosna Callows and River Suck Callows.

Shoveler (an estimated 12 pairs in 1987) and Black-tailed Godwit (Icelandic race) (one or two pairs in 1987) breed within this site. These species are listed in the Red Data Book as being threatened in Ireland. The scarce bird Quail is also known to breed within the area. The Callows continues to hold over 40% of the Irish population of the globally endangered Corncrake, although numbers have declined in recent years. A total of 66 calling birds were recorded in 1999. The total population of breeding waders (Lapwing, Redshank, Snipe and Curlew) in 1987 was one of three major concentrations in Ireland and Britain. The breeding Redshank, numbers was estimated at 10% of the Irish population, making it Nationally significant. Also, the Annex I species Merlin and Hen Harrier are regularly reported hunting over the callows during the breeding season and in autumn and winter.

This site holds a population of Otter, a species listed on Annex II of the EU Habitats Directive, while the Irish Hare, which is listed in the Irish Red Data Book, is a common sight on the callows.

The Shannon Callows are used for summer dry-stock grazing (mostly cattle, with some sheep and a few horses), and permanent hay meadow. About 30 ha is a nature reserve owned by voluntary conservation bodies. The River Shannon is used increasingly for recreational purposes with coarse angling and boating accounting for much of the visitor numbers. Intermittent and scattered damage to the habitats has occurred due to over-deepening of drains and peat silt deposition, water-skiing, ploughing and neglect of hay meadow (or reversion to pasture). However, none of these can as of yet be said to be serious. Threats to the quality of the site may come from the siting of boating marinas in areas away from centres of population, fertilising of botanically-rich fields, the use of herbicides, reversion of hay meadow to pasture, neglect of pasture and hay meadow, disturbance of birds by boaters, anglers, birdwatchers and the general tourist. The maintenance of generally high water levels in winter and spring benefits all aspects of the flora and fauna, but in this regard, summer flooding is a threat to breeding birds, and may cause neglect of farming.

The Shannon Callows has by far the largest area of lowland semi-natural grassland and associated aquatic habitats in Ireland and one in which there is least disturbance of natural wetland processes. Botanically, it is extremely diverse with two legally protected species of plants and many scarce species. Excellent examples of two habitats listed on Annex I of the EU Habitats Directive occur within the site – *Molinia* meadows and lowland hay meadows with good examples of a further two Annex habitats (both with priority status). In winter the site is internationally important for numbers and species of waterfowl. In spring it feeds large numbers of birds on migration. And in summer it holds very large numbers of breeding waders, rare breeding birds and the endangered Corncrake, as well as a very wide variety of more common grassland and wetland birds. The presence of Otter, an Annex II species, adds further importance to the site.



## Conservation Objectives for Middle Shannon Callows SPA [004096]

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

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

◆ <i>Cygnus cygnus</i>	[wintering]
◆ <i>Anas penelope</i>	[wintering]
◆ <i>Crex crex</i>	[breeding ]
◆ <i>Pluvialis apricaria</i>	[wintering]
◆ <i>Vanellus vanellus</i>	[wintering]
◆ <i>Limosa limosa</i>	[wintering]
◆ <i>Chroicocephalus ridibundus</i>	[wintering]
◆ Wetlands	[]

### Citation:

NPWS (2011) Conservation objectives for Middle Shannon Callows SPA [004096]. Generic Version 4.0.  
Department of Arts, Heritage & the Gaeltacht.

For more information please go to: [www.npws.ie/protectedsites/conservationmanagementplanning](http://www.npws.ie/protectedsites/conservationmanagementplanning)

## SITE SYNOPSIS

**SITE NAME: MIDDLE SHANNON CALLOWS SPA**

**SITE CODE: 004096**

The Middle Shannon Callows SPA is a long and diverse site which extends for approximately 50 km from the town of Athlone (at southern point of Lough Ree) to the town of Portumna (northern point of Lough Derg). The site averages about 0.75 km in width though in places is up to 1.5 km wide. Water levels on the site are greatly influenced by the very small fall between Athlone and Portumna and by the weir at Meelick. The Shannon Callows has a common boundary with two other sites of similar habitats, the River Suck Callows and the Little Brosna Callows, both of which are also Special Protection Areas.

The site has extensive areas of callow, or seasonally flooded, semi-natural, lowland wet grassland, along both sides of the river. The callows are mainly too soft for intensive farming but are used for hay or silage or for summer grazing. Other habitats of smaller area which occur alongside the river include lowland dry grassland, freshwater marshes, reedbeds and wet woodland. Along most of its length the site is bordered by raised bogs, now mostly exploited for peat, esker ridges and limestone-bedrock hills. The diversity of semi-natural habitats and the sheer size of the site attracts an excellent diversity of bird species and significant populations of several species.

The composition of the lowland wet grassland varies, depending on elevation and flooding patterns. Two habitats listed on Annex I of the EU Habitats Directive are well represented within the site – *Molinia* meadows and lowland hay meadows. The former is characterised by the presence of the Meadow Thistle (*Cirsium dissectum*) and Purple Moor-grass (*Molinia caerulea*), while typical species in the latter include Meadow Fescue (*Festuca pratensis*), Rough Meadow-grass (*Poa trivialis*), Downy Oat-grass (*Avenula pubescens*) and Common Sorrel (*Rumex acetosa*). In places these two habitats grade into one another.

Low-lying areas of the callows with more prolonged flooding are characterised by Floating Sweet-grass (*Glyceria fluitans*), Marsh Foxtail (*Alopecurus geniculatus*) and wetland herbs such as Yellow Cress (*Rorippa* spp.), Water Forget-me-not (*Myosotis scorpioides*) and Common Spike-rush (*Eleocharis palustris*). Most of the callows, however, consist of a plant community characterised by Creeping Bent (*Agrostis stolonifera*), Brown Sedge (*Carex disticha*), Common Sedge (*Carex nigra*), and herbs such as Marsh Marigold (*Caltha palustris*) and Marsh Bedstraw (*Galium palustre*). Scarce plant species associated with the grassland include Meadow-rue (*Thalictrum flavum*), Summer Snowflake (*Leucojum aestivum*) and Marsh Stitchwort (*Stellaria palustris*).

The dry grassland areas, especially where they exist within hay meadows, are species-rich, and can contain many orchid species and such species as Cowslip (*Primula*



*veris*), Adder's-tongue Fern (*Ophioglossum vulgatum*) and Spring-sedge (*Carex caryophyllea*), as well as an unusually wide variety of grasses. In places along the edge of the callows there occurs wet broad-leaved woodland dominated by both Birch (*Betula pubescens*) and Alder (*Alnus glutinosa*) and dry broad-leaved woodland dominated by Hazel (*Corylus avellana*). There are also areas of raised bog and fen on old cut-away bog with species such as Black Bog-rush (*Schoenus nigricans*).

Two legally-protected plant species (Flora (Protection) Order 1999) occur in the site: Opposite-leaved Pondweed (*Groenlandia densa*) in drainage ditches, and Meadow Barley (*Hordeum secalinum*) on dry alluvial grassland. The Red Data Book plant Green-winged Orchid (*Orchis morio*) is known from dry calcareous grasslands within the site, while the site also supports a healthy population of Marsh Pea (*Lathyrus palustris*).

The Middle Shannon Callows qualifies as a site of International Importance for wintering waterfowl both on the total numbers regularly exceeding 20,000 birds (for example 27,581 in winter 1998/99) and for the Whooper Swan population (287 – average peak count 1995/96-1999/00). Whooper Swan is listed on Annex I of the EU Birds Directive. Five further species occur in numbers of national importance (all figures are average peaks for winters 1995/96-1999/00) - Mute Swan 349, Wigeon 2,972, Golden Plover (listed on Annex I of the EU Birds Directive) 4,254, Lapwing 11,578 and Black-tailed Godwit 388. For some of these species, peak counts in the period have been considerably higher than the averages, such as 1,096 Black-tailed Godwits and 23,839 Lapwings. The importance of the site for species like Black-tailed Godwit and Whimbrel may have been underestimated if count coverage missed the brief spring peaks for these species. A wide range of other species occur in numbers of regional or local importance, including Bewick's Swan (listed on Annex I of the EU Birds Directive) 7, Teal 77, Tufted Duck 33, Dunlin 369, Curlew 129, Redshank 31 and Black-headed Gull 1,061. Small numbers of Greenland White-fronted Goose (listed on Annex I of the EU Birds Directive) use the Shannon Callows (average 21, peak 55) and these are generally associated with larger flocks which occur on the adjacent Little Brosna Callows and River Suck Callows. The callow grasslands provide optimum feeding grounds for these various species of waterfowl, while many of the birds also roost or rest within the site.

The site is also of national importance for breeding waterfowl. The total population of breeding waders (Lapwing, Redshank, Snipe and Curlew) on the Shannon and Little Brosna Callows in 1987 was one of three major concentrations in Ireland and Britain. Since then, however, numbers of at least Lapwing and Redshank have shown serious declines (a full survey of the callows is being carried out in 2002). For example, at a monitoring site at the callows at Shannon Harbour, numbers of Lapwing fell from 29 to 10 pairs and Redshank from 26 to 10 pairs between 1987 and 1994. Black-tailed Godwit, a very rare breeding species in Ireland, nests or attempts to nest in small numbers each year within the site. A further scarce breeding species, Shoveler, also nests in small numbers each year (an estimated 12 pairs in 1987).

The Shannon Callows continues to hold approximately 40% of the Irish population of Corncrake, a species of global conservation concern that is also listed on Annex I of the EU Birds Directive. Between 1997 and 2001, the average number of calling birds

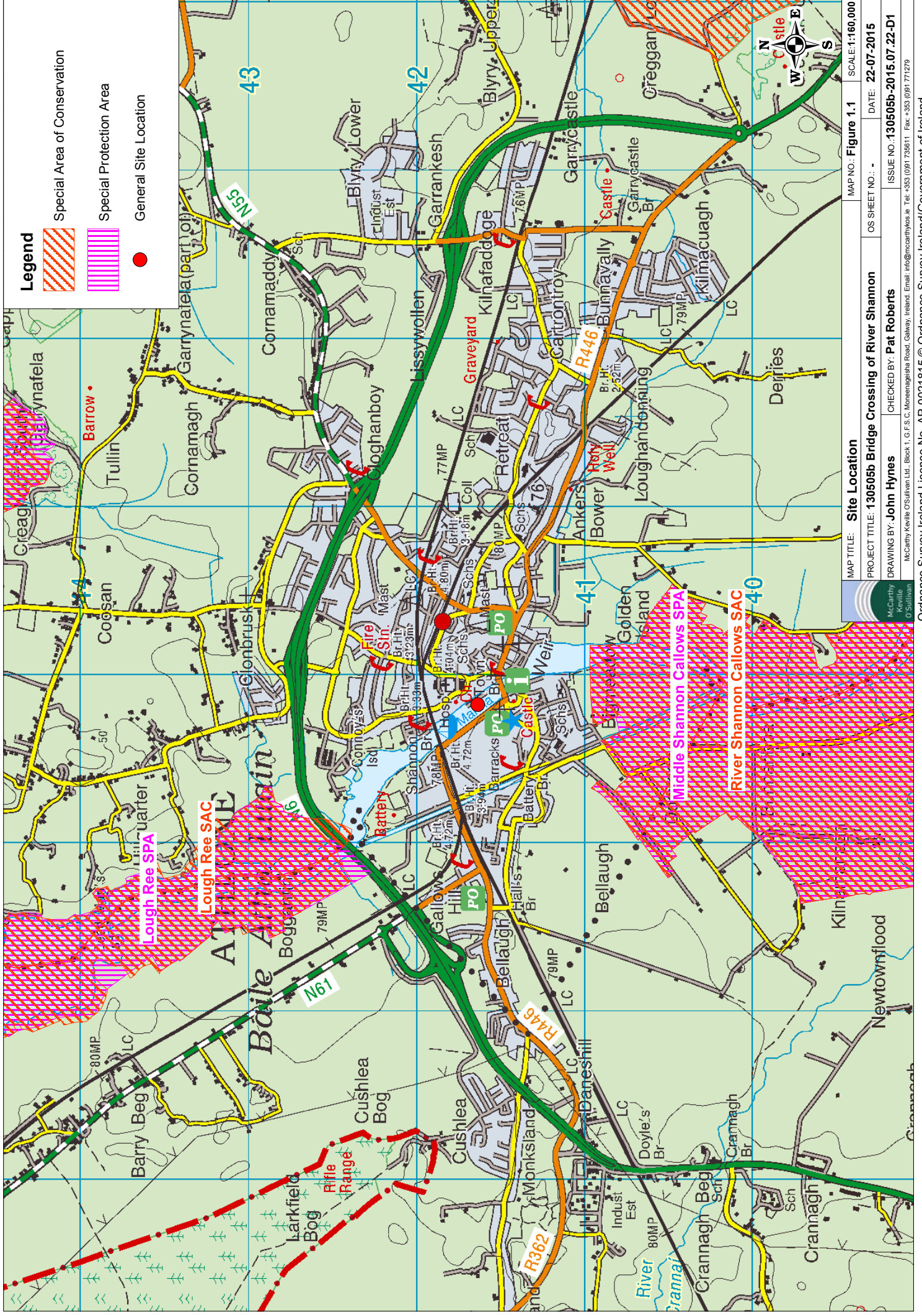
was 60, with a peak of 69. BirdWatch Ireland, in association with Dúchas and the RSPB, operate a grant scheme to encourage farming practices that favour the Corncrake and this has probably been responsible for the stabilisation of numbers in recent years. A related scarce species, the Quail, is also known to breed within the callow grasslands.

A good variety of other bird species are attracted to this site. Birds of prey, including scarce species such as Merlin (listed on Annex I of the EU Birds Directive) and wintering Hen Harrier (listed on Annex I of the EU Birds Directive), are regularly reported hunting over the callows. A range of passerine species associated with grassland and swamp vegetation breed, including Sedge Warbler, Grasshopper Warbler, Skylark and Reed Bunting. Kingfisher (listed on Annex I of the EU Birds Directive) is also regularly seen within the site. Whinchat, an uncommon breeding species, occur in small numbers.

The wintering waterfowl within the Shannon Callows are difficult to monitor due to the size and inaccessibility of large parts of the site. In each winter there is usually one complete aerial census, as well as partial land-based counts. The population of Corncrake within the site is monitored each year and research is carried out on various aspects of the species' ecology. The breeding waders are also surveyed at intervals. About 30 ha of the callows is a nature reserve owned by voluntary conservation bodies.

The Shannon Callows has by far the largest area of lowland semi-natural grassland and associated aquatic habitats in Ireland and one in which there is least disturbance of natural wetland processes. Botanically, it is extremely diverse. In winter the site is internationally important for the total numbers of birds (regularly exceed 20,000) and for Whooper Swan in particular. It also holds nationally important populations of a further five species. Some of the wintering species are listed on Annex I of the EU Birds Directive, including Whooper Swan, Greenland White-fronted Goose and Golden Plover. In summer the site supports important populations of breeding waders. Perhaps the most important species which occurs in the site is Corncrake (the site holds 40% of the national total), as this is listed on Annex I of the EU Birds Directive and is Ireland's only globally endangered species.

20.6.2002



- Legend**
- Special Area of Conservation
  - Special Protection Area
  - General Site Location

MAP NO.: <b>Figure 1.1</b>	SCALE: 1:160,000
PROJECT TITLE: <b>130505b Bridge Crossing of River Shannon</b>	OS SHEET NO.: -
DRAWING BY: <b>John Hynes</b>	CHECKED BY: <b>Pat Roberts</b>
<small>McCarty Kevin O'Sullivan Ltd, Block 1, G.F.S. Maresnang Road, Galway, Ireland. Email: info@mcCarthyKev.ie Tel: +353 (0)91 736511 Fax: +353 (0)91 771279</small>	
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**Site Location**

**Map Title:** 130505b Bridge Crossing of River Shannon

**Scale:** 1:160,000

**OS Sheet No.:** -

**Project Title:** 130505b Bridge Crossing of River Shannon

**Checked By:** Pat Roberts







**Issue No.:** 130505b-2015.07.22-D1

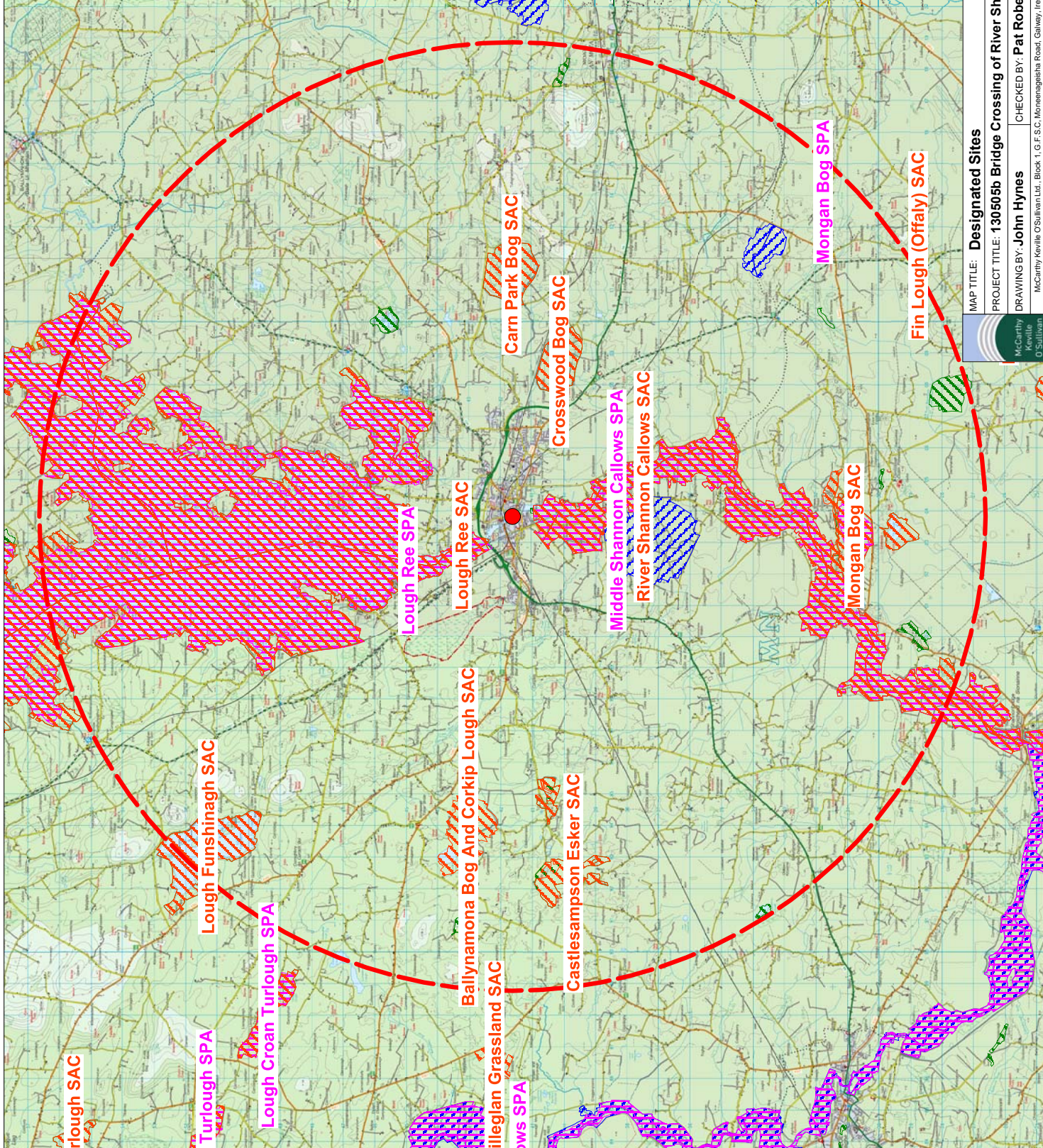
**Date:** 22-07-2015

**Drawing By:** John Hynes

McCarty Kevin O'Sullivan Ltd, Block 1, G.F.S. Maresnang Road, Galway, Ireland. Email: info@mcCarthyKev.ie Tel: +353 (0)91 736511 Fax: +353 (0)91 771279

**Legend**

-  Special Area of Conservation
-  Special Protection Area
-  Natural Heritage Area
-  Proposed Natural Heritage Area
-  15km Buffer Region
-  General Site Location



MAP TITLE: **Designated Sites** MAP NO: **Figure3.1** SCALE: 1:160,000

PROJECT TITLE: **130505b Bridge Crossing of River Shannon** OS SHEET NO: - DATE: **22-07-2015**

DRAWING BY: **John Hynes** CHECKED BY: **Pat Roberts** ISSUE NO: **130505b-2015.07.22-D1**

McCarthy Keville O'Sullivan Ltd., Block 1, C.F.S.C., Monaghanisha Road, Galway, Ireland. E-mail: info@mcCarthyKeville.ie Tel: +353 (0)91 726611 Fax: +353 (0)91 771279

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**Appendix 6.3**  
*Tree Survey Report*

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# LAND PLANNING & DESIGN

**CUNNANE STRATTON REYNOLDS**

**TREE SURVEY**

**Athlone Cycleway,  
Athlone,  
Co Westmeath.**

**September 2016**

**CUNNANE STRATTON REYNOLDS**  
**LAND PLANNING & DESIGN**  
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## SUMMARY

This report presents a record of those trees existing within the site that may potentially be effected by a proposed riverside cycle-way development. Trees have been surveyed as individuals or tree groups in accordance with BS 5837 (2012). The survey was undertaken on 14th September 2016 by Cunnane Stratton Reynolds arborist;

Keith Mitchell    Diploma Arboriculture (Level 4)  
                          Technician Member Arboricultural Association (UK)  
                          Tree Risk Assessment Qualification (International Society of Arboriculture)  
                          MA(Hons) Landscape Architecture  
                          Member of the Irish Landscape Institute  
                          Chartered Member of the Landscape Institute (UK)  
                          Diploma EIA Management

This survey and report are based on the Topographic Survey & Layout information contained in;

- Roughtan O'Donovan Engineers Topographical Survey

Also contained in the report is an assessment of the arboricultural impact of the proposed development of the site with the full survey record presented in Appendix 1, together with accompanying drawings Tree Survey Dwg No 13609\_T\_101, Constraints Dwg No 13609\_T\_102 and Tree Protection Plan Dwg No 13609\_T\_103. After introducing the terms of reference and the methodology of the survey, the report summarises the survey findings in an overview of the existing tree cover within the site.

A total of forty five individual trees were recorded.

The report recommends the removal of two individual 'Category U' trees - these are recommended for removal on management & safety grounds irrespective of any proposed development going ahead or not.

It is noted that the site contains a number of trees of significant size, in a visually prominent waterfront location and every effort should be made to safely retain these as part of any development proposal.

The removal of trees as part of a proposed development will present an opportunity to implement replacement tree planting both as part of a general landscape design scheme and also as part of an urban woodland management program aimed at maintaining high quality diverse long-term amenity tree cover, in keeping with the setting and proposed site use.

The report concludes with recommendations for protection measures to ensure the conservation of retention trees during any development.

# 1. INTRODUCTION

## Terms of Reference

Cunnane Stratton Reynolds (CSR) were instructed to conduct a tree survey of those trees identified by the site survey drawing provided, prior to and to inform the design stage / planning of the site development.

CSR considered those trees that might potentially be impacted upon by the proposed cycle-way development and produced this tree survey report presenting our findings, (in accordance with BS 5837:2012), together with recommendations for their best practice management in relation to the proposed development.

This involved a survey of the principal trees concerned in accordance with BS 5837 (2012).

Documents supplied to CSR for purposes of conducting a tree survey include:

- Roughan O'Donovan Engineers - Topographical Survey Dwg.
- Cunnane Stratton Reynolds Dwg 13609\_2\_100 Draft Landscape Masterplan

## Site Inspection & Methodology

The site was surveyed on 14<sup>th</sup> September 2015 by a qualified Arborist. A visual inspection from the ground was performed on all existing trees / tree groups on site. Where access allowed, principal individual trees were examined, tagged with reference number, critical measurements taken and observations made from ground level.

A description was recorded of each tagged tree / group of trees, their species, age class, all relevant measured dimensions (height, stem diameter, crown spread radii and crown clearance height) and an assessment of the tree health / vitality, structural form, life expectancy and quality categorisation. Any recommended remedial works required were outlined.

The findings of the survey are recorded and presented in;

- Tree Schedule (Appendix 1)
- Tree Survey (Dwg No 13609/T/101).
- Constraints Drawing (Dwg No 13609/T/102).
- Tree Protection Plan (Dwg No 13609/T/103).

This report is subject to the scope and limitations as given at the end of the report.

## Accompanying Drawings

The tree survey report should be read in conjunction with;

- Tree Survey (Dwg No 13609/T/101).
- Constraints Drawing (Dwg No 13609/T/102).
- Tree Protection Plan (Dwg No 13609/T/103).

A1 size colour coded drawings which accompany this report, (monochrome drawings should not be relied upon). These drawings are based upon the topographical and layout plans supplied to CSR.

### **Site Location**

The site is the quayside walkway on the west bank of the River Shannon in the centre of Athlone town, running parallel with Grace Road and defined by the Athlone Boat Club at one end and the Luan Gallery at the other.

## 2. DESCRIPTION OF EXISTING TREES

2.1 The site area (highlighted red – Fig 1) is currently a quayside walkway which sits at level lower than the parallel Grace Road and higher than the river Shannon, with tree planting in a series of grass verges and raised terrace planters.

The trees are relatively mature and primarily Sycamore with occasional Lime, Chestnut and Birch also present. They are generally of good size and health, making a significant visual and ecological contribution to this prime riverside location. It might be expected that a number of trees located in raised planters at the southern end will have more limited future growth potential given the physical constraint on their rooting volume.

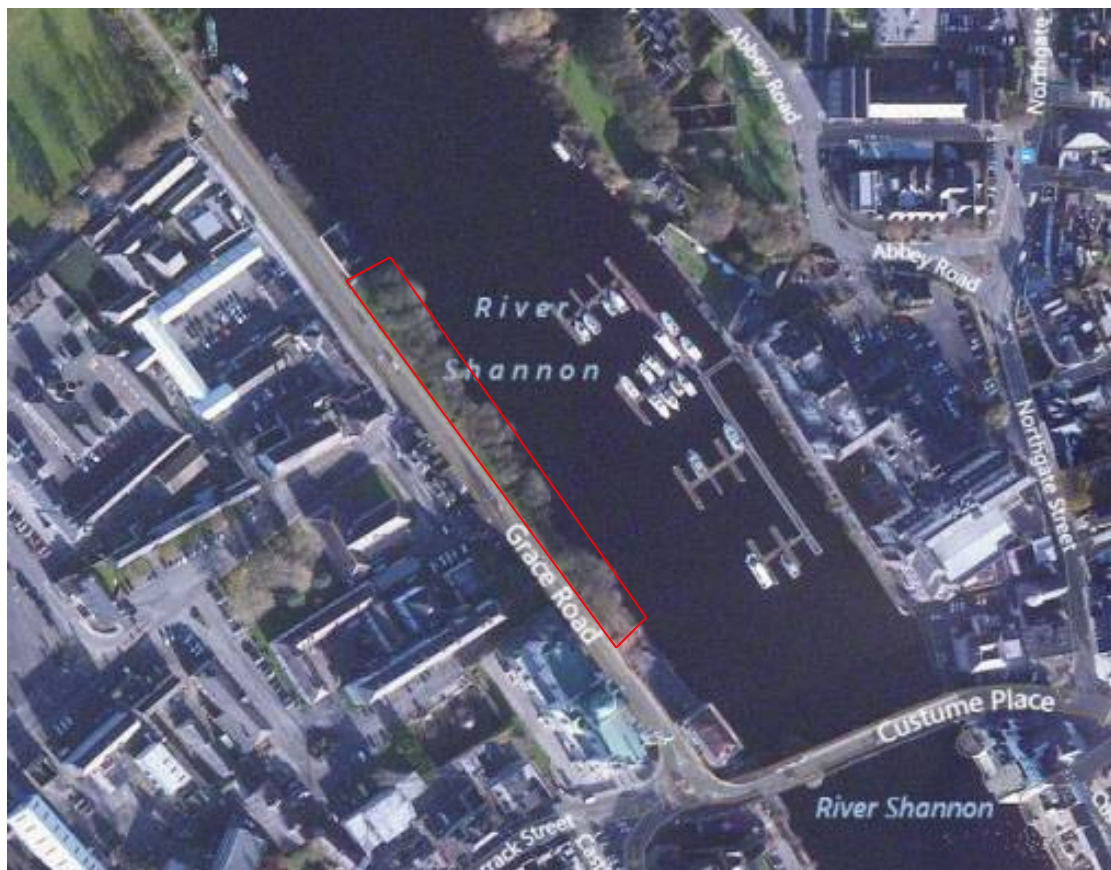


Figure 1: Low resolution aerial photograph of site area.

A total of forty five trees were inspected. Their location, size and quality category may be reviewed with reference to the accompanying Tree Survey Dwg No 13609/T/101 and the tree survey (Appendix 1).

## 2.2 Photographic Summary of Trees Surveyed



T933 Looking up river from Luan Gallery



T936 Looking down Grace Rd from Luan Gallery



Compression forks typical of a number of trees



T942 – T933 in raised planter



T977 Looking down river from Boat Club



Trees viewed from Bridge over River Shannon

2.3 The quality of trees on the site as a whole can be summarised as being of moderate to high quality with a significant number of individual trees of considerable maturity and size. All the trees are deciduous species and species variety is relatively narrow, primarily Sycamore, a species tolerant of the limited rooting opportunity and exposed riparian position.

Ages vary from middle age to mature and whilst a number are not of optimum form due to limiting factors such as overcrowding & phototropism - they are generally in fair to good condition.

Previous management of the trees appears to have occurred, with evidence of both a previous tree survey having been carried out and proactive pruning works. There is currently little significant requirement for further works to the trees other than minor pruning of weak tree growth, overcrowding regenerative growth, rubbing limbs etc.

However two trees are recommended for removal, (U Class), due to their poor condition. One of these trees is dead, whilst the second has two main trunks one of which is dying and also exhibits symptoms of significant internal decay around the lower eastern side of the trunk as it meets ground level. (Surrounding trees should be monitored for 12-24 months following removal as there is likely to have been an element of co-dependence in terms of shelter from high winds).

These trees are recommended for removal as a precautionary measure due to their likely or potential poor structural condition. Compensatory replacement tree planting might be considered if space allows on removal of trees.

This group of trees make a very substantial contribution to the surrounding landscape setting, being highly visible from both the opposite side of the river and the bridge crossing as well as defining Grace Road.

Collectively the trees can often become more valuable than they might be when considered as individuals, a grouping or woodland within a suburban setting being of significant visual and ecological value. As such it should be noted that the cumulative value of tree groups often reflects an increased categorised value than might be awarded to the constituent trees if they were assessed in isolation as individuals.

In this case the majority of the trees are deemed to be both individually and collectively of the highest value (Category A), whilst those that may not quite make 'Category A' individually remain an integral part of a 'Category A' collective group.

### **3. ARBORICULTURAL IMPACT ASSESSMENT**

3.1 This section discusses the potential impact of the proposed development on the existing tree cover on site and considers the need for mitigation measures, in accordance with BS 5837 (2012), for sustainable development.

The proposed development consists of a ramped cycle-way access largely following the footprint of existing footpaths alongside existing retaining walls and raised planters. The location of many of the trees within existing raised planters will mean that the development of their root system is likely to be significantly more restricted than the standardised 'Root Protection Area' calculation suggests.

The scheme has been designed to limit the impact on existing trees as far as possible and where unavoidable to avoid the highest quality trees.

3.2 Category 'U' trees are recommended for immediate removal (felling) on general management grounds, irrespective of site development.

#### U Class Trees:

T948 and T974.

#### **Direct Loss of Trees**

3.3 Tree that are in direct conflict with the proposed development include;

#### A Class Trees:

None

#### B Class Trees:

T936

#### C Class Trees:

None

#### U Class Trees:

T948 and T974

#### **Indirect Impacts**

3.4 Cognisance must also be given to indirect impacts - in particular care must be taken to ensure the proposed development and ancillary works do not conflict with the calculated 'Root Protection Area' of the existing trees - as illustrated in Constraints Dwg No 13609/T/102.

Disturbance of 'Root Protection Area' may just as readily kill or destabilise a tree over time, by means of root damage/severance and or earth compaction/covering preventing essential transfer of water and air to roots.

With this in mind it is suggested that the retention of T949 should be removed due to the proposed construction of a new wall and pathway within its RPA. T947 will



similarly be adversely impacted by the proposed pathway and it is suggested that this tree also be removed.

Whilst these two trees are B Class and thus in theory desirable for retention, they could also be readily replaced by replacement mitigation planting with two semi mature trees. It is considered that this is on balance a more pragmatic course of action, with better long term prospects, than attempting an engineered retention solution given their lack of particular merit.

### **Additional Loss of Trees – Considerations**

3.5 It is not envisaged that there will be any additional loss of trees. A proposed set of stairs located between T941 & T942 will be designed in such a manner that they are elevated above ground level between the two landing points on existing pathways above and below embankment, thus avoiding disturbance to the existing embankment and tree roots within. Some minor pruning may be required to T942 to raise crown clearance.

### **Summary of Trees to be Removed**

3.6 A total of five individual trees are proposed for removal.

#### U Class Trees

T948 and T974 (to be removed on general management grounds, irrespective of site development).

#### B Class Trees

T936, T947 & T949

### **Tree Protection**

3.7 Adequate protection and so successful retention of those trees to be retained within the land take area, will be achieved by rigidly excluding all construction activities from tree root protection areas by fit for purpose barriers/fencing and/or additional ground protection.

3.8 Tree Protection Areas (TPAs) are proposed, as indicated on accompanying Tree Protection plan. Protective fence line locations and details for these areas are indicated on this drawing - Dwg No 13609\_T\_103.

### **Services**

3.9 Services that are planned as part of this project must also avoid designated 'Root Protection Area' of tree / tree groups for retention and it is understood that this will be the case.

#### **4. RECOMMENDATIONS – Arboricultural Method Statement**

Recommendations for the specific measures advised regarding management of the trees in relation to this development are detailed within Appendix 1. These recommendations should inform, and be referred to in, the method statements submitted for approval prior to commencement by the responsible building/engineering and landscape contractors whose works (subject to grant of permission) will affect retained trees and the Tree Protection Areas.

##### *1. Tree Works.*

Subject to the required permissions removal / felling works as specified on Dwg No No13609\_T\_103, should be performed prior to project commencement, by reputable contractors in accordance with BS 3998:2010 and current best practice. Removal of scrub vegetation and ivy clearance should preferably be performed in winter outside of the bird nesting season. Tree felling should be preceded by a competent assessment as to the presence of any protected wildlife species, where required specialist advice should be sought if necessary.

##### *2. Protective Fencing.*

Following above permitted, priority tree works, protective fencing (barriers) should be erected in the positions and alignments as indicated on the Tree Protection Plan (Dwg No No13609\_T\_103). Fencing should be in accordance with BS 5837:2012 unless otherwise agreed with the planning authority. Commencement of development should not be permitted without adequate protective fencing being in place. This fencing, enclosing the minimum tree protection areas indicated, must be installed prior to any construction plant, vehicle or machinery access on site. Fencing should be signed 'Tree Protection Area – No Construction Access'. Fencing is not to be taken down or re-positioned without written approval of the project Arborist. No excavation, plant or vehicle movement, materials handling or soil storage is to be permitted within the fenced tree protection areas indicated on plan.

In order to facilitate works protective fencing may be aligned along edge of existing pathways which run below tree canopies – care must be taken to avoid damage to tree branches canopies with machinery traversing or working from paths.

#### **Additional Recommendations**

##### *3. Landscaping*

Proposed landscaping works including new planting, shall be performed in accordance with BS 5837:2012. During these works, the ground around retained trees must not be compacted by vehicles, nor be mechanically excavated for planting, nor be significantly altered in terms of ground levels.

##### *4. Monitoring & Compliance*

As indicated above and on accompanying Tree Protection Plan (Dwg No 13609\_T\_103), a number of potentially critical future works in proximity to retained trees are advised to be undertaken in accordance with approved method statements

and under direct supervision by a qualified consultant Arborist. Therefore, during the development, a professionally qualified Arborist is recommended to be retained as required by the principal contractor or developer to monitor and advise on any works within the RPA of retained trees to ensure successful tree retention and planning compliance.

It is advised that tree protection fencing, any required special engineering and supervision works etc must be included / itemised in the main contractor tender document, including responsibility for the installation, costs and maintenance of tree protection measures throughout all construction phases.

Copies of the Tree Survey and all accompanying drawings, a copy of BS 5837:2012 and NJUG 4 (2007) '*Guidelines for the planning, installation and maintenance of utility apparatus in proximity to trees*' should all be kept available on site by the contractor during development. All works are to be in accordance with these documents.

It is advised that all retained trees be subject to expert re-inspection within 12 months and/or prior to completion of development and public occupancy/access of the site.

### ***Limitations and Scope of this Survey Report***

This report covers only those trees individually inspected, (shown on the 'Tree Survey Drawings' and described in the 'Schedule'), and reflects the condition of those trees at the time of inspection. Inspection is limited to visual examination of the subject trees from the ground without; test boring, use of tomographic equipment, dissection, probing, coring, ivy removal or excavation to establish structural integrity. The trees were not climbed and dimensions are approximate, but considered a reasonable reflection of the trees measurements. This survey can only therefore be regarded as a preliminary assessment.

There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the subject trees may not arise in the future. The currency of this survey report and its recommendations is one year.

The accompanying drawings are illustrative and based on the land (topographical) survey supplied; CSR Ltd accept no legal liability or responsibility for any errors in the information contained in the supplied drawings.

CSR Ltd accept no responsibility for the performance of trees subject to pruning or other site works (including construction activities) not performed in strict accordance with recommendations as specified in this report and/or in accordance with BS 3998:2010 and BS 5837:2012

All retained trees mentioned in this report should be subject to expert re-inspection within 12 months and prior to completion of development works and public occupancy of the site.

This report was produced as a part of a planning application for the scheme; the author accepts no responsibility or liability for actions taken by reason of this report by the client or their agents unless subsequent contractual arrangements are agreed. Public disclosure or submission of any part of this report without title, or permission from the author, renders this report invalid and legally inadmissible.

### **References/Bibliography**

BS 5837 (2012). *Trees in Relation to Design, Demolition and Construction - Recommendations*. British Standards Institution. TSO, London.

BS 3998 (2010) *Tree Work - Recommendations*. British Standards Institution. TSO, London.

NJUG 4 (2007) *Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees (Issue 2)*. National Joint Utilities Group.

# APPENDIX 1

## TREE SURVEY KEY

Information in the attached schedule is given under the following headings:

### Tree No.

Individual trees have been numbered and tagged on site with corresponding survey tag or treated as a group where appropriate (e.g. Woodlands/hedgerows) and illustrated on accompanying tree survey drawing.

### Species

Common & Latin names of species are provided

### Height

Overall estimated height given in meters (measured using Truplus 200 Laser Rangefinder).

### Stem Diameter

The diameter of the main trunk taken at a height of 1.5m on a single stem tree, or, on each branch of multi-stemmed (MS) trees.

### Crown Spread

The largest radius of branch spread is provided in meters for North / East / South and West directions.

### Height of lowest branch

The distance between ground level and first significant branch or canopy (and direction of growth) given in meters (m).

Any measurement or dimension that has been estimated (for offsite or otherwise inaccessible trees where accurate data cannot be recovered) is identified by the suffix #.

### Life stage

The tree's age is defined as:

Y = Young, in first third of life (tree which has been planted in the last 10 years or is less than 1/3 the expected height of the species in question).

MA = Middle Age, in second third of life (tree, which is between a 1/3 and 2/3's the expected height of the species in question).

M = Mature, in final third of life (tree that has reached the expected height of the species in question, but still increasing in size).

OM = Over mature (tree at the end of its life cycle and the crown is starting to break up and decrease in size).

V = Veteran Tree (exceptionally old tree).

### Physiological Condition

The tree's physiological condition is defined as:

**Good** - Good vitality: normal bud growth, leaf size, crown density and wound closure

**Fair** - Average to below average vitality: reduced bud growth, smaller leaf size, lower crown density and reduced wound closure

**Poor** - Low vitality: limited bud growth, small chlorotic leaves, sparse crown, poor wound closure

**Dead** - No longer living.

### Structural Condition

The trees structural condition is defined as:

**Good** - No major structural defects observed (possibly some minor defects)

**Fair** - Minor defects present, (such as bark wounds, isolated decay pockets or structure affected due to overcrowding), that could be alleviated by tree surgery/management

**Poor** - Major structural defects present such as extensive deadwood, decay or defective to the point of being dangerous. (Significant defects are noted e.g. decay, collapsing etc).

### Preliminary Management Recommendations & Timescale

Recommendations actions based on limitations of survey – (may include further investigation and or assessment of suspected defects by means and or methods not undertaken / within the remit of this survey).

### Estimated Remaining contribution (Years)

Life of the tree is given as;

- 10 < less than 10 years remaining
- 10 + in excess of 10 years remaining
- 20 + in excess of 20 years remaining
- 40 + in excess of 40 years remaining

## Tree Quality Assessment Category

### **U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years.**

- Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning)
- Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline
- Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality

(NOTE: Category U trees can have existing or potential conservation value which it might be desirable to preserve).

### **A High quality**

*Trees of high quality with an estimated remaining life expectancy of at least 40 years*

A1 Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)

A2 Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features

A3 Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)

### **B Moderate quality**

*Those trees of moderate quality with an estimated remaining life expectancy of at least 20 years.*

B1 Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation.

B2 Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality.

B3 Trees with material conservation or other cultural value

## **C Low quality**

*Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm.*

C1 Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories.

C2 Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits.

C3 Trees with no material conservation or other cultural value



Tree No.	Species	Ht (m)	Crown spread (m)	Trunk Dia @1.5m (mm) RPA circle radius (m) RPA sqm	Ht of lowest branch (m) & direction of growth	Life stage (years)	Estimated remaining contribution (years)	General observations P – Physiological condition S – Structural condition	Preliminary management recommendations	Category of retention + sub-category
933	Acer psuedoplatanus	12m	N 5m S 4m W 4m E 4m	340mm 4.1m 52sqm	4.5m (all)	MA	40+	P – Good S – Fair		B1
934	Acer psuedoplatanus	#14m	N #4m S #4m W #4m E #4m	320mm 3.8m 46sqm	2.5m N/S	MA	40+	P – Good S – Good		B1
935	Acer psuedoplatanus	#13m	N #4m S #4m W #4m E #4m	260mm 3.1m 30sqm	2.5m (all)	MA	40+	P – Good S – Good		B1
936	Acer psuedoplatanus	#12m	N #4m S #4m W #4m E #4m	370mm 4.4m 62sqm	3m (all)	MA	40+	P – Good S – Good		B1
937	Acer psuedoplatanus	#12m	N #5m S #5m W #5m	630mm 7.6m 180sqm	6m (all)	MA	40+	P – Good S – Good		A1

Tree No.	Species	Ht (m)	E #5m Crown spread (m)	Trunk Dia @1.5m (mm) RPA circle radius (m) RPA sqm	Ht of lowest branch (m) & direction of growth	Life stage (years)	Estimated remaining contribution (years)	General observations P – Physiological condition S – Structural condition	Preliminary management recommendations	Category of retention + sub-category
938	Tilia cordata	#15m	N #7m E #7m S #7m W #7m	930mm 11.2m 391sqm	2m (all)	MA	40+	P – Good S – Fair		A1
939	Acer psuedoplatanus	#15m	N #6m E #6m S #6m W #6m	630mm 7.6m 180sqm	3.5m (W)	MA	40+	P – Good S – Good		A1
940	Acer psuedoplatanus	#12m	N #5m E #5m S #5m W #5m	420mm 5m 80sqm	3m (N/S)	MA	40+	P – Good S – Good		A1
941	Acer psuedoplatanus	#15m	N #7m E #7m S #7m W #7m	510mm 600mm = 787mm 9.4m 280sqm	2.5m (W)	MA	40+	P – Good S – Fair Significant compression fork at 1m but appears stable.		A1
942	Acer psuedoplatanus	#8m	N#3.5m	340mm	2.5m (all)	MA	40+	P – Good		B1

Tree No.	Species	Ht (m)	Crown spread (m)	E # S # W #	Trunk Dia @1.5m (mm) RPA circle radius (m) RPA sqm	Ht of lowest branch (m) & direction of growth	Life stage (years)	Estimated remaining contribution (years)	General observations P – Physiological condition S – Structural condition	Preliminary management recommendations	Category of retention + sub-category
943	Acer psuedoplatanus	#10m	N#3.5m E #3.5m S 3.5m W#3.5m	4.1m 552sqm	490mm 5.9m 108sqm	3.5m (S)	MA	40+	P – Good S – Good Roots in conflict with pathway.		B1
944	Betula pendula	#10m	N #3m E #3m S #3m W #3m		420mm 5m 80sqm	2.5m (all)	MA	40+	P – Fair S- Good		B1
945	Acer psuedoplatanus	#11m	N #6m E #6m S #6m W #6m		540mm 6.5m 132sqm	4m (E)	MA	40+	P – Good S- Good		A1
946	Acer psuedoplatanus	#13m	N #6m E #6m S #6m		690mm 8.3m 215sqm	4m (N)	MA	40+	P – Fair S - Fair		B1

Tree No.	Species	Ht (m)	Crown spread (m)	Trunk Dia @1.5m (mm) RPA circle radius (m) RPA sqm	Ht of lowest branch (m) & direction of growth	Life stage (years)	Estimated remaining contribution (years)	General observations P – Physiological condition S – Structural condition	Preliminary management recommendations	Category of retention + sub-category
947	Betula pendula	#9m	W #6m N #3m E #3m S #3m W #3m	430mm 5.2m 84sqm	3m (all)	MA	20+	P – Fair S - Fair		B1
948	Acer psuedoplatanus	#9m						P – Dead S - Poor		U
949	Acer psuedoplatanus	#11m	N 2m E 2m S 4m W 4m	430mm 5.2m 84sqm	3m (All)	MA	20+	P – Fair S - Good Large wound to trunk at 1m high SW side has occluded / healed.		B1
950	Acer psuedoplatanus	#11m	N #2m E #2m S #2m W #2m	360mm 4.3m 59sqm	3m (S)	MA	20+	P – Fair S - Good		B1
951	Betula pendula	#11m	N#2.5m	370mm	2.5m (All)	MA	20+	P – Fair		B1

Tree No.	Species	Ht (m)	Crown spread (m)	Trunk Dia @1.5m (mm) RPA circle radius (m) RPA sqm	Ht of lowest branch (m) & direction of growth	Life stage (years)	Estimated remaining contribution (years)	General observations P – Physiological condition S – Structural condition	Preliminary management recommendations	Category of retention + sub-category
952	Acer psuedoplatanus	#11m	N 2m E 4m S 3m W 2m	410mm 4.9m 76sqm	2.5m (All)	MA	20+	P – Fair S - Good		B1
953	Betula pendula	#12m	N#2.5m E #2.5m S #2.5m W#2.5m	290mm 3.5m 38sqm	3m (SW)	MA	20+	P – Fair S - Good		B1
954	Tilia cordata	#12m	N #4m E #4m S #2m W #7m	580mm 7m 152sqm	2.5m (E)	MA	40+	P – Good S – Good Heavy lean east over river		A1
955	Acer psuedoplatanus	#13m	N #5m E #5m S #5m	580mm 7m 152sqm	4m (All)	M	40+	P – Good S - Good		A1

956	Aesculus hippocastanum	#12m	W #5m N #6m E #6m S #6m W #6m	640mm 7.7m 185sqm	2.5m (N)	MA	40+	P – Good S – Fair		A1
957	Acer pseudoplatanus	#14m	N #6m E #6m S #6m W #6m	880mm 10.6m 350sqm	2m (all)	MA	40+	P – Good S – Good	Remove lvy	A1
958	Acer pseudoplatanus	#9m	N 1m E 4m S 2m W 2m	420mm 5m 80sqm	2.5m (all)	MA	40+	P – Fair S – Fair		B1
959	Acer pseudoplatanus	#13m	N #4m E #4m S #4m W #4m	550mm 6.6m 137sqm	2.5m (N)	MA	40+	P – Good S – Good		A1
<b>Tree No.</b>	<b>Species</b>	<b>Ht (m)</b>	<b>Crown spread (m)</b>	<b>Trunk Dia @1.5m (mm)</b> <b>RPA circle radius (m)</b> <b>RPA sqm</b>	<b>Ht of lowest branch (m) &amp; direction of growth</b>	<b>Life stage (years)</b>	<b>Estimated remaining contribution (years)</b>	<b>General observations</b> P – Physiological condition S – Structural condition	<b>Preliminary management recommendations</b>	<b>Category of retention + sub-category</b>

960	Tilia cordata	#12m	N 3m E 5m S 3m W 3m	500mm 6m 113sqm	1.5m (E)	MA	40+	P – Good S – Good	Remove branch at 1.5m on east side.	A1
961	Acer psuedoplatanus	#14m	N #6m E #6m S #6m W #6m	630mm 7.6m 180sqm	2.5m (N)	MA	40+	P – Good S – Good		A1
962	Acer psuedoplatanus	#13m	N 5m E 2m S 3m W 3m	430mm 5.2m 84sqm	4m (N)	MA	40+	P – Good S – Good		B1
<b>Tree No.</b>	<b>Species</b>	<b>Ht (m)</b>	<b>Crown spread (m)</b>	<b>Trunk Dia @1.5m (mm)</b> <b>RPA circle radius (m)</b> <b>RPA sqm</b>	<b>Ht of lowest branch (m) &amp; direction of growth</b>	<b>Life stage (years)</b>	<b>Estimated remaining contribution (years)</b>	<b>General observations</b> P – Physiological condition S – Structural condition	<b>Preliminary management recommendations</b>	<b>Category of retention + sub-category</b>
963	Acer psuedoplatanus	#15m	N #6m E #6m S #6m W #6m	590mm 7.1m 158sqm	4m (NE)	MA	40+	P – Good S – Good		A1
964	Acer psuedoplatanus	#13m	N #6m E #6m	370mm 480mm =606mm	1.5m (NE/SW)	MA	40+	P – Good S – Good		A1

965	Acer psuedoplatanus	#13m	<b>S</b> #6m <b>W</b> #6m <b>N</b> #6m <b>E</b> #6m <b>S</b> #6m <b>W</b> #6m	7.3m 166sqm 1040mm 12.5m 490sqm	2.5m (all)	MA	40+	P – Good S – Good	A1	
966	Acer psuedoplatanus	#13m	<b>N</b> 3m <b>E</b> 3m <b>S</b> 6m <b>W</b> 1m	410mm 4.9m 76sqm	2.5m (all)	MA	40+	P – Fair S – God	B1	
967	Acer psuedoplatanus	#13m	<b>N</b> 4m <b>E</b> 1m <b>S</b> 2m <b>W</b> 5m	440mm 5.3m 87sqm	4m (W)	MA	40+	P – Good S – Good	A1	
<b>Tree No.</b>	<b>Species</b>	<b>Ht (m)</b>	<b>Crown spread (m)</b>	<b>Trunk Dia @1.5m (mm)</b> <b>RPA circle radius (m)</b> <b>RPA sqm</b>	<b>Ht of lowest branch (m) &amp; direction of growth</b>	<b>Life stage (years)</b>	<b>Estimated remaining contribution (years)</b>	<b>General observations</b> P – Physiological condition S – Structural condition	<b>Preliminary management recommendations</b>	<b>Category of retention + sub-category</b>
968	Acer psuedoplatanus	#13m	<b>N</b> #6m <b>S</b> #6m <b>W</b> #6m <b>E</b> #6m	620mm 7.4m 174sqm	2.5m (all)	MA	40+	P – Good S – Good	A1	



969	Acer psuedoplatanus	#14m	N #6m S #6m W #6m E #6m	690mm 8.3m 215sqm	2.5m (all)	MA	40+	P – Good S – Good	A1	
970	Acer psuedoplatanus	#13m	N #6m S #1m W #2m E #2m	470mm 5.6m 100sqm	3m (N)	MA	20+	P – Fair S – Good	B1	
971	Acer psuedoplatanus	#9m	N#2.5m S #2.5m W#2.5m E #2.5m	300mm 3.6m 41sqm	2.5m (all)	MA	40+	P – Fair S – Good	B1	
972	Acer psuedoplatanus	#16m	N 5m S 7m W 7m E 5m	860mm 10.3m 334sqm	2.5m (all)	MA	40+	P – Good S – Good	A1	
Tree No.	Species	Ht (m)	Crown spread (m)	Trunk Dia @1.5m (mm) RPA circle radius (m) RPA sqm	Ht of lowest branch (m) & direction of growth	Life stage (years)	Estimated remaining contribution (years)	General observations P – Physiological condition S – Structural condition	Preliminary management recommendations	Category of retention + sub-category
973	Acer psuedoplatanus	#10m	N 2m	500mm	4m (all)	MA	20+	P – Fair	B1	

974	Aesculus hippocastanum	#14m	<b>S</b> 0m <b>W</b> 2m <b>E</b> 5m  <b>N</b> 7m <b>S</b> 5m <b>W</b> 5m <b>E</b> 5m	6m 113sqm  1080mm 13m 527sqm	2m (N/S)	M	10<	P – Poor S – Poor  One of two main stems dead, significant internal decay on east side of trunk at ground level suspected.			U
975	Acer psuedoplatanus	#15m	<b>N</b> 1m <b>S</b> 6m <b>W</b> 2m <b>E</b> 2m	670mm 8m 203sqm	3m (W/E)	MA	40+	P – Fair S – Fair			B1
976	Acer psuedoplatanus	#13m	<b>N</b> #5m <b>S</b> #5m <b>W</b> #5m <b>E</b> #5m	500mm 6m 113sqm	4m (N/S)	MA	40+	P – Good S – Good			B1
977	Acer psuedoplatanus	#15m	<b>N</b> 6m <b>S</b> 4m <b>W</b> 5m <b>E</b> 5m	850mm 10.2m 327sqm	2m (E/W)	MA	40+	P – Good S – Good			A1



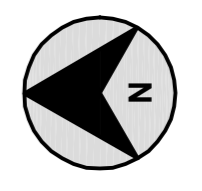
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	CLASS B INDIVIDUAL TREE (MODERATE QUALITY - RETENTION DESIRABLE)
	CLASS C INDIVIDUAL TREE (LOW QUALITY - RETENTION OPTIONAL)
	CLASS U INDIVIDUAL TREE (RECOMMEND REMOVAL)

REV	DATE	AMENDMENT

**CUNNANE STRATTON REYNOLDS**  
**LAND PLANNING & DESIGN**






GALWAY OFFICE  
 REDACONS: BALLYTRASNA, TUAM, CO GALWAY  
 TEL: 091 848810  
 EMAIL: cunnane@csrdandplan.ie  
 www.csrdandplan.ie



PROJECT:	ATHLONE CYCLEWAY	DATE:	SEPTEMBER 201
DRAWING:	TREE SURVEY	SCALE:	1:150C
CHECKED:		DRAWN:	KV
DRAWING NO:	13609_T_10'	CHECKED:	KV



**LEGEND**

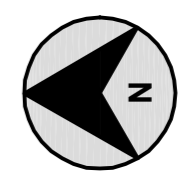
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-  CLASS B INDIVIDUAL TREE (MODERATE QUALITY - RETENTION DESIRABLE)
-  CLASS C INDIVIDUAL TREE (LOW QUALITY - RETENTION OPTIONAL)
-  CLASS U INDIVIDUAL TREE (RECOMMEND REMOVAL)
-  CALCULATED ROOT PROTECTION AREA



REV	DATE	AMENDMENT

**CUNNANE STRATTON REYNOLDS  
LAND PLANNING & DESIGN**

GALWAY OFFICE  
 REDACONG, BALLYTRASNA, TUAM, CO GALWAY  
 TEL: 091 8685100  
 EMAIL: cunnane@csrdandplan.ie  
 www.csrdandplan.ie










PROJECT:	ATHLONE CYCLEWAY	DATE:	SEPTEMBER 201
DRAWING:	TREE CONSTRAINTS	SCALE:	1:150C
CHECKED:		DRAWN:	KV
DRAWING NO:	13609_T_102	CHECKED:	KV





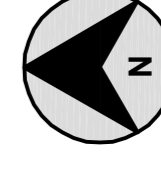
**LEGEND**

-  CLASS A INDIVIDUAL TREE (HIGH QUALITY - RETENTION HIGHLY DESIRABLE)
-  CLASS B INDIVIDUAL TREE (MODERATE QUALITY - RETENTION DESIRABLE)
-  CLASS C INDIVIDUAL TREE (LOW QUALITY - RETENTION OPTIONAL)
-  CLASS U INDIVIDUAL TREE (RECOMMEND REMOVAL)
-  CALCULATED ROOT PROTECTION AREA
-  TREES PROPOSED FOR REMOVAL
-  TREE PROTECTION FENCING LINE POSITION (AS PER DETAILS OR AGREED ALTERNATIVE)

REV	DATE	AMENDMENT

**CUNNANE STRATTON REYNOLDS  
LAND PLANNING & DESIGN**

GALWAY OFFICE  
REDACONG, BALLYTRASNA, TUAM, CO GALWAY  
TEL: 091 8685170  
EMAIL: csi@landplan.ie  
WWW.CSIANDPLAN.IE



PROJECT:	ATHLONE CYCLEWAY	DATE:	SEPTEMBER 201
DRAWING:	TREE PROTECTION & REMOVAL	SCALE:	1:150C
CHECKED:		DRAWN:	KV
DRAWING NO:	13609_T_102	CHECKED:	KV





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## **Appendix 8.1**

### *Section 50 Flood Risk Assessment and Management Study*

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**SECTION 50 FLOOD RISK  
ASSESSMENT &  
MANAGEMENT STUDY,  
PROPOSED BRIDGE,  
ATHLONE, CO. WESTMEATH**

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Technical Report Prepared For

**ROUGHAN & DONOVAN**

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Technical Report Prepared By

**David Casey BSc MSc MCIWEM**

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Our Reference

DC/15/8321WR01d

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Date Of Issue

05 February 2016

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**Cork Office**  
Unit 5, AIS Building,  
Carrigaline Industrial Estate,  
Carrigaline, Co. Cork.  
T: + 353 21 438 7400  
F: + 353 21 483 4605

AWN Consulting Limited  
Registered in Ireland No. 319812  
Directors: F. Callaghan, C. D'Ivor,  
T. Donnelly, T. Hayes, D. Kelly, E. Porter

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Revision Level	Revision Date	Description	Sections Affected
a	24/04/2015	General edits	
b	14/05/2015	Update Westmeath County Development Plan to 2014-2020 Version	Appendix III
c	13/07/2015	Updated Bridge Layout, Include Flood modelling scenario for partial blockage of bridge	Sections 6 & 7
d	29/01/2016	Revised bridge configuration. Update historic flood data.	Sections 3,6 & 7

## Record of Approval

Details	Written by	Approved by
Signature		
Name	David Casey	Teri Hayes
Title	Environmental Consultant	Director
Date	05 February 2016	05 February 2016

## EXECUTIVE SUMMARY

AWN Consulting were requested by Roughan & O'Donovan to undertake a flood risk assessment as part of a Section 50 application. The application covers a proposed bridge walkway/cycleway across the River Shannon in Athlone Town, Co Westmeath. This report forms part of the Section 50 application to determine the scale of impact the structure will have on the River Shannon.

A Section 50 application is covered by the European Communities (Assessment and Management of Flood risks) Regulation SI 122 of 2010 which requires that:

“No Person, including a body corporate, shall construct any new bridge or alter, Reconstruct, or restore any existing bridge over any watercourse without the Consent of the Commissioners or otherwise than in accordance with plans previously approved of by the Commissioners”.

Under a Section 50 application it is necessary to demonstrate that the following design standards are achieved:

- A bridge or culvert must be capable of passing a fluvial flood flow with a 1% Annual Exceedance Probability (AEP) or 1 in 100 year flow without significantly changing the hydraulic characteristics of the watercourse.
- A bridge must be capable of operating under the above design conditions while maintaining a freeboard of at least 300 mm.
- If the land potentially affected includes dwellings and infrastructure, it must be demonstrated that those dwellings and/or infrastructure are not adversely affected by constructing the bridge or culvert.
- A culvert diameter, height and width must not be less than 900 mm to facilitate maintenance access and reduce the likelihood of debris blockage

Hydraulic modelling was undertaken to quantify the effects that the proposed bridge structure will potential have on the River Shannon and that the above requirements are met. The 1% AEP flood level at the proposed bridge structure is calculated as 36.261 (mAOD) which provides a freeboard of 3.729m from the bridge soffit level of 39.99mAOD.

The proposed bridge will result in an increase in flood levels of 9mm directly upstream of the bridge which will dissipate down to 4mm approximately 350m upstream of the bridge.

The construction of the bridge will reduce the cross-sectional area of the river by approximately 30.64m<sup>2</sup> from the total river sectional area of approximately 707.16m<sup>2</sup> resulting in a final area of 676.52m<sup>2</sup>. As previously discussed the reduction in the cross-sectional area from the proposed bridge will result in minimal increase in peak flood levels of between 4-10mm.

Furthermore a potential blockage scenario was included in the hydraulic modelling process which assumes a reduction in the cross-sectional area from 676.52m<sup>2</sup> to 660.52m<sup>2</sup>. The result from the modelling process indicates an additional flood level increase of 14mm directly upstream of the proposed bridge. Under this scenario a freeboard of 3.714m is provided therefore no additional risk of flooding is foreseen during the Blockage scenario.

It is the conclusion of this report that no negative impacts will result on the hydraulic properties of the River Shannon and will not increase the risk of flooding elsewhere in the catchment.

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## 1.0 INTRODUCTION

### 1.1 Scope

AWN Consulting were requested by Roughan & O'Donovan to undertake a flood risk assessment as part of a Section 50 application. The application covers a proposed bridge walkway/cycleway across the River Shannon in Athlone Town, Co Westmeath. This report forms part of the Section 50 application to determine the scale of impact the structure will have on the River Shannon.

A Section 50 application is covered by the European Communities (Assessment and Management of Flood risks) Regulation SI 122 of 2010 which requires that:

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- A bridge must be capable of operating under the above design conditions while maintaining a freeboard of at least 300 mm.
- If the land potentially affected includes dwellings and infrastructure, it must be demonstrated that those dwellings and/or infrastructure are not adversely affected by constructing the bridge or culvert.
- A culvert diameter, height and width must not be less than 900 mm to facilitate maintenance access and reduce the likelihood of debris blockage.

To ensure that the proposed bridge does not have a negative impact on the hydraulic characteristics on the River Shannon a Flood Risk Assessment (FRA) will be undertaken for the site. The FRA will be carried out according to the Planning System and Flood Risk Management Guidelines for Planning Authorities, OPW (2009) which requires that a tiered approach will be taken. This begins with a Stage 1 assessment which aims to quantify the risk posed to the development and to the surround environment by this development. The Stage 1 assessment will also determine if it is necessary to proceed onto a Stage 2/3 investigation.

This hierarchy of assessment ensures that flood risk is taken into account at all levels of the planning system but also that the right level of detail is considered, avoiding the need for detailed and costly assessments prior to making strategic decisions.

In terms of the Flood Risk Assessment and Management Study the scope of works incorporates three stages:

- **Stage 1: Flood Risk Identification** - to identify whether there may be any flooding or surface water management issues related to a plan area or proposed development site that may warrant further investigation.
- **Stage 2: Initial Flood Risk Assessment** - to confirm sources of flooding that may affect a plan area or proposed development site, to appraise the adequacy of existing information and to determine what surveys and modelling approach is appropriate to match the spatial resolution required

and complexity of the flood risk issues. The extent of the risk of flooding should be assessed which may involve preparing indicative flood zone maps. Where existing river or coastal models exist, these should be used broadly to assess the extent of the risk of flooding and potential impact of a development on flooding elsewhere and of the scope of possible mitigation measures; and

- **Stage 3: Detailed Flood Risk Assessment** - to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of potential flood risk to a proposed or existing development, of its potential impact on flood risk elsewhere and of the effectiveness of any proposed mitigation measures. This will typically involve use of an existing or construction of a hydraulic model of the river or coastal cell across a wide enough area to appreciate the catchment wide impacts and hydrological processes involved.

This report contains the third stage of the flood risk assessment, Stage 3 – Detailed Flood Risk Assessment, in accordance with the guidelines produced by the Department of the Environment, Heritage and Local Government (DoEHLG) - *The Planning System and Flood Risk Management Guidelines for Planning Authorities*, November 2009.

For classification of the Flood Risk Zones see Appendix I.

## 1.2 Methodology

The Flood Risk Assessment involves a desktop study and detailed analysis of relevant flood studies to assess the risks posed by the development. The methodology involves researching the following guidelines and data sources.

This Stage 3 assessment will follow the guidelines set out by the following:

- The Planning System and Flood Risk Management Guideline for Planning Authorities (2009)<sup>1</sup>

The following sources were also referenced to provide information:

- Basemaps – Ordnance Survey of Ireland<sup>2</sup>
- Geological Survey of Ireland (GSI) maps on superficial deposits (current and historical)<sup>3</sup>
- Historical flooding-OPW<sup>4</sup>
- Hydrometric Stations- EPA<sup>5</sup>
- Extent of flood defences- EPA/OPW<sup>4,5</sup>
- The National Development Plan 2007-2013<sup>6</sup>
- Westmeath County Development Plan 2014-2020<sup>7</sup>
- CFRAM PFRA Indicative floodmaps<sup>8</sup>
- Shannon CFRAM study<sup>9</sup>
- OPW Flood Studies Update (FSU) Web Portal<sup>10</sup>



## **2.0 DEVELOPMENT PLANS & POLICIES**

There are a number of development plans associated with this development which were consulted. These are as follows:

- The National Development Plan 2007-2013<sup>8</sup>
- Westmeath County Development Plan 2014- 2020<sup>9</sup>

### **2.1 The National Development Plan 2007-2013**

For details of the flooding policies detailed in the National Development Plan see Appendix II.

### **2.2 Westmeath County Development Plan 2014-2020**

For details of the flooding policies detailed in the Westmeath County Development Plan see Appendix II.

### 3.0 EXISTING HYDROLOGICAL ENVIRONMENT

#### 3.1 Location

The proposed development is located in the Athlone Town, Co. Westmeath as shown in Figure 3.1 below. The proposed development comprises of a single walkway/cycleway and associated works to be constructed across the River Shannon.



**Figure 3.1** Site Location

The River Shannon is the main hydrological feature in the area as shown in Figure 3.2 below.

The River Shannon rises in the Cuilcagh Mountains in a small lake named as the Shannon Pot in Co. Cavan and predominantly flows in a southerly direction through Dowra and Lough Allen. It flows for approximately 386 km through the main town of Belturbet, Leitrim, Carrick-on-Shannon, Athlone, Portumna, Killaloe and Limerick City. The River Shannon discharges to the Atlantic Ocean via the Shannon Estuary.

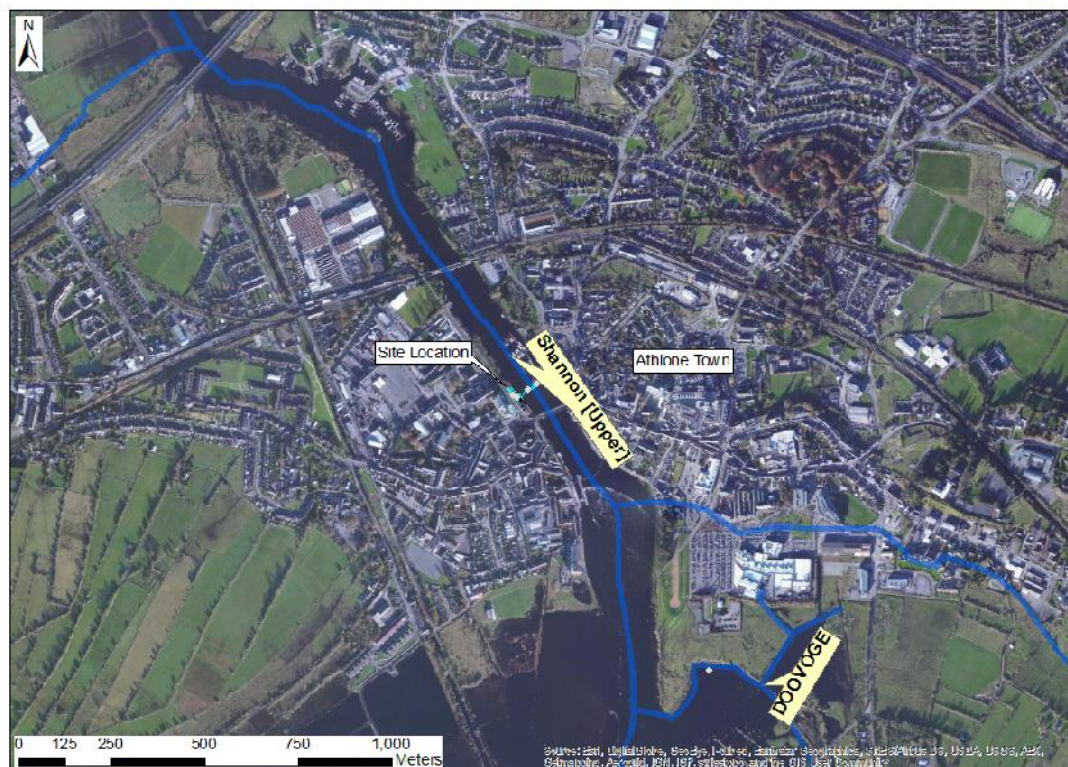


Figure 3.2 Hydrological Environment

### 3.2 Existing Flood Records

The OPW Floodmap.ie site was reviewed to research possible historical flooding at the site. No flood events have been recorded at the proposed development although the River Shannon has a history of flooding in Athlone Town. The following are the main flood events to have occurred in close proximity to the proposed bridge, (See Appendix III):

- November 30<sup>th</sup> 2009, Exceptionally heavy rainfall during November 2009 resulted in record flood levels along the Shannon with up to 100mm recorded in some areas of the catchment;
- February 2002- Flood due to heavy rainfall;
- November 2000-Heavy rainfall during December 1999 resulting in severe flooding along the River Shannon. The flooding in the middle catchment which spans from Lough Allen to Athlone was among the highest on record;
- December 1954;
- Recurring flooding;
  - Shannon Deer park
  - Shannon Wolfe tone Terrace
  - Shannon Strand
  - Railway Bridge

In addition to the above, severe flooding was recorded along the River Shannon during December 2015 when a series of storms hit Ireland during the months of November and December, most notable Storms Clodagh, Desmond, Eva and Frank. The series of storms resulted in the saturation of soils within the Shannon catchment resulting in increased surface water run and associated flood levels.

The peak flood level recorded in Athlone town was 37.01 mAOD (Malin) on the 05<sup>th</sup> January 2016. (Station No. 26333, Athlone Weir U/S) (Source: waterways Ireland).

This compares with the previous peak flood level of 36.9 mAOD (Malin) during the November 2009 flooding.

### 3.3 Existing Site Geology and Hydrogeology

The bedrock under the proposed site is classified as Waulsortian Limestones which is described as Massive fine-grained limestone. The Waulsortian Limestones formation is part of the Dinantian Pure Unbedded Limestone (DPUL). The maximum thickness of Dinantian Limestones is less than 100 m. The closet fault line located approximately 1.4km to the southwest which runs in a northwest to southeast direction, see Figure 3.3 below.



**Figure 3.3** Bedrock Geology

The GSI online mapping service ([www.gsi.ie](http://www.gsi.ie)) provides information on the subsoil, aquifer and groundwater vulnerability for the proposed site. In regards to the hydrogeological environment the aquifer is classified as LI, a Locally Important Aquifer- Bedrock which is Moderately Productive only in Local Zones, see Figure 3.4 below.



Figure 3.4 Bedrock Aquifer

The groundwater vulnerability for the site is classified as 'high' in the south-western bank of the site and 'Moderate' in the north-eastern bank, which indicates a subsoil depth of greater than 3m at the proposed site, see Figure 3.5 below.

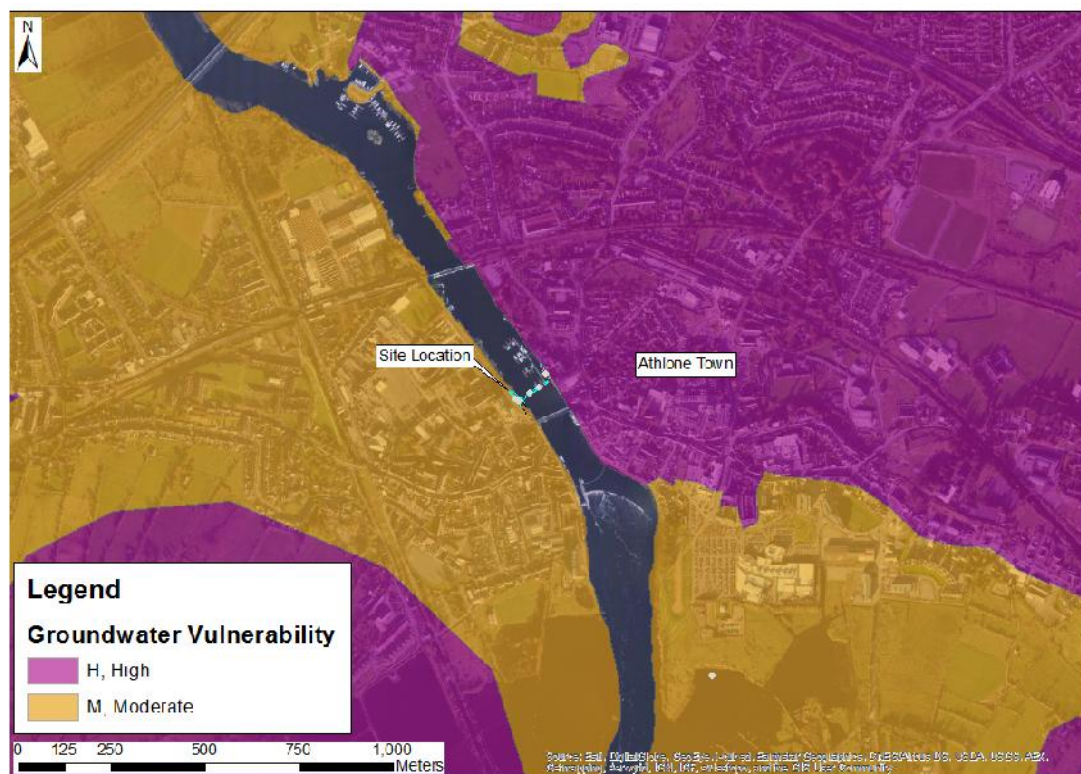


Figure 3.5 Groundwater Vulnerability

The subsoil types in the study area are predominately classified as Made Ground due to the urban setting of the development

### 3.4 Existing Flood Studies and Surveys

#### Jacobs CFRAM Shannon operations

The River Shannon Level Operation Review Report assesses the operating regulations and procedures of the control structures along the river Shannon with the purpose of identifying immediate, short term potential improvements with respect to flood risk management.

The ESB and Waterways Ireland (WI) currently undertake management of Lough Derg, Lough Ree and Lough Allen in compliance with their respective Regulations and Rules with the aim of providing optimum management of floods within existing storage and land control capabilities.

Management of water levels at Lough Ree which is located directly north of Athlone town is undertaken by the weir and Sluice gate systems located in Athlone. The aim of the weir system is to maintain a water level of 36.03mAOD in Lough Ree while managing flooding of the Callows located south of Athlone.

A Water Management Document is maintained by the ESB which outlines the day to day operational guidelines of control structures along the River Shannon. Specifically the operation Regulations and Guidelines have three main objectives:

- To ensure dam safety at both Lough Allen and at the Lower Shannon Dams (i.e. the embankments plus Parteen Weir and Ardnacrusha Dam). In this regard the Lower Shannon Dams are required to pass a flood event with an Annual Exceedance Probability (AEP) of 0.01% (1 in 10,000) while Bellantra Sluice structure and associated embankment dam at the outlet of Lough Allen is required to pass a 0.1% (1 in 1,000) AEP flood event.
- To maintain, as far as possible, minimum and seasonal navigation levels in the main lakes. Maintaining these minimum and seasonal levels assures adequate water supply and quality for Local Authorities and Inland Fisheries Ireland.
- To minimise flooding as far as possible for the agricultural sector and the general public.

The Athlone Weir is owned and operated by WI however the operation of the sluices is only carried out on the instruction of ESB. Opening of the sluice gates along the weir system in Athlone has direct impacts on the callows downstream of Athlone. If this release occurs late in the flood, it will worsen depths downstream however if released early, it could worsen the duration of downstream flooding. The current aim of the ESB Regulations and Guidelines is to provide a balance between these effects.

#### Shannon CFRAM Inception Report-Unit of Management 25/26

The Shannon RBD is the largest RBD in Ireland which covers approximately 17,800 km<sup>2</sup>. The RBD includes the entire catchment of the River Shannon and its estuary as well as some catchments in North Kerry and West Clare that discharge directly to the Atlantic. The Shannon Upper and Lower Unit of Management (or UoM 25/26), encompasses areas of the following counties; Sligo, Leitrim, Roscommon, Longford, Cavan, Meath, North and South Tipperary, Offaly, Galway, Clare, Westmeath, Limerick and small areas of Mayo and Laois. A very small area of County Fermanagh contributes to groundwater flow in the headwaters of the River Shannon.

From Lough Allen the Shannon flows south through a series of navigation locks to Lough Ree. It is joined on its way by major tributaries including the Boyle and Inny, but also by the Shannon-Erne Waterway.

The following flood events, see Table 3.1, are identified to have occurred in the wider Athlone area in the Inception report.

**Table 3.1** Historic Flood Events-Athlone Town

Event	Peak Flow (m <sup>3</sup> /s)	Peak Level (mAOD - Poolbeg)	Estimated Annual Exceedance Probability (AEP) (%)	Flood Extents & Damages
30-Nov-09	-	39.09 (Athlone)	1.5	Extensive flooding throughout the Shannon catchment
November/December 2006	-	38.60 (Athlone)	9	No flooding details available
Feb-03	-	-	-	No flooding details available
Nov-02	-	38.37 (Athlone)	20.2	60 to 80 residential properties flooded at Willow Park Estate to a depth of 1200mm. Golden Island area affected.
Feb-02	-	38.57 (Athlone)	10	Burgess Park, McQuaids Bridge & Deer Park area affected by flooding.
Winter 1999/2000	379.1 (Athlone Weir)	38.59 (Athlone)	9.3	Extensive flooding throughout the Shannon catchment. Barrymore, Golden Island, Creggan, Clonown, Cloonbonny & Carrick O'Brien area flooded
Winter 1994/1995	305.1 (Athlone Weir)	38.57 (Athlone)	10.0	Extensive flooding in the Shannon callow south of Athlone. Clonown Road flooded.
February 1990 - 38.55 (Athlone) 10.8				Extensive flooding throughout the Shannon catchment. 3,000 farm families & 700 acres of land south of Athlone affected by flooding
16-18 January 1965 - 38.42 (Athlone) 17.0 H				Hundreds of acres of land from Banagher to Athlone flooded.
Winter 1959 -		38.42 (Athlone) 17.0		No flooding details available
Dec-54	364.1 (Athlone Weir)	38.64 (Athlone)	7.8	Reported 124 farm holdings & 70 residential properties between Athlone & Meelick seriously flooded. (Estimated 165 farms & 100 dwellings) Thousands of acres of farmland flooded in the Shannon
November-January 1929/1930				Low lying areas of Athlone flooded.
Jan-25				No flooding details available

Recurring			Low lying area at Railway Bridge, Ballymahon Road, Retreat Rd, Railway Bridge, Coosan, Central Terrace, Cartron Drive, Auburn Heights & Marine View floods after heavy rain every year. Considerable area North of Athlone is flooded by the River Shannon
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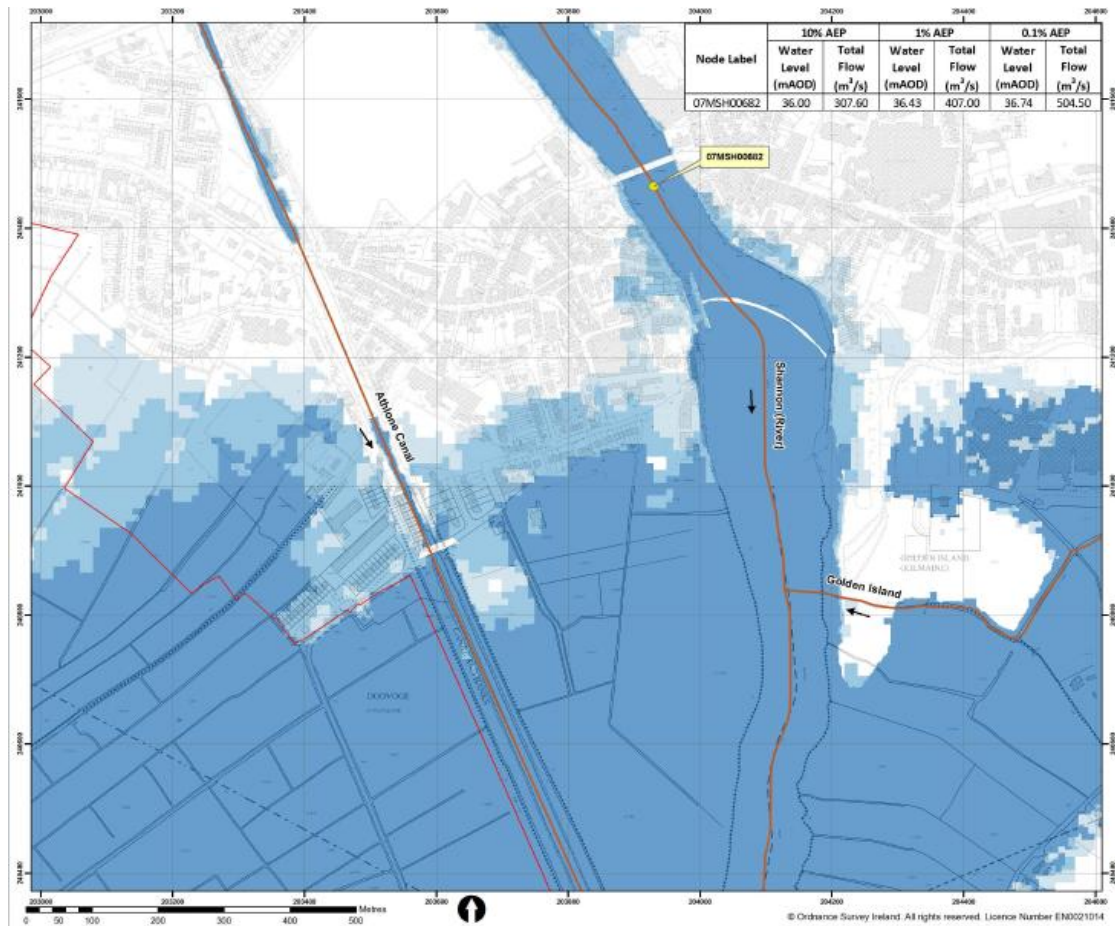
As part of the Inception report it was necessary to identify Communities at Risk (CAR) and Areas for Flood Risk Review (AFRR). One of the early activities on the Shannon CFRAM Study has been to undertake a Flood Risk Review for all of these locations. During this initial assessment Athlone is classified as Areas of Further Assessment (AFA)

The hydrological analysis that will be undertaken as part of the Shannon CFRAM is outlined in the Inception Report. A total of 44 models have been planned for the whole Shannon RBD, numbered N1-N21 in the North, Unit of Management (UoM) 25/26 and S1 – S23 in the South (UoM 23, 24, 27 and 28). Twenty-one models have been planned in UoM 25/26 which contains Athlone Town.

Within UoM 25/26 fluvial flooding is identified as the predominate cause of flooding in the designated AFAs therefore irrespective of the precise causes of historic flooding, observations from the nearest river gauge would be a useful indicator of flood risk. Gauging stations within the Shannon RBD are generally located within natural sections and therefore generally do not have any purpose-built control structures to ensure critical flow e.g. a flume or weir. As the majority of gauging station sites are located downstream of man-made structures, these structures will provide some stability to the rating curve at these gauges.

The main outcome of the Shannon CFRAM is the development of floodmaps across the entire reach. Draft floodmaps were released during Q1 of 2015 for the Shannon CFRAM which includes Athlone Town, see figure 3.6 below. The draft floodmaps provide the flood extent for the 10%, 1% and 0.1% flood events along the River Shannon. Additional information is provided at various nodes throughout modelled sections such as peak water level and flow.





**Figure 3.6** Shannon CFRAM Floodmaps

The nearest 'node' to the proposed bridge which provides flow data is located approximately 200m downstream, classified as 07MSH00682. The CFRAM hydraulic model produced the following flow data for a 1% AEP flow event;

- Total Flow 407m<sup>3</sup>/s
- Water level 36.43 (mAOD)

No flooding occurs in the vicinity of the proposed site however some flooding occurs upstream of the site and downstream in the vicinity of the weir structure.

## **4.0 FLOOD RISK IDENTIFICATION**

### **4.1 Fluvial**

Review of historical records such as the OPW Floodmaps.ie, GSI Subsoil maps classification and the CFRAM Preliminary Flood Risk Assessment (PFRA) Indicative Flood maps was undertaken to identify flood risks to the site. The GSI Subsoil maps do not provide evidence of Alluvium soils at either bank however due to the urban setting this evidence may have been removed. Historic flood events have occurred in Athlone town at the site from Floodmaps.ie primarily in low lying areas to the north and south of Athlone Town center. The extent of the flooding is confirmed by the CFRAM PFRA floodmaps, (see Appendix IV) and draft CFRAM floodmaps. Floodmaps.ie, CFRAM PFRA and the draft CFRAM floodmaps do not indicate flooding risks at the site.

### **4.2 Pluvial**

Pluvial flooding is usually caused by intense rainfall that may only last a few hours. The resulting water follows natural valley lines, creating flow paths along roads and through and around developments and ponding in low spots, which often coincide with fluvial floodplains in low lying areas. Any areas at risk from fluvial flooding will almost certainly be at risk from pluvial flooding.

The OPW floodmaps and the CFRAM PRTR flood maps do not indicated any pluvial flooding of the site. The area around the site is primarily an urban setting with associated stormwater drainage infrastructure in place which will capture and manage surface water.

The site is not identified as being at risk of flooding from pluvial flooding and will not increase the risk of pluvial flooding elsewhere in the catchment.

### **4.3 Groundwater**

Groundwater flooding can be due to high water tables and increased recharge following long periods of wet weather. Groundwater flooding typically occurs in areas underlain by limestone and where underlying geology is highly permeable with high capacity to receive and store rainfall.

As part of the EU Floods Directive, the OPW are currently developing national preliminary flood risk maps, which will provide an indication of vulnerability to groundwater flooding, amongst other sources. At the time of writing, these maps had not been released into the public domain. The purpose of the maps will be to highlight areas where more detailed assessment of the risk of groundwater may be required. Previous consultation with the OPW indicated that the maps would be based on an appraisal of the groundwater vulnerability, and correlation to reports of historic groundwater flooding. These maps will inform the CFRAM studies by highlighting the need for more detailed study.

There is no evidence of groundwater flooding at the site and from reviewing the above data the likelihood of groundwater flooding at the site is Low.

#### **4.4 Overview of Flood Risk Identification**

Analysis of the flood risk identification has highlighted that the main flood risk is from the River Shannon primarily from the result of flooding during heavy rainfall. During flood events in Athlone the areas affected are low lying areas to the north and south of the urban centre. No flooding is identified at either bank of the proposed bridge.

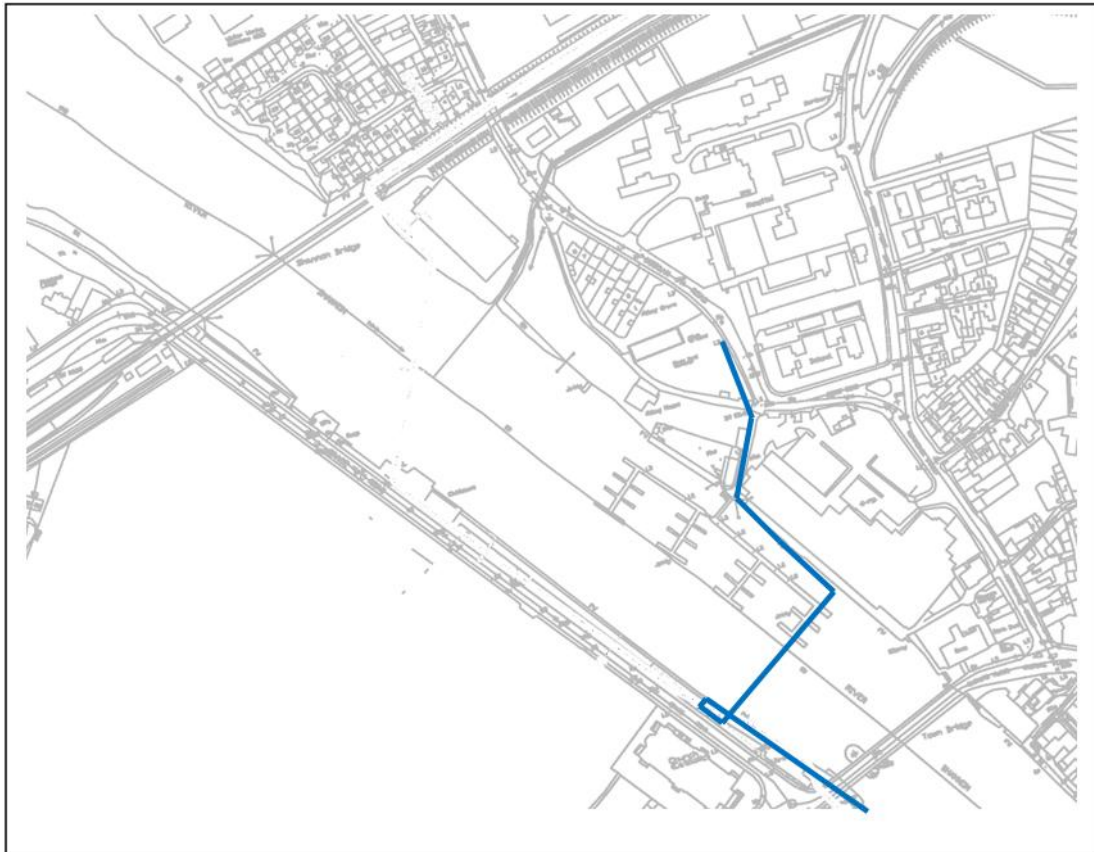
There is little risk of pluvial flooding to the site due to the urban setting and associated drainage infrastructure.

There is little risk of groundwater flooding due to the low permeability of the aquifer body and the subsoil overburden depth of greater than 3m.

## 5.0 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The bridge forms part of the a national cycle route proposed under direction from the Minister for Transport, Tourism & Sport, the National Roads Authority (NRA) which will run between Galway and Maynooth. The route passes through Maynooth, Mullingar, Athlone, Ballinasloe and Galway and will be a 3m wide traffic-free greenway.

Athlone is identified as a key destination on the route of the National Cycle Network which will run through the center of Athlone town, see Figure 5.1 below.



**Figure 5.1** Proposed Bike Route

The layout of the proposed bridge is shown in figure 5.2 below. It comprises a two span bridge with a pier in the middle of the river and end supports on the river banks. The spans are of approximately equal 52.0m length. The overall length of the main bridge is approximately 104m.

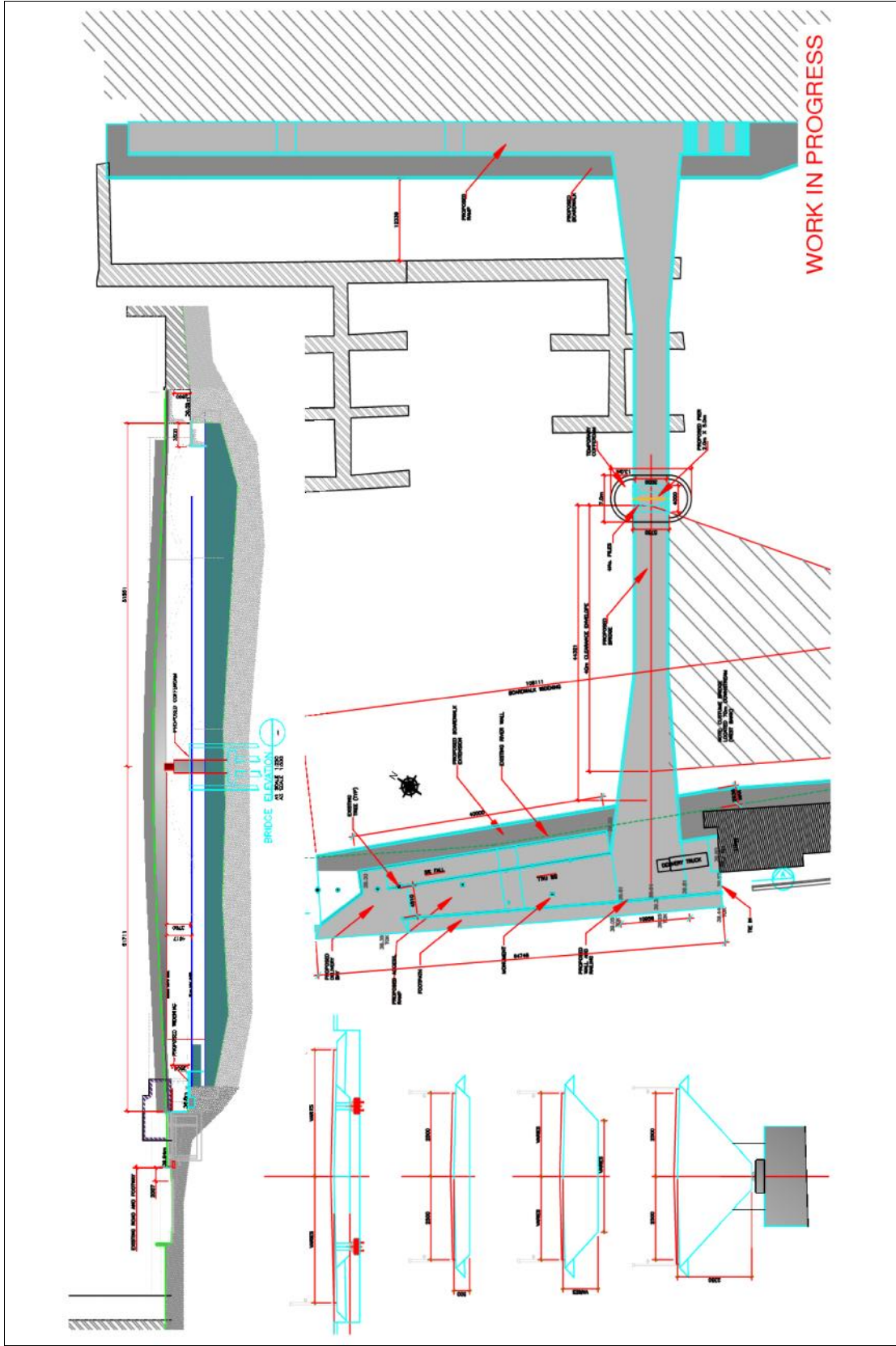


Figure 5.2 Proposed Bridge Layout

The deck of the main crossing spans is of orthotropic structural steel and is of variable cross section. The variable depth of construction is accommodated by voided construction (with maintenance access) where depths exceed 1.3m and spaced beam construction where internal access is not practicable. A seamless external appearance is proposed to be accomplished by the provision of inclined flat plates of variable depth over the full length of the main crossing spans. They are planar and provide continuity of elevation throughout.

See Appendix V for longitudinal cross-section of the bridge and Appendix VI for picture of site crossing.

**APPENDIX I**  
**FRM Guidelines**

## Classification of Flood Risk

Flood risk is a combination of the likelihood of flooding and the potential consequences arising, and is normally expressed in terms of the following relationship:

$$\text{Flood risk} = \text{Probability of flooding} \times \text{Consequences of flooding}$$

Likelihood of flooding is normally expressed as the percentage probability based on the average frequency measured or extrapolated from records over a large number of years. A 1% probability indicates the flood level that is expected to be reached on average once in 100 years, i.e. it has a 1% chance of occurring in any one year. Therefore

- 100 year flood = 1% Annual Exceedence Probability (AEP)
- 1000 year flood = 0.1% AEP

In the FRM Guidelines, the likelihood of a flood occurring is established through the identification of Flood Zones which indicate a high, moderate or low risk of flooding from fluvial or tidal sources, as defined as follows:

- *Flood Zone A* - Where the probability of flooding is highest (greater than 1% AEP or 1 in 100 for river flooding and 0.5% AEP or 1 in 200 for coastal flooding) and where a wide range of receptors would be vulnerable;
- *Flood Zone B* - Where the probability of flooding is moderate (between 0.1% AEP or 1 in 1000 and 1% AEP or 1 in 100 for river flooding and between 0.1% AEP or 1 in 1000 year and 0.5% AEP or 1 in 200 for coastal flooding); and
- *Flood Zone C* - Where the probability of flooding is low (less than 0.1% AEP or 1 in 1000 for both river and coastal flooding).

The FRM Guidelines describes good flood risk practice in planning and development management. Planning authorities are directed to have regard to the guidelines in the preparation of Development Plans and Local Area Plans, and for development control purposes. The objective of the FRM Guidelines is to integrate flood risk management into the planning process, thereby assisting in the delivery of sustainable development. For this to be achieved, flood risk must be assessed as early as possible in the planning process. Paragraph 1.6 of the Guidelines states that the core objectives are to: *"avoid inappropriate development in areas at risk of flooding; avoid new developments increasing flood risk elsewhere, including that which may arise from surface run-off; ensure effective management of residual risks for development permitted in floodplains; avoid unnecessary restriction of national, regional or local economic and social growth; improve the understanding of flood risk among relevant stakeholders; and ensure that the requirements of EU and national law in relation to the natural environment and nature conservation are complied with at all stages of flood risk management"*.<sup>1</sup>

The FRM Guidelines work on a number of key principles, including: Adopting a staged and hierarchical approach to the assessment of flood risk; Adopting a sequential approach to the management of flood risk, based on the frequency of flooding (identified through Flood Zones) and the vulnerability of the land use.

Within the hierarchy of regional, strategic and site-specific flood-risk assessments, a tiered approach ensures that the level of information is appropriate to the scale and nature of the flood-risk issues and the location and type of development, avoiding



expensive flood modeling and development of mitigation measures where it is not necessary. The stages and scales of flood risk assessment are shown as follows:

- *Regional Flood Risk Appraisal (RFRA)* – a broad overview of flood risk issues across a region to influence spatial allocations for growth in housing and employment as well as to identify where flood risk management measures may be required at a regional level to support the proposed growth. This should be based on readily derivable information and undertaken to inform the Regional Planning Guidelines.
- *Strategic Flood Risk Assessment (SFRA)* – an assessment of all types of flood risk informing land use planning decisions. This will enable the Planning Authority to allocate appropriate sites for development, whilst identifying opportunities for reducing flood risk. SFRA revisits the flood risk identification undertaken in the RFRA, and give consideration to a range of potential sources of flooding. An initial flood risk assessment, based on the identification of Flood Zones or best available data, will also be carried out for those areas which will be zoned for development. Where the initial flood risk assessment highlights the potential for a significant level of flood risk, or there is conflict with the proposed vulnerability of development, then a Local Area Plan SFRA will be recommended, which will necessitate a detailed flood risk assessment.
- *Site Specific Flood Risk Assessment (FRA)* – site or project specific flood risk assessment to consider all types of flood risk associated with the site and propose appropriate site management and mitigation measures to reduce flood risk to and from the site to an acceptable level. If the previous tiers of study have been undertaken to appropriate levels of detail, it is highly likely that the site specific FRA will require detailed channel and site survey, and hydraulic modeling.

**APPENDIX II**  
**Development Plans**

## **The National Development Plan 2007 - 2013**

The National Development Plan 2007 – 2013 sets out the priorities of the State in terms of economic, social and infrastructural investment over the course of the plan.

In relation to flood risk assessment the focus of investment under the National Development Plan is as follows,

- a) Relief from flooding where such occurs
- b) Preventing the creation of new problem areas and
- c) The maintenance of existing defences.

This will be achieved through structural works involving the construction of Flood Relief Schemes in a number of locations throughout the country. This programme of structural works is being designed and implemented in many areas at flood risk throughout the country. The spending in this area in the coming years will benefit, in many cases, older, less developed areas of towns which have had less development for the very reason that they are at risk from flooding. All these schemes will be implemented in an environmentally friendly fashion as far as possible, taking account of the principles of the Government's National Biodiversity Plan, which requires that:

- Damage to biodiversity is kept to a minimum and where possible, mitigation measures are implemented;
- Significant damage to biodiversity is avoided; and
- Where possible biodiversity is enhanced.

In addition a range of non-structural measures are funded. These include the Flood Hazard Mapping Programme which is already well under way. This programme will map areas which, based on historical data, are known to be at risk of flooding countrywide, and make this information available to the planning and development process in a timely manner. Early Flood Warning Systems are also being developed for those areas most at risk and where flood protection depends on the erection of defences when flooding is predicted.

OPW is also using its resources to highlight the dangers of flooding and remedial action which can be taken, and is promoting a Public Awareness Campaign, which endeavours to help people to take the appropriate action when flooding is forecasted.

A website has been developed which will advise the public on flooding issues and the measures to be undertaken during and after a flooding situation. The site also highlights the dangers to the public in the aftermath of a flood, such as water contamination, gas leaks and structural undermining, and offers some guidance on how to deal with them. It gives contact details of different organisations which can help in the event of a flood. Overall, the major programmes being undertaken to underpin the non-structural measures include:

- Flood Risk Assessment and Management Studies;
- Flood Forecasting and Warning Programme;
- Emergency Response Development Programme;
- Planning and Development Programme;
- High-Risk Channel designation; and
- Research Programmes.

## **Westmeath County Development Plan 2014-2020**

The Westmeath County Development Plan 2014-2020 provides the strategic framework for land use planning in the County Westmeath. In summary the plan will provide:

- A Spatial framework to facilitate economic recovery and growth founded on an Economic Regeneration Strategy for the County
- A sustainable spatial development strategy to guide the location of development
- A framework for future investment in physical, social and community infrastructure
- A process for the preservation, protection and enhancement of the County's natural and built heritage and social assets.
- Safe and socially inclusive sustainable communities with a renewed emphasis on improving the quality of life for all.

The Westmeath County Development Plan 2014-2020 details the following core strategy in relation to flooding issues:

- P-CS6 -It To restrict development in areas at risk of flooding in accordance with the Planning System and Flood Risk Management Guidelines for Planning Authorities (DoECLG/OPW 2009).

Specific philosophy relating to Flood issues within Westmeath are detailed as follows:

- Ensure that flood vulnerable development is not permitted in areas of flood risk, particularly floodplains and areas subject to flooding.
- Adopt a sequential approach to spatial planning which aims to avoid flood risk, where possible, substitute less vulnerable uses where avoidance is not possible, and mitigate and manage the risk where avoidance and substitution are not possible.
- A precautionary approach should be applied to flood risk management to reflect uncertainties in flooding datasets and risk assessment techniques and the ability to predict the future climate and the performance of existing flood defences.

In general, flood vulnerable development in flood plains should be restricted. Development should also be restricted on lands identified as 'benefiting lands' as there may be legacy flood risk issues in these areas. No flood-vulnerable development should be allowed within the original extent of any lakes that are used as buffering reservoirs by drainage schemes. Areas adjacent to maintainable channels should be reserved for maintenance.

As stated in the development plan, Westmeath CoCo are mindful of the potential for increased incidences of flooding due to climate change and will seek to incorporate this into strategic land use zoning decisions and into the assessment of planning applications.

The following are specific policies in relation to Flood Risk Management and Surface Water objectives:

- 
- P-FL1-To comply with the requirements of the “Planning System and Flood Risk Management – Guidelines for Planning Authorities” (DoEHLG/OPW, 2009) through the use of the sequential approach and application of the Justification Tests for Development Management and Development Plans’
  - P-FL2-To ensure that a flood risk assessment is carried out for any development proposal on lands at risk of flooding, in accordance with the “Planning System and Flood Risk Management – Guidelines for Planning Authorities” (DoECLG/OPW, 2009)’
  - P-FL3-To consult with the Office of Public Works in relation to proposed developments in the vicinity of drainage channels and rivers for which the OPW are responsible, and to retain a strip on either side of such channels where required, to facilitate access thereto’
  - P-FL4-To implement the recommendations of the Shannon and Eastern CFRAM study’
  - P-FL5-To ensure new development does not increase flood risk elsewhere, including that which may arise from surface water run-off’
  - P-FL6-To protect and enhance the county’s floodplains and wetlands as a valuable habitat, which provides space for storage and conveyance of floodwater, enabling flood risk to be more effectively managed and reducing the need to provide flood defences in the future.

**APPENDIX III**  
**OPW Historic Floodmaps**

## Summary Local Area Report

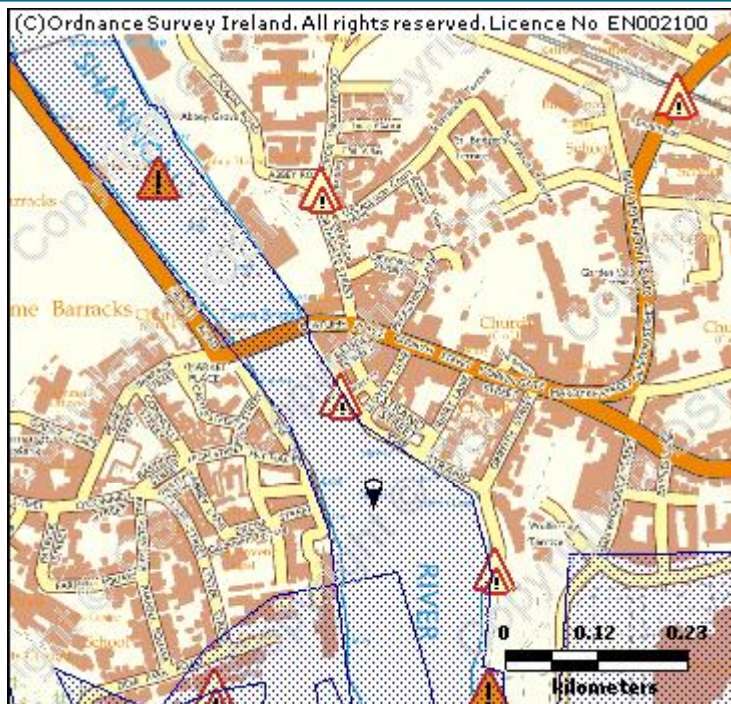
This Flood Report summarises all flood events within 2.5 kilometres of the map centre.

The map centre is in:

County: Westmeath

NGR: N 040 414

This Flood Report has been downloaded from the Web site [www.floodmaps.ie](http://www.floodmaps.ie). The users should take account of the restrictions and limitations relating to the content and use of this Web site that are explained in the Disclaimer box when entering the site. It is a condition of use of the Web site that you accept the User Declaration and the Disclaimer.



Map Scale 1:9,730

Map Legend	
	Flood Points
	Multiple / Recurring Flood Points
	Areas Flooded
	Hydrometric Stations
	Rivers
	Lakes
	River Catchment Areas
	Land Commission *
	Drainage Districts *
	Benefiting Lands *

\* Important: These maps do not indicate flood hazard or flood extent. Their purpose and scope is explained in the Glossary.

## 29 Results

	1. Shannon flood extents 30th Nov 2009 County: Westmeath Additional Information: Reports (5) More Mapped Information	Start Date: 20/Nov/2009 Flood Quality Code:1
	2. Shannon Winter 1999/2000 County: Galway, Leitrim, Longford, Offaly, Roscommon, Westmeath Additional Information: Photos (24) Reports (2) Press Archive (19) More Mapped Information	Start Date: 30/Nov/1999 Flood Quality Code:2
	3. Shannon December 1954 County: Clare, Galway, Leitrim, Limerick, Longford, Offaly, Roscommon, Tipperary, Westmeath Additional Information: Reports (4) Press Archive (16) More Mapped Information	Start Date: 01/Dec/1954 Flood Quality Code:1
	4. Shannon Athlone Winter 1994/95 County: Westmeath Additional Information: Reports (4) Press Archive (6) More Mapped Information	Start Date: 01/Dec/1994 Flood Quality Code:3
	5. Shannon Athlone Nov Dec 2006 County: Westmeath	Start Date: 01/Nov/2006 Flood Quality Code:3

Additional Information: Reports (1) More Mapped Information



6. Marine View, Athlone Feb 2003  
County: Westmeath

Start Date: 28/Feb/2003  
Flood Quality Code:2

Additional Information: Reports (2) More Mapped Information



7. AI Golden Island, Athlone  
County: Westmeath

Start Date: 14/Nov/2002  
Flood Quality Code:2

Additional Information: Reports (3) More Mapped Information



8. Shannon Burgess Park, Athlone Feb 2002  
County: Westmeath

Start Date: 13/Feb/2002  
Flood Quality Code:2

Additional Information: Reports (2) More Mapped Information



9. Shannon McQuaids Bridge, Athlone Feb 2002  
County: Westmeath

Start Date: 11/Feb/2002  
Flood Quality Code:2

Additional Information: Reports (2) More Mapped Information



10. Shannon Deerpark, Athlone Feb 2002  
County: Westmeath

Start Date: 01/Feb/2002  
Flood Quality Code:2

Additional Information: Reports (2) More Mapped Information



11. Shannon McQuaids Bridge Athlone Feb 1995  
County: Westmeath

Start Date: 03/Feb/1995  
Flood Quality Code:2

Additional Information: Reports (2) More Mapped Information



12. Shannon Clonown Road Athlone Feb 1995  
County: Westmeath

Start Date: 03/Feb/1995  
Flood Quality Code:2

Additional Information: Photos (1) Reports (1) Press Archive (4) More Mapped Information



13. Shannon Cloonown Road, Athlone Recurring  
County: Westmeath

Start Date:  
Flood Quality Code:2

Additional Information: Reports (3) More Mapped Information



14. Shannon Wolfe Tone Terrace, Athlone Recurring  
County: Westmeath

Start Date:  
Flood Quality Code:2

Additional Information: Reports (2) More Mapped Information



15. Shannon Strand, Athlone Recurring  
County: Westmeath

Start Date:  
Flood Quality Code:2

Additional Information: Reports (2) More Mapped Information



16. Shannon Deerpark, Athlone Recurring  
County: Westmeath

Start Date:  
Flood Quality Code:2

Additional Information: Reports (2) More Mapped Information



17. Shannon, Priory Park, Athlone Recurring  
County: Westmeath

Start Date:  
Flood Quality Code:2

Additional Information: Reports (2) More Mapped Information



18. AL Loughdonning Recurring  
County: Westmeath

Start Date:  
Flood Quality Code:2

Additional Information: Reports (3) More Mapped Information





19. Al Derries Recurring

County: Westmeath

Additional Information: [Reports \(2\)](#) [More Mapped Information](#)

Start Date:

Flood Quality Code:3



20. Shannon North of Athlone Recurring

County: Roscommon

Additional Information: [Reports \(1\)](#) [More Mapped Information](#)

Start Date:

Flood Quality Code:3



21. Retreat Road, Athlone Recurring

County: Westmeath

Additional Information: [Reports \(1\)](#) [More Mapped Information](#)

Start Date:

Flood Quality Code:4



22. Shannon Gallows Hill, Athlone Recurring

County: Roscommon

Additional Information: [Reports \(1\)](#) [More Mapped Information](#)

Start Date:

Flood Quality Code:4



23. Railway Bridge, Ballymahon Road, Athlone Recurring

County: Westmeath

Additional Information: [Reports \(1\)](#) [More Mapped Information](#)

Start Date:

Flood Quality Code:4



24. Auburn Heights, Athlone Recurring

County: Westmeath

Additional Information: [Reports \(1\)](#) [More Mapped Information](#)

Start Date:

Flood Quality Code:4



25. Cartron Drive, Athlone Recurring

County: Westmeath

Additional Information: [Reports \(1\)](#) [More Mapped Information](#)

Start Date:

Flood Quality Code:4



26. Shannon Iona Park Athlone Recurring

County: Westmeath

Additional Information: [Reports \(1\)](#) [More Mapped Information](#)

Start Date:

Flood Quality Code:4



27. Railway Bridge, Galway Road, Athlone Recurring

County: Westmeath

Additional Information: [Reports \(1\)](#) [More Mapped Information](#)

Start Date:

Flood Quality Code:4



28. Railway Bridge, Athlone Recurring

County: Westmeath

Additional Information: [Reports \(1\)](#) [More Mapped Information](#)

Start Date:

Flood Quality Code:4



29. Central Terrace, Athlone Recurring

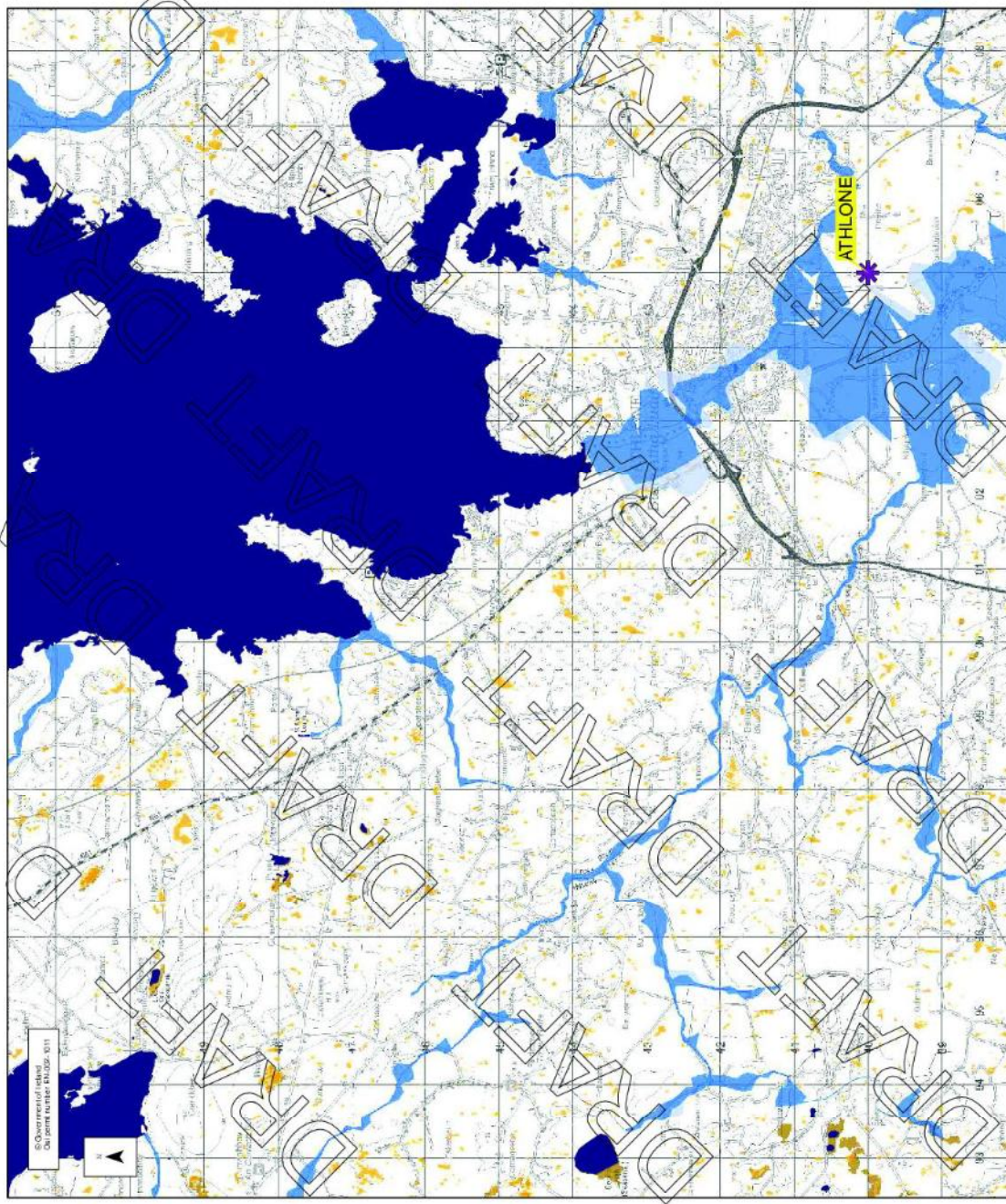
County: Westmeath

Additional Information: [Reports \(1\)](#) [More Mapped Information](#)

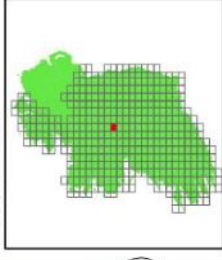
Start Date:

Flood Quality Code:4

**APPENDIX IV**  
**OPW PFRA Indicative Floodmaps**



**Location Plan :**



**Legend:**

- Flood Extents**
- Fluvial - Indicative 1% AEP (100-yr) Event
  - Fluvial - Extreme Event
  - Coastal - Indicative 0.5% AEP (200-yr) Event
  - Coastal - Extreme Event
  - Pluvial - Indicative 1% AEP (100-yr) Event
  - Pluvial - Extreme Event
  - Groundwater Flood Extents
  - Lakes/Turboughs
- PFRA Outcomes**
- ★ Probable Area for Further Assessment
  - ★ Possible Area for Further Assessment

**Important Note:**  
 The flood extents shown on these maps are based on maps scale and may not be accurate for a specific location. Information on the outcome, development and flood risk should be obtained from the relevant authority. Users should seek professional advice if they intend relying on the maps in any way.  
 If you believe that the maps are inaccurate in some way, please contact the OPW, prior to PFRA initiation unless you have your say (viewexam 6).

**Office of Public Works**  
 Josephson Swift Street  
 Tralee  
 Co. Kerry  
 Ireland

**OPW**  
 OFFICE OF PUBLIC WORKS

**Project:** PRELIMINARY FLOOD RISK ASSESSMENT (PFRA)  
**Map:** PFRA indicative extents and outcomes  
 - Draft for Consultation  
**Issue By:** EJM  
**Issue Date:** July 2011  
**Checked By:** MA  
**Check Date:** July 2011  
**Drawn No:** 2019 / MAP / 249 / A  
**Revision:** 0  
 Drawn Scale: 1:50,000  
 Plot Date: 11/08/13

## **APPENDIX V**

### **Proposed Bridge Cross-sections**



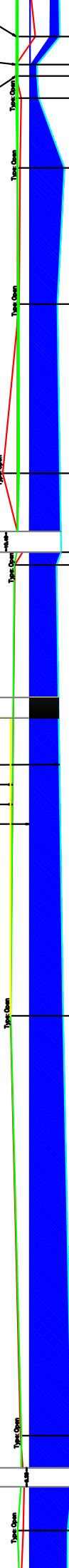
ID: 26SHAN02192D  
 Type: Bridge  
 ISS Change#: 21918.898  
 (Structure Width =9.58m)  
 Skew Angle 019 43 56

Proposed Bridge  
 (Structure Width =4.88m)

ID: 26SHAN02144D  
 Type: Bridge  
 ISS Change#: 21445.027  
 (Structure Width =10.48m)  
 Skew Angle 011 38 52

ID: 26SHAN02119W  
 Type: Weir  
 ISS Change#: 21203.603  
 Skew Angle 064 55 17  
 ID: 26SHAN02177W  
 Type: Weir  
 ISS Change#: 21197.792  
 Skew Angle 063 45 12  
 ID: 26SHAN02114X  
 Type: Weir  
 ISS Change#: 21193.606  
 Skew Angle 060 35 34

WL LB RB RBL



NO	DESCRIPTION	DATE	BY	CHECKED	APPROVED	APPD DATE
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2	ISS	21197.792				
3	ISS	21203.603				
4	ISS	21193.606				
5	ISS	21918.898				
6	ISS	21445.027				
7	ISS	21197.792				
8	ISS	21203.603				
9	ISS	21193.606				
10	ISS	21918.898				
11	ISS	21445.027				
12	ISS	21197.792				
13	ISS	21203.603				
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100	ISS	21918.898				

Legend

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AVN Consulting Ltd  
 The Teepro Building  
 Donegough Business & Technology Park  
 Buncrana, Co. Donegal  
 Buncrana BT57 1 847 4888  
 Fax: +353 1 847 4857

DRAWING TITLE	Longitudinal Cross-Section, River Shannon	
	REVISION DESCRIPTION	
CLIENT	PROJECT	DRAWING NUMBER
		SHEET REV

DRAWN	CHECKED	APPROVED	APPD DATE

## **APPENDIX VI**

### **Picture of Proposed Site Location**





**APPENDIX VII**  
**HYDRAULIC MODELLING**

## Hydraulic Modelling

The flood risk assessment has been carried out using a flood model, MIKE Flood (2014 Version). MIKE Flood is a software package developed by *DHI Water and Environment*, which couples One-Dimensional and Two-Dimensional hydrodynamic modelling systems. The model predicts single event and continuous hydrological events, to show the water levels, flow direction and extent of flooding for a particular area.

The MIKE Flood modelling system has been utilised for the hydraulic analysis component. MIKE Flood is a software shell comprising the following components:

- A one-dimensional river model (MIKE 11 HD) to describe the flow in linear rivers and channels.
- A two-dimensional model (MIKE 21 HD) which will be used to describe the free surface flow in the river flood plain.

Both components will be fully dynamically linked and exchange data in each time step of simulations. Having all model elements combined and coupled is beneficial for the solution of hydrological and hydraulic conditions.

### One-Dimensional Modelling (MIKE 11 HD)

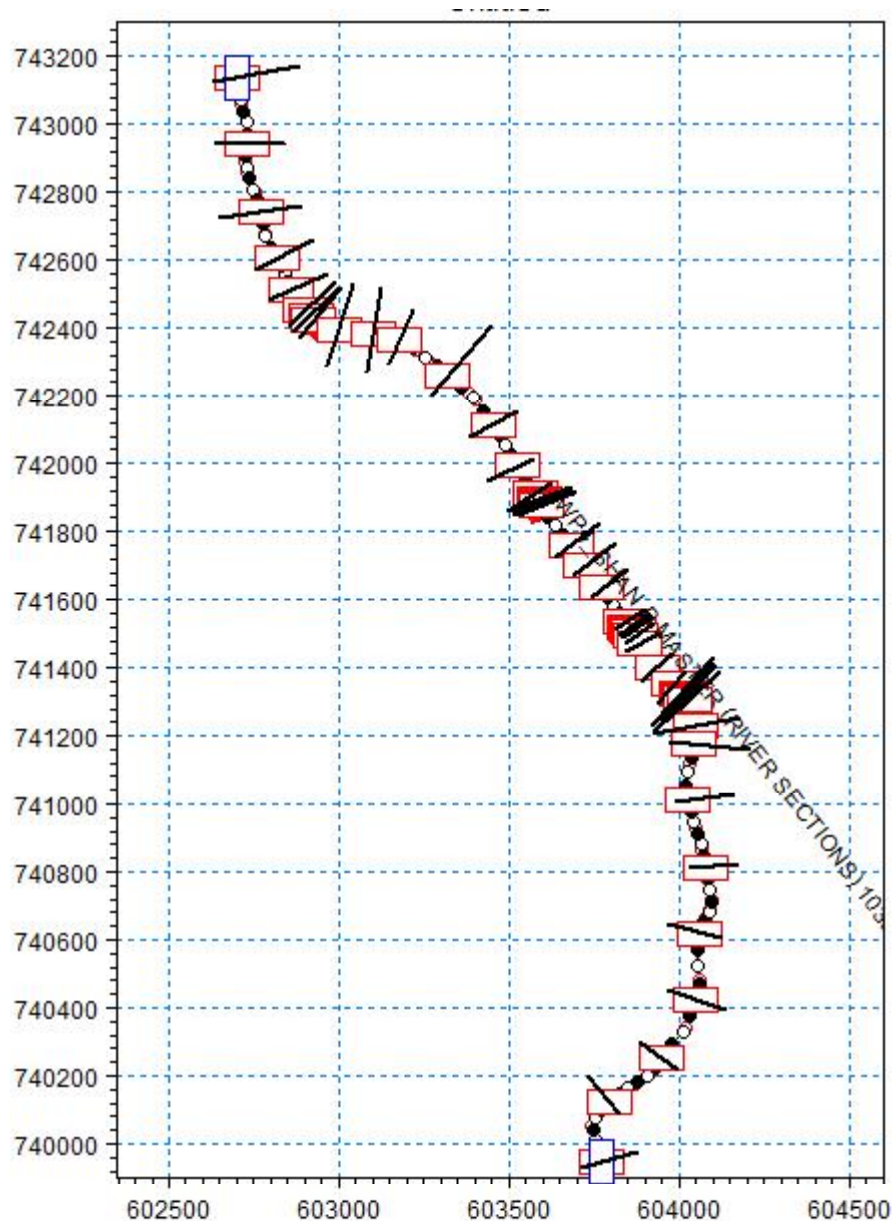
Individual 1-D hydrodynamic models will be established in MIKE 11 for the River Shannon

MIKE 11 is a one-dimensional model for modelling the channel flow of river systems. The model can be linked to rainfall and runoff programs and hydrometric data, producing the flow conditions in a river system. The hydrodynamic module forms the basis for simulating flows in rivers, channels and other water bodies. The model solves the vertically integrated equations for the conservation of continuity and momentum, i.e. the Saint Venant equations.

MIKE 11 comprises a number of modules which compute data for different aspects of the system. These are compiled in one file or 'editor' known as the simulation editor. The simulation editor also specifies the time-step to be used in the model. The following modules are used in the MIKE 11 model:

*Network Editor* – The river system or channel is defined, using both a graphical view and a tabular view. Structures, such as bridges, channels, weirs etc. on the channel are represented.

Figure 7.1 shows a screen shot of the completed network editor.



**Figure 7.1** MIKE 11 Network Editor – Screen Shot

*Cross-Section Editor* – Cross-sections for each branch of the system, usually produced from a river bed survey, are interpolated to produce the physical shape of the branches in the system.

*Boundary Editor* – The boundary conditions are specified for the system, including the inflows, point sources etc. for each branch.

*Parameter Editor* – This editor describes the variables related to the selected type of computation, such as bed resistance, wind conditions, stratification etc.

Once the editor files have been completed, they are combined in the simulation editor in order to perform a simulation.

The models were set up by inputting survey cross-section ASCII files directly into the software and then manually entering any structures by reading the survey information of each cross-section. An example cross-section taken from the MIKE 11 Cross-Section Editor is shown in Figure 7.2.

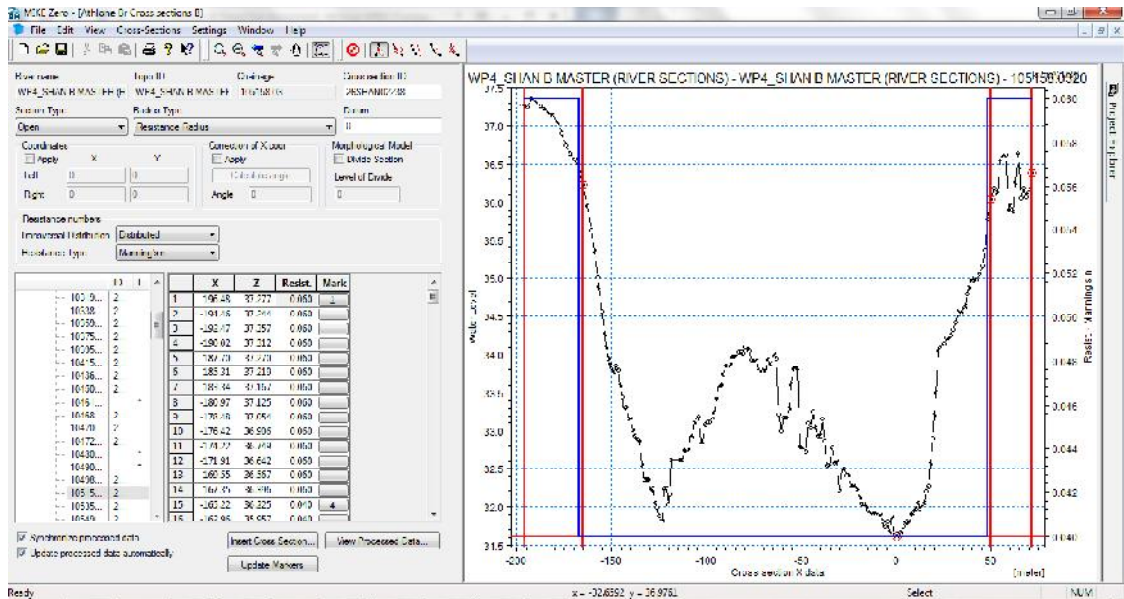


Figure 7.2 MIKE 11 Cross-Section Editor – Screen Shot

The cross-section survey data entered into the one-dimensional hydrodynamic model includes portions of the flood plains on either side of the river channel. These were manually reduced to only describe the river channel before the 1-D fluvial model was coupled with the two-dimensional model to allow flow computation within the flood plain.

Figure 7.3 shows a plan view of the cross sections and the bathymetry adjacent to the proposed development.

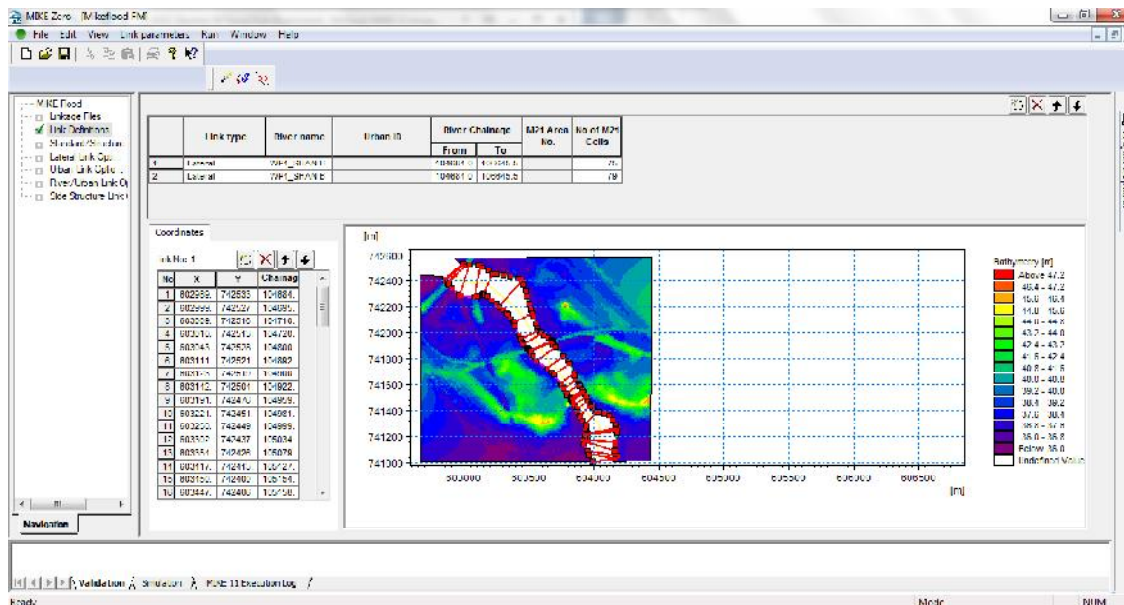


Figure 7.3 MIKE 11 Bathymetry & Cross-Section Editor – Screen Shot

Once the water level exceeds the level of the riverbanks it will spill into the two-dimensional floodplain model.

### Two-Dimensional Modelling (MIKE 21 HD)

Two-dimensional flow models were established in MIKE 21 for the River Shannon. MIKE 21 is a two-dimensional model for modelling overland flow, and calculating flooding and drying capacity. The model predicts two-dimensional free-surface flows.

A hydrodynamic module forms the basis for the computations performed in the MIKE 21 model. A bathymetry editor was set up in MIKE 21 which imports bathymetric data to create a two-dimensional surface. The model then simulates water level variations and flows in response to a variety of forcing factors, which in the case of flood prediction are the flooding and drying functions.

The models were developed from the Digital Terrain Model (DTM) using a grid size of one meter. From this raw lidar data a 10m grid bathymetry model was produced in Mike 21. This bathymetry formed the physical model in MIKEFLOOD from which the flood extent can be established.

The boundary conditions were estimated from the MIKE hydrological model or from gauging station data, as appropriate. The downstream boundary condition was set using the relevant stage time series data as derived from the hydrological analysis (Appendix VII).

The links between the 1D/ 2D model were established as lateral links for the entire length of each model. Links were established for the left bank and the right bank separately, to take account of the different elevations of each bank, Sections that do not allow overspill into the flood plain, such as walled bridges and culverts, were coupled to the 2D model. Figure 7.4 provides a schematic of the coupled 1D/ 2D Model.

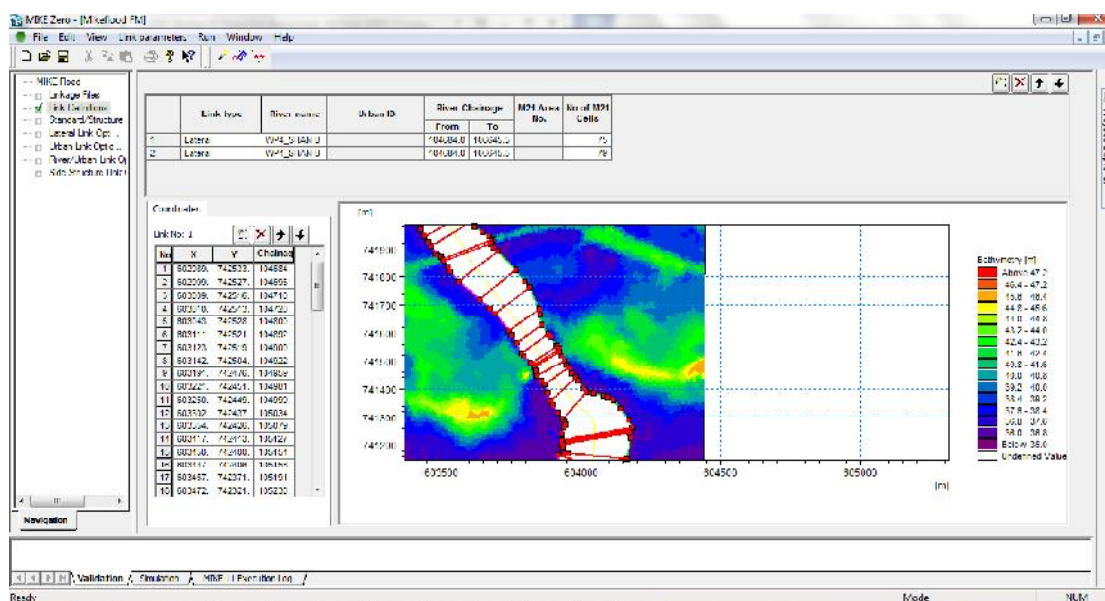


Figure 7.4 MIKE FLOOD – Screen Shot

### MIKE FLOOD (1D-2D Coupling Programme)

MIKE Flood integrates the one-dimensional MIKE 11 model and the two-dimensional MIKE 21 model to produce a dynamically coupled model. The MIKE Flood model laterally links the river channel system to the surrounding area, and predicts the overland flow during flood conditions as a river system exceeds its capacity. Flow is calculated using a structure equation or a QH table, which simulates overflow from a channel onto a floodplain, where flow over the river levee is calculated using a weir equation. The model is fully implicit.

On completion of the development of the MIKE 11 and MIKE 21 models they were run for current scenarios and MRFS and then using the MIKE Flood software suite a range of flood maps were produced. This mapping was undertaken by using the GIS model of MIKE Flood and then exporting flood information to MapInfo / ArcGIS.

## Climate Change Scenarios

The FRM Guidelines recommends that a precautionary approach to climate change is adopted due to the level of uncertainty involved in the potential effects.

The Intergovernmental Panel on Climate Change (IPCC) was established in 1988 and its first report in 1990 justified concern about the effects of climate change on a scientific basis. The more recent IPCC Fourth Assessment Report 2007 concludes that climate change is unequivocal. It projects a global average sea level rise of between 0.18m and 0.59m for different SRES emissions scenarios, up to the end of the century. (SRES refers to the IPCC Special Report on Emissions Scenarios, published in 2000. The scenarios explore different demographic, economic and technological forces and resultant greenhouse gas emissions.)

Two climate change scenarios are considered. These are the Mid-Range Future Scenario (MRFS) and the High-End Future Scenario (HEFS). The MRFS is intended to represent a "likely" future scenario based on the wide range of future predictions available. The HEFS represents a more "extreme" future scenario at the upper boundaries of future projections.

Based on these two scenarios the OPW recommended allowances for climate change are given in Table 7.1.

**Table 7.1** Allowances for Future Scenarios (100 Year Time Horizon)

Criteria	MRFS	HEF
Extreme Rainfall Depths	+20%	+30%
Flood Flows	+20%	+30%
Mean Sea Level Rise	+500mm	+1000mm
Land Movement *	-0.5mm / year	-0.5mm / year*
Urbanisation	No General Allowance – Review on Case by Case Basis	No General Allowance – Review on Case by Case Basis
Forestation	-1/6 Tp**	-1/3 Tp** +10% SPR**
Notes:		
<ul style="list-style-type: none"> <li>• Applicable to the southern part of the country only (Dublin - Galway and south of this)</li> <li>• ** Reduce the time to peak (Tp) by a third; this allows for potential accelerated runoff that may arise</li> <li>• as a result of drainage of afforested land</li> <li>• *** Add 10% to the Standard Percentage Runoff (SPR) rate; this allows for increased runoff rates</li> <li>• that may arise following felling of forestry</li> </ul>		

There are a number of drivers that can influence future flood hazard, the main ones identified being climate change and urban growth. The Mid-Range Future Scenario (MRFS) considers likely estimates of changes to the drivers by 2100. MRFS was considered in this assessment.

**Appendix VIII –  
Calculation of Peak Flows & Hydrograph**

# Flood Estimation Report #2285 (Shannon at Athlone)



Generated 08-04-2015 17:25

## Subject site

### Attributes

Name	Unit	Value
Coordinate [X]		-884037.378068118
Coordinate [Y]		7061688.32957321
Distance	km	831.878886800535
Station Number		26_3922_4
Location		
Water Body		
Catchment		
Hydrometric Area		
Organisation		
FSU Rating Classification		
Drainage works	year	
Contributing Catchment Area	km <sup>2</sup>	4600.648
Center Northing	m	287340
Center Easting	m	203250
Northing	m	241444
Easting	m	203942
A-Max series gap in years	year	
A-Max series number of years	year	
A-Max series number of usable years	year	
A-Max series end year	year	
A-Max series start year	year	
FARL		0.67
ALLUV		0.0216
PEAT		0.1273
FOREST		0.0841
PASTURE		0.7165
S1085	m/km	0.31692
MSL	km	176.771
DRAIND	km/km <sup>2</sup>	0.858
ALTBAR		87.8
NETLEN	km	3945.192
T4		
T3		



SAAPE	mm	470
T2		
ARTDRAIN2		0.2284
ARTDRAIN		0.0587
TAYSLO		0.109066
STMFRQ		3496
BFISOIL		0.692008243
SAAR	mm	1058.39
RWSEG_CD		26_3922
TOP_RWSEG		
Bankfull		
HGF	m <sup>3</sup> /s	
MAF	m <sup>3</sup> /s	
FAI		0.2062
FLATWET		0.68
URBEXT		0.0061
HGF/QMED		
centroidx3857		-880082.144952025
centroidy3857		7131676.74363215
x3857		-884037.378068118
y3857		7061688.32957321

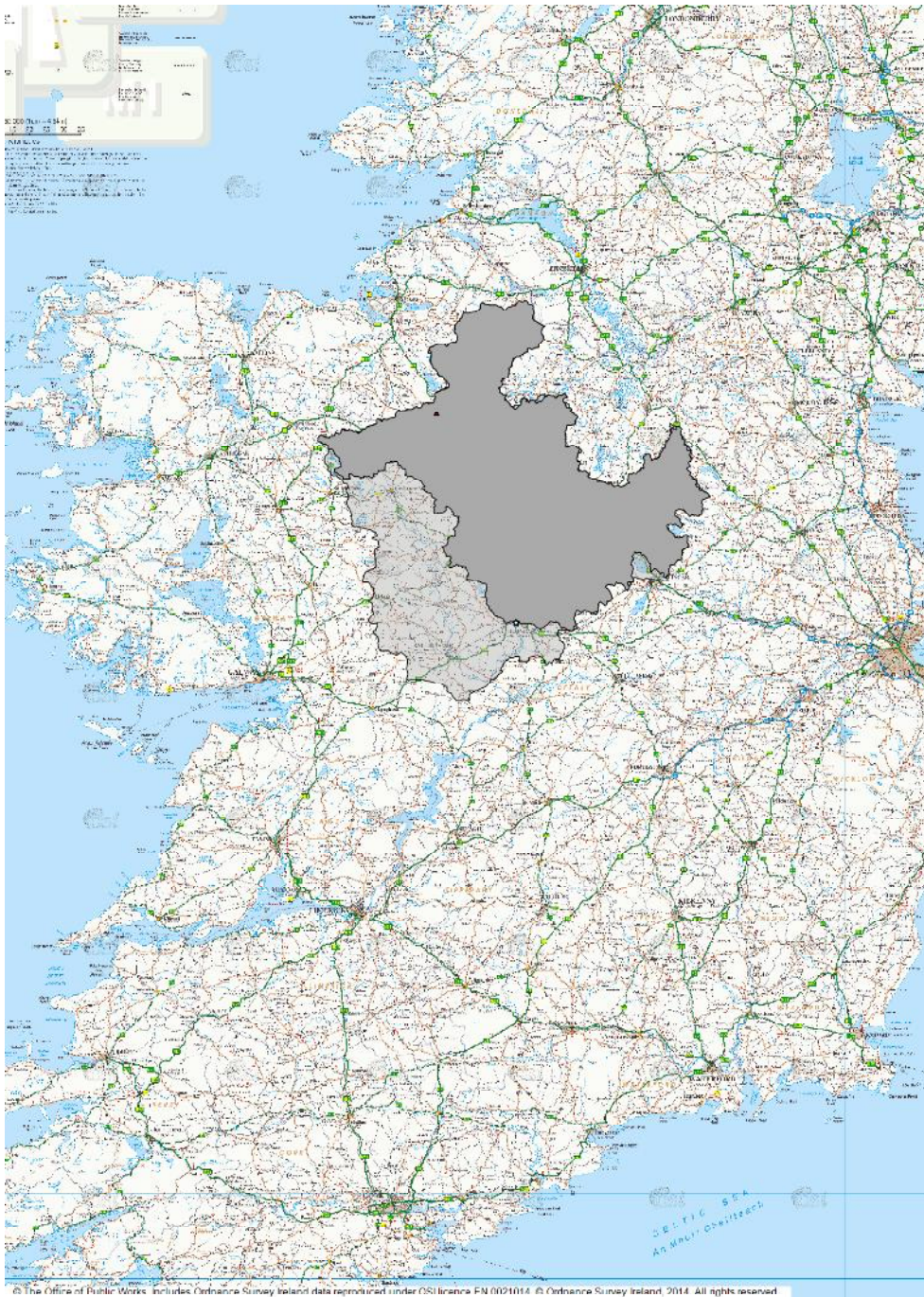
# Pivotal site

## Attributes

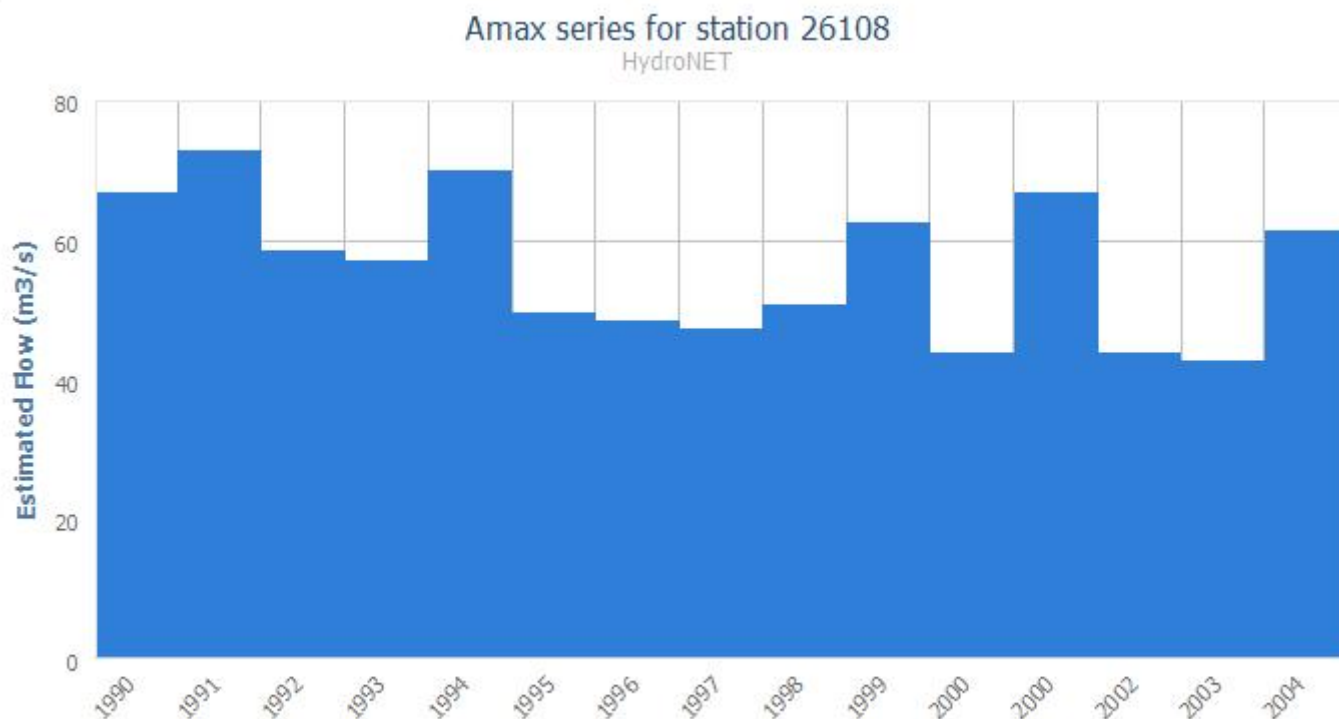
Name	Unit	Value
Coordinate [X]		-923581.155235885
Coordinate [Y]		7165014.01334582
Station Number		26108
Location		BOYLE ABBEY BR.
Water Body		BOYLE
Catchment		Boyle
Hydrometric Area		26
Organisation		OPW
FSU Rating Classification		B
Drainage works	year	1982-92
Contributing Catchment Area	km <sup>2</sup>	527.3198
Center Northing	m	293770
Center Easting	m	165950
Northing	m	302646
Easting	m	180581
A-Max series gap in years	year	0
A-Max series number of years	year	15
A-Max series number of usable years	year	15
A-Max series end year	year	2004
A-Max series start year	year	1990
FARL		0.825
ALLUV		0.0105
PEAT		0.2299
FOREST		0.1093
PASTURE		0
S1085	m/km	0.36912
MSL	km	70.03
DRAIN	km/km <sup>2</sup>	0.876
ALTBAR		0
NETLEN	km	461.725
T4		-0.061398739388546
T3		0.063396339320925
SAAPE	mm	450.7
T2		0.10790467062881
ARTDRAIN2		0.5319
ARTDRAIN		0.1154
TAYSLO		0.123551
STMFRQ		326
BFISOIL		0.7252
SAAR	mm	1142.66
RWSEG_CD		26_3573
TOP_RWSEG		26_2184
Bankfull		1.85 from survey
HGF	m <sup>3</sup> /s	40.45
MAF	m <sup>3</sup> /s	50.22
FAI		0.22
FLATWET		0.71
URBEXT		0.0042
HGF/QMED		0.70568736915562
x3857		-923581.155235885
y3857		7165014.01334582

centroidx3857		-946429.176248872
centroidy3857		7148376.87737903
Distance	km	68.4165406102106

# Map



## Amax Series Chart



## QMED Estimates

<b>Subject rural QMED</b>	143.84
<b>Subject urban QMED</b>	145.15
<b>Pivotal gauged QMED</b>	57.32
<b>Pivotal adjustment factor QMED</b>	1.58
<b>Subject adjusted QMED</b>	<b>229.87</b>

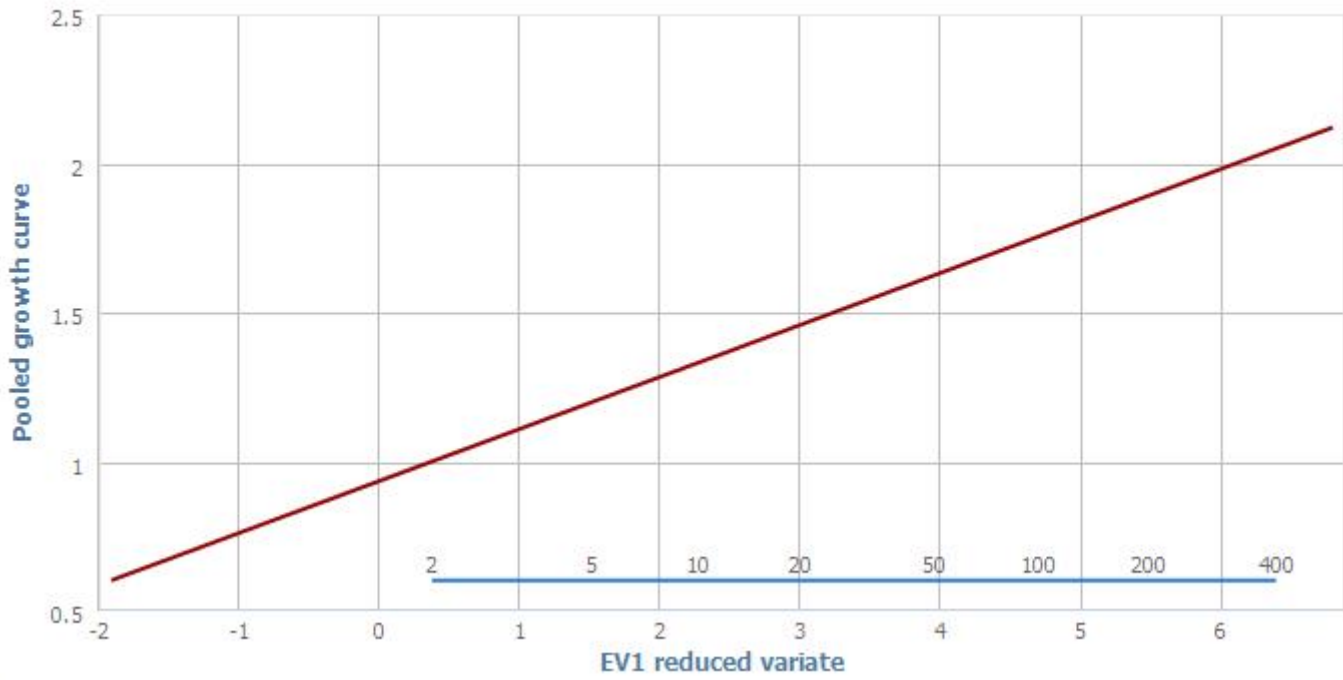
## Pooling Group

<b>Station</b>	<b>Amax years</b>
25017 BANAGHER	34
16011 CLONMEL	51
15006 BROWNSBARN	47
16009 CAHER PARK	52
18002 BALLYDUFF	49
26007 BELLAGILL	53
07012 SLANE CASTLE	19
15002 JOHNS BRIDGE	48
14029 GRAIGUENAMANAGH U/S	47
36019 BELTURBET	47



# Selected Flood Growth Curve

Flood growth curve



Pooled growth curve	EV1 reduced variate
0.6	-1.92
0.63	-1.75
0.65	-1.66
0.66	-1.6
0.67	-1.55
0.67	-1.5
0.68	-1.47
0.69	-1.43
0.69	-1.4
0.7	-1.37
0.7	-1.35
0.71	-1.33
0.71	-1.3
0.71	-1.28
0.72	-1.26
0.72	-1.24
0.72	-1.22
0.73	-1.21
0.73	-1.19
0.73	-1.17
0.73	-1.16
0.74	-1.14
0.74	-1.13
0.74	-1.12
0.74	-1.1
0.75	-1.09
0.75	-1.08
0.75	-1.06
0.75	-1.05

0.76	-1.04
0.76	-1.03
0.76	-1.01
0.76	-1
0.76	-0.99
0.76	-0.98
0.77	-0.97
0.77	-0.96
0.77	-0.95
0.77	-0.94
0.77	-0.93
0.78	-0.92
0.78	-0.91
0.78	-0.9
0.78	-0.89
0.78	-0.88
0.78	-0.87
0.79	-0.86
0.79	-0.85
0.79	-0.85
0.79	-0.84
0.79	-0.83
0.79	-0.82
0.79	-0.81
0.8	-0.8
0.8	-0.79
0.8	-0.79
0.8	-0.78
0.8	-0.77
0.8	-0.76
0.8	-0.75
0.81	-0.75
0.81	-0.74
0.81	-0.73
0.81	-0.72
0.81	-0.71
0.81	-0.71
0.81	-0.7
0.82	-0.69
0.82	-0.68
0.82	-0.68
0.82	-0.67
0.82	-0.66
0.82	-0.66
0.82	-0.65
0.82	-0.64
0.83	-0.63
0.83	-0.63
0.83	-0.62
0.83	-0.61
0.83	-0.61
0.83	-0.6
0.83	-0.59
0.83	-0.59
0.84	-0.58
0.84	-0.57
0.84	-0.57



0.84	-0.56
0.84	-0.55
0.84	-0.55
0.84	-0.54
0.84	-0.53
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0.85	-0.52
0.85	-0.51
0.85	-0.51
0.85	-0.5
0.85	-0.5
0.85	-0.49
0.85	-0.48
0.85	-0.48
0.85	-0.47
0.86	-0.46
0.86	-0.46
0.86	-0.45
0.86	-0.45
0.86	-0.44
0.86	-0.43
0.86	-0.43
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0.86	-0.41
0.87	-0.4
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0.88	-0.3
0.88	-0.3
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0.89	-0.25
0.89	-0.24
0.9	-0.24
0.9	-0.23
0.9	-0.22

0.9	-0.22
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0.91	-0.16
0.91	-0.16
0.91	-0.15
0.91	-0.15
0.91	-0.14
0.91	-0.14
0.91	-0.13
0.91	-0.12
0.92	-0.12
0.92	-0.11
0.92	-0.11
0.92	-0.1
0.92	-0.1
0.92	-0.09
0.92	-0.09
0.92	-0.08
0.92	-0.07
0.92	-0.07
0.92	-0.06
0.93	-0.06
0.93	-0.05
0.93	-0.05
0.93	-0.04
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0.93	-0.03
0.93	-0.03
0.93	-0.02
0.93	-0.01
0.93	-0.01
0.94	0
0.94	0
0.94	0.01
0.94	0.01
0.94	0.02
0.94	0.02
0.94	0.03
0.94	0.03
0.94	0.04
0.94	0.05
0.94	0.05
0.95	0.06
0.95	0.06
0.95	0.07
0.95	0.07
0.95	0.08
0.95	0.08
0.95	0.09

0.95	0.09
0.95	0.1
0.95	0.11
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0.96	0.12
0.96	0.12
0.96	0.13
0.96	0.13
0.96	0.14
0.96	0.14
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0.98	0.27
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0.99	0.29
0.99	0.3
0.99	0.31
0.99	0.31
0.99	0.32
0.99	0.32
0.99	0.33
0.99	0.33
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1	0.35
1	0.35
1	0.36
1	0.36
1	0.37
1	0.38
1	0.38
1	0.39
1	0.39
1.01	0.4
1.01	0.4
1.01	0.41

1.01	0.42
1.01	0.42
1.01	0.43
1.01	0.43
1.01	0.44
1.01	0.45
1.01	0.45
1.02	0.46
1.02	0.46
1.02	0.47
1.02	0.48
1.02	0.48
1.02	0.49
1.02	0.49
1.02	0.5
1.02	0.51
1.03	0.51
1.03	0.52
1.03	0.52
1.03	0.53
1.03	0.54
1.03	0.54
1.03	0.55
1.03	0.56
1.03	0.56
1.04	0.57
1.04	0.57
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1.04	0.59
1.04	0.59
1.04	0.6
1.04	0.61
1.04	0.61
1.04	0.62
1.04	0.62
1.05	0.63
1.05	0.64
1.05	0.64
1.05	0.65
1.05	0.66
1.05	0.66
1.05	0.67
1.05	0.68
1.06	0.68
1.06	0.69
1.06	0.7
1.06	0.7
1.06	0.71
1.06	0.72
1.06	0.72
1.06	0.73
1.06	0.74
1.07	0.74
1.07	0.75
1.07	0.76
1.07	0.76
1.07	0.77

1.07	0.78
1.07	0.78
1.07	0.79
1.08	0.8
1.08	0.81
1.08	0.81
1.08	0.82
1.08	0.83
1.08	0.83
1.08	0.84
1.08	0.85
1.09	0.85
1.09	0.86
1.09	0.87
1.09	0.88
1.09	0.88
1.09	0.89
1.09	0.9
1.09	0.91
1.1	0.91
1.1	0.92
1.1	0.93
1.1	0.94
1.1	0.94
1.1	0.95
1.1	0.96
1.1	0.97
1.11	0.97
1.11	0.98
1.11	0.99
1.11	1
1.11	1.01
1.11	1.01
1.11	1.02
1.12	1.03
1.12	1.04
1.12	1.05
1.12	1.05
1.12	1.06
1.12	1.07
1.12	1.08
1.13	1.09
1.13	1.1
1.13	1.1
1.13	1.11
1.13	1.12
1.13	1.13
1.13	1.14
1.14	1.15
1.14	1.16
1.14	1.16
1.14	1.17
1.14	1.18
1.14	1.19
1.15	1.2
1.15	1.21
1.15	1.22

1.15	1.23
1.15	1.24
1.15	1.25
1.15	1.25
1.16	1.26
1.16	1.27
1.16	1.28
1.16	1.29
1.16	1.3
1.16	1.31
1.17	1.32
1.17	1.33
1.17	1.34
1.17	1.35
1.17	1.36
1.18	1.37
1.18	1.38
1.18	1.39
1.18	1.4
1.18	1.41
1.18	1.42
1.19	1.43
1.19	1.45
1.19	1.46
1.19	1.47
1.19	1.48
1.2	1.49
1.2	1.5
1.2	1.51
1.2	1.52
1.2	1.53
1.21	1.55
1.21	1.56
1.21	1.57
1.21	1.58
1.21	1.59
1.22	1.61
1.22	1.62
1.22	1.63
1.22	1.64
1.22	1.66
1.23	1.67
1.23	1.68
1.23	1.69
1.23	1.71
1.24	1.72
1.24	1.73
1.24	1.75
1.24	1.76
1.25	1.78
1.25	1.79
1.25	1.8
1.25	1.82
1.26	1.83
1.26	1.85
1.26	1.86
1.26	1.88

1.27	1.89
1.27	1.91
1.27	1.93
1.27	1.94
1.28	1.96
1.28	1.97
1.28	1.99
1.29	2.01
1.29	2.03
1.29	2.04
1.3	2.06
1.3	2.08
1.3	2.1
1.31	2.12
1.31	2.13
1.31	2.15
1.32	2.17
1.32	2.19
1.32	2.21
1.33	2.23
1.33	2.26
1.33	2.28
1.34	2.3
1.34	2.32
1.34	2.34
1.35	2.37
1.35	2.39
1.36	2.42
1.36	2.44
1.37	2.47
1.37	2.49
1.38	2.52
1.38	2.55
1.38	2.57
1.39	2.6
1.4	2.63
1.4	2.66
1.41	2.69
1.41	2.73
1.42	2.76
1.42	2.79
1.43	2.83
1.44	2.87
1.44	2.9
1.45	2.94
1.46	2.98
1.46	3.03
1.47	3.07
1.48	3.12
1.49	3.17
1.5	3.22
1.51	3.27
1.52	3.33
1.53	3.39
1.54	3.45
1.55	3.52
1.56	3.59

1.58	3.67
1.59	3.75
1.61	3.84
1.62	3.94
1.64	4.06
1.67	4.18
1.69	4.32
1.72	4.49
1.75	4.69
1.8	4.94
1.85	5.27
1.94	5.76
2.12	6.79



## Adopted Growth Factors

Return Period	Growth Factor	Design Peak Flow (m <sup>3</sup> /s)
1.3	0.87	199.99
2	1	229.87
5	1.2	275.85
10	1.33	305.73
20	1.45	333.32
30	1.53	351.71
50	1.62	372.4
100	1.74	399.98
200	1.86	427.56
500	2.02	464.34
1000	2.14	491.93

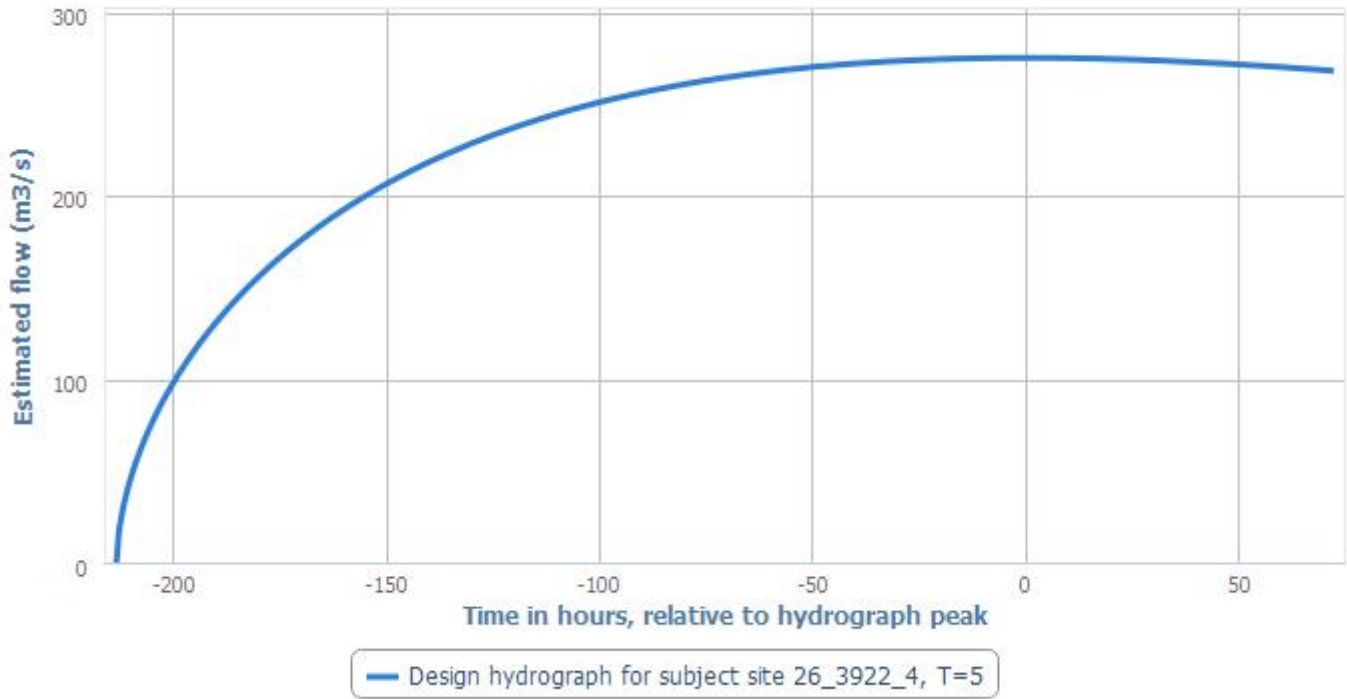
## Hydrograph Width Estimation Summary

Name	Value
<b>Pivotal site</b>	30061 "WOLFE TONE BRIDGE"
<b>Adjustment type</b>	The user adopted the original PCD hydrograph
<b>Transfer type</b>	The user adjusted the subject site estimate with the pivotal site deformation factor
<b>Deformation factor</b>	1
<b>Custom deformation factor</b>	1
<b>Accepted n</b>	1.55884046921493
<b>Accepted Tr</b>	213.636695256508
<b>Accepted C</b>	1944.31554243785

# Hydrograph Plots

Return Period: 5

Design hydrograph for subject site 26\_3922\_4, T=5



Hours relative to hydrograph peak	Estimated flow (m3/s)
-213.64	0
-213	18.63
-212	31.5
-211	41.01
-210	48.96
-209	55.93
-208	62.22
-207	67.98
-206	73.34
-205	78.35
-204	83.08
-203	87.57
-202	91.83
-201	95.91
-200	99.82
-199	103.58
-198	107.19
-197	110.68
-196	114.05
-195	117.32
-194	120.48
-193	123.55
-192	126.52
-191	129.42
-190	132.24
-189	134.98
-188	137.66
-187	140.27
-186	142.81

-185	145.3
-184	147.72
-183	150.09
-182	152.41
-181	154.68
-180	156.9
-179	159.08
-178	161.2
-177	163.29
-176	165.33
-175	167.33
-174	169.3
-173	171.22
-172	173.11
-171	174.96
-170	176.78
-169	178.57
-168	180.32
-167	182.04
-166	183.73
-165	185.39
-164	187.02
-163	188.62
-162	190.2
-161	191.75
-160	193.27
-159	194.76
-158	196.23
-157	197.68
-156	199.1
-155	200.5
-154	201.87
-153	203.22
-152	204.55
-151	205.86
-150	207.15
-149	208.42
-148	209.66
-147	210.89
-146	212.1
-145	213.29
-144	214.46
-143	215.61
-142	216.74
-141	217.85
-140	218.95
-139	220.03
-138	221.1
-137	222.14
-136	223.17
-135	224.19
-134	225.19
-133	226.17
-132	227.14
-131	228.09
-130	229.03
-129	229.96

-128	230.86
-127	231.76
-126	232.64
-125	233.51
-124	234.37
-123	235.21
-122	236.04
-121	236.85
-120	237.65
-119	238.44
-118	239.22
-117	239.99
-116	240.74
-115	241.48
-114	242.22
-113	242.93
-112	243.64
-111	244.34
-110	245.03
-109	245.7
-108	246.36
-107	247.02
-106	247.66
-105	248.29
-104	248.92
-103	249.53
-102	250.13
-101	250.73
-100	251.31
-99	251.88
-98	252.45
-97	253
-96	253.55
-95	254.08
-94	254.61
-93	255.13
-92	255.64
-91	256.14
-90	256.64
-89	257.12
-88	257.6
-87	258.06
-86	258.52
-85	258.97
-84	259.42
-83	259.85
-82	260.28
-81	260.7
-80	261.12
-79	261.52
-78	261.92
-77	262.31
-76	262.69
-75	263.07
-74	263.44
-73	263.8
-72	264.15

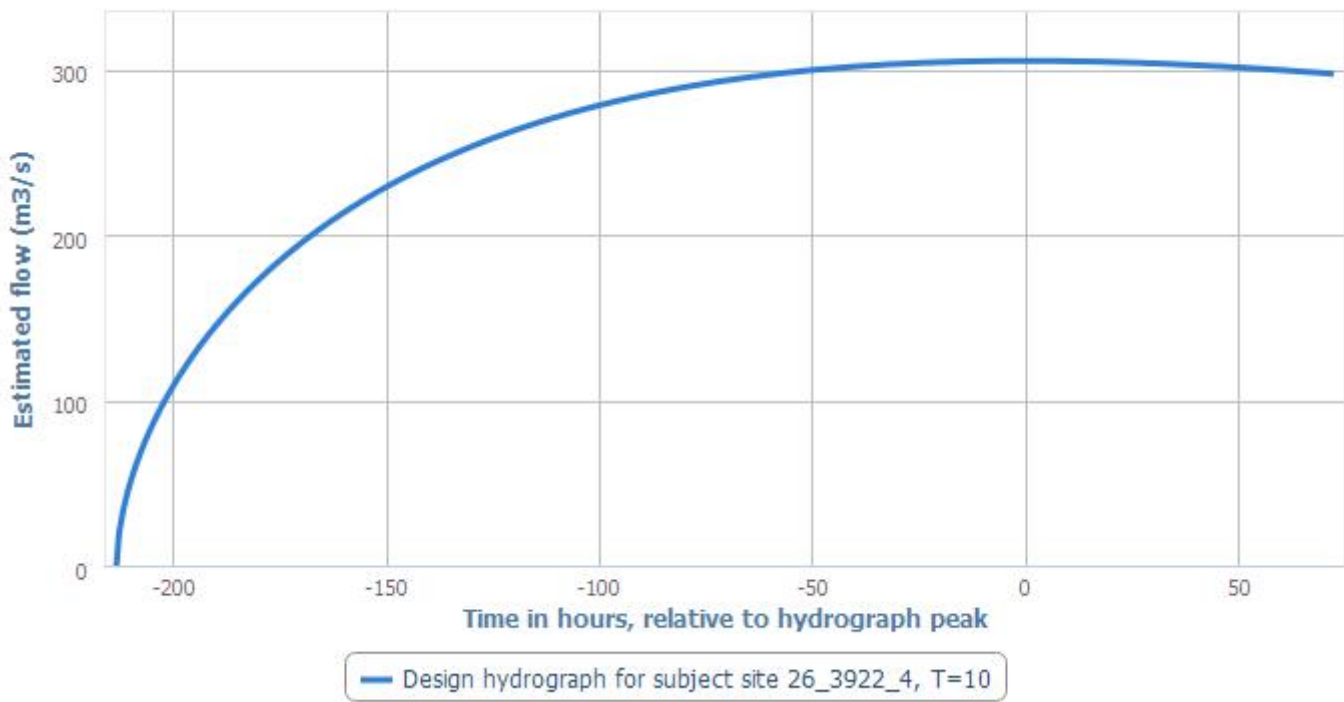
-71	264.5
-70	264.84
-69	265.18
-68	265.5
-67	265.82
-66	266.14
-65	266.45
-64	266.75
-63	267.04
-62	267.33
-61	267.62
-60	267.89
-59	268.16
-58	268.43
-57	268.69
-56	268.94
-55	269.19
-54	269.43
-53	269.66
-52	269.89
-51	270.12
-50	270.34
-49	270.55
-48	270.76
-47	270.96
-46	271.16
-45	271.35
-44	271.54
-43	271.72
-42	271.89
-41	272.07
-40	272.23
-39	272.39
-38	272.55
-37	272.7
-36	272.85
-35	272.99
-34	273.13
-33	273.26
-32	273.39
-31	273.51
-30	273.63
-29	273.75
-28	273.86
-27	273.96
-26	274.07
-25	274.16
-24	274.26
-23	274.34
-22	274.43
-21	274.51
-20	274.59
-19	274.66
-18	274.73
-17	274.79
-16	274.85
-15	274.91

-14	274.96
-13	275.01
-12	275.05
-11	275.09
-10	275.13
-9	275.16
-8	275.19
-7	275.22
-6	275.24
-5	275.26
-4	275.28
-3	275.29
-2	275.3
-1	275.3
0	275.3
1	275.3
2	275.3
3	275.29
4	275.28
5	275.26
6	275.24
7	275.22
8	275.2
9	275.17
10	275.14
11	275.11
12	275.07
13	275.03
14	274.99
15	274.94
16	274.89
17	274.84
18	274.79
19	274.73
20	274.67
21	274.61
22	274.54
23	274.47
24	274.4
25	274.33
26	274.25
27	274.17
28	274.09
29	274.01
30	273.92
31	273.83
32	273.74
33	273.64
34	273.55
35	273.45
36	273.34
37	273.24
38	273.13
39	273.02
40	272.91
41	272.8
42	272.68

43	272.56
44	272.44
45	272.32
46	272.2
47	272.07
48	271.94
49	271.81
50	271.67
51	271.54
52	271.4
53	271.26
54	271.12
55	270.97
56	270.83
57	270.68
58	270.53
59	270.38
60	270.22
61	270.07
62	269.91
63	269.75
64	269.59
65	269.43
66	269.26
67	269.09
68	268.92
69	268.75
70	268.58
71	268.41
72	268.23

Return Period: 10

Design hydrograph for subject site 26\_3922\_4, T=10



Hours relative to hydrograph peak	Estimated flow (m3/s)
-213.64	0
-213	20.67
-212	34.94
-211	45.49
-210	54.31
-209	62.04
-208	69.01
-207	75.41
-206	81.35
-205	86.91
-204	92.16
-203	97.13
-202	101.87
-201	106.39
-200	110.73
-199	114.89
-198	118.91
-197	122.78
-196	126.51
-195	130.13
-194	133.64
-193	137.04
-192	140.35
-191	143.56
-190	146.69
-189	149.73
-188	152.7
-187	155.59
-186	158.41
-185	161.17
-184	163.86



-183	166.49
-182	169.07
-181	171.58
-180	174.04
-179	176.46
-178	178.82
-177	181.13
-176	183.39
-175	185.62
-174	187.79
-173	189.93
-172	192.02
-171	194.08
-170	196.1
-169	198.08
-168	200.02
-167	201.93
-166	203.8
-165	205.65
-164	207.45
-163	209.23
-162	210.98
-161	212.69
-160	214.38
-159	216.04
-158	217.67
-157	219.27
-156	220.85
-155	222.4
-154	223.93
-153	225.43
-152	226.9
-151	228.36
-150	229.78
-149	231.19
-148	232.57
-147	233.93
-146	235.27
-145	236.59
-144	237.89
-143	239.16
-142	240.42
-141	241.66
-140	242.87
-139	244.07
-138	245.25
-137	246.41
-136	247.56
-135	248.68
-134	249.79
-133	250.88
-132	251.96
-131	253.01
-130	254.05
-129	255.08
-128	256.09
-127	257.08

-126	258.06
-125	259.02
-124	259.97
-123	260.9
-122	261.82
-121	262.73
-120	263.62
-119	264.5
-118	265.36
-117	266.21
-116	267.05
-115	267.87
-114	268.68
-113	269.48
-112	270.26
-111	271.04
-110	271.8
-109	272.54
-108	273.28
-107	274.01
-106	274.72
-105	275.42
-104	276.11
-103	276.79
-102	277.46
-101	278.12
-100	278.77
-99	279.4
-98	280.03
-97	280.64
-96	281.25
-95	281.84
-94	282.43
-93	283.01
-92	283.57
-91	284.13
-90	284.67
-89	285.21
-88	285.74
-87	286.26
-86	286.77
-85	287.27
-84	287.76
-83	288.25
-82	288.72
-81	289.19
-80	289.64
-79	290.09
-78	290.53
-77	290.97
-76	291.39
-75	291.81
-74	292.22
-73	292.62
-72	293.01
-71	293.4
-70	293.78

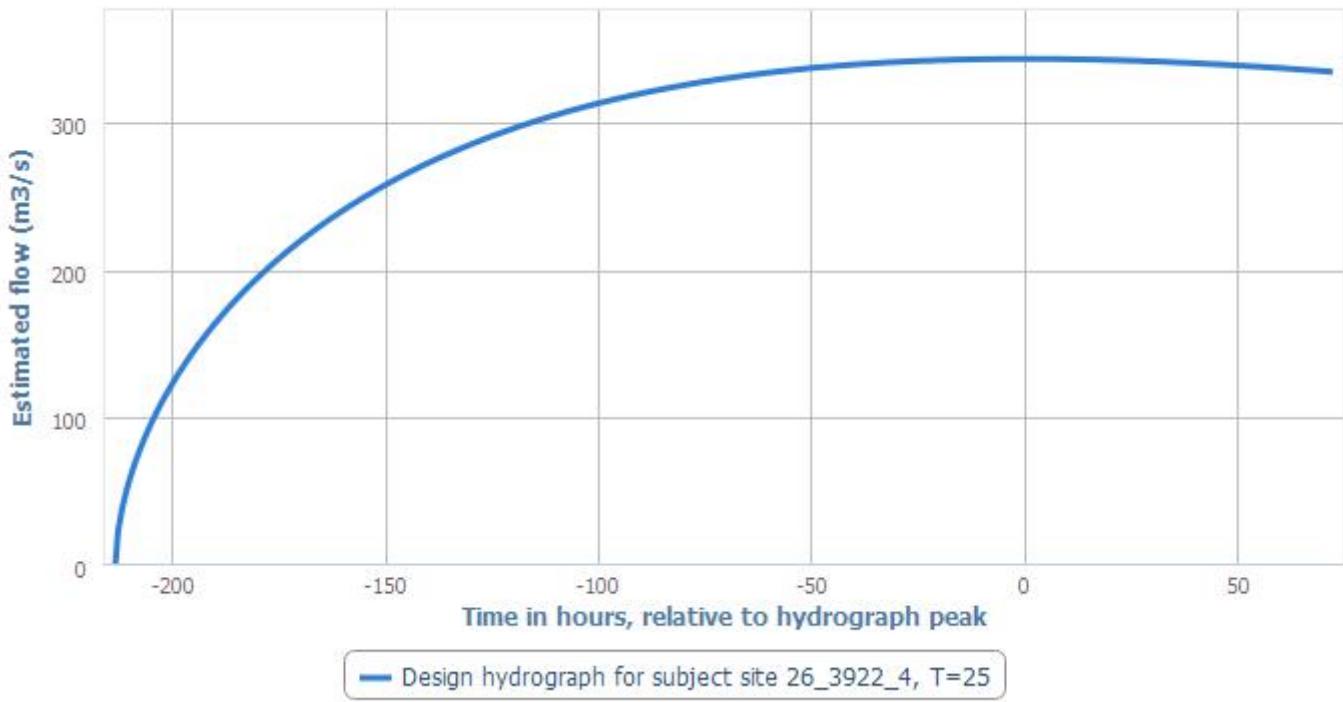
-69	294.15
-68	294.51
-67	294.87
-66	295.22
-65	295.56
-64	295.89
-63	296.22
-62	296.54
-61	296.85
-60	297.16
-59	297.46
-58	297.76
-57	298.04
-56	298.32
-55	298.6
-54	298.86
-53	299.13
-52	299.38
-51	299.63
-50	299.87
-49	300.11
-48	300.34
-47	300.56
-46	300.78
-45	301
-44	301.2
-43	301.4
-42	301.6
-41	301.79
-40	301.98
-39	302.15
-38	302.33
-37	302.5
-36	302.66
-35	302.82
-34	302.97
-33	303.12
-32	303.26
-31	303.4
-30	303.53
-29	303.66
-28	303.78
-27	303.9
-26	304.01
-25	304.12
-24	304.22
-23	304.32
-22	304.41
-21	304.5
-20	304.59
-19	304.67
-18	304.74
-17	304.81
-16	304.88
-15	304.94
-14	305
-13	305.05

-12	305.1
-11	305.15
-10	305.19
-9	305.23
-8	305.26
-7	305.29
-6	305.31
-5	305.34
-4	305.35
-3	305.37
-2	305.38
-1	305.38
0	305.38
1	305.38
2	305.38
3	305.37
4	305.35
5	305.34
6	305.32
7	305.29
8	305.27
9	305.24
10	305.2
11	305.16
12	305.12
13	305.08
14	305.03
15	304.98
16	304.93
17	304.87
18	304.81
19	304.75
20	304.68
21	304.61
22	304.54
23	304.46
24	304.38
25	304.3
26	304.22
27	304.13
28	304.04
29	303.94
30	303.85
31	303.75
32	303.65
33	303.54
34	303.43
35	303.32
36	303.21
37	303.09
38	302.98
39	302.85
40	302.73
41	302.6
42	302.48
43	302.34
44	302.21

45	302.07
46	301.94
47	301.79
48	301.65
49	301.51
50	301.36
51	301.21
52	301.05
53	300.9
54	300.74
55	300.58
56	300.42
57	300.25
58	300.09
59	299.92
60	299.75
61	299.57
62	299.4
63	299.22
64	299.04
65	298.86
66	298.68
67	298.49
68	298.31
69	298.12
70	297.93
71	297.73
72	297.54

Return Period: 25

Design hydrograph for subject site 26\_3922\_4, T=25



Hours relative to hydrograph peak	Estimated flow (m3/s)
-213.64	0
-213	23.24
-212	39.29
-211	51.15
-210	61.06
-209	69.76
-208	77.6
-207	84.79
-206	91.47
-205	97.73
-204	103.63
-203	109.22
-202	114.55
-201	119.63
-200	124.51
-199	129.19
-198	133.7
-197	138.05
-196	142.26
-195	146.33
-194	150.27
-193	154.1
-192	157.81
-191	161.43
-190	164.94
-189	168.37
-188	171.7
-187	174.95
-186	178.13
-185	181.23
-184	184.25

-183	187.21
-182	190.11
-181	192.94
-180	195.7
-179	198.42
-178	201.07
-177	203.67
-176	206.22
-175	208.72
-174	211.16
-173	213.57
-172	215.92
-171	218.23
-170	220.5
-169	222.73
-168	224.91
-167	227.06
-166	229.17
-165	231.24
-164	233.27
-163	235.27
-162	237.23
-161	239.16
-160	241.06
-159	242.93
-158	244.76
-157	246.56
-156	248.34
-155	250.08
-154	251.8
-153	253.48
-152	255.14
-151	256.77
-150	258.38
-149	259.96
-148	261.52
-147	263.05
-146	264.55
-145	266.03
-144	267.49
-143	268.93
-142	270.34
-141	271.73
-140	273.1
-139	274.45
-138	275.77
-137	277.08
-136	278.37
-135	279.63
-134	280.88
-133	282.1
-132	283.31
-131	284.5
-130	285.67
-129	286.82
-128	287.96
-127	289.08

-126	290.18
-125	291.26
-124	292.32
-123	293.37
-122	294.41
-121	295.42
-120	296.43
-119	297.41
-118	298.38
-117	299.34
-116	300.28
-115	301.21
-114	302.12
-113	303.01
-112	303.9
-111	304.77
-110	305.62
-109	306.46
-108	307.29
-107	308.11
-106	308.91
-105	309.7
-104	310.47
-103	311.24
-102	311.99
-101	312.73
-100	313.46
-99	314.17
-98	314.88
-97	315.57
-96	316.25
-95	316.92
-94	317.58
-93	318.23
-92	318.86
-91	319.49
-90	320.1
-89	320.71
-88	321.3
-87	321.88
-86	322.46
-85	323.02
-84	323.57
-83	324.12
-82	324.65
-81	325.18
-80	325.69
-79	326.2
-78	326.69
-77	327.18
-76	327.66
-75	328.12
-74	328.58
-73	329.04
-72	329.48
-71	329.91
-70	330.34



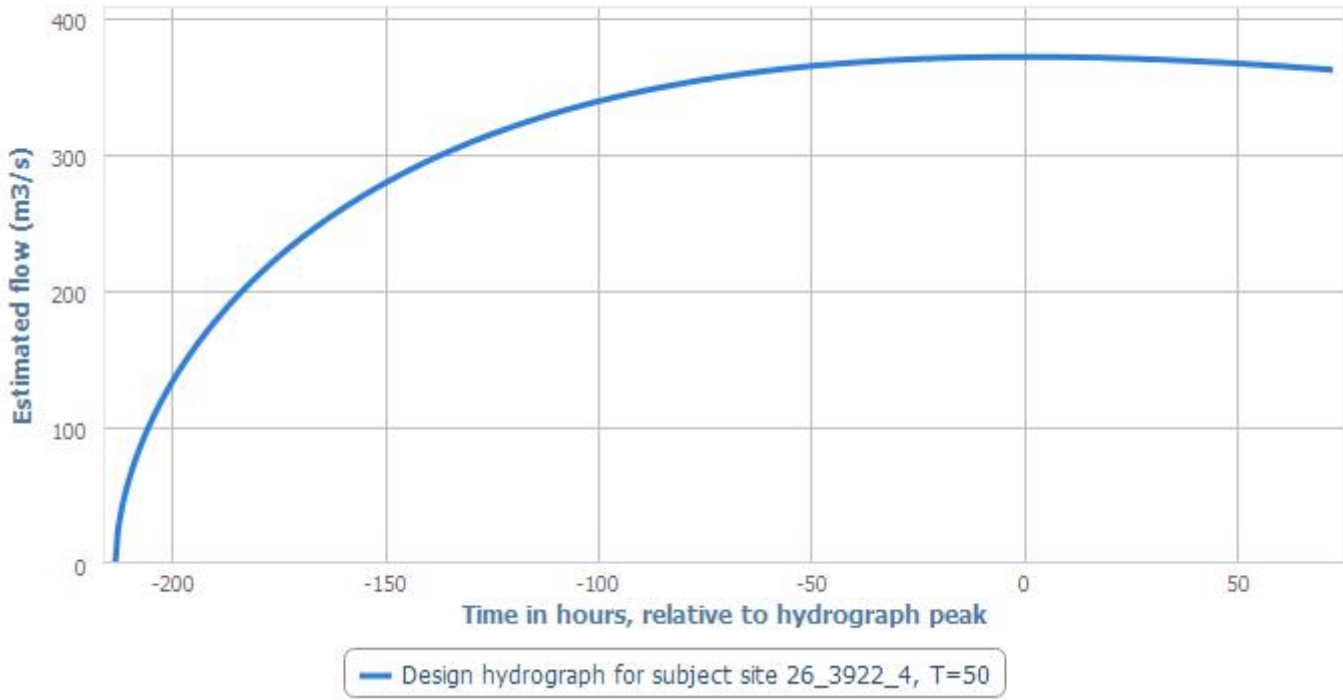
-69	330.75
-68	331.16
-67	331.56
-66	331.96
-65	332.34
-64	332.72
-63	333.08
-62	333.44
-61	333.8
-60	334.14
-59	334.48
-58	334.81
-57	335.13
-56	335.45
-55	335.76
-54	336.06
-53	336.35
-52	336.64
-51	336.92
-50	337.19
-49	337.46
-48	337.72
-47	337.97
-46	338.22
-45	338.45
-44	338.69
-43	338.91
-42	339.13
-41	339.35
-40	339.56
-39	339.76
-38	339.95
-37	340.14
-36	340.33
-35	340.5
-34	340.67
-33	340.84
-32	341
-31	341.16
-30	341.3
-29	341.45
-28	341.58
-27	341.72
-26	341.84
-25	341.96
-24	342.08
-23	342.19
-22	342.3
-21	342.4
-20	342.49
-19	342.58
-18	342.67
-17	342.75
-16	342.82
-15	342.89
-14	342.96
-13	343.02

-12	343.07
-11	343.12
-10	343.17
-9	343.21
-8	343.25
-7	343.28
-6	343.31
-5	343.33
-4	343.35
-3	343.37
-2	343.38
-1	343.39
0	343.39
1	343.39
2	343.38
3	343.37
4	343.35
5	343.34
6	343.31
7	343.29
8	343.26
9	343.22
10	343.18
11	343.14
12	343.1
13	343.05
14	342.99
15	342.94
16	342.88
17	342.81
18	342.74
19	342.67
20	342.6
21	342.52
22	342.44
23	342.35
24	342.26
25	342.17
26	342.07
27	341.98
28	341.87
29	341.77
30	341.66
31	341.55
32	341.43
33	341.32
34	341.19
35	341.07
36	340.94
37	340.81
38	340.68
39	340.54
40	340.41
41	340.26
42	340.12
43	339.97
44	339.82

45	339.67
46	339.51
47	339.35
48	339.19
49	339.03
50	338.86
51	338.69
52	338.52
53	338.34
54	338.17
55	337.99
56	337.81
57	337.62
58	337.43
59	337.24
60	337.05
61	336.86
62	336.66
63	336.46
64	336.26
65	336.06
66	335.85
67	335.64
68	335.43
69	335.22
70	335
71	334.78
72	334.56

Return Period: 50

Design hydrograph for subject site 26\_3922\_4, T=50



Hours relative to hydrograph peak	Estimated flow (m3/s)
-213.64	0
-213	25.15
-212	42.52
-211	55.35
-210	66.08
-209	75.49
-208	83.97
-207	91.76
-206	98.98
-205	105.75
-204	112.14
-203	118.19
-202	123.95
-201	129.46
-200	134.73
-199	139.8
-198	144.68
-197	149.39
-196	153.94
-195	158.34
-194	162.61
-193	166.75
-192	170.77
-191	174.68
-190	178.49
-189	182.19
-188	185.8
-187	189.32
-186	192.75
-185	196.11
-184	199.38

-183	202.58
-182	205.71
-181	208.78
-180	211.77
-179	214.71
-178	217.58
-177	220.39
-176	223.15
-175	225.85
-174	228.5
-173	231.1
-172	233.65
-171	236.15
-170	238.61
-169	241.01
-168	243.38
-167	245.7
-166	247.98
-165	250.22
-164	252.42
-163	254.59
-162	256.71
-161	258.8
-160	260.85
-159	262.87
-158	264.86
-157	266.81
-156	268.73
-155	270.61
-154	272.47
-153	274.29
-152	276.09
-151	277.86
-150	279.59
-149	281.3
-148	282.99
-147	284.64
-146	286.27
-145	287.88
-144	289.45
-143	291.01
-142	292.54
-141	294.04
-140	295.52
-139	296.98
-138	298.42
-137	299.83
-136	301.22
-135	302.59
-134	303.94
-133	305.27
-132	306.57
-131	307.86
-130	309.13
-129	310.37
-128	311.6
-127	312.81

-126	314
-125	315.17
-124	316.33
-123	317.46
-122	318.58
-121	319.68
-120	320.76
-119	321.83
-118	322.88
-117	323.92
-116	324.93
-115	325.94
-114	326.92
-113	327.89
-112	328.85
-111	329.79
-110	330.71
-109	331.63
-108	332.52
-107	333.4
-106	334.27
-105	335.13
-104	335.97
-103	336.79
-102	337.61
-101	338.41
-100	339.19
-99	339.97
-98	340.73
-97	341.48
-96	342.22
-95	342.94
-94	343.65
-93	344.35
-92	345.04
-91	345.72
-90	346.38
-89	347.04
-88	347.68
-87	348.31
-86	348.93
-85	349.54
-84	350.14
-83	350.73
-82	351.31
-81	351.87
-80	352.43
-79	352.98
-78	353.51
-77	354.04
-76	354.56
-75	355.07
-74	355.56
-73	356.05
-72	356.53
-71	357
-70	357.46

-69	357.91
-68	358.35
-67	358.79
-66	359.21
-65	359.63
-64	360.03
-63	360.43
-62	360.82
-61	361.2
-60	361.58
-59	361.94
-58	362.3
-57	362.65
-56	362.99
-55	363.32
-54	363.65
-53	363.97
-52	364.28
-51	364.58
-50	364.88
-49	365.16
-48	365.44
-47	365.72
-46	365.98
-45	366.24
-44	366.5
-43	366.74
-42	366.98
-41	367.21
-40	367.44
-39	367.65
-38	367.87
-37	368.07
-36	368.27
-35	368.46
-34	368.65
-33	368.83
-32	369
-31	369.17
-30	369.33
-29	369.48
-28	369.63
-27	369.77
-26	369.91
-25	370.04
-24	370.17
-23	370.29
-22	370.4
-21	370.51
-20	370.61
-19	370.71
-18	370.8
-17	370.89
-16	370.97
-15	371.04
-14	371.12
-13	371.18

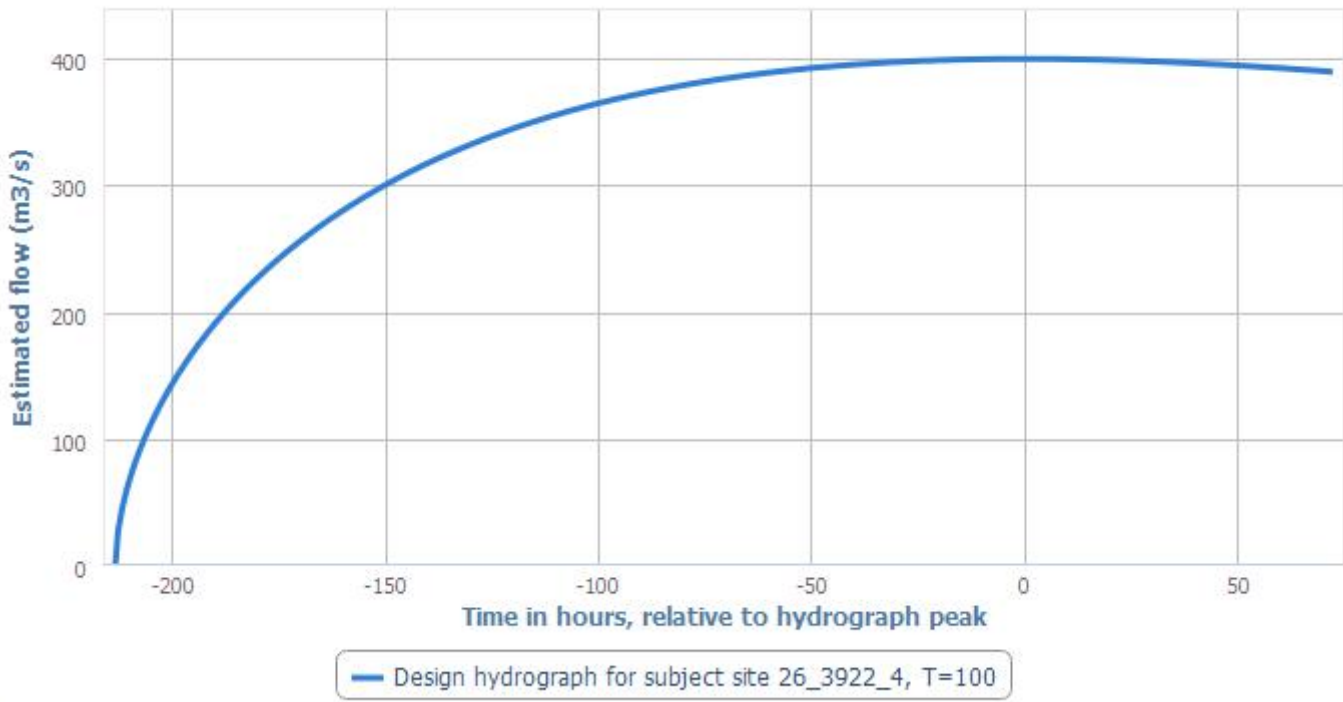
-12	371.24
-11	371.3
-10	371.35
-9	371.39
-8	371.43
-7	371.47
-6	371.5
-5	371.52
-4	371.54
-3	371.56
-2	371.57
-1	371.58
0	371.58
1	371.58
2	371.57
3	371.56
4	371.55
5	371.53
6	371.5
7	371.47
8	371.44
9	371.4
10	371.36
11	371.32
12	371.27
13	371.21
14	371.15
15	371.09
16	371.03
17	370.96
18	370.88
19	370.81
20	370.73
21	370.64
22	370.55
23	370.46
24	370.36
25	370.26
26	370.16
27	370.05
28	369.94
29	369.83
30	369.71
31	369.59
32	369.47
33	369.34
34	369.21
35	369.07
36	368.94
37	368.8
38	368.65
39	368.51
40	368.35
41	368.2
42	368.04
43	367.88
44	367.72



45	367.56
46	367.39
47	367.22
48	367.04
49	366.86
50	366.68
51	366.5
52	366.31
53	366.12
54	365.93
55	365.74
56	365.54
57	365.34
58	365.14
59	364.93
60	364.73
61	364.51
62	364.3
63	364.09
64	363.87
65	363.65
66	363.42
67	363.2
68	362.97
69	362.74
70	362.51
71	362.27
72	362.03

Return Period: 100

Design hydrograph for subject site 26\_3922\_4, T=100



Hours relative to hydrograph peak	Estimated flow (m3/s)
-213.64	0
-213	27.04
-212	45.72
-211	59.52
-210	71.05
-209	81.17
-208	90.3
-207	98.67
-206	106.44
-205	113.72
-204	120.58
-203	127.09
-202	133.29
-201	139.21
-200	144.88
-199	150.33
-198	155.58
-197	160.64
-196	165.53
-195	170.27
-194	174.86
-193	179.31
-192	183.63
-191	187.84
-190	191.93
-189	195.91
-188	199.79
-187	203.58
-186	207.27
-185	210.88
-184	214.4

-183	217.84
-182	221.21
-181	224.5
-180	227.72
-179	230.88
-178	233.97
-177	236.99
-176	239.96
-175	242.86
-174	245.71
-173	248.51
-172	251.25
-171	253.94
-170	256.58
-169	259.17
-168	261.71
-167	264.21
-166	266.66
-165	269.07
-164	271.44
-163	273.76
-162	276.05
-161	278.29
-160	280.5
-159	282.67
-158	284.8
-157	286.9
-156	288.97
-155	290.99
-154	292.99
-153	294.95
-152	296.88
-151	298.78
-150	300.65
-149	302.49
-148	304.3
-147	306.08
-146	307.83
-145	309.56
-144	311.26
-143	312.93
-142	314.57
-141	316.19
-140	317.78
-139	319.35
-138	320.89
-137	322.41
-136	323.91
-135	325.38
-134	326.83
-133	328.26
-132	329.66
-131	331.05
-130	332.41
-129	333.75
-128	335.07
-127	336.37

-126	337.65
-125	338.91
-124	340.15
-123	341.37
-122	342.57
-121	343.76
-120	344.92
-119	346.07
-118	347.2
-117	348.31
-116	349.41
-115	350.48
-114	351.54
-113	352.59
-112	353.62
-111	354.63
-110	355.62
-109	356.6
-108	357.57
-107	358.51
-106	359.45
-105	360.37
-104	361.27
-103	362.16
-102	363.03
-101	363.89
-100	364.74
-99	365.57
-98	366.39
-97	367.2
-96	367.99
-95	368.77
-94	369.54
-93	370.29
-92	371.03
-91	371.76
-90	372.47
-89	373.18
-88	373.87
-87	374.55
-86	375.21
-85	375.87
-84	376.51
-83	377.14
-82	377.77
-81	378.38
-80	378.97
-79	379.56
-78	380.14
-77	380.71
-76	381.26
-75	381.81
-74	382.34
-73	382.87
-72	383.38
-71	383.89
-70	384.38

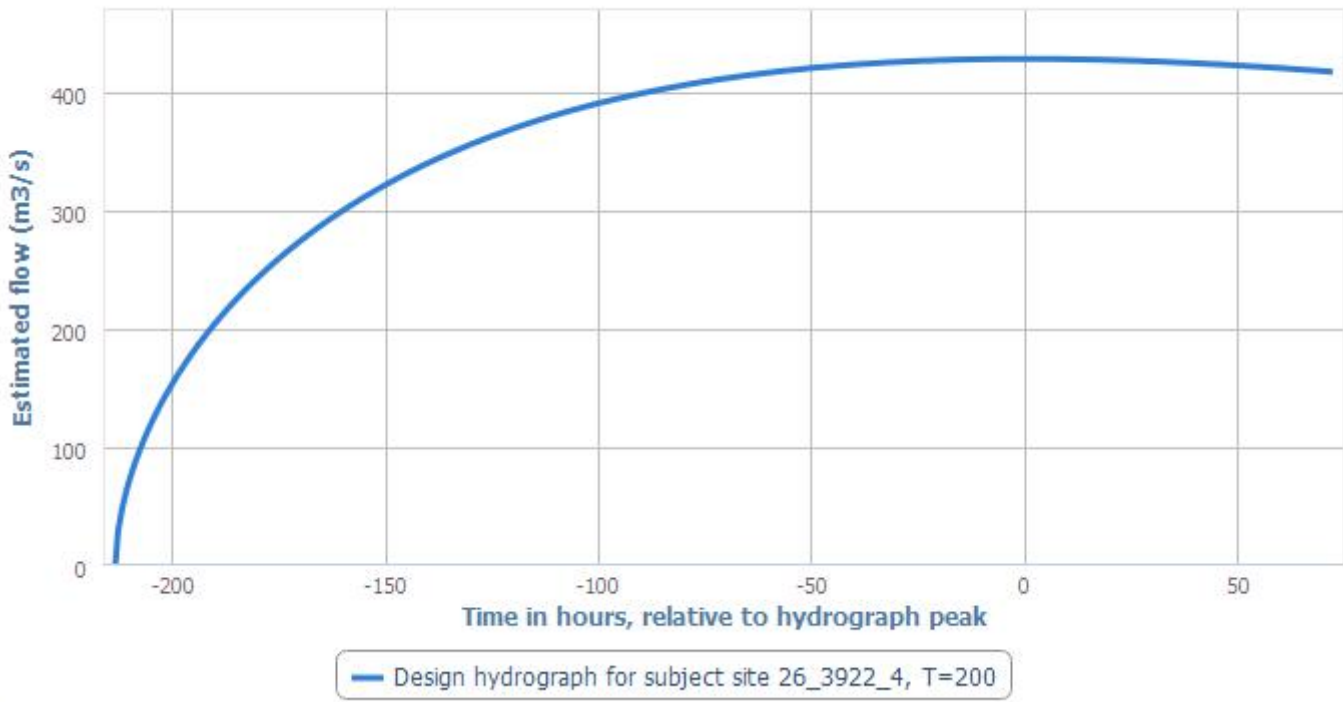
-69	384.87
-68	385.34
-67	385.81
-66	386.27
-65	386.71
-64	387.15
-63	387.58
-62	388
-61	388.41
-60	388.81
-59	389.2
-58	389.59
-57	389.96
-56	390.33
-55	390.69
-54	391.04
-53	391.38
-52	391.71
-51	392.04
-50	392.36
-49	392.67
-48	392.97
-47	393.26
-46	393.55
-45	393.83
-44	394.1
-43	394.36
-42	394.62
-41	394.87
-40	395.11
-39	395.34
-38	395.57
-37	395.79
-36	396
-35	396.21
-34	396.41
-33	396.6
-32	396.79
-31	396.97
-30	397.14
-29	397.31
-28	397.47
-27	397.62
-26	397.77
-25	397.91
-24	398.05
-23	398.17
-22	398.3
-21	398.41
-20	398.52
-19	398.63
-18	398.73
-17	398.82
-16	398.91
-15	398.99
-14	399.07
-13	399.14

-12	399.2
-11	399.26
-10	399.32
-9	399.36
-8	399.41
-7	399.45
-6	399.48
-5	399.51
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-3	399.55
-2	399.56
-1	399.57
0	399.57
1	399.57
2	399.56
3	399.55
4	399.53
5	399.51
6	399.48
7	399.45
8	399.41
9	399.37
10	399.33
11	399.28
12	399.23
13	399.17
14	399.11
15	399.04
16	398.97
17	398.9
18	398.82
19	398.73
20	398.65
21	398.56
22	398.46
23	398.36
24	398.26
25	398.15
26	398.04
27	397.92
28	397.81
29	397.68
30	397.56
31	397.43
32	397.29
33	397.16
34	397.02
35	396.87
36	396.72
37	396.57
38	396.42
39	396.26
40	396.1
41	395.93
42	395.76
43	395.59
44	395.42

45	395.24
46	395.06
47	394.87
48	394.69
49	394.49
50	394.3
51	394.1
52	393.9
53	393.7
54	393.49
55	393.28
56	393.07
57	392.86
58	392.64
59	392.42
60	392.19
61	391.97
62	391.74
63	391.51
64	391.27
65	391.04
66	390.8
67	390.55
68	390.31
69	390.06
70	389.81
71	389.56
72	389.3

Return Period: 200

Design hydrograph for subject site 26\_3922\_4, T=200



Hours relative to hydrograph peak	Estimated flow (m3/s)
-213.64	0
-213	28.93
-212	48.91
-211	63.68
-210	76.01
-209	86.84
-208	96.6
-207	105.55
-206	113.87
-205	121.65
-204	129
-203	135.96
-202	142.59
-201	148.92
-200	154.99
-199	160.82
-198	166.43
-197	171.85
-196	177.09
-195	182.15
-194	187.06
-193	191.82
-192	196.45
-191	200.95
-190	205.32
-189	209.58
-188	213.73
-187	217.78
-186	221.74
-185	225.59
-184	229.36



-183	233.04
-182	236.65
-181	240.17
-180	243.61
-179	246.99
-178	250.29
-177	253.53
-176	256.7
-175	259.81
-174	262.86
-173	265.85
-172	268.78
-171	271.66
-170	274.48
-169	277.25
-168	279.97
-167	282.65
-166	285.27
-165	287.85
-164	290.38
-163	292.87
-162	295.31
-161	297.71
-160	300.08
-159	302.4
-158	304.68
-157	306.92
-156	309.13
-155	311.3
-154	313.44
-153	315.54
-152	317.6
-151	319.63
-150	321.63
-149	323.6
-148	325.54
-147	327.44
-146	329.32
-145	331.16
-144	332.98
-143	334.76
-142	336.52
-141	338.25
-140	339.96
-139	341.63
-138	343.29
-137	344.91
-136	346.51
-135	348.09
-134	349.64
-133	351.17
-132	352.67
-131	354.15
-130	355.61
-129	357.04
-128	358.45
-127	359.84

-126	361.21
-125	362.56
-124	363.89
-123	365.19
-122	366.48
-121	367.75
-120	368.99
-119	370.22
-118	371.43
-117	372.62
-116	373.79
-115	374.94
-114	376.08
-113	377.19
-112	378.29
-111	379.37
-110	380.44
-109	381.49
-108	382.52
-107	383.53
-106	384.53
-105	385.51
-104	386.48
-103	387.43
-102	388.37
-101	389.29
-100	390.19
-99	391.09
-98	391.96
-97	392.82
-96	393.67
-95	394.5
-94	395.32
-93	396.13
-92	396.92
-91	397.7
-90	398.47
-89	399.22
-88	399.96
-87	400.68
-86	401.4
-85	402.1
-84	402.79
-83	403.46
-82	404.13
-81	404.78
-80	405.42
-79	406.05
-78	406.67
-77	407.27
-76	407.87
-75	408.45
-74	409.02
-73	409.59
-72	410.14
-71	410.68
-70	411.21

-69	411.73
-68	412.23
-67	412.73
-66	413.22
-65	413.7
-64	414.17
-63	414.63
-62	415.07
-61	415.51
-60	415.94
-59	416.36
-58	416.77
-57	417.18
-56	417.57
-55	417.95
-54	418.33
-53	418.69
-52	419.05
-51	419.4
-50	419.74
-49	420.07
-48	420.39
-47	420.71
-46	421.01
-45	421.31
-44	421.6
-43	421.88
-42	422.16
-41	422.42
-40	422.68
-39	422.93
-38	423.18
-37	423.41
-36	423.64
-35	423.86
-34	424.07
-33	424.28
-32	424.48
-31	424.67
-30	424.86
-29	425.04
-28	425.21
-27	425.37
-26	425.53
-25	425.68
-24	425.82
-23	425.96
-22	426.09
-21	426.22
-20	426.34
-19	426.45
-18	426.55
-17	426.65
-16	426.75
-15	426.83
-14	426.92
-13	426.99

-12	427.06
-11	427.12
-10	427.18
-9	427.23
-8	427.28
-7	427.32
-6	427.36
-5	427.38
-4	427.41
-3	427.43
-2	427.44
-1	427.45
0	427.45
1	427.45
2	427.44
3	427.43
4	427.41
5	427.39
6	427.36
7	427.33
8	427.29
9	427.25
10	427.2
11	427.15
12	427.09
13	427.03
14	426.96
15	426.89
16	426.81
17	426.73
18	426.65
19	426.56
20	426.47
21	426.37
22	426.27
23	426.16
24	426.05
25	425.94
26	425.82
27	425.69
28	425.57
29	425.44
30	425.3
31	425.16
32	425.02
33	424.87
34	424.72
35	424.57
36	424.41
37	424.25
38	424.08
39	423.91
40	423.74
41	423.56
42	423.38
43	423.2
44	423.01

45	422.82
46	422.63
47	422.43
48	422.23
49	422.02
50	421.82
51	421.61
52	421.39
53	421.17
54	420.95
55	420.73
56	420.5
57	420.27
58	420.04
59	419.8
60	419.56
61	419.32
62	419.08
63	418.83
64	418.58
65	418.32
66	418.07
67	417.81
68	417.55
69	417.28
70	417.01
71	416.74
72	416.47



## IBIDEM Plots and Tables

No IBIDEM plots were saved by the user.

# Audit Trail Report #2285 (Shannon at Athlone)



<b>User ID:</b>	jancek@rod.ie
<b>Name:</b>	Jancek, Martin
<b>Company:</b>	Roughan & O'Donovan
<b>Address:</b>	
<b>Report date &amp; time:</b>	08-04-2015 17:25
<b>Start of Calculation:</b>	08-04-2015 19:10

## Decisions made by the user:

Decision	User comment	System information	Date
2.1 Subject site accepted	N/A	Location 26_3922_4	08-04-2015 19:15
2.3 Pivotal site rejected	difference is too large	Station: 26021 BALLYMAHON	08-04-2015 19:16
3.1 Hydrograph pivotal site rejected	pivotal site is adequate	Station: 30061 WOLFE TONE BRIDGE	08-04-2015 19:17
3.3 Proceeded from hydrograph display	N/A		08-04-2015 19:17
3.3 Proceeded from hydrograph display	N/A		08-04-2015 19:17
3.4 Hydrograph inspected and adjusted	N/A	The user adopted the original PCD hydrograph	08-04-2015 19:17
3.5 Hydrograph transferred to subject site	N/A	The user adjusted the subject site estimate with n = 1.55884046921493, Tr = 213.636695256508, C = 1944.31554243785	08-04-2015 19:18



2.4 Pivotal site accepted	Reason for accepting: pivotal site is similar Reason for ignoring warnings:	Station: 26108 BOYLE ABBEY BR.Warnings: - Proportion of lakes/reservoirs in the catchment differs appreciably. Difference: (0.155). The user has been notified that 43 candidates where either hydrologically or geographically closer to the subject site than the chosen pivotal site. The user has accepted to reject these sites in preference of the chosen pivotal site.	08-04-2015 19:20
2.8 QMED data transfer performed	N/A		08-04-2015 19:20
2.11 Pooling group accepted	N/A	Pooled group accepted with the following stations: [25017, 16011, 15006, 16009, 18002, 26007, 07012, 15002, 14029, 36019, 16008] and distribution: EV1	08-04-2015 19:21
2.13 Module 2 finalized	N/A	Finished pooled analysis with the following distribution selected: EV1.	08-04-2015 19:21



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## **Appendix 8.2**

### *Section 50 Application and OPW Consent*

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**Construction, Replacement or Alteration of Bridges and Culverts  
Application for Consent under Section 50 of the Arterial Drainage Act, 1945 & EU (Assessment  
and Management of Flood Risks) Regulations SI 122 of 2010**

Project Name	<b>National Galway to Dublin Cycleway</b>	Structure Ref No.	
Applicant (Correspondence will issue to agent)			
Company or Organisation Name: <b>Westmeath County Council</b>			
Postal Address:	<b>Westmeath National Roads Office, Cullen Beg, Mullingar, Co. Westmeath</b>		
Contact Person:	<b>Michael Kelly</b>		
Phone:	<b>044 93 34250</b>	Fax:	
E-mail:	<b>mkelly@westmeathcoco.ie</b>		

Agent (Correspondence will issue to agent)			
Company or Organisation Name:			
Postal Address:	<b>The Tecpro Building, Clonshaugh Business &amp; Technology Park, Dublin 17</b>		
Contact Person:	<b>David Casey</b>		
Phone:	<b>01 8474220</b>	Fax:	<b>01 8474257</b>
E-mail:	<b>david.casey@awnconsulting.com</b>		

Location and Parameters of crossing			
Watercourse:	<b>River Shannon</b>	Catchment:	<b>River Shannon</b>
Address (Townland – County): <b>Athlone Town</b>			
Grid Reference	X: <b>603822</b>	Y: <b>741597</b>	
Hydrometric Station(s) utilized (including reference number):	<b>Boyle Abbey Br (26108)</b>		
Area of Contributing Catchment:	<b>4600</b> Km <sup>2</sup>	Road Reference:	<b>N/A</b>
Design Flood Flow:	<b>480</b> m <sup>3</sup> /s	Annual Exceedance Probability (AEP):	<b>1</b> %

Statement of Authenticity	
I hereby certify that the information contained in this application form, along with all appended supporting information, has been checked by me and that all statements are true and accurate.	
Name:	<b>David Casey</b>
Company/Organisation:	<b>AWN Consulting</b>
Signature:	
Date:	<b>29/01/2016</b>

Application Check List	—
COMPLETED APPLICATION FORM	<input checked="" type="checkbox"/>
SUPPORTING HYDROLOGICAL AND HYDRAULIC INFORMATION	<input checked="" type="checkbox"/>
PHOTOGRAPHS COVERING SITE OF ALL PROPOSED WORKS	<input type="checkbox"/>
SCALED PLAN OF BRIDGE/CULVERT/APPROACH EARTHWORKS	<input type="checkbox"/>
SCALED CROSS SECTION OF BRIDGE/CULVERT/APPROACH EARTHWORKS	<input type="checkbox"/>
SCALED LONG SECTION OF CHANNEL THROUGH BRIDGE/CULVERT	<input type="checkbox"/>
DETAILS OF RELEVANT EXISTING STRUCTURES	<input type="checkbox"/>
COMPLETED STATEMENT OF AUTHENTICITY	<input type="checkbox"/>
PLAN OF CATCHMENT AREA	<input type="checkbox"/>
COPY OF NOTICE OF GRANT OF PLANNING PERMISSION WITH CONDITIONS *1	<input type="checkbox"/>

If the application form is not completed correctly, and in its entirety, the application may be deemed invalid and returned for correction.

<i>For OPW use only</i>		<i>Date of Receipt</i>						
<i>OPW Drainage Maintenance Region</i>	<i>East</i>	<input type="checkbox"/>	<i>South East</i>	<input type="checkbox"/>	<i>South West</i>	<input type="checkbox"/>	<i>West</i>	<input type="checkbox"/>
<i>Correspondence Number</i>			<i>OPW Register No:</i>					
			<i>Consent Issued</i>			<input type="checkbox"/>		

**ADDITIONAL INFORMATION**

Hydrological Analysis			
Methodology Applied			Factors Applied
Method Used	Tick box if used or state other	Flow *2 (m <sup>3</sup> /sec)	Type of Factor
6 – Variable Catchment characteristics	<input type="checkbox"/>		Climate Change
3 – Variable Catchment Characteristics	<input type="checkbox"/>		Irish Growth Curve
IH 124	<input type="checkbox"/>		Factor for Standard Error
Gauged Flow	<input type="checkbox"/>		Drained Channel
Unit Hydrograph	<input type="checkbox"/>		Other
Other	<input type="checkbox"/>		
Other	<input checked="" type="checkbox"/>	<b>480</b>	Tidal
FSR <input type="checkbox"/>	FSU <input checked="" type="checkbox"/>	Other <input type="checkbox"/>	Comments
Comments: Use of OPW FSU Web Portal to estimate design flow			

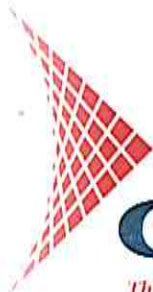
Hydraulic/Structure Details	
Description of Structure*3	<p>The bridge structure comprises a two span bridge with a pier in the middle of the river and end supports on the river banks. The spans are of approximately equal 52.0m length. The overall length of the main bridge is approximately 104m. The main crossing spans are straight on plan and are aligned approximately perpendicular to the existing eastern river wall. they vary in width between 5.0m (between handrails) over the central pier to 13m (approximately between handrails) at each end support. This is in orthotropic steel construction.</p> <p>It is anticipated that all of the principal bridge foundations will be piled. The piles are likely to be steel tubular piles driven into the river bed. It is anticipated that the central pier will be supported on a rectangular pilecap on 4No. piles. The top of the pilecap will be set just below bed level of the river to ensure no impact on flow.</p>
Effective Conveyance Area *4	<b>21,550</b> m <sup>3</sup> /s
Upstream Invert Level <b>31.933</b> mOD	Downstream Invert Level <b>32.022</b> mOD
Upstream Soffit Level <b>39.99</b> mOD	Downstream Soffit Level <b>39.99</b> mOD
Upstream Design Flood Level <b>32.261</b> mOD	Downstream Design Flood Level <b>36.262</b> mOD

NOTES :

If the application form is not completed correctly, and in its entirety, the application may be deemed invalid and returned for correction.

1. In line with OPW policy, section 50 approvals should be sought for bridges and culverts that are necessary for access or deemed acceptable by the planning authority. A copy of the notice of grant of planning permission with all conditions should be enclosed with all applications that are not exempt development under the Planning and Development Act, 2000, as evidence that these factors have been considered.
2. Flow is the estimated flow from the catchment, without any factors applied.
3. The following details are to be included: the channel bed level, invert and soffit levels of the structure along with the width, length and total conveyance area. Any environmental considerations such as bed depression, baffles, mammal walkways etc. should be described.
4. Effective conveyance area is from channel bed level to design flood level.
5. All levels must be given to Ordnance Datum, Malin Head.

If the application form is not completed correctly, and in its entirety, the application may be deemed invalid and returned for correction.



**OPW**

*The Office of Public Works*  
*Oifig na nOibreacha Poiblí*

David Casey  
AWN Consulting  
The Tecpro Building  
Clonshaugh Business & Technology Park  
Dublin 17



**Ceann Oifig**  
Sráid Jonathan Swift  
Baile Átha Troim  
Co. na Mí

**Head Office**  
Jonathan Swift Street  
Trim  
Co Meath

Tel/Phone: (046) 942 6000  
Facs/Fax: (046) 948 1793  
Íosghlao/LoCall 1890 213414  
Suíomh gréasáin/website: [www.opw.ie](http://www.opw.ie)

**Our Ref: 509 – 2015**

**RE: Section 50 Application – Galway to Dublin Cycleway – Shannon Crossing**

Dear David,

I refer to the revised correspondence which was received in our Mullingar Office in February 2016, in relation to the above matter.

The documentation submitted has been examined and I recommend that the consent of the Commissioners of Public Works under Section 50 of the Arterial Drainage act, 1945 is given for the proposed bridge as detailed in the revised application and accompanying drawing SK-16, Rev P4.

It should be noted that the consent is given only for the purpose of Section 50 and does not absolve the recipient of responsibility for any adverse effects caused by this installation to any third party.

The Commissioners of Public Works are not responsible and accept no liability for any loss or damage whatsoever caused as a result of this development.

Yours sincerely

Karen Donovan  
Engineering Services Administration Unit  
16<sup>th</sup> March 2016



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## **Appendix 12.1**

### *Recorder Archaeological Monuments*

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## Appendix 12.1

### Recorded Archaeological Monuments

The recorded archaeological sites within c. 50m of the proposed development are listed below, all noted in the Sites and Monuments Record for Co. Westmeath ([www.archaeology.ie](http://www.archaeology.ie)) and in the archive of the National Monuments Service. Please note that the sites described below as redundant records (WM029-042069- / HC 28, WM029-042076- / HC 29) have been reclassified as part of the generic site number for the Athlone town defences (WM029-042020-).

Abbreviations:

AFM - Annals of the Kingdom of Ireland by the Four Masters from the Earliest Period to the Year 1616.

ALC - The Annals of Loch Cé: a chronicle of Irish affairs, 1014-1690,

Ann. Clon. - The Annals of Clonmacnoise: being annals of Ireland from the earliest period to AD 1408, translated into English, AD 1627,

Ann. Conn. - Annála Connacht, The Annals of Connacht, 1224-1544.

Cal. Carew MSS - Calendar of the Carew Manuscripts, Preserved in the Archiepiscopal Library at Lambeth, 1515–1574.

<b>HC #</b>	1
<b>Legal Status</b>	RMP WM029-042----
<b>Townland</b>	Athlone, Athlone and Bigmeadow, Golden Island, Loughnaskin
<b>Site Type</b>	Historic town
<b>ITM (E, N)</b>	603850, 741525
<b>Description</b>	See individual elements below
<b>Distance from Route</b>	0m

<b>HC #</b>	2
<b>Legal Status</b>	National Monument Ref. No. RMP520 'O' / RMP WM029-042002- / RPS 070
<b>Townland</b>	Athlone South
<b>Site Type</b>	Castle - Anglo-Norman masonry castle
<b>ITM (E, N)</b>	603801, 741443
<b>Description</b>	Athlone Castle was built as a Royal Castle in 1210 to control an important fording point over the River Shannon which may have had a pre-Norman fortification (WM029-042098-) at this location. The Anglo-Norman stone castle was built on lands originally granted in 1200 to Geoffrey de Costentin who was then granted other lands in Connacht due to the construction of Athlone Castle which became the demesne lands of King John. The king of England then ordered Geoffrey de Costentin to maintain and keep possession of the castle on behalf of the king. In the year 1200 as part of the Anglo-Norman settlement of Connacht, King John of England granted Geoffrey de Costentin, 'a cantred in Connaught called Tirieghrachbothe' (Cal. doc. Ire., 22). The castle of Athlone and the western side of Athlone town were located on these lands called 'Tirieghrachtbothe'. In 1214 shortly after the construction of the Royal Castle of Athlone, King John allowed Geoffrey de Costentin to exchange the lands containing Athlone Castle for the cantred of Trithweth also located in Connacht (Cal. doc. Ire., 92). The lands of Trithweth were described as being located 'more remote from the castle, and nearer to the Irish' (Cal. doc. Ire., 257). In this year following a petition submitted by Geoffrey to the Archbishop of Dublin, King John commanded the 'exchange for the cantred in which the Castle of Athlone is situated, the Archbishop cause

Godfrey [Geoffrey] to have another cantred of equal value in the marches' (Cal. doc. Ire., 81). In 1215, King John granted a mandate to 'Godfrey [Geoffrey] de Constantin to safely keep the castle of Aslon [Athlone], as he previously kept it' (Cal. doc. Ire., 95). In 1220 Geoffrey de Constantin was appointed to maintain 'the custody of the K.'s land and castles in that country, which custody shall be surveyed by counsel of the Archbishop of Dublin, Thomas Fitz Adam, and Richard de Burgh' (Cal. doc. Ire., 144). No further mitigation measures required. The present structure traces its foundation to John de Grey, Bishop of Norwich and Justiciar of Ireland, who commenced construction of Athlone castle in 1210 (ALC; Ann. Clon. sub 1208-9). In this year King John of England, ordered the Bishop to erect three castles in the province of Connacht. The Annals of Loch Cé recorded in the year 1210 that the Bishop of Norwich came along with the forces of Meath and Leinster to Athlone where a 'bridge (WM029-042004-) was constructed by him across Ath-Luain, and a castle instead of O'Conchobhair's [O'Conor's] castle (WM029-042098-)' (ALC). The following year in 1211 a stone tower (possibly the keep or donjon) collapsed killing Richard de Tuite and eight others (Gilbert 1884, ii, 232, 279) and Orpen (1907, 262-3) has suggested that this disaster might have resulted from the construction of a Keep on top of a motte (WM029-042099-) which had not settled sufficiently to hold the weight. This event was recorded on the Annals of Clonmacnoise in the entry for the year 1210 which stated that the English Bishop who 'was Deputy, and Richard Tuite founded a stone castle in Athlone, wherein there was a tower of stone built, which soon after fell & killed the said Richard Tuite with eight Englishmen more' (Ann. Clon.).

The stone castle of Athlone was built on monastic lands belonging to the priory (WM029-042003-) of Saints Peter and Paul situated to the south. In 1213 the King of England commanded 'Henry Archbishop of Dublin to cause the monks of Athlone to have the tenth part of the expenses of the castle in that town, in exchange for their land in which the castle is situated, as the Bishop of Norwich undertook when fortifying the castle' (Cal. doc. Ire., 80). In 1216, King John commanded the Justiciar of Ireland to exchange with the 'Prior of Athlone, for the 4 cantreds in the fee of Logseuethy [Lough Sewdy] assigned to the Prior by John Bishop of Norwich in compensation for the site of the K.'s castle of Athlone' (Cal. doc. Ire., 106-07). The King also commanded the Justiciar to 'cause competent satisfaction to be given to the Prior touching an exchange for his meadow, his fisheries of 12 marks, and the tithes of the castle' (Cal. doc. Ire., 107). In 1235 the King of England discovered by inquisition that the 'monks of Adlon [Athlone] have been wont to receive at the Exchequer, Dublin, an annuity of 10 marks of the vill (WM029-042----), castle, mill (WM029-042056-), and fishery (WM029-042081-) towards Connaught, which John Bishop of Norwich, when [justiciary], constructed in the their land, the K. commands the monks to have this annuity' (Cal. doc. Ire., 340-1). Work on the castle is sporadically recorded during the thirteenth century, in 1232-4 (35th Rep. Deputy Keeper Public Records Ireland, 37) and 1251 when the King ordered to 'employ 80 marks of the K.'s money in aid of the inclosure (WM029-042020-) of the K.'s vills of Adlon [Athlone] and Rendun [Rindown, Co. Roscommon], and repair of their castles (Cal. doc. Ire., 469). In 1270-72 the Exchequer paid 5 marks in wages to 'Nicholas of Gloucester, carpenter of the castle of Athlone' (Cal. doc. Ire., 150). In 1273-4, the justiciar, Geoffrey de Geneville, spent over £3,500 on various projects including 'repairs of the castle and houses of Athlone' (36th Rep. Deputy Keeper Public Records Ireland, 40). In 1276-7 Robert d'Ufford, the succeeding justiciar, spent £2,136 on fortifications and buildings at the castles of Rindown (RO046-004002-), Co. Roscommon and Athlone (36th Rep. Deputy Keeper Public Records Ireland, 35; Cal. doc. Ire., 267) and a further £3,200 in 1278-9 on work at Roscommon (RO039-043001-), Rindown (RO046-004002-) and Athlone castles (36 Rep Deputy Keeper Public Records Ireland, 48). In 1277-78 Robert de Ufford spent money on 'repairing houses of the castle of Athlone' (Cal. doc. Ire., 267). In 1281 the Exchequer made a payment to Thomas de Isham 'for works of the castles of Roscommon, Raundun [Rindown, RO046-004002-] and Athlone' (Cal. doc. Ire., 406). In 1284 the Exchequer made a payment of £11 13s 4d. to William 'the carpenter, spent in works of the castle of Athlone' (Cal. doc. Ire., 541). In 1290 the chief justiciary of

Ireland went to 'the castle of Athlone, and remaining there to treat with the Irish of those parts, to inspect the defects of the works of the castle and bridge (WM029-042004-)' (Cal. doc. Ire., 326). Between 1286 and 1290 the Exchequer made a payment to 'Geoffrey Brun, clerk, of £300, to be spent on fortifications of the castles of Roscommon (RO039-043001-), Randon (RO046-004002-), and Athlone, in works of those castles' (Cal. doc. Ire., 370). It is likely that much of the surviving medieval fabric of the castle, particularly the river wall with its three-quarter-round towers at each angle dates to this period (Orpen 1907, 271; Claffey 1970-1, 57; Leask 1951, 42). Parts of the castle had fallen into neglect by 1305 and repairs were carried out in 1306 by Richard de Exeter, constable of Roscommon castle (38th Rep. Deputy Keeper Public Records Ireland, 103). The Annals of St. Mary's, Dublin, note the burning of the castle and town by Ruaidri O Conchobhar in 1315 but Orpen (1907, 272), using the Irish annals, has suggested that the castle was not captured at this time. Little is known of the castle in the later fourteenth and fifteenth centuries although it is clear that it was frequently in Irish hands until recovered by the Crown in 1537. In this year it was recorded that the 'castle of Athlone, standing upon a passage betwixt Connaught and these parts, is recovered, which has long been usurped by the Irish' (Gardiner 1891, 47-85). Thereafter the castle remained in English hands serving as the residence of the Presidents of Connacht after 1569 (Murtagh 1980, 81). In 1547, the Annals recorded that the 'castle of Athlone was repaired by the English, namely, by William Brabazon, the King's Treasurer in Ireland, and the English and Irish of Meath, in despite of O'Kelly (Donough, the son of Edmond) and the Irish of Connaught' (AFM). These works involved the construction of a building or house described in the annals as a 'court' in 1552 when recording the death of William Brabazon (AFM). This court was probably the range of buildings on the east side of the castle known as the president's apartments. In 1574 the castle was described as 'this castle of Allon [Athlone] is on the Shannon, and is of great strength. It is held by the English, but by way of munitions it has but two very small pieces of artillery' (Rigg 1926, 148-69).

In 1589 Athlone Castle was captured by a Spanish army of 2,000 men who 'did break the bridge (WM029-042004-) of Athlone, and told that when your Lordship understood of their fortifying there you went against them with 8,000 soldiers as far as Athlone, and finding the bridge of Athlone broke by the Spaniards that your Lordship did return again to Dublin, and that they hold the fort' (Cal. S. P. Ire., 136). In 1590 the castle is described as 'Her Majesty's manor house' to which was attached the customs of 'the bridge (WM029-042004-) and market of Athlone' (Cal. S. P. Ire., 374). In 1592 there is a reference to 'restoration to the house of Athlone of half of the bawn or strength which Sir Edward Waterhouse hath gotten' (Cal. S. P. Ire., 443). The reference to the bawn probably refers to the curtain wall of the stone castle. In 1641 the castle is placed under a siege by Catholic forces and around 1642 the custody of Athlone Castle is surrendered to lord viscount Dillon of Costelloe (Vallancey 1786, 97). In 1663 there was a payment made of £1,000 to Viscount Dillon which was described as 'being one year's pay on the annuity granted said Viscount in consideration of a surrender made by him of the Presidentship of Connaught, the Constableness of Athlone Castle' (Shaw 1904, 504).

In 1684 the King sent a warrant to the Lord Lieutenant of Ireland 'reciting the grant dated 17 April, 1674, to the Earl of Ranelagh of the office of Constable and Governor of Athlone Castle and Governor of Athlone and the barony of Athlone and the half barony of Moycarn, co. Roscommon, and the territory of the Brawney, co. Westmeath, with a fee of 100l. per annum, for, at the request of the said earl, giving all necessary and effectual orders for inserting the said fee in the Military List of the present establishment for Ireland, making it payable to him from 25 March last during his continuance in the said government, and also for giving effectual orders for payment to him of whatsoever is due to him of the said fee from 29 Sept., 1682, to the said 25 March last' (Blackburne Daniell and Bickley 1938, 109-32).

According to Piers (1981, 86) the president's apartments were in the east wing overlooking the river. Between 1689-91 the castle in Athlone was described as

'the castle is yet in good repair, but no one dwelling in it, it will run to decay' (Hardy 1900, 21-80). The castle buildings were largely destroyed in the 1691 siege when the castle suffered considerable damage as a result of bombardment by Ginkel's artillery (Murtagh 1972-3, 176). These apartments are shown by Thomas Phillips in a drawing of 1685 and have been attributed to Sir William Robinson the architect of the Royal Hospital at Kilmainham, Dublin (Loeber 1981, 96). In 1693 a royal warrant was issued by the Lord Lieutenant of Ireland for a 'patent to pass the great seal of Ireland for a release and discharge to the said Earl of Ranelagh of the covenant to keep the Castle of Athlone in good repair' (Shaw 1935, 1-5). In 1697, Richard the earl of Ranelagh submitted a petition to the King 'showing that he was a great sufferer by the late war in Ireland, having lost nearly 12,000l. of rent, and his castles of Roscommon and Athlone being utterly ruined, his mansion in Dublin being pulled down for timber to build a mass house there; praying for a grant of 500l. per ann. out of the forfeitures in the counties of East and West Meath, and in the province of Connaught; also the inheritance of his house at Chelsea, with the 23 acres thereto belonging, already granted to him for 99 years; in order that he might make a settlement in his family' (Redington 1871, 18-37). In this year there was given 'an account of a violent tempest at Athlone, accompanied by thunder and lightning; the town and castle have been burnt and blown down, the magazine having been fired by lightning' (Hardy 1927, 454-97). The castle appears to have remained in a ruinous condition until the 1790's when the possibility of French invasion drew the attention of the British authorities to the defence of Athlone. The castle was considerably rebuilt following a survey by Lt. Col. Tarrant in 1793 and further modifications took place during the nineteenth century (Kerrigan 1980, 182-5).

In 1682 the castle was described by Sir Henry Piers who wrote that 'one tower on the castle wall is so advantageously seated that it commandeth the whole bridge (WM029-042004-), which nevertheless hath a great drawbridge on that end' (Vallancey 1786, 86). Piers (ibid.) describes the siting of the castle as being built 'on an high raised round hill (WM029-042099-; WM029-042098-), resembling one of our Danish raths or forts, the walls whereof do almost shut up the whole ground; in the centre whereof is an high-raised tower, which overlooketh the walls and country round about; on the side that faceth the river are the rooms and apartments which served always for the habitation of the lord president of Connaught, and governor of the castle; the middle tower being the repository or store-house for ammunition and warlike provisions of all sorts. Of late, since the presidency was dissolved, this castle and the demesnes of it an all revenues are granted in fee by his gracious majesty now reigning, to the right honourable Richard Jones, earl of Ranelagh, grandson to Roger lord Ranelagh, who was president of Connaught in 1641, and his heirs. The presidents heretofore here held their courts of justice, which are now dissolved'. The 1685 plan of the town by Thomas Phillips (NLI Ms. 3137(32); Murtagh 1994 Map 4) depicts the castle as a polygonal-shaped keep standing in the W quadrant of the castle ward which is protected by a polygonal-shaped curtain wall. A square-shaped mural tower on the SW side of the curtain wall is depicted along with the remains of a square-shaped tower on the SE angle overlooking the medieval bridge (WM029-042004-). A long rectangular building known as the president's house runs along the full length of the E wall of the castle ward overlooking the river and bridge below. This plan shows a wall running N off the centre of the N wall of the curtain wall of the castle keep/donjon. This second curtain wall runs onto the W angle tower of a medieval castle known as the Connaught Tower which is described in 1581 in a land grant to the earl of Ormond and Ossory as an 'an old ruinous tower called Connaghte tower covered with straw, near the castle of Athlone, with a parcel of land on the south side containing 90 feet [27m], and a garden plot with certain ruined cottages on the north side, and a parcel of land in the great foss[e] [ditch] on the west, from the tower to the river Shennen' (Nicholls 1994, 511). On Phillips' plan of 1685 the Connacht Tower is depicted as a rectangular-shaped building with circular angle towers on the N and W angles. The castle is shown standing on the W bank of the River Shannon in an area that roughly corresponds with the present location of the Father Mathew Hall now Athlone Library. No

surface remains survive of this medieval castle that was located on the S side of Barrack Street immediately beside the river Shannon and to the S of a boat slip known as the 'Barrack Slip' as shown on Thomas Sherrard's map of 1784 (RCB Library Ms 151; Murtagh 1994, Map 7(a)). On this 1784 map only a short section of upstanding wall belonging to the Connaught Tower is depicted standing amongst a range of buildings fronting onto the S side of Barrack Street. A drawing of the E elevation of the castle and bridge (WM0239-042004-) by Thomas Phillips in 1685 (NLI Ms. 3137 (33)) shows the crenellated square-shaped angle tower on the SE angle of the crenellated curtain wall along with a view of the square-shaped SW angle tower in the background. The polygonal-shaped keep or donjon with conical roof is shown standing high above the curtain walls of the castle. The 'presidents house' running along the E side of the curtain wall is shown with a dormer fronted roof overlooking the River Shannon, the remains of chimney stacks on the later W wall of the building can be seen rising above the roof line of this building. Jean Goubet's plan of the castle (NLI Ms. 2742; Murtagh 1994, Map 5) dating from 1691 depicts a similar range of buildings inside the curtain wall, however on this plan a new four-sided bastion or tower has been built against the W face of the curtain wall of the castle and a new circular tower or bastion has been built against the E face of the SE angle tower of the curtain wall. The remains of a third polygonal-shaped tower or bastion depicted on Goubet's plan may have been added to the NE angle of the curtain wall between 1685 and 1691. The 1784 plan of the castle by Thomas Sherrard depicts the freestanding polygonal-shaped keep enclosed by a polygonal-shaped curtain wall with the partial remains of a circular angle-tower on the SE angle, a circular tower on the NE angle and a square tower projecting outwards from the N wall to the W of the NE angle tower which protects the entrance into the castle ward on the N side. A second entrance into the castle ward is shown on the E side of the castle where a gap in the curtain wall located at the S end of the E wall may mark a second entrance into the castle. On this plan the S section of the curtain wall appears to have been destroyed and is not depicted as upstanding. This section of the curtain wall may have been destroyed in the 1691 siege of Athlone.

In 1837 the castle was described as 'the oldest of the works is a tower of decagonal form, which, from the massive structure of the walls, was probably the keep of the ancient castle, though having a new exterior; it is situated on a lofty mound (WM029-042099-) supported on the side next the river by a stupendous wall, but overlooked on the opposite side by the houses in the upper part of the town. The platform on which this tower, now used as a barrack, is bounded on the side next the lower town by dwellings for the officers, and walls of imposing appearance; and on the others by modern works mounted with cannon, commanding not only the approach on the Connaught side of the river but also the bridge itself; and the strong circular towers at irregular intervals, with the carefully fortified entrance, give to the whole place a very formidable appearance' (Lewis 1837, 86). According to Orpen (1907, 265) during the late 13th century the 'three-quarter-round towers at the angles of the river frontage, and the great retaining wall (or its predecessor) between them' were added to the main tower of the castle. Orpen (ibid.) goes on to state that 'these towers were, no doubt, originally higher than they are now, and were probably furnished at the top with battlements or wooden bretesches for archers. They have since been lowered for cannon, while the parapet of the wall has been furnished with embrasures. Though I call these structures at the angles towers, they might now be more properly described as rounded bastions; for it is to be noted that the whole space enclosed by the outer walls is a solid platform of earth, only a little lower than the top of the parapet on the river side, and from 20 to 25 feet [6 - 7.6m] above the level of the present roadway outside. This platform of earth represents the earlier mote (WM029-042099-)'. The main tower or keep of the castle was described by Orpen (ibid.) as 'the decagonal keep or donjon, which rises from near the landward edge of the mote or platform, was also probably much higher than at present, and the present top, with a bastard machicouli on each face, is modern work. I see no reason to doubt, however, that the plan and much of the lower masonry of the keep - the walls of which above its spreading plinth are 8 feet

	<p>[2.4m] thick - may date from the early part of the thirteenth century'.</p> <p>The castle presents itself to the present-day viewer as a Napoleonic fortification but behind the artillery embrasures and Martello tower-style keep, the outline of its medieval defences can be distinguished. In plan the castle consists of a pentagonal-shaped or five-sided curtain wall with a decagonal or ten-sided keep or donjon placed just west of centre within the curtain wall. The entrance is approached from the north by a ramp constructed in the rebuilding after 1793. It is likely that the medieval entrance was on the north side but its exact location is unknown. The curtain wall is thickest on the east (riverside) where it also appears to have been considerably rebuilt. Two circular bastions project from the east curtain wall and there may be the remains of a third in the north-west angle. These may have formed part of the thirteenth century defences but they are now almost totally hidden by later masonry (Orpen 1907, 265). The keep is decagonal-shaped and its base is concealed by a plinth. The upper stories of the keep were removed in the 1793 works and, while the wall fabric may be medieval, all visible features date from that time (Bradley et. al. 1985, 36-7).</p> <p>Compiled by: Caimin O'Brien Date of upload: 05 December 2013</p>
<b>Distance from Route</b>	0m

<b>HC #</b>	3
<b>Legal Status</b>	RMP WM029-042004-
<b>Townland</b>	Athlone, Athlone and Bigmeadow
<b>Site Type</b>	Bridge
<b>ITM (E, N)</b>	603891, 741469
<b>Description</b>	<p>In 1566 the Lord Deputy, Sir Henry Sidney, ordered a new stone bridge to be built and although it suffered much at the hands of both sides in the sieges of 1690-1 it survived until 1844 when the present bridge was constructed 50m to the N of it. Piers writing in 1682, described it as "a very strong, high raised and well-built bridge, in the middle whereof stands a fair monument with some figures well cut in marble, together with Queen Elizabeth's scutcheon of arms and some inscriptions declaring the time and the founders of the building". He also noticed the presence of a "great drawbridge" at the W end of the bridge and several undershot mills at each end. The presence of mills dates to at least 1578 when Edmund O'Fallone of Athlone was leased two watermills which he himself had built on the bridge. According to Joly (1881, 18) the bridge had nine arches and was 360 feet in length with a maximum of 14 feet in width.</p> <p>Sidney's bridge stood about 50m downstream of the modern bridge just S of the castle, linking Bridge Street on the E with Main Street on the W. It is perhaps a reasonable assumption that the twelfth century bridges occupied this site also but this remains to be definitely established. The bridge was ornamented with a series of plaques which were removed prior to its demolition in 1844 and are now preserved in the National Museum of Ireland. In all thirteen plaques survive, eleven of which relate to the building of the bridge, (WM029-042005 to WM029-042017-) and the remaining two its repair in the eighteenth century. (Bradley et. al. 1985, 30-31).</p> <p>(Compiled by: Rachel Barrett, Date of upload/revision 15 October 2010)</p>
<b>Distance from Route</b>	20m

<b>HC #</b>	4
<b>Legal Status</b>	RMP WM029-042005-
<b>Townland</b>	Athlone, Athlone and Bigmeadow



<b>Site Type</b>	Memorial stone
<b>ITM (E, N)</b>	603852, 741518
<b>Description</b>	In National Museum of Ireland. Rectangular. A demi-figure holds a plaque with the letters E.R. and a crown surmounted by scroll-work and knots in relief. It is slightly damaged and the head of the figure is missing. Dims. H 23cm, W 26cm, D 20cm. (Bradley et. al. 1985, 31). (Compiled by: Rachel Barrett, Date of upload: 15 October 2010)
<b>Distance from Route</b>	No longer in original position now housed in National Museum of Ireland

<b>HC #</b>	5
<b>Legal Status</b>	RMP WM029-042006-
<b>Townland</b>	Athlone, Athlone and Bigmeadow
<b>Site Type</b>	Inscribed stone
<b>ITM (E, N)</b>	603852, 741518
<b>Description</b>	Description: In National Museum of Ireland. Rectangular stone with a Tudor rose, and ivy spray. Inscribed in false relief: GEVE TO CESAR THAI W/ IS CESARS AND TO GOD/ THAT WHICHE IS GOIS MAT 22. Dims. H 21cm, W 81cm, D 10cm. (Bradley et. al. 1985, 31). (Compiled by: Rachel Barrett, Date of upload: 04 October 2010)
<b>Distance from Route</b>	No longer in original position now housed in National Museum of Ireland

<b>HC #</b>	6
<b>Legal Status</b>	RMP WM029-042007-
<b>Townland</b>	Athlone, Athlone and Bigmeadow
<b>Site Type</b>	Inscribed slab
<b>ITM (E, N)</b>	603852, 741518
<b>Description</b>	In National Museum of Ireland. Three stone fragments. Incised inscription: GOD SAVE * QWEN ELIZAB. The ornament after 'SAVE' is a Tudor rose. Dims. H 21cm, W 156cm, D 9cm. (Bradley et. al. 1985, 31). (Compiled by: Rachel Barrett, Date of upload: 04 October 2010)
<b>Distance from Route</b>	No longer in original position now housed in National Museum of Ireland

<b>HC #</b>	7
<b>Legal Status</b>	RMP WM029-042008-
<b>Townland</b>	Athlone, Athlone and Bigmeadow
<b>Site Type</b>	Inscribed stone
<b>ITM (E, N)</b>	603852, 741518
<b>Description</b>	In National Museum of Ireland. Worn rectangular panel with a bearded man wearing a long fur-trimmed mantle over a tunic. His right hand holds a ?pleated purse which may be suspended from his neck and his left hand is outstretched holding an animal which looks like a badger but has been described as a rat (Joly 1881, 62-3). It has a very worn inscription: E R/ PETRVS/ LEWYS. Dims. H 67cm, W 49cm. (Bradley et. al. 1985, 31, 32). (Compiled by: Rachel Barrett, Date of upload: 04 October 2010)
<b>Distance from Route</b>	No longer in original position now housed in National Museum of Ireland

<b>HC #</b>	8
<b>Legal Status</b>	RMP WM029-042009-
<b>Townland</b>	Athlone, Athlone and Bigmeadow
<b>Site Type</b>	Armorial plaque
<b>ITM (E, N)</b>	203902, 241493
<b>Description</b>	In National Museum of Ireland. Rectangular. Carved in high relief with a male demi-figure in a narrow-waisted armour. He holds a sword in an upright position in his right hand and his left hand rests on his waist and touches the garter which is worn knotted over his left shoulder. The head is missing. Below the figure is a small grotesque head with leafy swags protruding from his ears and held down by chains. On his left side is a coat of arms surrounded by the garter with the legend HONI SOIT QUI MAL Y PENSE. The end of the garter rests on a parchment with an ivy spray and the motto INVI/ DIA. NOTI/ OB. Dims. H 62cm, W 86cm. (Bradley et. al. 1985, 32). (Compiled by: Rachel Barrett, Date of upload: 04 October 2010)
<b>Distance from Route</b>	No longer in original position now housed in National Museum of Ireland

<b>HC #</b>	9
<b>Legal Status</b>	RMP WM029-042010-
<b>Townland</b>	Athlone, Athlone and Bigmeadow
<b>Site Type</b>	Memorial stone
<b>ITM (E, N)</b>	603852, 741518
<b>Description</b>	In National Museum of Ireland. The main inscription. Carried on six stones (4 panels) in relief. There are commas between words and some letters are conjoined: THIS BRYGE OF ATHLONE FROM THE MAINE/ EARTH VNDER THE WATER WAS ERECTED AND MA/ DE THE NINTH YEARE OF THE RAIGN OF OVR MO/ ST DERE SOVERAIGNE LADIE ELIZABETH BY THE GRACE OF GOD QVENE OF ENGLAND FRAVNCE &/ IRELAND DEFNDER OF THE FAITHET & BY HE DEVICE AND OR/ DER OF SIR HENRY SIDNEY KNIGHT OF HE MOSTE NOBIL/ ORDER THE 20 DAIE OF IVLIE THEN REINGE OF THE AYGE OF 38/ YERE L PRESIDENT OF THE COVNSEL IN WALLS AND MA/ RCHIS OF THE SAME AND L DEPVTIE GENERAL OF THIS HIR/ MAIESTIS REALM IR AND FINSHED IN LES THEN ONE YEAR BI/ THE GOOD INDVSTRI AND DIILIGENS OF SIR PETIR LEWYS/ CLERKE CHANTOR CATHEDRAL CHVRCH OF CHRIST/ CHVRCH IN DVBLIN AND STEWARD TO THE SAID L DE/ PVTIE IN Wc YEARE WAS BEGONE AND FINESHED THE FAI/ RE NEWE WOVRKE IN THE CASTHEL OF DVBLIN BESIDIS/ MANY OTHER NOTABLE WORK IS DONE IN SODRI O/ THER PLACIS IN HIS REALME ALSO THE ARCHE REBEL/ (SH)ANE O NEY; OVER THROVEN HIS HEAD SET ON THE/ GATE OF THE SAID CASTEL COYNO AND LIVRY ABOLESHED/ AND THE HOLE REALME BROVGHT INTO SVCHE OBEDIENCE/ TO HIR MAISTE AS THE LIKE TRANQVILITIE PEACE AND... Dims. (a+b) H 46cm W 116cm. (c+d) H 50cm, W 117cm. (e+f) H 30.5, W 118cm. (Bradley et. al. 1985, 32). (Compiled by: Rachel Barrett, Date of upload: 04 October 2010)
<b>Distance from Route</b>	No longer in original position now housed in National Museum of Ireland

<b>HC #</b>	10
<b>Legal Status</b>	RMP WM029-042011-
<b>Townland</b>	Athlone, Athlone and Bigmeadow
<b>Site Type</b>	Memorial stone

<b>ITM (E, N)</b>	603852, 741518
<b>Description</b>	In National Museum of Ireland. Rectangular plaque decorated in false relief with a man wearing late 16th century armour and a dog. The figure holds a ceremonial axe in the left hand and an arrow in the right. His sword is suspended from a belt behind his back. The name ROBARTS/ DAMPORT is in false relief and AN OWER/ SEER OF THY/ S WORKYS is incised below. Dims. H 52cm, W 54cm. (Bradley et. al. 1985, 32). (Compiled by: Rachel Barrett, Date of upload: 04 October 2010)
<b>Distance from Route</b>	No longer in original position now housed in National Museum of Ireland

<b>HC #</b>	11
<b>Legal Status</b>	RMP WM029-042012-
<b>Townland</b>	Athlone, Athlone and Bigmeadow
<b>Site Type</b>	Armorial plaque
<b>ITM (E, N)</b>	603852, 741518
<b>Description</b>	In National Museum of Ireland. Rectangular plaque with a shield in relief on which there is a porcupine, said to be the crest of Henry Sidney, surrounded by the garter and the words HONI SOIT QUI MAL Y PENSE. The initials H S are on either side below. Dims. H 69cm, 49cm. (Bradley et. al. 1985, 33). (Compiled by: Rachel Barrett, Date of upload: 04 October 2010)
<b>Distance from Route</b>	No longer in original position now housed in National Museum of Ireland

<b>HC #</b>	12
<b>Legal Status</b>	RMP WM029-042013-
<b>Townland</b>	Athlone, Athlone and Bigmeadow
<b>Site Type</b>	Armorial plaque
<b>ITM (E, N)</b>	603852, 741518
<b>Description</b>	In National Museum of Ireland. Rectangular plaque set with WM029-042014- in an elaborate surround decorated with renaissance style palmettes and foliage in false relief. Heater shaped shield with Henry Sidney's achievement of arms. It has elaborate mantling and the garter inscribed as WM029-042012-. The letters H S occur below the shield. The shield is quartered with a pheon or broad arrow in the first and fourth and a lion rampant with bars in the second and third. Dims. H 95cm, W 81cm. (Bradley et. al. 1985, 33) (Compiled by: Rachel Barrett, Date of upload: 04 October 2010)
<b>Distance from Route</b>	No longer in original position now housed in National Museum of Ireland

<b>HC #</b>	13
<b>Legal Status</b>	RMP WM029-042014-
<b>Townland</b>	Athlone, Athlone and Bigmeadow
<b>Site Type</b>	Armorial plaque
<b>ITM (E, N)</b>	603852, 741518
<b>Description</b>	In National Museum of Ireland. Plaque with the arms of England on a heater shaped shield: three lions statant guardant and three fleur-de-lis in false relief. Above the shield on the chamfer are the incised words QVO ME FATA VOCANT and on the plaque a crown and the letters E. R. This may be the plaque removed to the bridge from the North gate. Dims. H 95cm, W 81cm. (Bradley et. al. 1985,

	33). (Compiled by: Rachel Barrett, Date of upload: 04 October 2010)
<b>Distance from Route</b>	No longer in original position now housed in National Museum of Ireland

<b>HC #</b>	14
<b>Legal Status</b>	RMP WM029-042015-
<b>Townland</b>	Athlone and Bigmeadow, Athlone
<b>Site Type</b>	Armorial plaque
<b>ITM (E, N)</b>	603852, 741518
<b>Description</b>	In National Museum of Ireland. Rectangular plaque with a heater shaped shield and garter with HONI SOIT QUI MAL Y PENSE. The centre of the shield has a ragged staff set diagonally which is considered to be the arms of Thomas Radcliff, Earl of Essex. Dims. H 64cm, W 44cm. (Bradley et. al. 1985, 33). (Compiled by: Rachel Barrett, Date of upload: 04 October 2010)
<b>Distance from Route</b>	No longer in original position now housed in National Museum of Ireland

<b>HC #</b>	15
<b>Legal Status</b>	RMP WM029-042016-
<b>Townland</b>	Athlone, Athlone and Bigmeadow
<b>Site Type</b>	Memorial stone
<b>ITM (E, N)</b>	603852, 741518
<b>Description</b>	In National Museum of Ireland. Rectangular panel with a tooled surface and a male figure in relief. He wears a long gown, loosely belted at the waist over a shirt with sleeves caught into a tight fitting wrist-band. He has a short square cravat and the sleeves of the outer garment are wide and pleated at the shoulders. His left hand is on his chest and the right outstretched hand holds a small animal on a twisted rope. At his feet there is an incised inscription: PETRO LEWYS/ CLERICO DOMUS NR Q DISPENSA/ HUJUS OPIS Ps SICLE. This stone may belong to the 1730 rebuilding of the bridge. Dims. H 75cm, W 60cm. (Bradley et. al. 1985, 33). (Compiled by: Rachel Barrett, Date of upload: 04 October 2010)
<b>Distance from Route</b>	No longer in original position now housed in National Museum of Ireland

<b>HC #</b>	16
<b>Legal Status</b>	RMP WM029-042017-
<b>Townland</b>	Athlone and Bigmeadow, Athlone
<b>Site Type</b>	Armorial plaque
<b>ITM (E, N)</b>	603800, 741450
<b>Description</b>	Athlone Museum. Rectangular sandstone plaque. Two corners are broken but the achievement of arms in high relief is complete. The mantling is elaborate with helm and very tall feathered cap of maintenance. The shield has a cross with a lion rampant in the first quarter and a hand in the second. Incised motto partly damaged ...VENI REDEO. Lightly incised inscription on the upper corners: BUILT BY THE RIGHT WORSH.../ SIR THOMAS BOVRKE KNIGHT. 1639. Mr. Thomas Walker informed us that this plaque was removed from the bridge by his father. Dims. H 96cm, W 73cm, D 18cm. (Bradley et. al. 1985, 34). (Compiled by: Rachel Barrett, Date of upload: 15 October 2010)

<b>Distance from Route</b>	No longer in original position now housed in Athlone Castle Museum.
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<b>HC #</b>	17
<b>Legal Status</b>	RMP WM029-042038-
<b>Townland</b>	Athlone and Bigmeadow, Athlone
<b>Site Type</b>	Armorial plaque
<b>ITM (E, N)</b>	603812, 741433
<b>Description</b>	John Waple. 1621. Currently in Athlone Museum. Rectangular block of limestone from Church Street. Carved in false relief with a heater shaped shield and an inscription in Roman lettering. The shield has two bends and three cross crosslets per fess. The date 1621 is incised below. Inscription: 'ERCTED BY IOHN/WAPLE MARCHANT'. Dims. H 41cm, W 37cm, T 12cm. (Bradley et. al. 1985, 28). (Compiled by: Rachel Barrett, Date of upload: 15 October 2010)
<b>Distance from Route</b>	No longer in original position now housed in Athlone Castle Museum.

<b>HC #</b>	18
<b>Legal Status</b>	RMP WM029-042039-
<b>Townland</b>	Athlone, Athlone and Bigmeadow
<b>Site Type</b>	Armorial plaque
<b>ITM (E, N)</b>	603811, 741429
<b>Description</b>	Unidentified Heraldic Plaque. Seventeenth century. Currently in Athlone Museum. Rectangular limestone plaque with heater-shaped shield and mantling similar to WM029-047----. Removed from Hogan's on the S side of Church Street. Engrailed shield with a bend sinister and a lion rampart overall. The family have not been identified but it could be either Gray, Lloyd, Price or Grace. Dims. H 50cm, W 46cm, T 16cm. (Bradley et. al. 1985, 28). (Compiled by: Rachel Barrett, Date of upload: 15 October 2010)
<b>Distance from Route</b>	No longer in original position now housed in Athlone Castle Museum.

<b>HC #</b>	19
<b>Legal Status</b>	RMP WM029-042040-
<b>Townland</b>	Athlone
<b>Site Type</b>	Armorial stone (original location)
<b>ITM (E, N)</b>	603811, 741429
<b>Description</b>	Dillon plaque. Possibly seventeenth century. A stone mural tablet carrying the Dillon arms is mentioned in the Burgess Papers (Bradley et. al. 1985 28) (Compiled by: Rachel Barrett)
<b>Distance from Route</b>	No longer in original position now housed in Athlone Castle Museum.

<b>HC #</b>	20
<b>Legal Status</b>	RMP WM029-042041-
<b>Townland</b>	Athlone
<b>Site Type</b>	Quays possible
<b>ITM (E, N)</b>	No Precise Location

<b>Description</b>	<p>No direct references are known to quays in medieval Athlone but their presence in the late sixteenth century can be deduced from the placing of galleys there, under the command of a water bailiff, in order to patrol the Shannon (Murtagh 1978, 52-54). A galley was placed on Lough Ree in 1305 but it is not clear whether it was based at Athlone or Rindown, where the remains of a medieval quay can still be seen (Mills 1914, 64). The office of water bailiff was established in 1571 and on the appointment of Sir Edward Waterhouse in 1571 it was specifically stated that his headquarters were to be in Athlone (Murtagh 1978, 52-3). Initially there were to be two galleys but in 1588 this was increased to four. References to other vessels at Athlone until 1615 are listed by Murtagh (1978, 54).</p> <p>The presence of these boats presumably demanded the construction of suitably quays, in none already existed. The location of these quays is uncertain by a request made in 1591 by Sir Richard Bingham for the return of half the 'bawn' of Athlone where Waterhouse had kept his boats; this may indicate that the quays were in the vicinity of the castle, perhaps on the site of the present quay (Murtagh 1980, 93; Bradley et. al. 1985 34-35)</p> <p>(Compiled by: Rachel Barrett)</p>
<b>Distance from Route</b>	0m

<b>HC #</b>	21
<b>Legal Status</b>	RMP WM029-042042-
<b>Townland</b>	Athlone
<b>Site Type</b>	Religious house - Franciscan friars
<b>ITM (E, N)</b>	603885, 741635
<b>Description</b>	<p>The church of the Friars Minor was consecrated in 1241. There is some confusion about the exact date of foundation as the Annals of the Four Masters record the founding of the monastery of St. Francis at Athlone in 1224 whereas Gwynn and Hadcock rejects this and suggest it was founded two years earlier.</p> <p>It is not certain that the present ruin marked 'Abbey (site of)' (WM029-042001-) stands on the site of the medieval friary. If the church had been built on the foundations of the 1241 friary church then one would have expected that the foundations of the cloister and domestic buildings would have been uncovered during the building of the houses to the N as was Franciscan practice. There is opinion that the medieval friary stood a short distance to the S of the graveyard on a site now occupied by a factory. (see field notes for further information). (Bradley et. al. 1985, 44).</p> <p>(Compiled by: Rachel Barrett, Date of upload: 15 October 2010)</p>
<b>Distance from Route</b>	25m

<b>HC #</b>	22
<b>Legal Status</b>	RMP WM029-042043-
<b>Townland</b>	Athlone, Athlone and Bigmeadow
<b>Site Type</b>	Cross-slab (present location)
<b>ITM (E, N)</b>	603811, 741429
<b>Description</b>	<p>Ailill Ua Dunchatho 764 A.D. Athlone Museum No. 279. Roughly rectangular sandstone slab missing a small section of one corner. The decoration consists of an almost equal-armed ringed cross within a rectangular frame. The centre of the cross consists of a square enclosing a circle; the terminals are also square and bear foliage decoration. The arms of the cross have a fret pattern of interlocking T type while the frame consists of a broad band of continuous fret pattern of the interlocking L type. Incised inscription above the panel: AILILL AUE</p>

	DUNCHATHO. Ailill Ua Dunchado, King of Connacht, died in 764. Dims. H 82cm, W 59cm, T 13cm. (See also Irish Midland Studies 1980, 5-23). (Bradley et. al. 1985, 45, 46). (Compiled by: Rachel Barrett, Date of upload: 15 October 2010)
<b>Distance from Route</b>	No longer in original position now housed in Athlone Castle Museum.

<b>HC #</b>	23
<b>Legal Status</b>	RMP WM029-042044-
<b>Townland</b>	Athlone, Athlone and Bigmeadow
<b>Site Type</b>	Cross-slab (present location)
<b>ITM (E, N)</b>	603811, 741429
<b>Description</b>	Conloc and Chadal. Pre-1200. Athlone Museum No. 280. Damaged sandstone slab. Incised three-line Latin cross with a central circular expansion, containing a tetraskelion, and semi-circular terminals ornamented with worn key patterns. The cross is outlined by a two-line border with knots at the external angles. Incised inscription flanking the stem: OR DO CONLOC DO CHADAL. Dims. H 76cm, W 52cm, T 8.5cm. (See also Irish Midland Studies 1980, 5-23). (Bradley et. al. 1985, 46). (Compiled by: Rachel Barrett, Date of upload: 15 October 2010)
<b>Distance from Route</b>	No longer in original position now housed in Athlone Castle Museum.

<b>HC #</b>	24
<b>Legal Status</b>	RMP WM029-042045-
<b>Townland</b>	Athlone, Athlone and Bigmeadow
<b>Site Type</b>	Cross-slab (present location)
<b>ITM (E, N)</b>	603811, 741429
<b>Description</b>	Pre-1200. Athlone Museum No. 278 and National Museum of Ireland (WM029-042046-). Sandstone slab. The upper half survives in Athlone and the lower left corner is in the NMI. Highly decorated ringed cross in false relief. The cross has a square panel at the centre filled with interlace and rectangular terminals at the end of lozenge-shaped arms. The arms and terminals are also decorated with interlace and spiral motifs. The ring is ornamented with pelta designs. Outside the ring are the winged lion of St. Mark and the winged calf of St. Luke each of which hold a book. Above the symbols of the evangelists are the pocked letters OR DO. The fragment in the NMI (WM029-042046-) depicts a winged figure, presumably St. Matthew, and bears the incised letters MUIR M below. Dims. H 37cm, W 72cm, T 10cm. (See also Irish Midland Studies 1980, 5-23). (Bradley et. al. 1985, 46). (Compiled by: Rachel Barrett, Date of upload: 15 October 2010)
<b>Distance from Route</b>	No longer in original position now housed in Athlone Castle Museum.

<b>HC #</b>	25
<b>Legal Status</b>	RMP WM029-042052-
<b>Townland</b>	Athlone, Athlone and Bigmeadow
<b>Site Type</b>	Stone head
<b>ITM (E, N)</b>	603805, 741427
<b>Description</b>	In Athlone Museum No. 40. Tenoned head of a tonsured cleric. Possibly granite. Now set into a stone with the words "St. Peter's Port" and initials 'I.B'. 'I.B' refers

	to a man named Booth, a property owner otherwise known as 'Copper Fisted Jack' who levied a toll on all produce brought through St. Peter's Port. (See also WM029-042088-). Head has a long pointed face with damaged chin. Unknown date. Dims. H 19cm, W 13cm, T 33cm. (Bradley et. al. 1985, 48). (Compiled by: Rachel Barrett, Date of upload: 15 October 2010)
<b>Distance from Route</b>	No longer in original position now housed in Athlone Castle Museum.

<b>HC #</b>	26
<b>Legal Status</b>	RMP WM029-042053-
<b>Townland</b>	Athlone and Bigmeadow
<b>Site Type</b>	Sheela-na-gig (present location)
<b>ITM (E, N)</b>	603809, 741429
<b>Description</b>	In Athlone Museum No. 285. Abraded sandstone squatting figure. The hands are clasped around the legs which are drawn up under the chin and the vulva or anus is openly displayed. The face has protruding lips and slanting eyes. Dims. H 40cm, W 21cm, D 20cm. Originally from St. Peter's Abbey (WM029-042003-/WM029-042091). (Bradley et. al. 1985, 48, 49). (Compiled by: Rachel Barrett, Date of upload: 15 October 2010)
<b>Distance from Route</b>	No longer in original position now housed in Athlone Castle Museum.

<b>HC #</b>	27
<b>Legal Status</b>	RMP WM029-042059-
<b>Townland</b>	Athlone and Bigmeadow
<b>Site Type</b>	Cross - Wayside cross
<b>ITM (E, N)</b>	603787, 741434
<b>Description</b>	Fragment outside Athlone Museum. Decorated in low false relief with quarter of a ringed cross having incised crosses on the stem. Inscribed INRI on the ring and the date 16.. is in one corner. Exact provenance unknown. Dims. H 43cm, W 42cm, D 17cm. (Bradley et. al. 1985, 50). (Compiled by: Rachel Barrett, Date of upload: 24 June 2010)
<b>Distance from Route</b>	No longer in original position now housed in Athlone Castle Museum.

<b>HC #</b>	28
<b>Legal Status</b>	RMP WM029-042069-
<b>Townland</b>	Athlone
<b>Site Type</b>	Redundant record
<b>ITM (E, N)</b>	603834, 741648
<b>Description</b>	Demi-bastion to N. From the N gate (WM029-042063-) the wall continued to the Shannon where a demi-bastion, set on a slight promontory, jutted into the river. (Bradley et. al. 1985, 40). (Compiled by: Rachel Barrett, Date of upload: 15 October 2010)
<b>Distance from Route</b>	0m

<b>HC #</b>	29
<b>Legal Status</b>	RMP WM029-042076-



<b>Townland</b>	Athlone and Bigmeadow
<b>Site Type</b>	Redundant record
<b>ITM (E, N)</b>	603802, 741507
<b>Description</b>	Connacht tower. A feature of the defences on the Connacht side was the Connacht Tower which stood to the N of the castle. Rectangular structure with two circular towers at N angles, linked to Athlone Castle by defensive wall or ditch, perhaps the 'great fosse' to form the riverside bawn. Little is known of its history and the earliest references occur in the late sixteenth century. In 1581, it is described as "an old ruinous tower" which would suggest that it was built considerably earlier. Langr ishe records that its ruins survived into the mid-nineteenth century and that it was removed during the Shannon improvements and the making of the Grace Road. (Bradley et. al. 1985, 38). (Compiled by: Rachel Barrett, Date of upload: 15 October 2010)
<b>Distance from Route</b>	12m

<b>HC #</b>	30
<b>Legal Status</b>	RMP WM029-042082-
<b>Townland</b>	Athlone and Bigmeadow
<b>Site Type</b>	Memorial stone
<b>ITM (E, N)</b>	603798, 741452
<b>Description</b>	Rectangular memorial stone. Located just outside the entrance to Athlone Museum, lying against the wall. There appears to be an inscription on it but it is impossible to decipher. Appears to be pre-1700 but exact date uncertain. (Compiled by: Rachel Barrett, Date of upload: 15 October 2010)
<b>Distance from Route</b>	No longer in original position now housed in Athlone Castle Museum.

<b>HC #</b>	31
<b>Legal Status</b>	RMP WM029-042083-
<b>Townland</b>	Athlone and Bigmeadow
<b>Site Type</b>	Architectural fragment
<b>ITM (E, N)</b>	603793, 741446
<b>Description</b>	A series of four architectural fragments, including a male and a female stone head, located in the Athlone Museum (One of the pieces is located just outside the entrance to the museum beside a milestone). Exact date or provenance unknown. (Compiled by: Rachel Barrett, Date of upload: 15 October 2010)
<b>Distance from Route</b>	No longer in original position now housed in Athlone Castle Museum.

<b>HC #</b>	32
<b>Legal Status</b>	RMP WM029-042085-
<b>Townland</b>	Athlone and Bigmeadow
<b>Site Type</b>	Stone head
<b>ITM (E, N)</b>	603793, 741446
<b>Description</b>	Currently in Athlone Museum. Carved stone head of uncertain date discovered at Hodson Bay. Slight damage to the nose. On loan from the Lenihan family, Athlone. Original location - Co. Roscommon. See RO049-011---- for more information.

	(Compiled by: Rachel Barrett, Date of upload: 15 October 2010)
<b>Distance from Route</b>	No longer in original position now housed in Athlone Castle Museum.

<b>HC #</b>	33
<b>Legal Status</b>	RMP WM029-042086-
<b>Townland</b>	Athlone and Bigmeadow
<b>Site Type</b>	Architectural feature
<b>ITM (E, N)</b>	603836, 741397
<b>Description</b>	On the premises of Sean's Bar (WM029-042087-), 13 Main Street, is a late medieval stone built fireplace from a house on an island in Lough Ree. (Bradley et. al. 1985, 28).(Compiled by: Rachel Barrett, Date of upload: 15 October 2010)
<b>Distance from Route</b>	40m

<b>HC #</b>	34
<b>Legal Status</b>	RMP WM029-042087- / RPS 063
<b>Townland</b>	Athlone and Bigmeadow
<b>Site Type</b>	Inn
<b>ITM (E, N)</b>	603834, 741398
<b>Description</b>	'Sean's Bar' is two storeyed with an additional third storey in brick and thick walls. Preserved on the premises is a section of wattle partition removed from a first floor wall. This could be of seventeenth century date but it is not securely dated. (Bradley et. al. 1985, 28). Claims to have a documented history of all its innkeepers since 1600. (Compiled by: Rachel Barrett, Date of upload: 15 October 2010)
<b>Distance from Route</b>	40m

<b>HC #</b>	35
<b>Legal Status</b>	RMP WM029-042088-
<b>Townland</b>	Athlone and Bigmeadow
<b>Site Type</b>	Memorial stone
<b>ITM (E, N)</b>	603803, 741425
<b>Description</b>	In Athlone Museum. One of two stones removed from gateway to St. Peter's Port (see also WM029-042089-). The inscription reads 'WILL O' WISP AND JACK THE PRINTER'. Will O' Wisp and Jack the Printer refer to two prominent men with whom a man named Booth was in dispute. They were William Sproule, a Quaker merchant, and John Potts, a printer and owner of Saunders' newspaper. Booth owned the property and was otherwise known as 'Copper Fisted Jack', who levied a toll on all produce brought through the port. Dims. H 35cm, W 46cm, D 15cm. (Information Card, Athlone Museum, Athlone). (Compiled by: Rachel Barrett, Date of upload: 15 October 2010)
<b>Distance from Route</b>	No longer in original position now housed in Athlone Castle Museum.

<b>HC #</b>	36
<b>Legal Status</b>	RMP WM029-042089-
<b>Townland</b>	Athlone and Bigmeadow

<b>Site Type</b>	Inscribed stone
<b>ITM (E, N)</b>	603805, 741424
<b>Description</b>	In Athlone Museum. One of two stones removed from gateway to St. Peter's Port (see also WM029-042088-). The inscription reads 'O MAY NOT SATAN'S AGENTS ENTER'. Dims. H 32cm, W 46cm, D 13cm. (Information Card, Athlone Museum, Athlone). (Compiled by: Rachel Barrett, Date of upload: 15 October 2010)
<b>Distance from Route</b>	No longer in original position now housed in Athlone Castle Museum.

<b>HC #</b>	37
<b>Legal Status</b>	RMP WM029-042099-
<b>Townland</b>	ATHLONE
<b>Site Type</b>	Motte
<b>ITM (E, N)</b>	603797, 741451
<b>Description</b>	<p>The Kingdom of Mide [Meath] was granted to Hugh de Lacy in 1172 (Mills and McEnery 1916, 177) and the process of sub-infeudation and settlement began soon afterwards but it is unlikely that any effective inroads were made as far west as Athlone for some time. The original Anglo-Norman grantee of Athlone was Geoffrey de Costentin who was granted a cantred in Connacht adjoining Athlone in 1200 (Cal. doc. Ire., no. 137; Orpen 1907, 259; Claffey 1970-1, 55). In this year, King John of England granted Geoffrey de Costentin, 'a cantred in Connaught called Tirieghrachbothe (Cal. doc. Ire., 22). If a motte castle had been constructed in Athlone then Geoffrey would have been responsible for the construction of this earth and timber castle (WM020-042098-) between the years 1191 and 1199 (Orpen 1911-20, II, 129; Graham 1980, 53; Bradley et. al. 1985, 35). In 1199 the annals recorded that a 'depredation was committed on the Foreigners by Cathal Crobhderg, who burned the bodhun [bawn] of Ath [Athlone], and killed many persons; and they carried with them many cows to their homes' (ALC). The use of the word bodhun [Cow fort] anglicised as bawn to describe an Anglo-Norman fortification suggests that the fortification may have been a ringwork type earthwork rather than a motte. Alternatively the bawn may have been a reference to the bailey or courtyard adjoining the motte castle. Graham (1980, 52-3) suggests that Athlone formed a part of the final western frontier of the Liberty of Meath, a frontier which also included the motte castles of Granard (LF010-080001-), Co. Longford, Kilbixy (WM011-041----) and Rathconrath (WM018-093----), Co. Westmeath. The construction dates of the latter two motte castles, in 1192 and 1191 respectively, dates the formation of this frontier in his view. Accordingly a date between 1191 and 1199 could be proposed for the construction of the Athlone motte castle (Bradley et. al. 1985, 36). Claffey (1970-1, 55) has suggested that de Costentin may not have built a motte but merely reused the Ua Conchobhar [O'Connor] fortification (WM029-042098-) in Athlone. This suggestion finds some support in the Annals of Loch Ce reference to the Bishop of Norwich building in Athlone a new bridge (WM029-042004-) and a 'castle (WM029-042002-) instead of 'Ua Conchobhar's [O'Connor's] castle (WM029-042098-)' in 1210. Even if the survival of the Ua Conchobhar castle until 1210 were accepted, however, this does not exclude the construction of a motte because mottes were frequently built on top of ringforts and other pre-existing settlements (Graham 1980, 51). Claffey (1970-1, 55) further suggests that de Costentin's settlement was sited on the east bank of the Shannon but Orpen (1907, 263-4) was of the opinion that the original motte was built and could still be detected, on the site of the present stone castle (WM029-042003-). The visit of King John to Ireland in 1210 marks a turning point in the development of Athlone. John de Grey, Bishop of Norwich, was appointed justiciar of Ireland as part of John's efforts to improve the administration of the colony and he appears to have recognized the strategic importance of Athlone as the gateway between the</p>

	Anglo-Norman liberty of Meath and Connacht, still effectively in Irish hands (Orpen 1911-20, II, 281; Claffey 1970-1, 56). De Grey appears to have desired to establish Athlone as the joint seat (with Dublin) of English administration in Ireland (Claffey 1970-1, 56) and the first step in this plan was the construction of new stone castle (WM029-042002-) and bridge (WM029-042004-) at Athlone in 1210. The 13th century Anglo-Norman stone castle may have been built on the site of the 12th century motte castle which in turn was built on the site of the Gaelic earth and timber fortification of the O'Conor's. Compiled by: Caimin O'Brien Date of upload: 29 November 2013.
<b>Distance to route</b>	No longer in original position now housed in Athlone Castle Museum.

<b>HC #</b>	38
<b>Legal Status</b>	RMP WM029-042100-
<b>Townland</b>	ATHLONE AND BIGMEADOW
<b>Site Type</b>	Water mill - unclassified
<b>ITM (E, N)</b>	603894, 741441
<b>Description</b>	One of three mills (WM029-042079-; WM029-042080-) built onto the S face of the 16th century bridge (WM029-042004-) of Athlone. This mill was located at the W end of the bridge built onto the S face of the final arch of the 16th century bridge (WM029-042004-) and is shown on Thomas Sherrard's map of Athlone dating from 1784 (RCB Ms. 151; Murtagh 1994, map 7(A)). A flour mill known as Mabbot's flour mill was built on the site of the 16th century mill and may have incorporated fabric of the earlier mill. This flour mill was demolished c. 1840 (Murtagh 1994, 12). Sir Henry Piers writing in 1682, described several undershot mills (WM029-042079-; WM029-042080-) located at either end of the medieval bridge (WM029-042004-) of Athlone. In 1682 he wrote that 'this bridge, tho the arches thereof be wide and large, causeth the river, which here is very deep, to rise and swell backwards, so that under it the river hath a great fall, which giveth an advantageous situation to several undershot mills (WM029-042079-; WM029-042080-; WM029-042100-) at each end of the bridge' (Vallancey 1786, 86). This mill on the W side of town may have been the same mill referred to in 1619 when the Crown granted 'John Trestian, esq." Roscommon Co." a mes. and mater-mill, lately Hugh Magauly's' (Cal. pat. rolls Ire., Jas I, 421). There is also documentary evidence to suggest that there were four corn mills, the location of which is unknown, in 1675 (Murtagh 1994, 12). Three watermills located on the medieval bridge of Athlone are depicted on Thomas Sherrard's map (RCB Ms. 151; Murtagh 1994, map 7(A)) of Athlone dating from 1784. On this map two watermills are located at the E end of the bridge built up against the S face of the bridge, a third bridge is shown at the W end of the bridge built up the S face of the bridge. The two mills at the E end of the bridge were probably the same mills that were constructed in the 1570s by Edmund O Fallon of Athlone. The other mill was located at the W end of the bridge and was built onto the S face of the final arch of the 16th century bridge (WM029-042004-). Compiled by: Caimin O'Brien. Date of upload: 06 December 2013.
<b>Distance from Route</b>	44m

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## **Appendix 12.2**

### *Archaeological Finds*

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## Appendix 12.2

### Archaeological Finds

The recorded archaeological finds in the vicinity of the proposed development, are listed below, all noted in the National Museum of Ireland files, Kildare Street, Dublin 2, or in other published catalogues of prehistoric material: Raftery (1983 - iron age antiquities), Eogan (1965; 1983; 1994 - bronze swords, Bronze Age hoards and goldwork), Harbison (1968; 1969a; 1969b - bronze axes, halberds and daggers) and the Irish Stone Axe Project Database. The townlands assessed were Athlone, Athlone and Broadmeadow and Ranelagh.

Abbreviations:

NMI – National Museum of Ireland registration number.

Wk – Wakeman Catalogue

W – Wilde Catalogue

Reg No.	Simple Name	Findplace	County	Description
NMI 2010:60	Iron cannon ball	River Shannon, Athlone	Westmeath	No further information
NMI 2007:48	Bog Butter	River Shannon near Athlone	Westmeath	Wooden vessel with no lid
NMI 2007:47	Bog Butter	River Shannon near Athlone	Westmeath	No further information
NMI 2004:207	Whetstone	Athlone town centre	Westmeath	No further information
NMI 1996:2000	Iron shell	Athlone	Westmeath	No further information
NMI 1994:33	Copper alloy finger ring	Connolly Street, Athlone	Westmeath	Bronze finger ring
NMI 1992:25	Human bones	River Shannon, Athlone	Westmeath	Human and animal bone
NMI 1991:82	Bronze axehead	River Shannon near Athlone	Westmeath	Bronze flat axehead, Killaha type
NMI 1991:5	Iron axe hammer	River Shannon near Athlone	Westmeath	Iron axe hammer with wooden handle
NMI 1990:79.2	Gold bracelet	Near Athlone	Roscommon	No further information
NMI 1990:79.3	Gold bracelet	Near Athlone	Roscommon	No further information
NMI 1990:79.1	Gold bracelet	Near Athlone	Roscommon	No further information
NMI 1990:23	Copper alloy pin	River Shannon, Athlone	Westmeath	Bronze sunflower pin
NMI 1989:114	Mortar	River Shannon near Athlone	Westmeath	Two fragments of mortar shrapnel
NMI 1989:113	Lead ball	River Shannon near Athlone	Westmeath	Twenty eight lead musket balls
NMI 1989:31	Stone axehead	River Shannon, Athlone	Westmeath	Stone axehead, Riverford type
NMI 1988:85	Iron spearhead	River Shannon near Athlone	Westmeath	Iron spearhead
NMI 1998:84	Iron axehead	River Shannon near Athlone	Westmeath	Iron axehead

Reg No.	Simple Name	Findplace	County	Description
NMI 1998:5	Bronze rapier	River Shannon near Athlone	Westmeath	Bronze rapier blade
NMI 1998:4	Bronze spearhead	River Shannon near Athlone	Westmeath	Bronze looped spearhead
NMI 1998:3	Bronze spearhead	River Shannon near Athlone	Westmeath	Bronze spearhead with protected loops in blade
NMI 1987:44	Copper alloy blade	Banks of River Shannon, Athlone and Bigmeadow	Roscommon	Fragment of bronze sword blade
NMI 1996:119	Iron spearhead	River Shannon near Athlone	Westmeath	Leaf-shaped iron spearhead
NMI 1996:110	Iron axehead	River Shannon near Athlone	Westmeath	Medieval woodman's iron axehead
NMI 1996:109	Iron axehead	River Shannon near Athlone	Westmeath	Iron axehead
NMI 1996:108	Iron axehead	River Shannon near Athlone	Westmeath	Iron axehead with modern shaft (medieval woodman's)
NMI 1985:45	Bronze palstave	Athlone	Westmeath	Bronze palstave
NMI 1968:389	Bone object	Near Athlone	Westmeath	Five bone objects (?amulets) and a stone plaque. Found near Athlone, summer of 1853.
NMI 1968:388	Bone objects	Near Athlone	Westmeath	Five bone objects (?amulets) and a stone plaque. Found near Athlone, summer of 1853.
NMI 1968:387	Bone objects	Near Athlone	Westmeath	Bone objects
NMI 1968:386	Bone objects	Near Athlone	Westmeath	Bone objects
NMI 1968:353	Bronze axehead	Near Athlone	Westmeath	Bronze axehead socketed, found near Athlone, Co. Westmeath in 1850s.
NMI 1968:319	Bronze palstave	Near Athlone	Westmeath	No further information
NMI 1968:313	Bronze axehead	Near Athlone	Westmeath	Bronze axehead flanged
NMI 1968:239	Copper alloy blade	Near Athlone	Westmeath	Copper alloy rapier blade fragment
NMI 1967:220	Wax seal impression	Unknown	Westmeath	Wax seal impression reads 'SIGILVM OPPIDI ALONIENSIS 1663'
NMI 1945:292	Stone axehead	River Shannon near Athlone	Westmeath	Polished stone axehead
NMI 1945:291	Stone axehead	River Shannon near Athlone	Westmeath	Polished stone axehead
NMI 1945:290	Stone axehead	River Shannon near Athlone	Westmeath	Polished stone axehead
NMI 1943:185	Stone adze	Athlone	Westmeath	Polished stone adze



Reg No.	Simple Name	Findplace	County	Description
NMI 1942:230	Stone axehead	Athlone	Westmeath	Polished stone axehead
NMI 1941:569	Copper coin	Old bridge near Athlone	Westmeath	Copper halfpenny coin. Hibernia reading 'incorporated by Act of Parliament 1792'
NMI 1941:568	Copper alloy gun money	Old bridge near Athlone	Westmeath	Issued October 1689, copper alloy gun money, half crown coin
NMI 1940:118	Stone axehead	Near Athlone	Westmeath	Polished stone axehead
SA 1927:66	Bronze pin	Near Athlone	Westmeath	A pin with 10 perforated bronze discs, found near Athlone, Co. Westmeath in 1898. Cat. Day Coll. (1913), 51: lot 355.
RIAI 1920:44	Bronze pin	Near Athlone	Westmeath	Bronze ring-headed pin. Apparently found near Athlone, Co. Westmeath. Raftery 1983, 154.
NMI 1895:18	Silver brooch	Athlone	Westmeath	Anthropomorphic silver ring brooch. Decoration consists of two square panels with hatched motif. Found c. 1850s beneath the foundation of an old house in Athlone.
NMI 1893:8	Gold ring	Athlone	Roscommon	Penannular gold ring, Found together near Athlone. Armstrong 1920, 78, 254-5, Pl. XVIII, 379, 388; Taylor 1980, Co. Roscommon 10-11; Eogan 1983, p. 144.
NMI 1893:7	Gold ring	Athlone	Roscommon	Penannular gold ring, Found together near Athlone. Armstrong 1920, 78, 254-5, Pl. XVIII, 379, 388; Taylor 1980, Co. Roscommon 10-11; Eogan 1983, p. 144.
NMI 1893:6	Gold torc	Athlone	Roscommon	Gold bar twisted torc, Found near Athlone, 1848. Armstrong 1920 60, Pl. XII 85-86; Taylor 1980, Co. Roscommon 12, 13.
NMI 1893:5	Gold torc	Athlone	Roscommon	Gold bar twisted torc, Found near Athlone, 1848. Armstrong 1920 60, Pl. XII 85-86; Taylor 1980, Co. Roscommon 12, 13.

Reg No.	Simple Name	Findplace	County	Description
NMI 1893:4	Gold lunula	Athlone	Roscommon	Gold lunula, Taylor type classical, found near Athlone, 1848. Armstrong 1920, 56. Pl. VI:33.
NMI 1882:69.9	Jet/Lignite bead	Near Athlone	Westmeath	Lignite disc bead
NMI 1882:69.2	Jet/Lignite bead	Near Athlone	Westmeath	Lignite disc bead
NMI 1882:69.1	Jet/Lignite bead	Near Athlone	Westmeath	Lignite disc bead
NMI 1882:69.4	Jet/Lignite bead	Near Athlone	Westmeath	Lignite disc bead
NMI 1882:69.5	Jet/Lignite bead	Near Athlone	Westmeath	Lignite disc bead
NMI 1882:69.6	Jet/Lignite bead	Near Athlone	Westmeath	Lignite disc bead
NMI 1882:69.3	Jet/Lignite bead	Near Athlone	Westmeath	Lignite disc bead
NMI 1882:69.8	Jet/Lignite bead	Near Athlone	Westmeath	Lignite disc bead
NMI 1882:69.11	Jet/Lignite bead	Near Athlone	Westmeath	Lignite disc bead
NMI 1882:69.7	Jet/Lignite bead	Near Athlone	Westmeath	Lignite disc bead
NMI 1882:69.10	Jet/Lignite bead	Near Athlone	Westmeath	Lignite disc bead
NMI 1882:66	bone crucifix	Near Athlone	Westmeath	IHS incised on back
NMI 1882:43	Copper alloy bell	Near Athlone	Westmeath	Bronze cattle bell
NMI 1882:36	Copper alloy boss	Near Athlone	Westmeath	Copper alloy boss
NMI 1882:28	Copper alloy buckle	Near Athlone	Westmeath	Copper alloy buckle fragment
NMI 1882:27	Copper alloy buckle	Near Athlone	Westmeath	Copper alloy buckle fragment
NMI 1882:17	Copper alloy ringed pin	Athlone	Westmeath	One of three bronze ringed pins. Found near Athlone, Co. Westmeath. Kilbride-Jones 1980, 108. ?Nos. 67-8, 131: No. 117; Fanning 1974-5, 213: No. 8.
NMI 1882:12	Copper alloy ringed pin	Athlone	Westmeath	One of three bronze ringed pins. Found near Athlone, Co. Westmeath. Kilbride-Jones 1980, 108. ?Nos. 67-8, 131: No. 117; Fanning 1974-5, 213: No. 8.
NMI 1881:43	Iron pipe	Athlone	Westmeath	Iron smoking pipe

Reg No.	Simple Name	Findplace	County	Description
X4654	Stone object	Old bridge of Athlone	Westmeath	Carved stone from bridge
X4653	Stone object	Old bridge of Athlone	Westmeath	Carved stone from bridge
X4652	Stone object	Old bridge of Athlone	Westmeath	Carved stone from bridge
X4651	Stone object	Old bridge of Athlone	Westmeath	Carved stone from bridge
X4650	Stone object	Old bridge of Athlone	Westmeath	Carved stone from bridge
X4649	Stone object	Old bridge of Athlone	Westmeath	Carved stone from bridge
X4648	Stone object	Old bridge of Athlone	Westmeath	Carved stone from bridge
X4647	Stone object	Old bridge of Athlone	Westmeath	Carved stone from bridge
X4646	Stone object	Old bridge of Athlone	Westmeath	Carved stone from bridge
X4645	Stone object	Old bridge of Athlone	Westmeath	Carved stone from bridge
X4644	Stone object	Old bridge of Athlone	Westmeath	Carved stone from bridge
X4643	Stone object	Old bridge of Athlone	Westmeath	Carved stone from bridge
X4642	Stone object	Old bridge of Athlone	Westmeath	Carved stone from bridge
X4641	Stone object	Old bridge of Athlone	Westmeath	Carved stone from bridge
R1942	Bronze sword	Athlone	Roscommon	Leaf shaped with modern handle of deer horn, found in 1838 in a millrace, parish of St. Peter's, Athlone, Co. Roscommon.
X1675	Bronze brooch	Athlone	Westmeath	Bronze enamelled zoomorphic penannular brooch
R1623	Stone object	Old bridge of Athlone	Westmeath	Inscribed stone from the Old Bridge of Athlone
R1622	Stone object	Old bridge of Athlone	Westmeath	Inscribed stone from the Old Bridge of Athlone
R1621	Stone object	Old bridge of Athlone	Westmeath	Inscribed stone from the Old Bridge of Athlone
R1620	Stone object	Old bridge of Athlone	Westmeath	Inscribed stone from the Old Bridge of Athlone
R1619	Stone object	Old bridge of Athlone	Westmeath	Inscribed stone from the Old Bridge of Athlone
R1618	Stone object	Old bridge of Athlone	Westmeath	Inscribed stone from the Old Bridge of Athlone
R1617	Stone object	Old bridge of Athlone	Westmeath	Inscribed stone from the Old Bridge of Athlone



Reg No.	Simple Name	Findplace	County	Description
R1592	Stone object	Old bridge of Athlone	Westmeath	Inscribed stone from the Old Bridge of Athlone
R1591	Stone object	Old bridge of Athlone	Westmeath	Inscribed stone from the Old Bridge of Athlone
R1590	Stone object	Old bridge of Athlone	Westmeath	Inscribed stone from the Old Bridge of Athlone
R1589	Stone object	Old bridge of Athlone	Westmeath	Inscribed stone from the Old Bridge of Athlone
R1588	Stone object	Old bridge of Athlone	Westmeath	Inscribed stone from the Old Bridge of Athlone
R1587	Stone tablet	Old bridge of Athlone	Westmeath	Bearing arms of Thomas Ratcliffe
R1586	Stone tablet	Old bridge of Athlone	Westmeath	Bearing shield and letters HS
R1585	Stone sculpture	Old bridge of Athlone	Westmeath	Bearing bust of Queen Elizabeth
R1584	Stone tablet	Old bridge of Athlone	Westmeath	Bearing Royal Arms
R1583	Stone sculpture	Old bridge of Athlone	Westmeath	Full length figure
R1582	Stone sculpture	Old bridge of Athlone	Westmeath	Full length figure
R1581	Stone sculpture	Old bridge of Athlone	Westmeath	Half length figure
R1056	Silver seal matrix	Athlone	Westmeath	1056 Circular seal matrix.
R0767	Bronze tool	River Shannon, Athlone	Westmeath	Pair of bronze compasses
R677.1	Bronze seal matrix	River Shannon, Athlone	Westmeath	Bronze monastic seal matrix with Virgin and Child, Cistercian abbey of Kilbeggan. Found at Athlone, Co. Westmeath. Armstrong 1913, 470, Pl. Ll:6.
4057:W547	Bronze axehead	Athlone	Westmeath	Socketed bronze axehead
4006:W496	Bronze axehead	River Shannon, Athlone	Westmeath	Socketed bronze axehead, dredged from river Shannon about fifty yards above New Bridge at Athlone, Co. Westmeath, 1847.
3889:W389	Bronze axehead	Athlone	Westmeath	Socketed bronze axehead
5518:W371	Bronze brooch	Near Athlone	Westmeath	Bronze zoomorphic penannular brooch
5510:W363	Bronze brooch	Athlone	Westmeath	Bronze zoomorphic penannular brooch

Reg No.	Simple Name	Findplace	County	Description
5483:W336	Bronze ringed pin	River Shannon, Athlone	Westmeath	Bronze ring pin. Found in bed of river Shannon at Athlone, Co. Westmeath.
7814:W295.1	Bronze seal matrix	River Shannon, Athlone	Westmeath	Bronze monastic seal matrix, Cistercian monastery at Athlone
4459:W252	Bronze dagger	River Shannon above new bridge	Westmeath	Bronze flat rivetted dagger
4458:W251	Bronze dagger	River Shannon near Athlone	Westmeath	Bronze flat rivetted dagger, Corkey type
P0242	Bronze sword	River Shannon near Athlone	Westmeath	Eogan Class 5, Eogan 1965, 140.
1572:W241	Stone axehead	Near Athlone	Westmeath	Polished stone axehead
4736:W228	Bronze spearhead	Athlone	Westmeath	Bronze looped spearhead. Found probably in river Shannon, at Athlone, Co. Westmeath.
3722:W212	Bronze palstave	River Shannon, Athlone	Westmeath	No further information.
4699:W191	Bronze spearhead	River Shannon, Athlone	Westmeath	Kite shaped bronze spearhead, found in river Shannon at Athlone, Co. Westmeath. Wilde 1857, 501-2: Fig. 383.
7456:W144	Iron knife	River Shannon near Athlone	Westmeath	iron knife with decorated wooden handle
R122	Stone point	River Shannon near Athlone	Westmeath	Stone celt felstone slate, found in River Shannon opposite North Gate, Athlone, Co. Westmeath.
4326:W119	Bronze dirk	Athlone	Westmeath	Bronze group 3 dirk
4317:W110	Bronze dirk	Athlone	Westmeath	Bronze group 3 dirk, Burgess and Gerloff 1981, 75: No. 579.
4614:W106	Bronze spearhead	Athlone	Westmeath	Leaf-shaped bronze spearhead
4607:W99	Bronze spearhead	Athlone	Westmeath	Leaf-shaped bronze spearhead
4597:W89	Bronze spearhead	Athlone	Westmeath	Leaf-shaped bronze spearhead
4291:W84	Bronze sword	Near Athlone	Westmeath	Bronze sword, Eogan Class 5, part of a group of four bronze swords. Said to have been found together near Athlone, 'upon an ancient battlefield'. Eogan 1965, 140-3, 164; Eogan 1983, 144-5.
4590:W82	Bronze spearhead	Athlone	Westmeath	Bronze leaf-shaped spearhead

Reg No.	Simple Name	Findplace	County	Description
7455:82.1	Wooden shaft	Athlone	Westmeath	Wooden spearhead shaft fragment
4287:W80	Bronze sword	Near Athlone	Westmeath	Bronze sword, Eogan Class 5, part of a group of four bronze swords. Said to have been found together near Athlone, 'upon an ancient battlefield'. Eogan 1965, 140-3, 164; Eogan 1983, 144-5.
4588:W50	Bronze spearhead	Near Athlone	Westmeath	Leaf shaped and basal looped
4254:W77	Bronze sword	Near Athlone	Westmeath	Bronze sword, Eogan Class 5, part of a group of four bronze swords. Said to have been found together near Athlone, 'upon an ancient battlefield'. Eogan 1965, 140-3, 164; Eogan 1983, 144-5.
4580:W72	Bronze spearhead	Athlone	Westmeath	Leaf-shaped
5101:W70	Bronze beam	River Shannon, Athlone	Westmeath	Bronze ounce beam
1782:Wk065	Bronze box	River Shannon, Athlone	Westmeath	Bronze box
7272:W64	Silver armring	Near Athlone	Westmeath	Silver broad band arm ring
1385:W54	Stone axehead	Shannon fords, Athlone	Westmeath	Polished stone axehead
2451:Wk049	Iron sword	Site of new bridge, Athlone	Westmeath	Broad flat double-edged iron blade. Found several feet under ground on site of the new bridge, Athlone, Co. Westmeath.
3661:Wk047	Jet/Lignite beads	Near Athlone	Westmeath	String of 11 jet beads, two globular and nine flattened
1377:W46	Stone axehead	Shannon fords, Athlone	Westmeath	Polished stone axehead
1376:W45	Stone axehead	Shannon fords, Athlone	Westmeath	Polished stone axehead
1375:W44	Stone axehead	Shannon fords, Athlone	Westmeath	Polished stone axehead
1374:W43	Stone axehead	Shannon fords, Athlone	Westmeath	Polished stone axehead
4249:W42	Bronze sword	Near Athlone	Westmeath	Bronze sword, Eogan Class 1. Eogan 1965, 26.

Reg No.	Simple Name	Findplace	County	Description
4247:W40	Bronze sword	Near Athlone	Westmeath	Bronze sword, Eogan Class 5, part of a group of four bronze swords. Said to have been found together near Athlone, 'upon an ancient battlefield'. Eogan 1965, 140-3, 164; Eogan 1983, 144-5.
6551:W39	Bronze spur	Athlone	Westmeath	Bronze spur. Found at Athlone.
1303:Wk036	Wooden knife	River Shannon near Athlone	Westmeath	iron knife with decorated wooden handle
4542:W34	Bronze spearhead	River Shannon near Athlone	N/A	Spearhead, socketed, peg holed
8111:W26	Wooden object	Below old bridge, Athlone	Westmeath	Wooden fragment
6818:W24	Bronze mount	River Shannon, Athlone	Westmeath	Anthropomorphic
2240:W24	Stone object	River Shannon, Athlone	Westmeath	Sub-rounded stone object
1215:Wk023	Iron sword	River Shannon, Athlone	Westmeath	Shannon Navigation 1847
1873:W21	Stone axe-hammer	River Shannon, Athlone	Westmeath	Wilde 1857, 80: Figure 66.
2209:W16	Stone object	Athlone	Westmeath	Inscribed stone slab
6903:W5	Gold lunula	Near Athlone	Roscommon	Gold classic lunula, found near Athlone, Co. Roscommon, prior to 1842, Taylor 1980
<b>Ranelagh</b>				
NMI 1991:116	Bronze dagger	River Shannon off Ranelagh	Westmeath	No further information
NMI 1987:123	Iron sword	Bed or River Shannon	Westmeath	No further information



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## **Appendix 12.3**

### *Previous Excavations*

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## Appendix 12.3

### Previous Excavations

Published archaeological excavations from the study area from 1970 to 2015 ([www.excavations.ie](http://www.excavations.ie)) are summarised below.

**County:** Westmeath **Site name:** Athlone Castle, Athlone

**Excavations.ie number:** 1991:124 **Licence number:**

**Author:** Andrew Halpin, Archaeological Development Services Ltd. The Power House, Pigeon House Harbour, Dublin 4.

**Site type:** Medieval/post-medieval castle

**ITM:** E 620246m, N 724229m

**Latitude, Longitude (decimal degrees):** 53.268013, -7.696494

In January 1991 Archaeological Development Services Ltd carried out a short excavation on behalf of Athlone Urban District Council in Athlone Castle. The purpose of the excavation was to determine the date of a wall within the castle yard, which the Council proposed to demolish in the course of preparing an Exhibition Centre for the Athlone 1691 Tercentenary celebrations.

Athlone Castle is thought to be a structure of mainly 13th-century fabric, possibly on the site of a 12th-century castle of the Uí Conchobhair and/or late 12th century Anglo-Norman motte-and-bailey castle. Little is known of the later medieval history of the castle but a drawing of 1685 by Thomas Phillips shows it to have been an impressive structure, with a fine suite of apartments (the residence of the governors of Connacht) overlooking the river on the east side. Within a few years, however, the castle lay in ruins as a result of the Williamite siege of 1691. As late as 1793 the castle was almost entirely levelled; the only standing remains was the stump of the central keep 'about 5 to 10 feet high' and even the curtain walls stood no higher than internal ground level. From 1793 to 1815, efforts to fortify the Shannon against a French invasion via the west coast of Ireland included substantial rebuilding of Athlone Castle. It is clear that this work must have involved almost complete rebuilding above internal ground level.

The wall, located in the south-west corner of the castle yard, ran between an armaments store and a domestic building, both of late 18th/early 19th-century date; it was 1.05m-1.2m thick at the base and built of coursed, roughly dressed limestone blocks with a limestone rubble core. Its maximum surviving height was c. 4.2m, but a wall-line on the south wall of the armaments building indicates that it originally abutted this building to a height of c. 6m. Two cuttings were opened on either side of the wall at its junction with the armaments building. This confirmed that the foundations of the wall rested on redeposited boulder clay and sand/gravel layers, apparently laid down in order to level up a depression or sharp slope in the area, and almost certainly in preparation for the construction of the wall. It was clear from the foundation details that the wall was contemporary with the armaments building (of late 18th- or 19th-century date) to the north.

The conclusion that the wall is of modern date is not surprising in view of the evidence that practically the entire upstanding fabric of the castle, above internal ground level, must post-date 1793. As a result of the excavation the proposed development by Athlone Urban District Council was able to proceed as planned.

Andrew Halpin, Archaeological Development Services Ltd. The Power House, Pigeon House Harbour, Dublin 4.

**County:** Westmeath **Site name:** The Docks/Williams' Yard, Athlone

**Excavations.ie number:** 1991:125 **Licence number:** —

**Author:** Andrew Halpin, Archaeological Development Services Ltd., The Power House, Pigeon House Harbour, Dublin 4.

**Site type:** Urban

**ITM:** E 620246m, N 724229m

**Latitude, Longitude (decimal degrees):** 53.268013, -7.696494

In December 1990 and February 1991 Archaeological Development Services Ltd. carried out an archaeological site assessment on behalf of Athlone Urban District Council on two adjacent sites known as The Docks and Williams' Yard, located on the west bank of the Shannon in Athlone.

Williams' Yard and the north part of the Docks are in the Zone of Archaeological Potential identified for Athlone by the Urban Archaeology Survey.

Little is known of the development of Athlone west of the Shannon. If there were a substantial medieval town on this side of the river, the present sites should have been part of it, but it is not certain that such a town ever existed. It is more likely that the sites formed part of the precinct of the Cluniac Priory of SS Peter and Paul, founded in the 12th century. The monastic buildings of this priory were located some distance to the west in the angle between Excise Street and Abbey Lane, but this precinct would have covered a large area and must surely have incorporated a river frontage on the Shannon. Thus the present sites may have remained undeveloped until after the priory was dissolved in the later 16th century. In the later 17th century the town defences (first erected 1651-4) on the southern limits of the town ran roughly along the line of the east-west portion of Excise Street, ending beside the river in a large demi-bastion at the east end of Excise Street. The street pattern around the sites (apart from The Quay) was already laid out in its modern form by 1685.

The assessment trenches both outside the line of the town defences and in the area of the 17th-century bastion (i.e. Trenches 3-7, The Docks) displayed only modern material, with no evidence of archaeological stratigraphy. A dock or harbour known as St Peter's Port occupied the area in the late-18th and 19th centuries, and its construction probably destroyed all trace of the bastion. Within the line of the defences, from c. 1.3m below present ground level, were substantial deposits of organic material resting directly on undisturbed river gravels and muds at c. 1.9m-2m below present ground level. This organic deposit represents the earliest sustained occupation on the site and a later 17th/early 18th-century date was indicated by artifactual evidence.

Given that the street pattern around the sites was already established by 1685, there may have been earlier 17th-century occupation on the site. However, there is no evidence of medieval occupation, which tends to support the hypothesis that this area was part of the precinct of the Cluniac Priory throughout the medieval period. This in turn raises fundamental questions about the extent and nature of medieval settlement on the Connacht side of Athlone.

Andrew Halpin, Archaeological Development Services Ltd., The Power House, Pigeon House Harbour, Dublin 4.

**County:** Westmeath **Site name:** PEARSE STREET, ATHLONE

**Excavations.ie number:** 1997:583 **Licence number:** 97E0039

**Author:** Malachy Conway, Margaret Gowen & Co. Ltd, Rath House, Ferndale Road, Rathmichael, Co. Dublin.

**Site type:** Urban post-medieval

**ITM:** E 603651m, N 741387m

**Latitude, Longitude (decimal degrees):** 53.422588, -7.945069

The site lies within a triangular block defined by Pearse Street (north and west), Connelly Street (east) and Bastion Street/O'Connell Street (south). The assessment was undertaken on 11 March 1997 as the result of a planning requirement. Demolition of the pre-existing structures on site had taken place prior to the assessment.

First walled in 1251, the town had numerous lines of defences built and destroyed up to the 17th century. The town fortifications were greatly strengthened in 1651 after its capture by Cromwellian forces (eastern walls strengthened and bastions included, and an earthen-bastioned enceinte constructed on the west). However, they were unable to withstand the 1691 siege by Ginkel, when extensive damage was done to the castle and town. An important reference from the time (1682) describes how the western fortification works were set with a 'quick hedge', the only reference of planting to bind earthen ramparts to prevent slippage and collapse at an Irish site. By the 17th century the town comprised an 'English town' on the east bank and an 'Irish town' on the west. The Connacht-side settlement may have been very small during the 17th century, especially after the 1691 bombardment, described as the heaviest any Irish town received.

While nothing survives of the fortifications of the West town, its original layout has influenced (and can still be traced in) the present street pattern. There was a demi-bastion at the north-east end in the vicinity of the present main gate of Custume Barracks, from which the rampart continued west for around 90m before reaching an acute-angled bastion. From here the rampart turns 90 degrees south

and continues to the junction of Barrack Street and Pearse Street, where a gate was located. A ravelin, located here to protect the entrance, may have contributed to the pronounced bend in the main street at this location (Pearse Street/Barrack Street). From here the rampart ran south for a distance of c. 80m to a large central bastion which provided the main western exit for the town. Bastion Street obviously derived its name from this feature and, along with Grattan Street, their juxtaposition and layout reflect the line of fortification (it is unusual that the exact lines of the central bastion should be so well preserved in the street pattern and this may be a reflection of properties being 'wrapped' around the defences or may indicate that the earthen rampart was guided by pre-existing properties). The rampart continues south from here, just outside Abbey Lane, to a small corner bastion near Goldsmith Terrace, where it turns east and runs to a demi-bastion forming a terminal at the Shannon, close to the modern lock. This terminal is most probably the exit known as Peter's Port.

Of the cartographic sources, Thomas Phillips's plan of 1685 provides a layout of the western town. The map locates the main thoroughfares and entrances of the West town at Bastion Street, Barrack Street and Excise Street. The layout of present-day Connolly Street, Abbey Lane and The Bawn have obviously been influenced by the trace of the 17th-century fortifications. The western approach roads are flanked by cabin dwellings (poorer inhabitants), including an area around the central bastion. Thomas Sherrard's map of 1784 depicts the eastern town as walled, while the walls on the west have been removed.

Five trenches were mechanically excavated. Trench 1, located 22m south of the north-east corner of the site, was perpendicular to the wall at the rear of the property line fronting Bastion Street. It was orientated approx. south-east/north-west and measured 22m by 2m. The following profile and features were recorded: 0m–3m: dark brown soil with small stones and brick fragments (0–0.5m), and yellow clay containing small stones (0.5–1.5m+); 3–22m: compact dump of gravel and rubble deposits mixed with dark brown clay (banded) (0–1.1m), dark brown clay with charcoal flecks and small stones (1.1–1.5m), and yellow clay containing small stones (1.5m+). A south-west/north-east linear ditch, 13.2m wide, was located 5.3m north of the property wall boundary. The feature cuts the natural yellow clay subsoil and is characterised by a dark brown clay fill containing charcoal flecks and small stones. A possible division or berm composed of yellow clay, several metres in width, was located within the feature at a position 12m north of the property wall boundary. The feature appears to represent a parallel double line of fortification ditches.

Trench 2, positioned at a right angle to the wall forming the northern boundary of the site at the rear of properties fronting Connolly Street, lay c. 28m from the north-east corner of the site along a recessed portion of the wall. It measured 17.3m by 2m. The following profile and features were recorded: 0–6.5m: concrete and hard-core infill (0–0.2m), yellow clay mixed with numerous red brick fragments and small stones (0.2–0.45m), grey-brown clay (0.45–1m) (exposed to diesel/oil seepage), and dark brown/black clay containing small stones and charcoal flecks (1m+) (this represents a continuation of the counterscarp ditch); 6.5–17.3m: concrete and hard-core infill (0–0.2m), yellow clay mixed with red brick fragments and small stones (0.2–1m), and yellow clay (1m+).

Trench 3 was positioned at a right angle to the wall forming the northern boundary of the site at the rear of properties fronting Connolly Street. It is located c. 34m from the north-west corner of the development, orientated north-east/south-west, and measures 19m by 2m. The deposits revealed were dark brown/black soil containing brick rubble (0–0.4m), yellow clay mixed with red brick fragments and small stones (0.4–1m), grey-brown clay containing red brick fragments and small stones (1–1.2m), and yellow clay (1.2m+). Features uncovered included an east–west linear ditch positioned 4.5m south of the boundary wall cut into natural clay. The ditch is 2.8m wide and filled with dark brown/black clay and small stones. It probably represents a continuation of the counterscarp ditch. An east–west linear wall foundation was located 8.7m south of the boundary wall and 0.5m below present ground level. The wall is composed of rough-cut stone blocks and red brick, 1.1m wide and 0.8m+ high, representing a 19th/20th-century property division.

Trench 4 was positioned at the northern corner of the development site parallel with the Pearse Street frontage. It was orientated north–south, measuring 13m by 2m. It contained dark brown soil mixed with brick rubble (depth 0–0.2m), and yellow clay (depth 0.2–0.5m).

Trench 5 was positioned across the site entrance to the south on the Bastion Street/O'Connell Street confluence. It was located 16.3m north of the street, orientated north-east/south-west, and measured 4m by 2m. Owing to the nature of the deposits uncovered in this area, the sides of the trench were very unstable and so the measurements given below are approximate: dark brown soil/clay heavily mixed with domestic rubbish and brick rubble (0–1.5m), dark brown soil containing numerous stones (1.5–2.7m), and yellow clay (2.7m+) (darker and drier than that observed in other trenches).

The test excavation results clearly uncovered portions of the external ditch of the rampart in Trenches 1–3. The excavation did not reveal any evidence for remains of the earthen rampart forming either the central bastion or the ravelin believed to overlie Pearse Street. Monitoring of rubble and soil clearance over the remainder of the site did not reveal any features or soils of archaeological significance.

Malachy Conway, Margaret Gowen & Co. Ltd, Rath House, Ferndale Road, Rathmichael, Co. Dublin.

**County:** Westmeath **Site name:** THE QUAY, ATHLONE

**Excavations.ie number:** 1997:584 **Licence number:** 97E0194

**Author:** E. Eoin Sullivan, c/o Arch Tech, 32 Fitzwilliam Place, Dublin 2.

**Site type:** Urban medieval

**ITM:** E 603865m, N 741389m

**Latitude, Longitude (decimal degrees):** 53.422604, -7.941850

Archaeological test-trenching at The Quay, Athlone, Co. Westmeath, was carried out on 3 and 4 July 1997. The site is on the west side of the River Shannon, c. 200m south of Athlone Castle. Little is known about the development of Athlone west of the Shannon, but the castle, which is the only surviving defensive feature on the west side of the town, is thought to be mainly 13th-century in date, possibly on the site of a 12th-century wooden castle of the Uí Conchobhair (1129) and/or a late 12th-century Anglo-Norman motte and bailey castle. The site under assessment was probably located within the precinct of the Cluniac Priory of SS Peter and Paul, founded in the 12th century, which would have run down to the riverfront.

Two trenches were mechanically excavated. Trench 1 was located at the eastern end of the warehouse, oriented east–west; it was 8m long and was excavated to a depth of 33.07m OD. The excavated trench to a depth of 0.45m below the present concrete floor consisted of two layers of decayed mortar floor with pieces of red brick, occasional oyster shell, bottle glass and modern ceramics. This was underlain by a sandy brown clay which overlay a layer of peat containing small twigs and pieces of root (1.3–1.9m) with laminated layers of sand. Below this peat layer was a layer of fine sand which produced fragments of clay pipes and occasional leather offcuts.

Trench 2 was located at the western end of the warehouse, oriented east–west; it measured 10m in length and was excavated to a depth of 33.425m OD. The excavated trench revealed a similar series of decayed mortar floors as in Trench 1, which overlay a layer of rubble and brown loose clay containing roots of shrubs. This layer produced fragments of clay pipes and a piece of modern wood. The trench was excavated down to a grey marl of compact riverine silt.

There were no indications of any medieval activity on the site. The earliest activity can be dated by the artefactual evidence to the later part of the 17th/ early 18th century. There were no indications of any structures on the site, nor were there any indications of the earthen rampart which ran along the line of the site. The evidence discovered during the test-trenching suggests that the site was part of the precinct of the Cluniac priory, which meant that this area of land would not have been available for development until after the dissolution of the priory in the later 16th century. No further archaeological excavation was deemed necessary.

E. Eoin Sullivan, c/o Arch Tech, 32 Fitzwilliam Place, Dublin 2.

**County:** Westmeath **Site name:** BASTION STREET, ATHLONE

**Excavations.ie number:** 1998:642 **Licence number:** —

**Author:** Paul Stevens for Margaret Gowen & Co. Ltd, 2 Killiney View, Albert Road Lower, Glenageary, Co. Dublin.

**Site type:** Urban post-medieval

**ITM:** E 603721m, N 741341m

**Latitude, Longitude (decimal degrees):** 53.422174, -7.944016

Archaeological monitoring took place in October 1998 at a housing redevelopment at No. 16 Bastion Street, Athlone. The site lies on the northern side of Bastion Street, south of the 17th-century bastion wall, which runs parallel to the street and at right angles to the medieval town wall. The development area measures 19m north-south by 8m.

Development was in progress when archaeological monitoring was requested; no demolition or alteration to existing walls was planned; however, subsurface works were undertaken close to the

wall, and these were all subject to an archaeological monitoring clause. In fact, only one trench was available to archaeologically monitor; however, all standing walls were visible.

The trench was opened for a foul water main supply and lay in the centre of the building on the site. The trench was 6m long, 1m wide and 0.4-1m deep and revealed two linear features of 17th/18th-century date below the existing property. These were revealed at a depth of 0.3-0.4m below ground level.

The line of the bastion wall appeared to be substantially altered and contained several phases of masonry and brick. No intact portion of the original bastion wall was noted during the assessment. Analysis of the other face of the wall revealed that the bastion wall had been rebuilt from a point east of the property, where it was listing and buttressed. It is therefore likely that the wall fell and was rebuilt using existing stone and brick additions.

Paul Stevens for Margaret Gowen & Co. Ltd, 2 Killiney View, Albert Road Lower, Glenageary, Co. Dublin.

**County:** Westmeath **Site name:** NORTHGATE STREET, ATHLONE

**Excavations.ie number:** 1998:643 **Licence number:** 98E0210

**Author:** Martin E. Byrne, 39 Kerdiff Park, Monread, Naas, Co. Kildare.

**Site type:** Urban medieval

**ITM:** E 603740m, N 741470m

**Latitude, Longitude (decimal degrees):** 53.423333, -7.943729

Trial-trenching was undertaken at the site of a proposed hotel, leisure centre and apartment development on 27-9 April 1998. The work was undertaken in compliance with a condition of the grant of planning in respect of the development. Subsurface ground disturbance works had commenced on the site before the involvement of an archaeologist. However, following a report of such to the Garda by Athlone UDC, all works were halted until an archaeologist was present.

The site lies on the east bank of the River Shannon, north of the bridge, and is bounded on the east by Northgate Street. Before development the site consisted of a number of houses fronting onto the street, with the remainder of the site consisting, for the most part, of a disused factory unit. The upstanding remains of the Athlone gasworks building are also within the development site. Demolition of the houses and part of the factory had been completed; the levels had been reduced into the subsoil in much of the south-western quadrant of the site.

The site lies within the walled town of Athlone, and cartographic sources indicate the line of the medieval town wall running west towards the river, in the central part of the site. Furthermore, this wall was reinforced during the 17th century, and a demi-bastion was constructed at the river end. In addition a plan of Athlone dating to 1691 indicates that a number of trenches were dug along the waterfront, within the site, most probably by the Williamites following their breaching of the north bastion.

Trial-trenching indicated that the levels across the southern half of the site had been reduced, probably during the construction of the former factory premises, and that any features of archaeological interest had been removed.

However, investigations along the presumed line of the town wall uncovered the foundation remains of the wall. The nature of the foundations indicated that they are probably medieval in origin, although there were indications that portions were rebuilt, probably in the 17th century. The wall lay up to 4m below the present ground surface and stood to a maximum height of 1.65m. It was up to 1.83m wide and had a slight batter on the internal face.

No further features or finds of archaeological interest were revealed during the course of the evaluation.

The existence of undemolished sections of the former factory building and other extant buildings militated against further archaeological investigations of the site, particularly in the area of the mural defences. Therefore it was decided to cease the evaluation until the remaining demolition works were complete. However, the development ran into financial difficulties, and no further work has been undertaken.

A further planning application in relation to the site has been made, to replace the proposed hotel and leisure centre with apartments. It is intended that demolition works will commence in spring 1999, following which, further archaeological investigations, including the survey of the existing gasworks, will be undertaken.

**County:** Westmeath **Site name:** Abbey Lane, Athlone

**Excavations.ie number:** 2003:1954 **Licence number:** 03E0107

**Author:** Martin E. Byrne, Byrne Mullins & Associates, 7 Cnoc na Gréine Square, Kilcullen, Co. Kildare.

**Site type:** Urban post-medieval

**ITM:** E 604998m, N 740228m

#### **Latitude**

Testing was undertaken in the area of a proposed development situated at the eastern side of the present Abbey Lane, Athlone, Co. Westmeath. It is speculated that the line of the 17th-century earthen rampart defences ran along the western side of the lane.

Machine excavation of three trenches took place within the boundaries of the property. Testing revealed a 0.55m layer of fill overlying a moderately compact light-brown sandy clay typical of the general area. No features or artefacts of archaeological interest were uncovered.

Martin E. Byrne, Byrne Mullins & Associates, 7 Cnoc na Gréine Square, Kilcullen, Co. Kildare.

**County:** Westmeath **Site name:** 1 Abbey Lane, Athlone

**Excavations.ie number:** 2003:1955 **Licence number:** 03E0111

**Author:** Martin E. Byrne, Byrne Mullins & Associates, 7 Cnoc na Gréine Square, Kilcullen, Co. Kildare.

**Site type:** No archaeological significance

**ITM:** E 604996m, N 740196m

#### **Latitude**

Testing was undertaken in the area of a proposed development situated to the rear of 1 Abbey Street, Athlone. The site is located on the western side of the present Abbey Lane. It is speculated that the line of the 17th-century earthen rampart defences ran along the western side of the lane.

Hand excavation took place of a trench in the rear garden of the property at right angles to the postulated line of the defensive feature. Testing revealed a 0.4m layer of topsoil overlying a moderately compact light-brown sandy clay typical of the general area. No features or artefacts of archaeological interest were uncovered.

Martin E. Byrne, Byrne Mullins & Associates, 7 Cnoc na Gréine Square, Kilcullen, Co. Kildare.

**County:** Westmeath **Site name:** ATHLONE

**Excavations.ie number:** 2004:1710 **Licence number:** 03E0978

**Author:** Dominic Delany, Dominic Delany & Associates, Unit 3, Howley Court, Oranmore, Co. Galway.

**Site type:** Urban

**ITM:** E 603942m, N 741537m

#### **Latitude**

Monitoring of excavations associated with the Athlone broadband project was carried out from June 2003 to January 2004. The project comprised the laying of cables below the ground surface throughout the town of Athlone and its surrounding infrastructure. The majority of the cable was laid below existing roads and footpaths. The ducts carrying the cables were placed at a standard depth of 0.6m, requiring trench excavation to an average depth of 0.9m. The archaeological impact assessment report had identified a number of potential impacts and recommended monitoring of all excavations within the zone of archaeological potential in Athlone and in the vicinity of recorded monuments outside the zone. The route crossed the suggested line of the town defences in a number of locations on the east and west banks of the River Shannon. These sections of the route were deemed to be particularly sensitive potential impact locations, as the course and development of the town defences is well documented.

Excavations within the zone of archaeological potential were subject to intensive monitoring, while excavations outside the zone were monitored on an intermittent basis. A wall was discovered at the junction of Northgate Street and Abbey Road. It was situated c. 50m north of the suggested line of the town wall, of which no trace was discovered. The wall was built of roughly worked limestone blocks with traces of lime render on both faces. It was c. 1m in thickness and appeared to be built directly on



the natural ground. Inclusions of red brick in the wall fabric attest to its post-medieval date. This wall is not marked on any published map of the town defences, nor is it indicated on Thomas Philips' plan of Athlone from 1685. However, a wall is shown at this location on an old Bord Fíilte street map depicting the town defences during the siege of Athlone in 1691. Consequently it is possible that the wall discovered during monitoring is part of the defences erected in advance of the siege of Athlone in 1691.

Two walls were exposed in the south-east section of the trench on Barrack Street. The walls were faced with worked and roughly worked limestone blocks, with occasional pieces of red brick evident between the facing stones and in the core of the wall. One to two courses survived and the wall had a maximum height of 0.35m. The walls uncovered on Barrack Street almost certainly pertain to barrack buildings located along the southern edge of the military barracks on the north side of the street, which was considerably narrower at the time. These buildings are clearly shown on the first-edition OS map. Only a slight realignment of the broadband trench was required to avoid impacting on these walls. No other archaeological material was discovered during monitoring of broadband excavations in Athlone.

Dominic Delany, Dominic Delany & Associates, Unit 3, Howley Court, Oranmore, Co. Galway.

**County:** Westmeath **Site name:** NORTHGATE STREET, ATHLONE

**Excavations.ie number:** 2004:1713 **Licence number:** 04E0518

**Author:** Ellen O'Carroll, The Archaeology Company, 17 Castle Street, Dalkey, Co. Dublin.

**Site type:** No archaeological significance

**ITM:** E 603750m, N 741525m

**Latitude, Longitude (decimal degrees):** 53.423827, -7.943578

Monitoring took place of topsoil clearance associated with the construction of a single-storey prefabricated unit at St Vincent's Hospital, Northgate Street, Athlone. The development work was carried out for the Midland Health Board. The development is within the zone of archaeological potential for Athlone town (SMR 29:42). The topsoil, which measured 0.15-0.2m in depth, was composed of grey/brown silty clay with occasional charcoal flecking and red-brick fragments. In addition, there were 19th- and 20th-century ceramics and glass noted in the topsoil. The natural throughout the site was composed of yellow/brown boulder clay. Nothing of archaeological significance was recorded during the monitoring.

**County:** Westmeath **Site name:** River Shannon, Athlone

**Excavations.ie number:** 2006:2032 **Licence number:** 05E1350

**Author:** Kieran Campbell, 6 St Ultan's, Laytown, Co. Meath.

**Site type:** Riverbank monitoring

**ITM:** E 603631m, N 741955m

**Latitude, Longitude (decimal degrees):** 53.427691, -7.945363

Monitoring of trench excavations on the banks of the River Shannon took place on 4 April 2006 during the laying of an ESB cable across the river, upstream of the railway bridge and immediately outside the archaeological zone of Athlone town (townlands Athlone, Co. Westmeath, and Ranelagh, Co. Roscommon). The monitoring followed from pre-development assessment and geophysical surveys carried out by Donal Boland and Ciara Herron. The trenches, 1m wide and 8–12m long, on both sides of the river were excavated through topsoil and redeposited soil of 20th-century date without exposing the natural riverbed.

**County:** Westmeath **Site name:** CASTLE STREET/MAIN STREET/THE QUAYS, ATHLONE

**Excavations.ie number:** 2009:824 **Licence number:** C311

**Author:** Martin E. Byrne, Byrne Mullins & Associates, 7 Cnoc na Greine Square, Kilcullen, Co. Kildare.

**Site type:** Urban

**ITM:** E 603797m, N 741430m

**Latitude, Longitude (decimal degrees):** 53.422973, -7.942872

Monitoring of ground-reduction works associated with the Athlone westside street enhancement project was undertaken, on a phased basis, from 8 September to 3 November. The works are located

within the zone of archaeological potential established for the town and adjacent the southern curtain walls of Athlone Castle. Monitoring of geotechnical slit-trench excavations was undertaken by Tara O'Neill Archaeological Consultancy Services Ltd, in February 2009, but nothing of archaeological interest was uncovered.

All ground-reduction works associated with Phase 1 of the development, extending from the junction of Castle Street and Main Street to The Quays, were monitored. Such works included removal of existing street, carpark and footpath surfaces, diversion of services and construction of a new surface water sewer. No subsurface features of archaeological interest were uncovered, although a number of sherds of pottery, of medieval and post-medieval date, were recovered. It is expected that works associated with Phase 2 of the project will be undertaken during 2010.

Martin E. Byrne, Byrne Mullins & Associates, 7 Cnoc na Greine Square, Kilcullen, Co. Kildare.

**County:** Westmeath **Site name:** FATHER MATTHEW HALL, GRACE ROAD, ATHLONE

**Excavations.ie number:** 2009:826 **Licence number:** 09E0443

**Author:** Martin E. Byrne, Byrne Mullins & Associates, 7 Cnoc na Greine Square, Kilcullen, Co. Kildare.

**Site type:** Adjacent to site of tower

**ITM:** E 603799m, N 741522m

#### **Latitude**

Monitoring of geotechnical investigations at the site was undertaken on a phase basis during November 2009 and January 2010. The site is located between Grace Road and the River Shannon and comprises a former temperance hall (Father Matthew Hall), constructed in 1897, and a terraced embanked landscaped area to the immediate north. This latter area was originally created in the late 19th century by land reclamation and was further landscaped in the 1980s. It is the intention of Athlone Town Council to create an art galley on the site, by means of converting much of the existing building and constructing an extension to the north. Other works will include a service yard and creation of a boardwalk along a section of the riverfront. The site is situated within the zone of archaeological potential established for Athlone. A defensive feature – Connaught Tower – was located within, or in the immediate environs of, the site. This was constructed in the 16th century and was described in 1581 as 'an old ruinous tower covered with straw'. It is illustrated on Thomas Phillip's map of 1685 as comprising a rectangular structure with two circular towers at north angles, linked to Athlone Castle to the south by a defensive wall or ditch. Although the tower was largely demolished by Williamite bombardment in 1691, its location was marked on maps up to the late 18th century. Research indicates that the tower was located at the south-western corner of the site at the junction formed by Grace Road, Market Square and the road leading west from the bridge.

All trial-pit and borehole investigations were monitored and the spoil generated from such was subjected to 'raking over' to increase the chances for artefact recovery. A number of wall remains were encountered to the immediate north and south of the existing building. The form, nature and dates of the walls encountered during the site investigations were not ascertained due to the 'monitoring' nature of the works. Historical research indicates that part of the site, particularly the southern area, including Father Matthew Hall, was previously constructed in the 18th century and that all the previous buildings were demolished as part of the preparation/ construction works associated with the construction of the adjacent Town Bridge. The remaining areas of the site to the north originally formed part of the shallow riverbed and were reclaimed in the 19th century.

Given the historical background to the site and environs, together with the limited evidence uncovered by the programme of monitoring, it is difficult to determine whether any of the walls uncovered by the site investigations are of archaeological interest. Consequently, following consultation with the National Monuments Service, additional archaeological investigations will be undertaken in 2010.

Martin E. Byrne, Byrne Mullins & Associates, 7 Cnoc na Greine Square, Kilcullen, Co. Kildare.

**County:** Westmeath **Site name:** MARKET SQUARE/CASTLE STREET, ATHLONE

**Excavations.ie number:** 2009:827 **Licence number:** C347; E4018

**Author:** Martin E. Byrne, Byrne Mullins & Associates, 7 Cnoc na Greine Square, Kilcullen, Co. Kildare.

**Site type:** Adjacent to castle

**ITM:** E 603771m, N 741461m

**Latitude, Longitude (decimal degrees):** 53.423252, -7.943263

Monitoring of ground-reduction works associated with the provision of an army memorial was undertaken on a phased basis between 25 August and 16 October 2009. The site of the memorial is located adjacent to the north-west mural tower of Athlone Castle, a national monument.

The ground-reduction works were undertaken in three distinct phases. Phase 1 consisted of all demolition works and removal of street furniture, etc., and the excavation of three trial-pits, two within the site and one in the adjacent road. Phase 2 consisted of the laying of a new surface water drain from the site to an existing manhole on Castle Street, as well as the construction of an associated manhole/chamber in the footpath adjacent to the site. Phase 3 consisted of general ground-reduction works to the agreed construction level within the site. The only features of archaeological interest uncovered during the works were the subsurface basal remains of the extant mural tower and curtain walls; no artefacts of interest were recovered.

Martin E. Byrne, Byrne Mullins & Associates, 7 Cnoc na Greine Square, Kilcullen, Co. Kildare.

**County:** Westmeath **Site name:** Athlone

**Excavations.ie number:** 2010:662 **Licence number:** 10E0186

**Author:** Martin Fitzpatrick, Arch Consultancy Ltd, New Line, Athenry, Co. Galway.

**Site type:** Urban

**ITM:** E 603942m, N 741537m

**Latitude, Longitude (decimal degrees):** 53.423933, -7.940690

The proposed Athlone main drainage scheme includes improvements to the wastewater and surface water collection networks in various areas throughout the town of Athlone. An assessment of the scheme was undertaken in April 2010. The monitoring of slit-trenches and test-pits was undertaken over a four-month period from May 2010. The soil investigations were undertaken in both urban and rural settings including the town centre and immediate surrounds as well as an area of bog and farmland. The following summary describes only the areas where archaeological features were encountered.

Slit-trench A1.6 was excavated south of the junction of Abbey Road and North Gate Street and north of the possible location of the original North Gate of the town. The trench was excavated east–west across the road and measured 11m in length and 1.5m wide. A wall feature was encountered 1.1m east of the west end of the trench. Service pipes were uncovered to the immediate east and west of the wall, while a further pipe ran across the top of the wall. The wall was uncovered 0.8m below the surface. It was exposed for a depth of 0.7m and was 1m in width. Consisting of a double face with a rubble fill, it is three courses in height with mortar throughout. Occasional red-brick fragments were visible in the west face. Traces of a cobbled surface were recorded adjacent to the base of the wall at a depth of 1.5m. The cobbles, which were concentrated in an area c. 1m x 1m, were small rounded stones extending for a depth of 0.12m and sitting on top of a natural sticky sand. Previous archaeological work in Athlone town revealed that sections of this wall had been uncovered in this area. Monitoring of the Athlone broadband project in 2003–2004 by Dominic Delaney (Excavations 2004, No. 1710, 03E0978) uncovered a wall at the junction of North Gate Street and Abbey Road. The wall was built of roughly worked limestone blocks with traces of lime render on both faces. It was c. 1m in thickness and appeared to be built directly on the natural ground. According to Delaney, inclusion of red brick in the wall fabric attests to its post-medieval date. Also in 2003 monitoring of the Athlone gas feeder pipeline was undertaken by Tom Rogers (Moore Ltd) (Excavations 2003, No. 1953, 03E1489). He mentions the discovery of a possible disturbed wall at the lowest part of Northgate Street. It seems likely that all three sections of walling uncovered are part of the same structure, which appears to run along the west side of Northgate Street. An examination of the various cartographic sources for Athlone indicates that the feature may correspond to the town wall defences as depicted on Jean Goubet's 1691 map of Athlone town. It appears therefore that the wall and associated cobbles uncovered during site investigations are the remnants of the town defences erected in advance of the siege of Athlone.

Slit-trench A1.5 was excavated close to the south end of Northgate Street and directly outside the local Credit Union building. This trench was orientated east–west, measured 9.5m in length and was 1.3m wide. Removal of the road surface revealed an orange/brown clay which was excavated to a maximum depth of 1.4m. A stone culvert, 0.25m wide, was located at a depth of 0.8m in the east end of the trench. No trace of the wall feature encountered in Trench A1.6 was uncovered in this trench.

Slit-trench A1.4 was excavated diagonally across the road from the junction of Northgate Street/Church Street to the path on the opposite side of the road. The trench measured 15.5m in length and was 0.9–1m in width. Some 8.6m from the north end of the trench a mixed layer of brick and mortar was encountered below the road fill, at a depth of 0.3m. This deposit of brick and mortar extended for a length of between 2.4m and 2.5m and was c. 0.3m in depth. Below this, the excavation of a sticky clay revealed a dark-brown clay. Evidence for a wall feature was uncovered at a depth of 1.1–1.2m. All that survived was a single course of stones. The feature was revealed for a width of 1–1.1m. A mixed rubble fill adjoined the wall feature in the south. The significance of the brick and remains of the wall feature is not conclusive but the latter may relate to the former market place and tholsel, of which no trace survives aboveground today. A reference from 1587 informs us that John Rawson was leased the market place of Athlone on condition that he built a timber market house ‘20 yards long and 15 yards wide’ (Cal State Papers 1606–1608, 45). English’s map of 1750 indicates that it is a marketplace while in Sherrard’s map of 1784 it is referred to as a tholsel. A stone arcaded tholsel and market house with a tower surmounted by a cross was constructed here in 1703 and demolished in 1837. The abundance of pipes and services in this area made any excavations difficult and increased the possibility of disturbance to archaeological layers. However, the excavation of the slit-trench indicated that archaeological layers and features do survive below the ground in this area.

Slit-trench FST A2 was located on Bridge Street and traversed the road diagonally in a north-north-east/south-south-west orientation. This trench measured 6.3m by 1m and was up to 2m deep. The road surface and underlying gravel and rubble was removed to reveal a red-brick and lime mortar rubble at the north-north-east end of the trench. Red-brick wall foundations were encountered at this location. Approximately three courses of one wall spanning the length of the trench were recorded.

Slit-trench F1 was located on Quay Road adjacent to the junction with Peter’s Port on the west bank of the River Shannon. A proposed river crossing will be located to the immediate east. The west side of the trench revealed a wall feature at a distance of 8m from the path on the east side of the roadway. Located at a depth of 0.65m below the surface, the wall of uncut stones with mortar throughout measured 0.8m in width and was revealed to extend for a depth of 1m. Below this depth the space was too confined to excavate further. On the west side of the wall, red brick, occasional pottery and animal-bone fragments were recovered. An examination of the cartographic evidence from the area suggests that this feature may correspond to the 1691 map of Athlone town by Jean Goubet, where defences associated with the castle are indicated in this area.

Two test-trenches and a test-pit were excavated through the area of the proposed pumping station, which is located on the slope of a hill. No artifacts or features of archaeological significance were encountered.

**County:** Westmeath **Site name:** Father MATHEW HALL, GRACE ROAD, ATHLONE

**Excavations.ie number:** 2010:663 **Licence number:** 09E443 ext.

**Author:** Martin E. Byrne, Byrne Mullins & Associates, 7 Cnoc Na Greine Square, Kildare, Co. Kildare.

**Site type:** Adjacent site of tower

**ITM:** E 603799m, N 741522m

**Latitude, Longitude (decimal degrees):** 53.423799, -7.942841

The site is located between Grace Road and the River Shannon and comprises a former temperance hall (Father Mathew Hall), constructed in 1897, and a terraced embanked landscaped area to the immediate north. This latter area was originally created in the late 19th century by land reclamation and was further landscaped in the 1980s. It is the intention of Athlone Town Council to create an art gallery on the site, by means of converting much of the existing building and constructing an extension to the north. Other works will include a service yard and creation of a boardwalk along a section of the riverfront. The site is situated within the zone of archaeological potential established for Athlone. A defensive feature – Connaught Tower – was located within, or in the immediate environs of, the site. This was constructed in the 16th century and was described in 1581 as ‘an old ruinous tower covered with straw’. It is illustrated on Thomas Phillip’s map of 1685 as comprising a rectangular structure with two circular towers at the north, linked to Athlone Castle to the south by a defensive wall or ditch. Although the tower was largely demolished by Williamite bombardment in 1691, its location was marked on maps up to the late 18th century. Research indicates that the tower was located at the south-western corner of the site at the junction formed by Grace Road, Market Square and the road leading west from the bridge.

A programme of monitoring of geotechnical site investigations was undertaken on a phased basis during November 2009 and January 2010, during which a number of wall remains were encountered to the immediate north and south of the existing building (see Excavations 2009, No. 826). Consequently, it was agreed that additional testing should be undertaken. This was undertaken on a phased basis in March and April 2010.

No further evidence for the wall remains uncovered to the north of the building was found. However, testing to the south of the building uncovered the remains of a substantial wall feature (Wall A). The wall is 0.8m wide and extends in a southerly direction from the southern face of the Father Mathew Hall for a distance of 9.8m, where it was truncated by works associated with the construction of the adjacent bridge and road in the 1840s. In addition, there was evidence for additional truncation of the wall along its exposed length with the top of the wall lying at 0.3–1.5m below the present external yard surface.

Further testing was undertaken within the confines of the existing building. Further evidence for Wall A was uncovered and was found to be partially truncated by foundation works associated with the existing building. This wall is considered to be the subsurface remains of a riverside wall indicated on Sherrard's map of 1784. Further wall remains (C and D) were uncovered bonded to the northern extent of Wall A. These incorporate a slight kink/corner feature and represent the basal remains of late 18th/early 19th-century walls illustrated in the 1837 OS map.

The remains of a further wall (E) were uncovered in the central area of the existing building. This comprised the random rubble remains of a corner feature, truncated to the west by works either associated with the construction of Grace Road in the 1850s or by Father Mathew Hall in the 1890s and to the south by Wall A. The east–west-orientated portion of Wall E was up to 2.7m long and stepped down in profile from east to west and was 0.54m in width with a stepped foundation. Similarly, the north–south portion was stepped in profile (from north to south) and extended for a length of 0.95m, with some evidence for a stepped foundation to the west. The eastern face of this length had been truncated by Wall A, although a lower section was incorporated into the latter. Further investigations indicated that this north–south length might have been up to 0.86m in thickness. The uppermost level of the wall remains is 0.58m below that of the existing floor level. In addition, Walls C and D were constructed against the remains of Wall E. No artefactual material was recovered that might aid in the dating of the various walls. It was initially considered that Wall E might represent the basal foundation remains of Connaught Tower. However, one would consider that such remains would be substantially thicker, particularly given the defensive nature of Connaught Tower and its substantial rebuilding/refortification in the 17th century. However, it is noted that Connaught Tower had an associated garden to its north and it is possible that Wall E represents the north-eastern corner of this feature, particularly given that it is generally considered that Connaught Tower was located a little further to the south under the junction formed by Market Square and Grace Road.

Changes to the development, particularly with respect to foundations and underpinning works, were subsequently agreed and it is intended that construction works will commence in early 2011. All ground-reduction works, including the excavations for foundations, ground beams, underpinning and service trenches, will be monitored.

**County:** Westmeath **Site name:** River Shannon, Athlone

**Excavations.ie number:** 2010:665 **Licence number:** 10D20; 10R49

**Author:** Eoghan Kieran, Moore Marine Services, Corporate House, Ballybrit Business Park, Galway.

**Site type:** Riverine

**ITM:** E 603942m, N 741537m

**Latitude, Longitude (decimal degrees):** 53.423933, -7.940690

Moore Marine Services was commissioned by Martin Fitzpatrick of Arch Consultancy Ltd to carry out an underwater impact assessment of a proposed pipeline crossing of the River Shannon in Athlone, Co. Westmeath. The assessment is a component of the larger Athlone main drainage scheme (Stage 3) and Mr Fitzpatrick has been appointed consultant archaeologist for Westmeath County Council for the overall project. The impact assessment comprised the combination of a desktop assessment of the archaeological and historical background to the site and a visual and metal-detection survey of the pipeline route and its immediate vicinity.

The desktop assessment concluded that the potential for works to impact on archaeology in the River Shannon in Athlone is high. The town was a significant fording point on the river and the river itself

has been a major communication thoroughfare since prehistoric times. Testament to this fact is the number of artefacts recovered from the river.

The visual and metal-detection surveys were undertaken on 20 May 2010. A large quantity of modern material was noted during the survey, which included car tyres, traffic cones, a beer keg and an outboard engine. Only one feature of possible archaeological significance was noted, a single vertical wooden post. This feature was noted in the deep navigation channel on the western side of the river. The visible component comprised a small section of rounded timber emerging c. 0.15m from the marl riverbed. The exact nature of the timber was not discernible as only a small section was exposed. Inspection of the surrounding area concluded that there were no other visible associated timbers.

Based on the results of the impact assessment, it would appear that there is potential for the project to impact on possible archaeology.

**County:** Waterford **Site name:** Fr MATTHEW HALL, GRACE ROAD, ATHLONE

**Excavations.ie number:** 2012:608 **Licence number:** 09E443 ext.; C489

**Author:** Martin E. Byrne

**Site type:** Adjacent site of tower

**ITM:** E 603799m, N 741522m

**Latitude, Longitude (decimal degrees):** 53.423799, -7.942841

Monitoring of ground reduction works associated with the development of the Athlone Arts Gallery was completed during 2012 (see also *Excavations 2011*, No. 603). Such works were largely concentrated in the southern area of the site where new services pipes and ducts were installed, together with a new vehicular entrance on the northern edge of the site. No additional subsurface features were uncovered and no additional artefacts were recovered during this final phase of monitoring.

**County:** Westmeath **Site name:** ATHLONE CASTLE

**Excavations.ie number:** 2012:607 **Licence number:** E4398; C505

**Author:** Martin E. Byrne

**Site type:** Castle

**ITM:** E 603785m, N 741448m

**Latitude, Longitude (decimal degrees):** 53.423135, -7.943053

Athlone Castle, though preserving in outline the plan of the earlier medieval castle, comprises a crisp pentangular curtain wall, with a free-standing keep and two large rounded bastions facing the river, owing most to a late Georgian reconstruction. In plan, the castle consists of a pentangular curtain wall with base batter with a keep placed just west of the centre. The entrance is approached from the north by a ramp constructed after 1793. It is likely that the medieval entrance was also on the north side but its exact location is unknown. The curtain wall is thickest on the east (riverside) where it also appears to have been considerably rebuilt. Two circular bastions project from the east curtain wall and there may have been a third in the north-west angle. These may have formed part of the 13<sup>th</sup>-century defences but they are now almost totally hidden by later masonry. The keep is decagonal and its base is concealed by a plinth. The upper storeys of the keep were removed in the 1793 works and, while the wall fabric may be medieval, all visible features date from that time.

The castle, as reconstructed, had at least eleven gun embrasures, while in addition a traversing platform emplacement was constructed in the south-east tower, overlooking the bridge. The top of this tower is very similar to a Martello tower. In addition, the lower slope of the entrance ramp to the castle was covered by musket loops and by a gun embrasure in the upper level of the north-west tower directly above. Additional musket-loops provide for the defence of the upper part of the entrance ramp and gateway. The open space within the castle contains a large hexagonal tower, most of the upper part of which dates from the reconstruction work; it is provided by loop-holed projecting structures – similar to machicolations on some of the Martello towers – to allow for musketry defence. The north-east tower, overlooking the present bridge of Athlone, built in the 1840s, has two gun-embrasures in the parapet, although the limited space here suggests that there would be room for only one gun on the gun platform. The broad parapet between the north-east and south-east towers is provided with two large, widely splayed gun-embrasures giving a field of fire over the river to the east. Just to the west of the south-east tower with its traversing gun emplacement is another gun embrasure – now blocked up – covering the open-space below. The platform of the north-west tower, approached

through a barrel-vaulted passageway, has four gun-embrasures, one of which covers the entrance ramp below. The remaining embrasures facing the north and west have each been blocked by a later wall provided with musket-loops. The western side of the castle is at a considerably higher level than the rest. At this higher level are two more gun-embrasures – now blocked up – in the high parapet wall.

A visitor centre was opened at the castle in 1991. However, in more recent years this was largely considered to be outdated and was deemed unsafe from a fire safety perspective. Consequently, a visitor centre refurbishment project was instigated. Pre-planning consultations with a number of organisations, including the OPW and National Monuments Service, required that the overall proposals be subject to both non-intrusive architectural and archaeological heritage impact assessments. The Architectural Conservation/Heritage assessment was undertaken by Alasdair Lindsay and the Archaeological Heritage assessment was undertaken by Byrne Mullins & Associates. Following further consultation with the National Monuments Service, it was agreed that all ground reduction works required of the development, including general removal of existing internal and external surfaces, foundation and service trench excavations, be monitored. In addition, it was agreed that two test trenches be excavated by hand within the courtyard and that protective measures be put in place in order to protect the base plinth of the keep from damage by machinery.

Two subsurface features of archaeological interest were uncovered during the course of the works. A service trench along the riverside edge of the courtyard revealed a wall face truncated by modern disturbance. It is suggested that this wall may represent the basal foundations of a structure constructed in the 16th/early 17th century, when the castle was used as the official residence of the 'Presidents of Connaught', whose apartments were in the east wing overlooking the river. Furthermore, the truncated remains of a wall was uncovered running north from the existing entrance gate and across the existing access ramps. This may be associated with a former entrance feature, illustrated on later 17<sup>th</sup>-century maps of the town.

A number of artefacts, mostly pottery sherds and fragments of clay pipes of 19th/20<sup>th</sup>-century date, were recovered, particularly within the courtyard area of the site.





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## **Appendix 12.4**

### *Recorded Shipwrecks at Athlone*

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## Appendix 12.4

### Recorded Shipwrecks at Athlone

The following shipwrecks are recorded from the River Shannon at Athlone (source Shipwreck Inventory of Ireland).

<b>Wreck No.</b>	W11715
<b>Vessel Name</b>	Unknown
<b>Place of Loss</b>	River Shannon, just north of the Yacht Club, Meehan Townland
<b>Location</b>	Unknown
<b>Summary</b>	Found in 1989. Worked timbers recovered, strake like with iron nails. Pieces of iron stamped with "...and sons West Bromich". Lid of pottery/china vessel also recovered.
<b>Record Source</b>	NMI TF IA171/1989

<b>Wreck No.</b>	W11716
<b>Vessel Name</b>	Unknown
<b>Place of Loss</b>	River Shannon, just north of the Yacht Club, Meehan Townland
<b>Location</b>	Unknown
<b>Summary</b>	One of two (W11717) log boats found just north of the Yacht Club in 1989. Located just north of wreck (W11715)
<b>Record Source</b>	NMI TF IA171/1989

<b>Wreck No.</b>	W11717
<b>Vessel Name</b>	Unknown
<b>Place of Loss</b>	River Shannon, just north of the Yacht Club, Meehan Townland
<b>Location</b>	Unknown
<b>Summary</b>	One of two (W11716) log boats found just north of the Yacht Club in 1989. Located just north of wreck (W11715)
<b>Record Source</b>	NMI TF IA171/1989

<b>Wreck No.</b>	W12894
<b>Vessel Name</b>	Unknown
<b>Place of Loss</b>	River Shannon, Athlone
<b>Location</b>	Unknown
<b>Summary</b>	Four men went out fishing at Athlone. Boat capsized drowning all.
<b>Record Source</b>	F. J. Tuesday May 21 <sup>st</sup> – Saturday May 25 <sup>th</sup> 1765, pg. 299. "A few days since, four men going out fishing at Athlone, the boat overset, by which they were unfortunately drowned".

<b>Wreck No.</b>	W13129
<b>Vessel Name</b>	Friendship
<b>Place of Loss</b>	River Shannon
<b>Location</b>	Unknown
<b>Summary</b>	The Friendship, of Workington, from Limerick, reported on shore in the Shannon and full of water.

<b>Record Source</b>	Lloyd's List, No. 4144, Friday April 18, 1807. "The Friendship, of Workington, from Limerick, reported on shore in the Shannon and full of water".
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## **Appendix 12.5**

### *Underwater Assessment*

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**JULIANNA O'DONOGHUE**  
**ARCHAEOLOGICAL SERVICES**

**Title:** Underwater Archaeological Impact Assessment  
River Shannon Crossing: Athlone, Co.  
Westmeath.  
Dublin to Galway Cycleway.

**Client:** Westmeath County Council

**Written by:** Julianna O'Donoghue and Laurence Dunne

**Date:** January 2017

**Licence Nos.:** 16D0078 & 16R0213

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## 1. Introduction

This underwater archaeological impact assessment (UAIA) report should be read as an addendum to the Cultural Heritage Chapter 12 of an Environmental Impact Statement (EIS) undertaken by CRDS Ltd with regard to a proposal to construct a 3.0m wide bridge for pedestrians and cyclists across the Shannon River at Athlone Co. Westmeath by Westmeath County Council as a component of the national cycleway currently being developed between Galway and Dublin. The section of the cycleway between Mullingar and Garrycastle on the eastern outskirts of Athlone is known as the Old Rail Trail that follows the route of the disused Midland Great Western Railway. A Part 8 Planning application is approved for the section between the eastern outskirts of Athlone to the Marina on the eastern banks of the River Shannon in the centre of Athlone town.

## 2. Scope of Report

A licensed archaeological dive survey with regard to this UAIA were carried out at the location of the proposed bridge crossing, to the north of and incorporating part of the existing marina (Figs. 1-2).



Figure 1: Site location map.

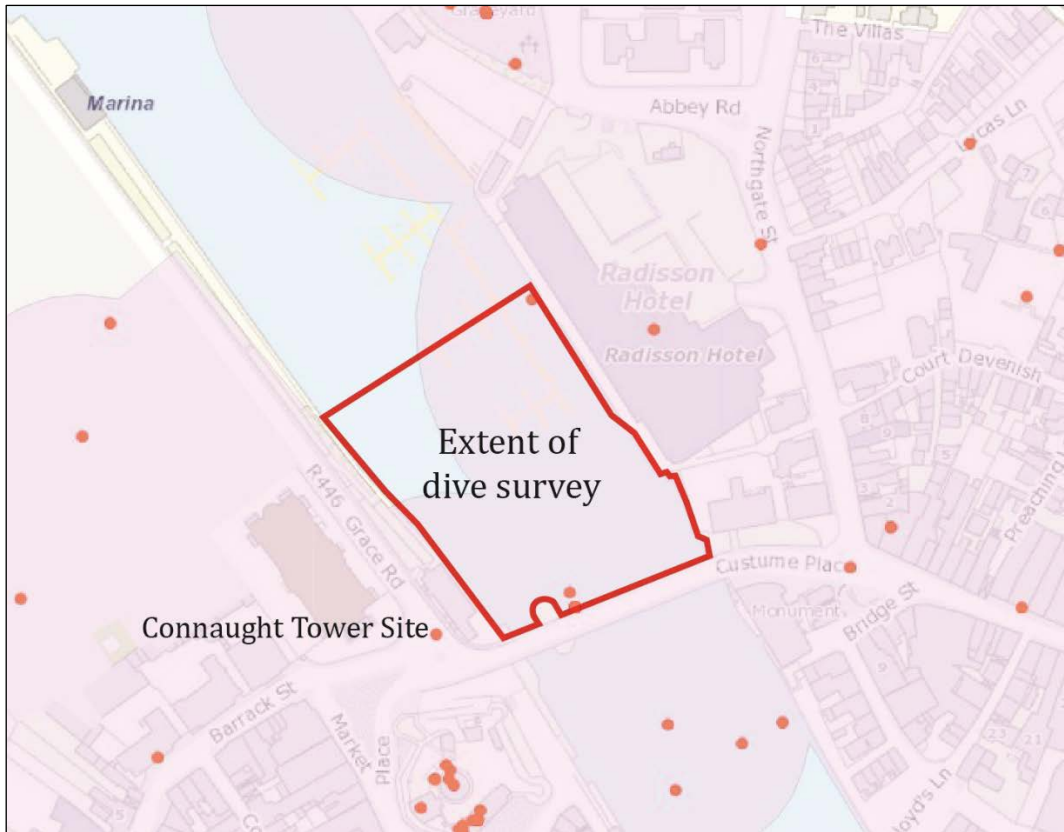


Figure 2: Survey area of the River Shannon overlain on the zones of notification associated with the Sites and Monuments Records of the National Monuments Service, [www.archaeology.ie](http://www.archaeology.ie).

### 3. Research

The terrestrial archaeology has been dealt with in Chapter 12 of the EIS and in that context for brevity sake, avoidance of repetition and ease of reading this report liberally references it. However, many of the sources cited in Chapter 12 had to be re-examined in an underwater context. Of particular importance were the many publications on fishing and weirs by the eminent scholar Arthur Went without whose work much of the fascinating history of this now lost ancient eel fishing would have been lost (for a complete list of sources, see the References section below).

### 4. Location and Description

The location of the proposed bridge for the River Shannon Crossing in Athlone Town Centre is approximately 75m (measured at mid-channel) north of the existing Costume Bridge.

The proposed bridge structure comprises a two-span bridge with a pier in the middle of the river and end supports on the river bank. The spans are approximately equal in length, of approximately 52m each, with a total overall length of the main bridge of approximately 104m.

## 5. Proposed Development

### 5.1 General

The proposed development includes the following:

- Widening of the existing promenade/boardwalk over the River Shannon to the east of the Luan Gallery.
- Construction of an extensive ramp layout linking the riverside promenade to the footpath on the east side of Grace Road.
- Modifications to the existing riverside promenade for approximately 60m north of the Luan Gallery and widening of the promenade into the river by up to 3.5m.
- Construction of a new bridge over the river between the Luan Gallery and the Radisson Hotel for the exclusive use of pedestrians and cyclists, consisting a two-span bridge which includes a central pier at the midpoint of the river.
- Modifications to the roof of the service area to the Luan Gallery to accommodate the west landing area of the new bridge.
- Temporary removal of a number of berths of the Athlone Marina to facilitate construction of the new bridge.
- Construction of a landing area at the east side of the bridge to tie in to the existing terrace of the Radisson Hotel.
- Construction of a new ramp on the line of the existing riverside promenade on the west side of the Radisson Hotel in order to provide mobility access north from the east landing area to the existing promenade, close to Marina Lane.
- Construction of stairs on the line of the existing riverside promenade to the south side of the east landing area to the existing promenade in order to provide mobility access south of Methodist Church Lane.



Plate 1: View from south within the survey area of east side of river including the Radisson Hotel and part of the Marina.

## 5.2 Bridge Pier, End Supports and Access Ramps

**River Pier:** A reinforced concrete pier on piled supports is proposed in the middle of the river. The pier is proposed to be elliptically-shaped on plan, orientated with the long dimensions parallel to the flow of the river. It represents an obstruction to flow of approximately 2m wide.

**Western End Support and Access Ramp:** The western end support is proposed to be off the Luan Gallery structure. This will involve alterations and perhaps underpinning of the Gallery structure. The walls for the proposed ramp will be reinforced concrete construction to match the existing finishes on the Luan Gallery. They are expected to be supported on spread foundations, subject to detailed site investigations. In order to deliver full segregation from traffic, it is necessary to provide ramped access alongside Grace Road to get down to the existing promenade level. In addition, it is proposed to enhance access to the Castle to the south along the river by extending the existing boardwalk along the side of the Luan Gallery.

**Eastern End Support and Access Ramp:** the eastern access ramp is necessary to provide access to the existing river bank promenade from the bridge that will give the necessary connection for the cycleway route via Marina Lane to Abbey Road and on eastwards. The planned alignment is dictated by the availability of space fronting the existing

Radisson Hotel. There is also a requirement to address a link to walkway level southeast of the proposed bridge towards the town centre at Northgate Street. It is proposed that the ramp will be supported on a light steelwork lattice structure on discrete spread or piled foundations dependent on the ground conditions encountered. The eastern abutment is proposed in piled reinforced concrete construction and will be located on the existing river bank. The abutment will support the proposed cantilevered promenade under the bridge which facilitates continuity of the eastern promenade to the south. The eastern end support is on a dedicated full height abutment which provides a landing for the main crossing and the eastern approach ramp.



Plate 2: View of west side of river / survey area with Catholic Church in background.

### 5.3 Foundations

From the historic borehole records available for the site it is evident that soft clays and silts are present at the site to a depth of between 7m and 14m. These overlay sands and gravels with boulders. The underlying rock is mudstone.

**Eastern End Support:** The Eastern support for the bridge will be of piled construction.

**Eastern Ramp Supports:** These are likely to be supported on spread foundations and/or discrete piles of small cross-section located under trestle columns.

**Western End Support:** The primary structural loads will be taken to ground at the Luan Gallery and the structure is likely to require strengthening and possibly underpinning.

**Western Ramp Supports:** These are likely to be supported on traditional reinforced concrete foundations on piles.

**Cantilevered Boardwalks:** The proposed boardwalks are likely to require small diameter piles along the river bank to support the structure above.



Central Pier: It is anticipated that the central pier will be supported on a rectangular pilecap of 4 x piles. A temporary coffer dam is likely to be needed to facilitate construction of the pilecap.

## 5.4 Stages

### 5.4.1 Stage 1

Decommission the southernmost berths of the marina

### 5.4.2 Stage 2

Construct a sheet piled cofferdam around the proposed river pier to accommodate construction. This cofferdam is likely to occupy a width of approximately 5m of the river and will extend for approximately 7m along the river.

The deposits excavated from the river bed within the area enclosed by the coffer dam will be removed to the Scheme compound for archaeological processing. Following processing, the residue spoil will be managed in accordance with the Waste Management Acts 1996-2013.

Carry out piling works for the pier in the river, at the east abutment and along the existing promenades and proposed ramps. The pier and abutment piling will comprise 750mm diameter steel tubular piles driven into the river bed. The promenade piles will be 355mm H-section steel piles. This activity is likely to be carried out from a barge in the river.

Install bridge protection adjacent to navigation channel.

### 5.4.3 Stage 3

Carry out underpinning and refurbishment works to Luan Gallery. Excavate boardwalk and ramp foundations, west bank Stage 4. Excavate boardwalk and ramp foundations, east bank



Plate 3: View north towards Railway Bridge with Marina in foreground.

## 6. Cultural context

Athlone- *Áth Luain*- is generally accepted as meaning the Ford of Luan son of Lugaid. It is also translated as the ford of brightness (Ó Riain, Ó Murchadha, Murray 2003,140-1). There are multiple entries for Athlone in annalistic sources with eleven references in the Annals of the Four Masters (AFM) alone. The earliest reference is recorded in the Annals of Innisfallen (AI) for the year 998 where it records that Brian Bóroma (Boru) took the hostages of Connacht in one week and handed them over to Mael Sechnaill at Athlone (MacAirt 1988, 173 & 513).

The ford is a recorded monument MW0029-042054 within the context of the historic town of Athlone WM029-042. Fording points were important aspects of routeways in ancient times. Knowledge of the locations of crossing / fording points in rivers was vital throughout all cultural periods. Often fords were the focus of ambush as unwary travellers were more vulnerable whilst crossing and therefore more susceptible to attack. The recovery of many high-status artefacts from fording points at several locations in Ireland may indicate some form of propitiatory, sacral offering to the goddess. The importance of the fording point at Athlone should not be underestimated, indeed it and Killaloe could be accepted as the paradigm examples on the Shannon.

## 6.1 Prehistory

At present the earliest settlement evidence from the study area, thus far recorded, dates from the Neolithic period (4,000-2,400BC). This is manifest in a megalithic context by a Portal-tomb in the townland Mihanboy *c.*5.4km to the west on the Roscommon side of Athlone (Murtagh 1994, 1; Chapter 12, 14/4; [www.archaeology.ie](http://www.archaeology.ie)). In an artefactual context, the Neolithic period is represented by at least seventeen stone axes recovered from the Shannon during arterial drainage works in the 1840's (ibid).

A large significant assemblage of Bronze Age weaponry and other artefacts as well as a smaller collection of Iron Age artefacts have been found in the river at Athlone. There are at least fifty-four records of artefacts recovered from the River Shannon at Athlone. Many were found during the dredging works in the 19<sup>th</sup> century. In August 1847 one of the buckets in dredger 'C' brought up a leaf-shaped Halstatt Class iron sword. The recovery was made above the new bridge (Custume Bridge) in Athlone (Coffey 1906-7, 42). Although the river has been dredged, significant artefacts from the Bronze Age etc. are still being found. Between 1920 and 2010 at least twenty-five finds have been recovered from the river at Athlone (EIS Chapter 12, Appendix 12.2). This is possibly best exemplified by the discovery in 1982 of an 8<sup>th</sup> century BC bronze shield by Louis Fleming, a member of the Athlone Scuba Club (Raftery 1982; Figs. 3-4). Recent non-metal finds from the river at Athlone include two wooden vessels containing bog-butter in 2007 and human and animal remains in 1992.

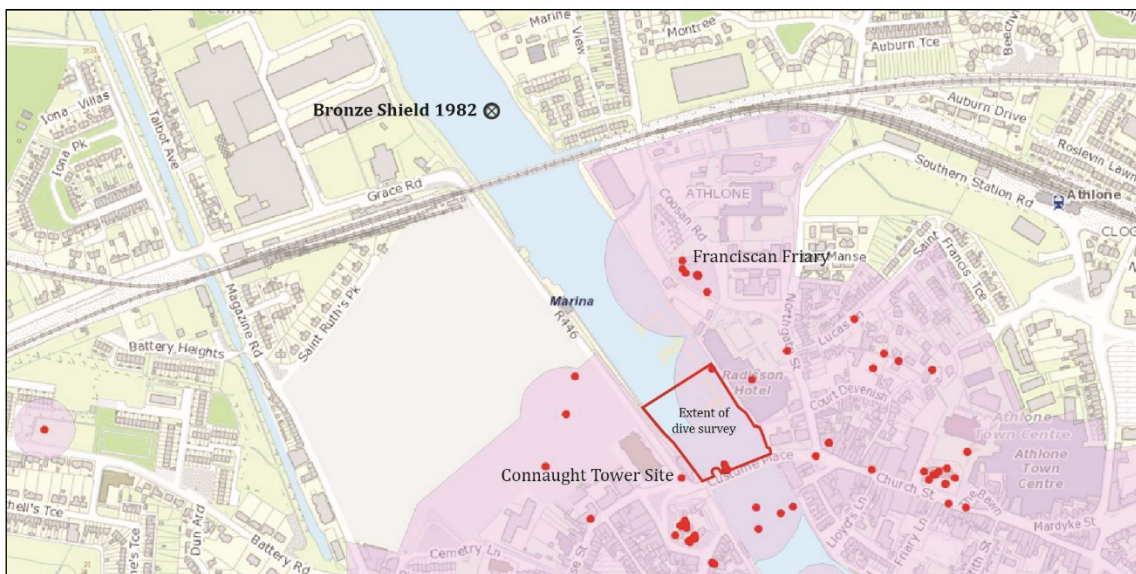


Figure 3: Find location of Bronze Age shield in Shannon at Athlone in 1982.

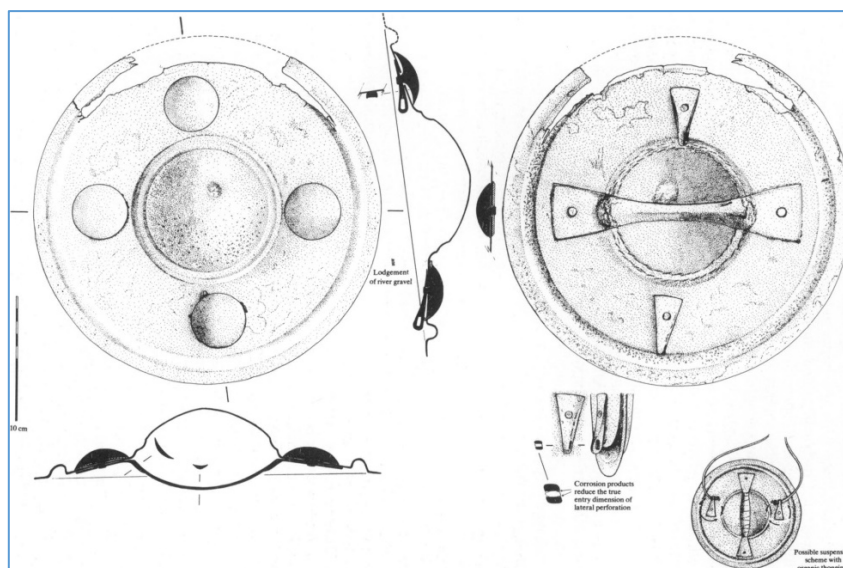


Figure 4: Illustration of Late Bronze Age shield recovered from Shannon at Athlone in 1982 (Raftery 1982).

## 7. History of Athlone

### 7.1 Early Medieval period

The River Shannon was the most important communication channel in the medieval period. Politically in the midland region the Shannon formed the geographic frontier between the kingdoms of Connaught and Meath. Here on either side of the Shannon near Lanesborough (Áth Liag) and south of Athlone and indeed on both sides of the River Suck broad callows extend some of which are up to 1.6km wide. In winter these callows become inundated and then slowly dry out during summer. These callows have made the wide River Shannon much more difficult to ford or bridge (Doran 2004, 63).

From c.AD800 the immediate territory on the east side of Athlone was occupied by the *Bregmuine* from whom the barony of Brawny is derived. On the opposite western side of Athlone the area was occupied by the *Delbna Nuadat* a subservient sept of the Uí Maine of south Connaught. Frequent raiding incursions were undertaken into Meath using the fording point at Athlone. The Annals of the Four Masters (AFM) record that in AD894 a battle was fought at Athlone with defeat inflicted on the Connaughtmen by the men of Westmeath who left behind them 'a slaughter of heads' (AFM Vol.1, 553). Furthermore, the navigable Shannon was a main artery for raiding into Connaught and Meath from the south by the kings of Munster and by the Viking incursions. The discovery of a Viking hoard in 1802 on Hare Island immediately north of Athlone in Lough Ree bears testament to this. Certainly, there is some level of Viking integration in the native population as the chief of the Muintir Maelsinna in the kingdom of Tethba north-east of Athlone on the shore of Lough Ree was Imhar mac Gilla Ultain, a name of Danish origin. Three other families with Danish pedigrees were recorded along the south-east shores of the lake in 1845 (Dobbs 1942, 138).

The importance of Athlone as a crossing point of the Shannon is attested to in a documentary sense by the frequent references in various annals. The Annals of Ulster (AU) for the year AD1000 record that a *tochar* or causeway was built across the Shannon at Athlone (AU 1000; Orpen 1907, 258). The construction of the *tochar* at Athlone by the

Connaughtmen may have had a dual function in aiding attacks into Meath and at the same time checking or preventing incursions up the Shannon from the Munster naval fleets. In 1087 Brian Borumha (Boru) surrendered his fleet at Athlone-an event that marked the ascendancy of the Ua Conchubair (O'Connor dynasty) of Connaught.

## 7.2 High Medieval period

Toirdealbhach Ua Conchubair (Turlough O'Connor) reigned as King of Connaught between c.1114-1156. In 1120 Turlough built three strategic bridges (*trí prímhdrochaid*) at Athlone, Áth Chroich near Shannon Harbour and Dún Leodha (Dunloe) on the River Suck at Ballinasloe (AFM Vol. 2, 1011; Ó Cróinín 1995, 282). Turlough built a wicker bridge-*cliath-dhroichet* and a *caislén* to protect Athlone in 1129 and may also have maintained his own fleet on the Shannon, testament to the importance of Athlone (Dobbs 1942, 140-1; Graham 1988, 20). In a pre-Norman context *caislén* most likely refers to a wooden fortress, similar to a motte or other fortification as stone castles as such were not known in Ireland in the early 12<sup>th</sup> century. Evidence of its wooden construction is recorded in the annals when the *caislén* was hit by lightning two years later and burned to the ground (AFM). An earlier *caislén* was constructed by O'Connor at Dún Leodha in 1124 (ibid Vol.2 1021). That Turlough O'Connor had a great fleet on the Shannon is attested to by several annalistic references including 1124 when he brought the fleet as far south as Foynes to attack Uí Conaill (ibid). A reference in the AFM to the *longphoirt* at Athlone in 1157 may refer to the maintaining of his fleet there.

Several more bridges and fortresses were constructed in Athlone by Turlough and his son Rory. Annalistic records show that at least five wicker-bridges were constructed between 1120 and 1159 for the purpose of raiding into Meath. These bridges were rapidly destroyed by the kings of Meath. Ultimately, it would appear that some form of frontier proto-urban medieval settlement was in place at Athlone possibly somewhat similar to that at Kincora at Killaloe but without a Viking element. The establishment of the only Cluniac priory of SS Peter and Paul in Athlone, possibly by Turlough O'Connor c.1150, may also add weight to the importance of this proto-urban settlement (Graham 1988, 22). Conflict with his northern neighbours was also prevalent with the rise of Muircertach Mac Loughlin, king of the Cenél Eoghain and internally with the defect and ultimately bitter warfare with the O'Rourkes. As Turlough was retreating from an attack by O'Rourke during which his fleet was burnt, he narrowly escaped death when the wicker bridge at Athlone, that had been deliberately sabotaged, collapsed under the weight of his retreating forces (Ó Cróinín 1995, 284). In 1147 the men of Tethba defeated O'Connor's son (Rory) at Athlone and again the following year but were slaughtered (Dobbs 1942, 143). In 1153 the wicker bridge (*cliathdroichit*) and fortress (*daingin*) at Athlone was destroyed by Maelseachlainn, son of Murchadh, King of Meath. However, O'Connor responded by building another at Áth Liag (Lanesboro), (AFM Vol. 2, 1109; Dobbs 1942, 144). Two years later Turlough O'Connor returned with a fleet and re-built the wicker bridge, however the bridge was almost immediately destroyed by Donnchadh Ua Macleachlainn, (Donnagh Mac Loughlin) King of Meath (ibid 1117). Rory son of Turlough O'Connor built a wicker bridge at Athlone in 1159 and a battle ensued there with Donnchadh Ua Maeleachlainn, King of Meath during which Rory's son Aedh was fatally wounded and died after a week (AFM Vol. 2, 1133).

### 7.3 Arrival of the Anglo/Normans

The first Anglo/Normans (Cambro /Normans) arrived in Wexford in 1168. Their forces were active west of the Shannon by 1177 with activity also recorded on Lough Ree in 1194 by which time Rory O'Connor had been deposed in 1183 and died in Cong in 1198. In 1195 his son Cathal Crobderg levelled all the Norman castles in Munster. In 1199 he burnt the Anglo/Norman bawn at Athlone. This destruction is the first real evidence that a permanent urban settlement had been established at Athlone (Graham 1988, 22). Speculative grants were made to the Anglo/Norman settlers west of the Shannon by Henry II but to little effect.

Cathal Crobderg regained Crown control of Connaught after the Peace of Athlone in 1215. However, following his death in 1224, twelve years of warfare erupted (ibid 23). Between 1210-1213, during the reign of King John, the Irish Justiciar and Bishop of Norwich John de Gray built a bridge of stone at the ford at Athlone and also commenced construction of the current stone castle on the west bank (Langrishe 1890, 278; Hayward 1989, 111). During construction one of the towers in the outworks collapsed and killed Richard Tuite his most important baron. Tuite's, chaplain and seven other Englishmen were also killed. The selected castle site at Athlone, including riverine meadow and eel fishery, was owned by the Cluniac Priory who were compensated by the Crown. Richard de Burgh was granted Connaught in 1227 and established by 1235. The king retained five cantreds around Athlone that were in turn ruled by the O'Connors *in capite* as feudal tenants of Henry. Later this castle was strengthened and added. With the construction of stone castles at Roscommon and Rindown the King's cantreds were secured as were the crossing into Connaught, traffic on the river and the base of power to consolidate royal patronage. By the 1230's the town of Athlone extended on both sides of the river and by 1251 a murage grant was in place and walls built. The town of Athlone prospered during the thirteenth century that included the establishment of an eight-day fair, two water-mills, boat building, important eel fishery and the foundation of the Franciscan Friary of St. Mary c.1241 principally founded by Charles de Burgo (Conlan1988, 107).

The development of Athlone was not done without a price as records show that it was burnt by the O'Connor's on at least six occasions between 1218 and 1315 who, in a reversal of roles, now sought to prevent a bridgehead being established there by the English. Following one attack in 1272 the bridge was in poor repair. In 1279, Edward I granted to St. Peter's Abbey the weirs and fisheries of Athlone and also the tolls of the bridge (Wilde 1869, 326).

The bridge at Athlone was in poor repair since the attack in 1272 and eventually replaced in 1306. This second bridge was short lived as a ferry is recorded in 1314 after which there is no record of a bridge at Athlone until the sixteenth century. In 1348 the King granted Thomas Talbot the custody of the castle of Athlone and the fishery of Lough Ree. After 1350 the Crown had lost its cantreds on the west of Athlone including the castles of Roscommon and Rindown while the O'Breens controlled Brawny on the east side. In 1381 the castle of Athlone was taken by Sir Edmond Mortimer (AFM Vol. 3, 683) and eight years later the castle was given to Richard D'Alton. The Franciscan Friary was maliciously damaged by fire in 1398 (Conlan 1988, 107).

There are virtually no records about Athlone in the fifteenth century. In 1495 it was enacted that only an Englishman should be entrusted with the constableness of Athlone castle (Irish Penny Magazine, 1933, 90).

#### 7.4 16<sup>th</sup> Century

In June 1537, the castle of Athlone was taken by the English and possibly is the earliest use of ordnance in its capture as the account in the Carew Mss records that their only piece of ordnance was broken in the taking of the castle (Carew Mss, Vol 1, 124). Around 1549 the bridge at Athlone was swept away to be replaced in 1566 by a bridge built by Sir Henry Sidney and designed by architect the Rev. Sir Peter Lewys who was also chanter of Christ Church in Dublin (Wilde 1869, 326; Coyne & Bartlett, 2003, 367). Sidney also built bridges at Ballinasloe, Carlow and Islandbridge. The event was also recorded in the Annals of the Four Masters for the year 1567. Sidney's bridge building was entirely undertaken for strategic military purposes and funded by the war treasury (O'Keefe & Simington 2016, 17). Sidney's bridge at Athlone was a vast improvement to the '...wretched temporary structure which had preceded it' (Stokes 1890, 200). The bridge revived the economy of the town as east-west traffic increased. Corn mills were built and markets established on both sides of the river and renewed emphasis on the eel fishery and an increasing number of merchants (Murtagh 1994, 2). The mills at the bridge of Athlone were granted to the Jones family who held them until the mills and bridge were removed in the 1840's (Stokes 1890, 205).

In 1569 Athlone Castle became the residence of the Presidents of Connaught at which time the river above and below the town was patrolled by government galleys (Murtagh 1994, 2). During the Elizabethan period, there was a regular service of boats maintained on the river and lakes with Athlone at the centre. In the Calendar of State Papers for the period 1574-1585 there is a petition about boats from one Dudley Norton, servant of Mr. Waterhouse, who had charge of the Shannon Navy. The Archbishop of Tuam and Rowland de Burgh, Bishop of Clonfert, asked for a ship from Athlone to bring them from Clonfert to pay their respects to Sir Edward Fyton, President of Connaught (ibid).

#### 7.5 17<sup>th</sup> century

In 1599 Athlone was granted a charter and a second one in 1606 with Richard Fallon appointed sovereign. The charter included that the bridge tolls should be equally divided with half to go to the corporation to maintain the bridge and the other to construct a ditch and palisade fortification around the Connaught side of the town (ibid 204). In 1619 Athlone received a third charter authorising the rebuilding of houses on the Westmeath side with grants also on the Roscommon side awarded to several individuals of land and weirs including Baraby Coman, Jane Coman and John Walpole. John Awbrey was granted the weir of Carrahenry. One grantee was Phillip Elder who was a fisherman (ibid). By 1620 the population of Athlone was around 1,300 comprising an ethnic mix of Old and New English, Gaelic Irish and Welsh, the majority of which were Catholics (Murtagh 1994, 2).

The medieval walls of Athlone had decayed by the sixteenth century. Stone bastions were added by Cromwellian engineers who also fortified the west section of Athlone with an earthen rampart. These fortifications proved of little military value during the Confederate wars of the 1640's and subsequent Jacobite sieges of 1690 and 1691. Indeed, the greatest

defence proved to be the river itself (ibid). During the sieges the Williamite forces expended 12,000 cannon bullets, 600 bombs, almost 50 ton of powder and a great many tons of stones to make rubble of the west town several arches of the bridge and the castle (ibid 3)

In 1690 Athlone was listed as one of the top ten towns in Ireland.

### 7.6 18<sup>th</sup> Century

Amid the ruins of destruction, the first decade of the eighteenth century witnessed a revival of Athlone with the construction of a new military barracks and by 1709 Athlone was described as 'a handsome town'. By 1750 the population was estimated at c.2500 rising to c.4000 by 1800. In 1750 a new canal was cut on the west side of the river to alleviate congestion in the narrow point of the river within the town while a bank was also opened reflecting increase in commerce. However, the importance of Athlone faded in the second half of the 18<sup>th</sup> century and by 1798 it was not included in the first twenty-three towns in Ireland. The presidency estate was granted to the third earl of Ranelagh from whom it passed into the ownership of the Incorporated Society for the Promotion of Schools (Protestant) in Ireland. This society produced estate maps in 1784 that are a valuable cartographic source detailing the locations of properties that they claimed ownership of - basically most of the town (ibid).

### 7.7 19<sup>th</sup> Century

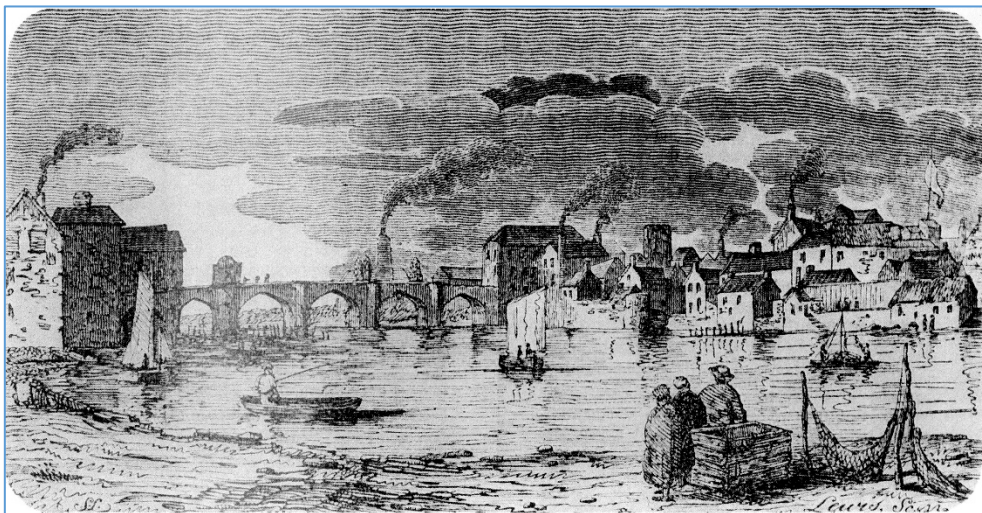
Although commercially Athlone had faded during the eighteenth century, the importance of the town militarily increased and new fortifications known as the 'Batteries' were constructed in 1803-05 on high ground at Kelly's Field, Rocky Hill and Gallows Hill, to the west of the town to guard against potential attack from Napoleon (ibid; McEnery 2006, 111). However, the full extent of the proposed military fortifications were never completed following the defeat of Napoleon in 1816.

In 1831 Colonel Burgoyne, Captain Mudge and Thomas Rhodes were commissioned to survey the waterway in Athlone and to prepare a report on how navigation could be improved (Delaney, 1930, 198). At this time three mills operated on the south elevation of the 16<sup>th</sup> century bridge. Jones's mill, at the east end of the bridge had sixty-one feet of frontage on the bridge, Steel's mill had a thirty-four feet frontage on an island near to the east end and Mullin's mill had a twenty-six feet frontage at the western end of the bridge (ibid, 200). The narrow sixteenth century bridge was unable to cope with traffic especially on market days and was condemned as '*not merely a discredit to the town alone, but a positive stigma upon the nation*' (Murtagh 1994, 4). The ten arch- bridge, the adjoining mills and the large number of weirs greatly impeded the flow the navigation through Athlone.





*Plate 4: The Elizabethan Bridge of Athlone (Aidan Heavey Public Library, Athlone).*



*Plate 5: View of the old Elizabethan bridge from the north. Sketch by Samuel Lover, R.H.A. published in the Irish Penny Magazine, March 23rd 1833, p.89.*

With the advent of steamboats in the 1830's greater speed and efficiency in trade was possible which provided the impetus for improvement and investment in the navigation of the river under the auspices of the Shannon Commissioners (Plate 6). The old canal was abandoned and the main river channel through the town opened for the first time. This involved the dredging of the river and the construction of quays, a dam, and a lock.

The old Elizabethan bridge was removed and replaced a little upstream by a wider bridge, Custume Bridge, while further downstream a large weir and a lock were installed.

Custume Bridge was constructed between 1841 and 1844. The average daily workforce on the navigation improvement works in Athlone during 1843 is recorded as four hundred and twelve (ibid, 201). Work on the lock commenced in 1845, and in 1848 it was reported that all of the masonry work had been completed but the deepening of the riverbed was not in an advanced state.

During the Summer of 1849 a temporary dam was erected across the river. In July of that year the *Westmeath Independent* reported that ‘nearly one thousand men were at work in the bed of the river which is completed dry and which as far the eye can reach is filled with workmen and horses, miners and engineers etc. (Delaney 1980, 203)’.

At least nineteen eel weirs were removed to clear the navigation channel as well as shoals and the remains of the old bridge (see below and Figs. 5-6).

However, the massive input into the establishing Athlone as a major inland port was severely impacted by the arrival of the Midland Great Western railway in 1851 and a second line opened by the Great Southern and Western railway in 1859 requiring the construction of a substantial iron rail-bridge. The arrival of the railways boosted economic growth particularly the construction of the Athlone Woollen Mills along the east riverbank that employed up to 400 people by the 1890’s.

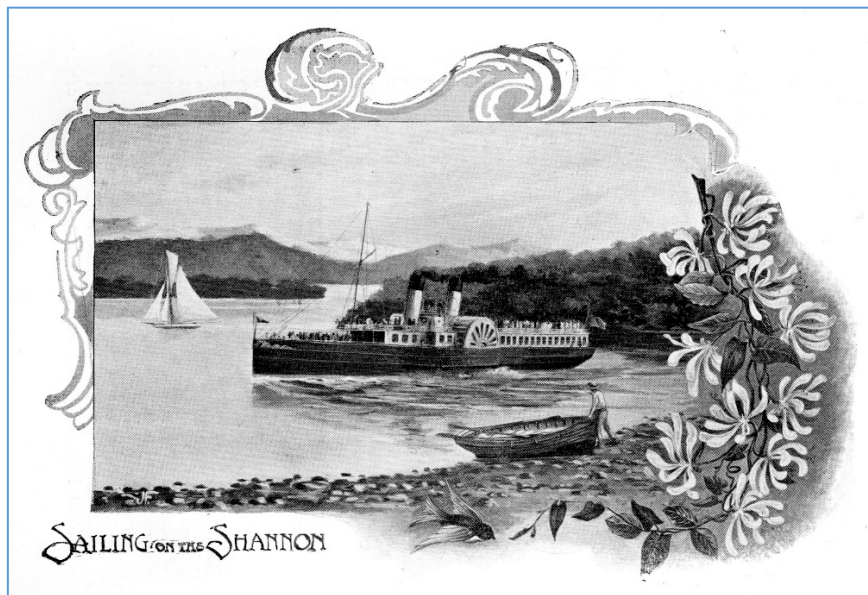


Plate 6: Paddle steamship on the Shannon, 1902.

## 8. Eels and eel weirs

The European eel (*Anguilla anguilla*) is one of the most widespread fish in the rivers lakes, estuaries, coasts and littoral zones of Ireland and Europe. Up to 1950 it was the third most common fish. The main population of Irish eels are to be found in lowland

lakes and rivers where they have been fished since the Mesolithic period (McCarthy 2014, 13; Woodman & Anderson 1999, 89). Eels lay their eggs in the Sargasso Sea south-east of Bermuda and their distinct flat larvae, *Leptocaphali*, drift on or just below the surface eastwards for about three years after which they become elvers, also known as glass eels, eel fry or bootlace eels (Plate 7). Elvers migrate into fresh waters and mature into silver eels over a period of between eight to fifteen years returning to the Sargasso Sea to spawn (Plate 8). Eels can be caught in large numbers in weirs during their migration when shoals move downriver towards the sea during high floods and moonless nights ‘*in the dark periods of the year, between the last quarter and the first quarter of the moon from September to December or into January when the strength of the moon is negligible*’ (Went 1950, 153-4; Kelly 1998, 295-6; Barker 1989, 196). It is interesting that the word for a moonless night is *éasca* in Irish and the Irish name for eels is *eascann*.

Eel bones have been recorded in several Mesolithic -Middle Stone Age (8000-4000BC) sites in Ireland from Mount Sandel in Co. Antrim to the tip of the Dingle Peninsula (Woodman 1978; Woodman & Anderson 1999, McCarthy 2014, 24).



Plate 7: Elver eels for sale on the international market-Wikipedia



Plate 8: Juvenile European eels migrating upstream.

## 8.1 Placenames

The word *eascann* is also found in several placenames i.e. Carricknanaskin-*Carraig na nEascann*-the rock of the eels, Annaghaskin, *Eanach Eascann*-the eel marsh and Loughanaskin, *Loch na nEascann*-the lake of eels (Kelly 1998, 295-6; McCarthy 2014, 14; www.logainm.ie).

Fish weirs are constructed from stones or stakes and wattling or a combination of the two materials. The two old Irish words for weir is '*corae*' and *aire* and *can* refer to both types of construction materials. *Cora* or *cora-eisc* fish-weir, means 'stone-wall' while *aire* simply means 'woven fence' (ibid 287). In later sources the word *sód* also refers to a weir. Weirs are often found associated with mills where fish can be channelled into the mill race and captured in an associated weir whereby an arrangement of wattling with a wicker basket is positioned in a gap to capture the fish. This basket was known as a *ces* in Irish (ibid 288). In a rather appalling reference, '*the Annals of Connacht record a slaughter in 1225 of the people of Cúl Ceardnadh by Aodh mac Cathail Chrobhdheirg and a band of Normans. Many of those fleeing were drowned at Ballycong, Co. Mayo and the baskets of the weir were full of drowned children*' (ibid).

*Cora* appears in many Irish placenames, one of the most notable is *Kincora*, *Cinn Cora*-the head of the weir at Killaloe. *Kincora* was the stronghold of the Dál Cais of which Brian Boromha (Boru) became the High King of Ireland in the 11<sup>th</sup> century. An early reference to the use of the word *cora* is recorded in a grant to Sir Henry ffolliott in 1622 where the names of two eel weirs on the River Erne are given, Corrymonagh and Corrybane (Went 1945, 216).

Several of the weirs in the Athlone area of the Shannon are derived from these words including Carrahenry, Carracormack, Carramore etc. (Went 1950, 149). Went (1945, 213) also recorded similar names on the River Erne, Corry Dermot, Corlea, CorryMcGinty, near Ballyshannon.

There are many places around Ireland with placenames associated with weirs. A selection of placenames from Cork include Ballinacurra, Castlecor (castle of the weir) and Midleton-*Mainistir na Corann* (monastery of the weir) in Cork. The nearby 12<sup>th</sup> century Cistercian foundation had fishing rights on the Owenacurra River (*Abhann na cora*), river of the weirs (ibid).

## 8.2 Medieval Weirs

There are several Old and Middle Irish medieval references in the annals, law tracts and lives of saints about, use construction and ownership of weirs and fish. The most important freshwater fish were salmon, trout, and eels (Kelly 1998, 285-290, 296). Early monastic foundations received much of their revenue from their fishing rights. (O'Sullivan 1994, 10-11). In Northern Europe animals were the only source of providing fatty supplement in the diet (cheese, butter milk or lard). As most of the population of Northern Europe was Christian, periods of fasting were a challenge during Lent and Advent and indeed during springtime when cupboards were bare. Eels along with salted herrings, mackerel, trout, and salmon provided the much need fat supplement to the

fasting Christian population, particularly eels which were more accessible to the peasant population.

With the arrival of the major monastic foundations and the establishment of large manors there was an increase in the construction of fish-weirs and fish-ponds as a valuable source of income but also because of Lent and other fish-only days. In 1216 the Prior of Athlone was paid 12marks in compensation for the loss of a meadow for the site of the King's castle at Athlone and fisheries (Went 1950, 146). Furthermore, in 1279 Edward 1 granted the abbey of St. Peter the weirs and fisheries at Athlone (ibid). The income from the weirs and fisheries at Athlone were substantial in the late thirteenth century with over £24 returned to the crown from the meadow, pool, and fisheries there. The rent of pools and pontage (bridge upkeep) by the prior at Athlone is given as £15 6s 8d in a Roll receipt for the Michaelmas term in 1284 (ibid). In 1290 Gilbert monk of Athlone issued a receipt for 40s in silver for the losses that they incurred over the previous three years due to the construction of the King's mills there (ibid). Weirs were often associated with watermills as the millrace often proved a convenient place to catch them. The Luttrell Psalter, which dates back to about 1330, includes an image of an eel trap, (known as a 'bucke') in Lincolnshire beside a mill (Plate 9). There were at least three mills on the old bridge in Athlone.



Plate 9: Mill with eel 'buckles from the 'The Luttrell Psalter, in the British Museum, Add MS 42130 fol. 181r.

A further receipt for Thursday the 30<sup>th</sup> July 1293 records that Thomas de Pykering received £4 16s for 3600 eels sold at Athlone. In 1344 the King rented the weir and fishery at Athlone to Henry Dillon for £10 per annum (ibid).

The importance of eels both as a valuable commodity and as a food resource should not be underestimated. Eel weirs were almost as valuable as salmon weirs with Galway and Athlone two of the principal suppliers. In 1283 they were valued in Galway at £10 and £11 respectively (O'Neill 1987, 41). During the severe winter of 1338 the River Liffey froze over and people played games and made a fire with timber and turf on which they roasted eels. Fish merchants regularly brought eels from Athlone to Dublin. In an interesting, somewhat anecdotal account known as *maidhm-an-eisg*-the defeat of the fish,

in McFiris's Annals and the AFM for the year 1452, merchants accompanied by Lysagh Fitzross and some local Irish were coming from Athlone via Athboy and Trim when they were attacked by Fearghal Óg MácEochagáin that *'no man living shall give account of the multitude of eels that were lost'* (ibid 41-2; AFM Vol. 4, 986). Fisheries and fishing-rights were jealously guarded. In 1389-90, Walter de Bermingham, Lord of Athenry, complained that certain Irishmen from Connaught were poaching in his waters (ibid 43).

Prices for eels in the UK between 1450 -1499 show that fat silver eels on their way back to spawn in the Saragossa could fetch three times the price of salmon and double that of sturgeon.

In Athlone both abbeys, one on either side of the Shannon had fishing weirs. In 1570 after the dissolution of the abbeys the abbey weirs were leased to Andrew Breteton for thirty years. Eight years later another lease was made to Edmund O'Fallone, a merchant from Athlone, for a mill at Clonekill, two other mills above the bridge of Athlone, with a castle on the east end of the bridge, an eel weir of the late monastery of St. Peter of Athlone and sundry other lands and properties for twenty-one years for an annual rent of £2 4s 7d (Irish Penny Magazine 1833, 90). Details of a second lease to O'Fallone eight years later records that the 'President of Connaught having the house of Athlone in keeping shall two nights in each month have the use of the weir with O'Fallone supplying nets, boats, poles and other necessaries' (Went 1950, 147). The Fallons were the most important tribe in the Barony of Athlone. Covaghe O'Fallon resided in Milltown Castle near Athlone in 1585 and it was their family stronghold for centuries (Stokes 1890, 201).

The continued importance of the weirs at Athlone is further exemplified by a grant on the 17<sup>th</sup> June 1580 under letters issued to Edmund Waterhouse (appropriately named!) *'overseer and keeper of the river Shenan'* who was to survey the weirs of the river, to remove or destroy those impeding navigation. An exception was given to the weirs of the manor and abbeys of Athlone (ibid). A similar grant was issued eight years later in July 1588 with the same exceptions testifying to the importance of the weirs to the grantees. Arthur Went's seminal publication of 1950 (ibid) lists the entire grants of eel weirs in the Shannon for the year 1619. Interestingly the rents are mainly in the form of payment in kind e.g. two large eels at Easter and one at Michaelmas or six large eels at Easter and five at Michaelmas. Twenty-two weirs at Athlone were granted to thirteen persons the majority of whom appear to be not Irish. Went sees the payment dates of Easter and Michaelmas as odd as eels are generally scarce at these times of the year. However, by way of explanation he states that eels can be kept alive for long periods in special 'live-boxes' (ibid 149). The boxes were positioned on the river bed with holes in them to allow the water to run through and eels could be removed as required with a landing net (Went 1945, 221). It would appear that eels were largely supplying the home market as they rarely appear on the Bristol customs accounts (O'Neill 1987,43).

There is little or no information regarding the eel weirs at Athlone during the eighteenth century.

### 8.3 Athlone Weirs in the 19<sup>th</sup> Century

In 1832 the travel writer, artist, and explorer Isaac Weld records that the river at Athlone is deformed by numerous weirs constructed of wicker work and poles that project some feet above the water. Weld goes on to state that vast quantities of eels are taken in autumn

after the first winter floods that supply the Dublin market (Went 1950, 149). Also in 1832 Rhodes published a map of the shallows or shoal of the Shannon at Athlone. Rhodes map depicts several eel weirs and also records *'The Shoal at Athlone is of considerable extent both above and below the Bridge, and the River is almost choked with Eel Wears- it is proposed to increase the facility for discharging the flood waters here by a Wear to be constructed above the Bridge and to regulate the Shoal so as to give sufficient depth for the small craft to ply at all times-and it is proposed to erect a New Bridge a little above the present one as it is almost indispensable that the present one should be removed as speedily as possible'* (Rhodes 1832, Fig. 5).

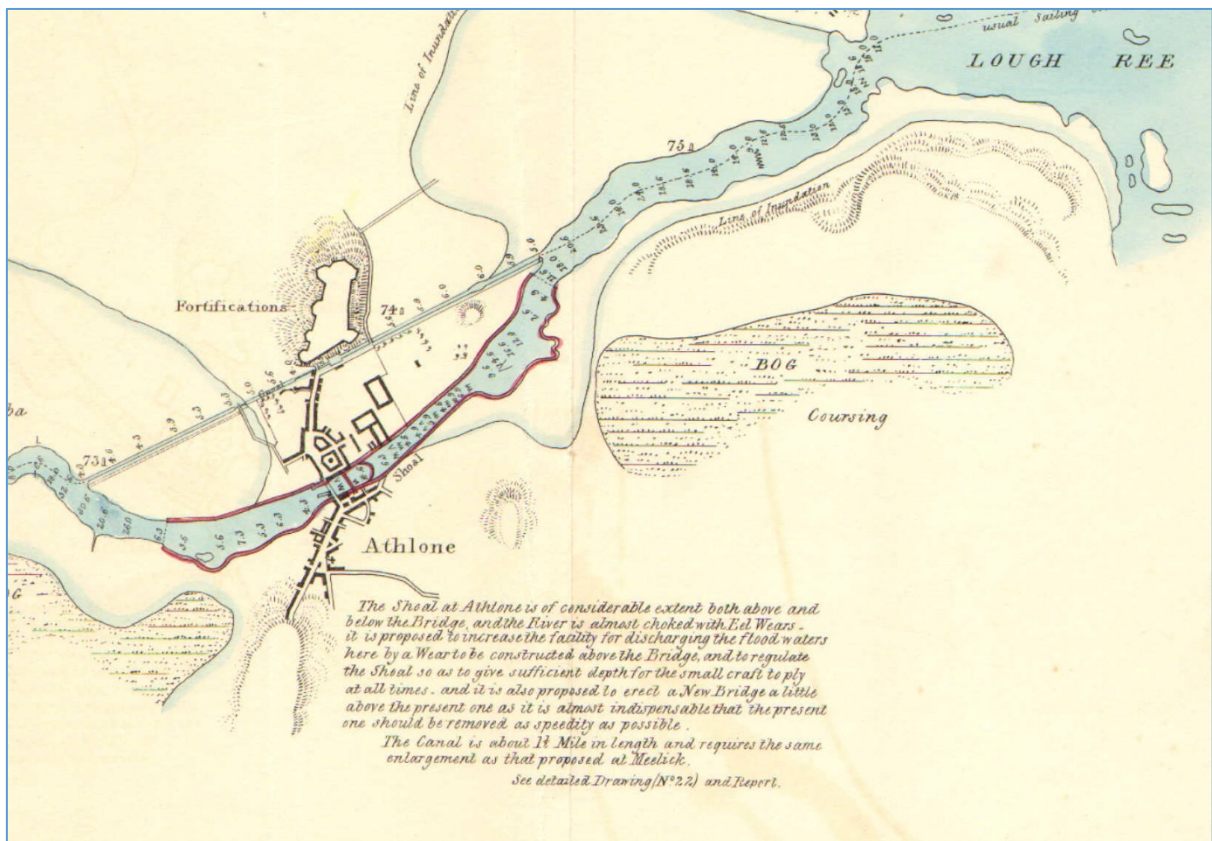


Figure 5: Rhodes 1832 Map of the Shoal at Athlone. Note the many eel weirs particularly in the narrows of the river in the town.

The Dublin Penny Journal has a wonderful account by another travel writer Terence O'Toole in June 1833 who records *'...when you wish to see the Shannon, you go through a narrow street, or rather lane, towards the bridge, which you find narrow and encumbered with mills and houses, besides sundry annoyances both moveable and immovable-but still if you can with any safety, amidst the rush of pigs, cars, and Connaught men, stand on this important bridge and observe the huge volume of the Shannon rushing rapidly and clearly under its arches-look upwards, and you will perceive how the stream bristles with staked eel-wears-and above them the cots of fishermen...'* (O'Toole 1833, 415)

The Shannon Navigation Act of 1835 resulted in the appointment of five Commissioners for the Improvement of navigation and drainage along the river. They produced a number of reports from 1836 onwards. Included in the works was the removal of most of the eel-weirs, which were seen as interrupting the free discharge of the waters, thereby creating flooding issues and also hampering navigation along the river.

Included in the reports are descriptions of each of the Athlone eel weirs and their associated land, acreage, property, and river frontage

The reports include census/listings of the eel-weirs to be removed, including the proprietors and tenant's leases and the amount of award to be paid in compensation for removal of weirs, if appropriate. Compensation was awarded to Thomas Gill for loss sustained by him consequent upon the removal of the whole of the eel weirs in this district. The Commissioners reports also list the ages of the eel weirs that range between c.1760 to 1835. Sir Ross Mahon was awarded £321 6s 8d for the loss of his eel weir in Roscommon that had been built in 1767.

The 1<sup>st</sup> Edition Ordnance Survey map of Athlone denotes a total of nineteen eel weirs from the old bridge as far as the northern limits of the townlands of Ranelagh and Athlone (Fig.6). This cartographic recording of the weirs demonstrates that the eel fishery was still very much in use up to 1837. In the same year the Commissioners stated: -*'The removal of eel weirs might be considered as depriving the country of a valuable source of food and useful industry, but there can be no doubt that other modes of fishing for this prolific article, which will not be injurious to the navigation or drainage, will be discovered and practised; and we ourselves are making researches for such as may be at present exercised in other countries in order to have them introduced immediately on removal of the existing weirs (ibid, 150).*



Figure 6: 1837 1<sup>st</sup> Ed. OS 6" map extract depicting several eel weirs in study area overlain by modern map of Athlone.



The Third Report of the Commissioners lists over thirty weirs in Athlone, the majority of which are named *viz*: Carrogar, Abbey Weirs, Lyrabeg, New Bridge Weirs, etc.

It is evident from the Commissioners reports that the weirs could be built either of stone or wood or a combination of both. Stone weirs are best suited locations where the riverbed is composed of bed-rock or gravels and wooden weirs where there were silt deposits in the riverbed. Near Lanesborough Bridge the Commissioners recorded eel weirs belonging to Mr. Bellew that were constructed of stone walls between 0.6m to 0.9m in thickness and height that extend across the full width of the river. The weirs were let for £4 per year. Financial accounts of the Commissioners include the purchase of steam dredging vessels and accompanying barges for carrying out all the improvement works, including the removal of the eel-weirs. The removal of the weirs appears to imply total removal as there are accounts of the dredging up of the stakes of wooden weirs. Also, there was probably a need for total removal, as there are further accounts of old eel-weirs being removed, only to be partly replaced by poachers for the following fishing season, with the Commissioners resorting to legal means to prevent re-occurrence

The Commissioners first annual report detailed the selection of the season when the eel fishing terminated as the most favourable for removal of the weirs and the dispossession of the owners.

The Commissioners second annual report of 1841 records expenditure of a large sum in payments for compensation, purchase of lands and the provision of steam dredging vessels and barges with contracts entered into for works at Athlone, Killaloe, Banagher, Meelick and Shannon Harbour. They also record the removal of obstructions in the river occasioned by the eel weirs. Furthermore, included are the terms by which some eel weirs were allowed to remain in the Shannon.

#### 8.4 Eel fishing

Historically eel weirs were generally constructed in a V-shaped plan with a gap at the point of the V directed downstream (Fig. 6). The weir generally comprises of a series of robust wooden poles, 100-125mm in diameter, driven into the riverbed and projecting above the surface by *c.* 1.2m. Wattle panels are attached to the poles from a canoe leaving a gap at the point of the V into which is attached a long conical net, 5.0m in length, known as a coghill net (Fig. 7). Elongated wicker baskets were also used as well as the nets. Local areas had different net adaptations to suit the particular local circumstances. The Athlone net had an internal valve or *false-tail* as the river is slow moving except during flood (Fig.7).

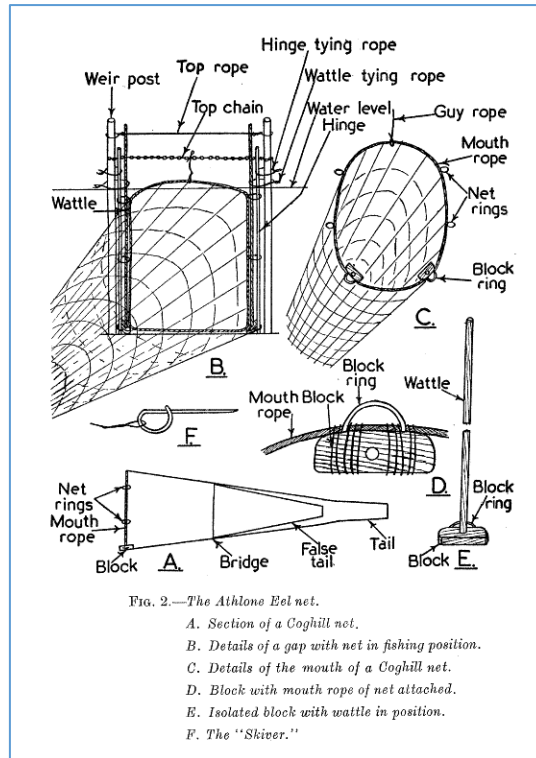


Figure 7: The Athlone coghill net (Went 1950, 153).

After the removal of the traditional weirs in 1844 a new type weir was developed that included a straight row of poles supported at intervals with steel girder uprights and a lattice superstructure that accommodated several coghill nets. This type of eel weir is depicted on the 2<sup>nd</sup> and 3<sup>rd</sup> Eds. of the OS map (Fig. 8) and on images published by Arthur Went in 1949 (Plates 11-13). This eel weir was in use up to the mid-twentieth century but has now disappeared.

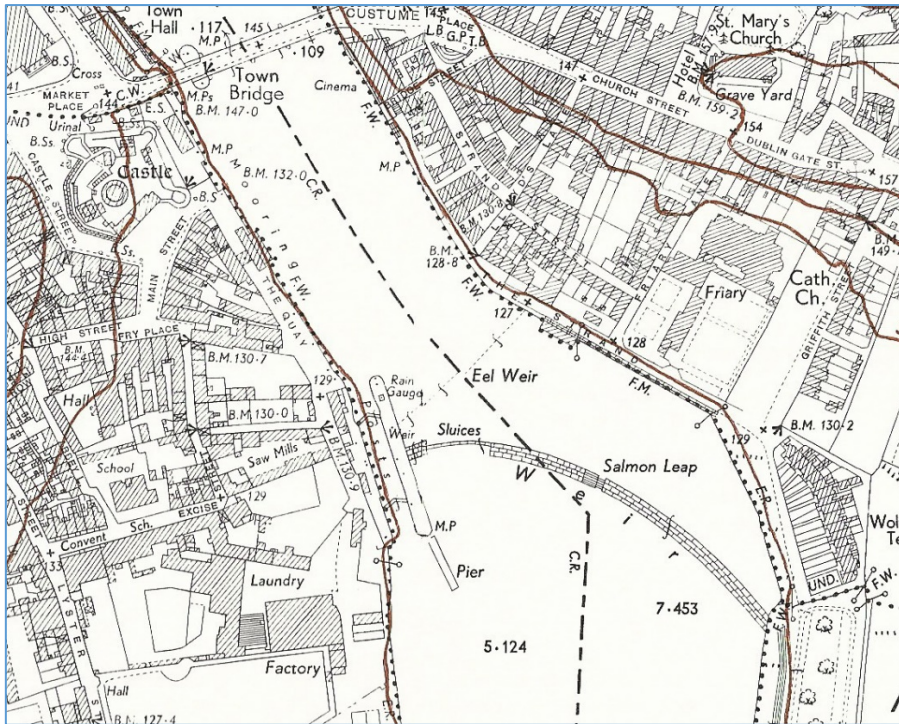


Figure 8: Athlone eel weir between The Quay and extending NE across the river to The Strand. (Extract from the OSI map 1952, 1:5000)



Plate 10: 'Eel weir at Athlone' by Paul Henry (1877-1958), courtesy of Gearoid O'Brien, Athlone Library.



*Plate 11: Athlone eel weir at from west looking towards The Strand (Went 1950).*



*Plate 12: Athlone eel weir from the eel tanks at The Strand view towards The Quay and Presbyterian Church (Went 1950)*



Plate 13: View south over eel weir (Went 1950).

Similar side by side eel weirs were known as *'buckles'* in the UK and are still in use in some areas (Plates 14-15).

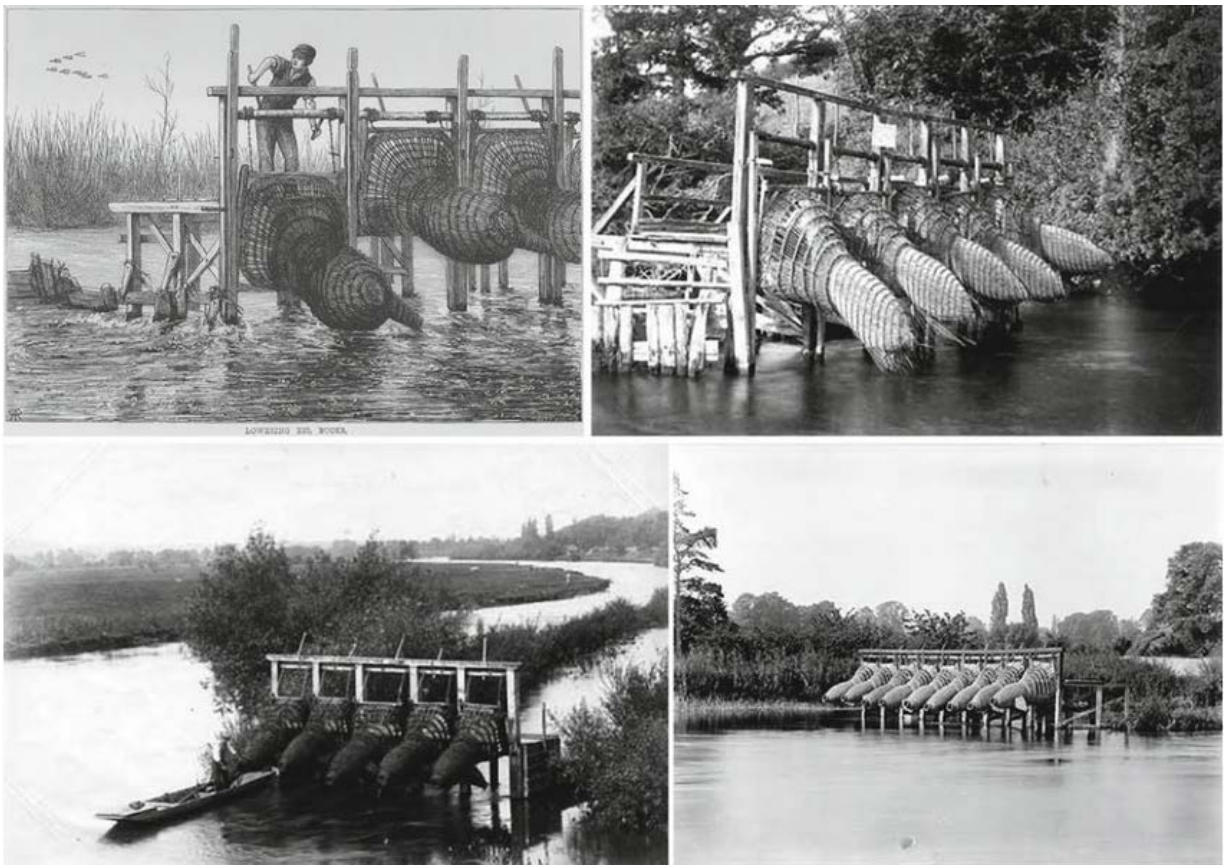


Plate 14: Eel weir *'buckles'* in UK.



Plate 15: Eel weir 'buckets' on the River Test in UK.

### 8.5 Eel traps

Eels were also captured in small elongated wicker baskets that were known as eel grigs in the UK and as *ces* by the Irish who also used hide covered coracles to take fish from the weirs and baskets. The term *seiche corad* is recorded in Triad 230 meaning weir-hide and refers to these craft. (Figs. 9-11).



Figure 9: Setting eel 'grigs' in UK.

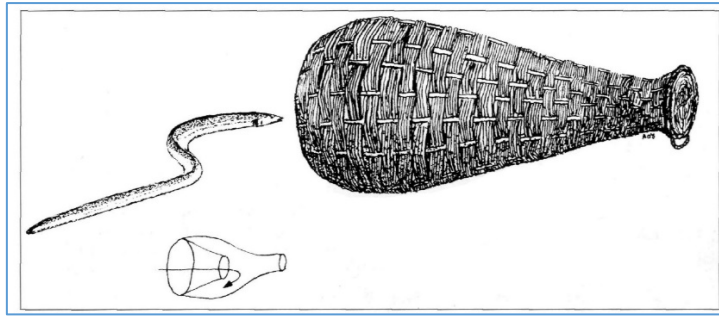


Figure 10: Modern wicker eel pot from Carrick-on-Suir (O'Sullivan 1994, 12)



Figure 11: Boyne River currach or coracle at Oldbridge, Co. Meath drawn by archaeologist William F. Wakeman in 1848 (extract from Wood-Martin 1886, 255).

## 8.6 Spearing eels

Eels were also fished using casting spears with barbed or serrated prongs or tines, sometimes with circular widenings at the back between the prongs where the eels could be withdrawn easily (Went 1952, 121) (Fig. 12). The ninth century Glosses of St. Gall gives the Irish term for a fishing spear as *gáe gona éisc*- a spear for killing fish (Kelly 1998, 290).

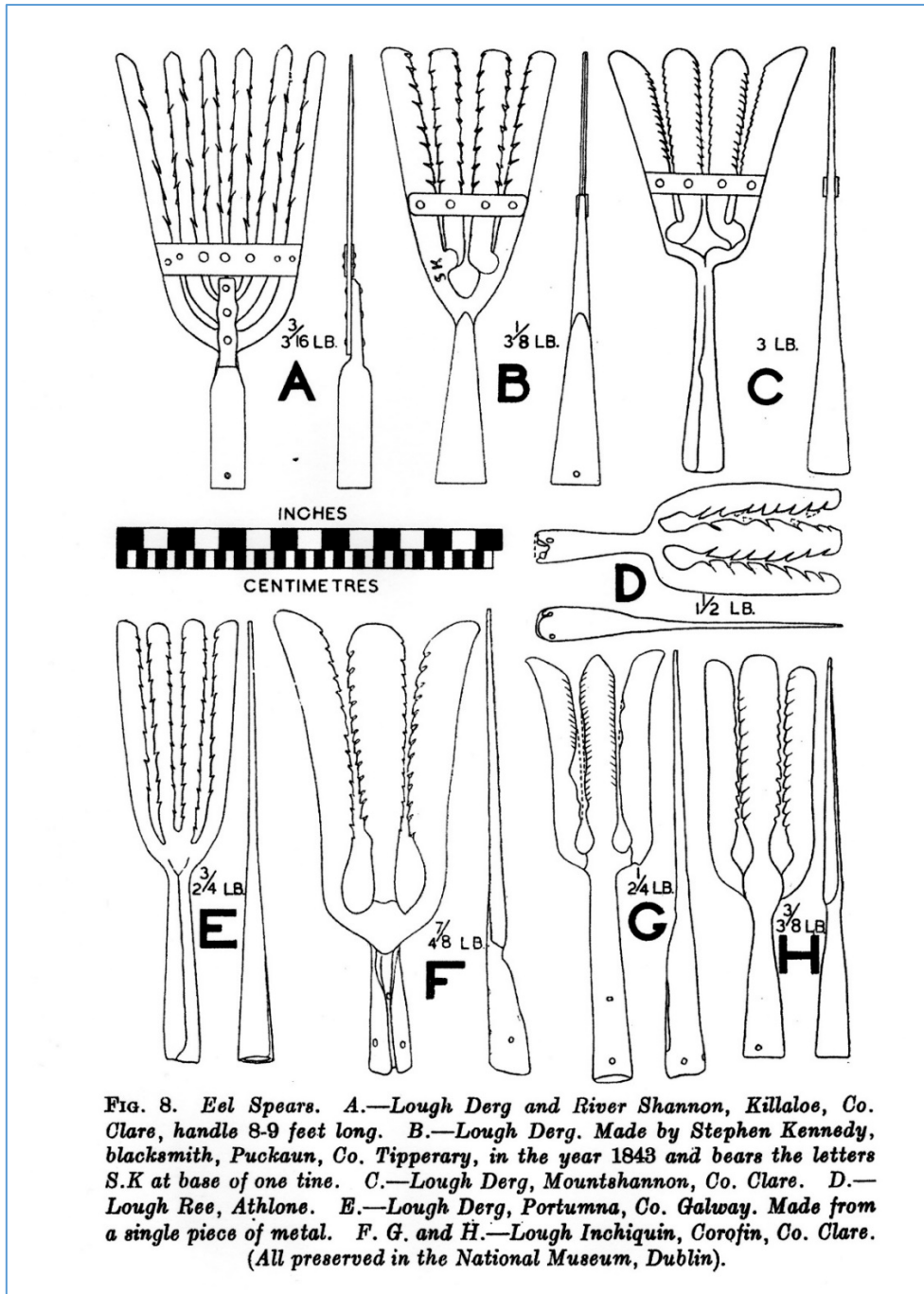


Figure 12: Eel spears in the National Museum of Ireland. Note 'D' from Lough Ree, Athlone (after Went 1952, 121)

Commercial eel fishing is still carried out with the largest fishery in Europe for wild eels situated in Lough Neagh. A successful co-operative, the Lough Neagh Fishermen's Society Ltd, has operated in Lough Neagh since 1971 (McCarthy 2014, 23).



## 9. Underwater Archaeological Dive Survey

### 9.1 General

The site survey area, encompasses c.11, 985sq.m across the entire width of the Shannon and extending for 75.0m downstream and 45.0m upstream of the proposed bridge construction area (Fig.2) The underwater archaeological survey team included an archaeological surveyor and a four-person dive team. All of the divers possess H.S.A. parts III and IV diving licenses and H.S.A Medical Certificates. The dive operations complied with the Health and Safety at Work (Diving Operations) Regulations 1981 SI 422. Diving was carried out using surface supplied equipment from a rigid inflatable boat (RIB). Identified features were plotted using a global navigation satellite system (GNSS) to <100mm accuracy.

The underwater survey was carried out in November 2016 following a period of dry weather. The water level was remarkably low (max 2.5m) due to a flood management plan implemented by Waterways Ireland involving the operation of the sluice gates at Athlone Weir, and the low rainfall in the preceding weeks. Weather conditions were generally dry and very cold. Underwater visibility was up to 4m.

### 9.2 Dive and Metal Detection Survey

The survey area was laned-off using lines weighted to the riverbed at 3.0m intervals and undertaken along 1.5m transects to ensure 100% coverage. An underwater Excalibur 800 metal detector with a high-resolution discriminator was utilized to metal detect the survey area of the riverbed.

### 9.3 Results

The riverbed consists of a stony layer overlying compact white clay. Much of the riverbed on the eastern extent of survey area was covered in a tar-like substance. A large quantity of modern debris was visible on the riverbed, particularly in areas close to the riverbanks. The modern debris included a damaged bicycle, car wheel hubs, glass, aluminum cans, plastic ducting, fishing rods, tattered fabrics, and a suitcase containing scissors.

No archaeological features, stratigraphy or artefacts were recorded on the footprint of the proposed bridge pier and coffer dam. The dive survey revealed that the wider study area contains the *in-situ* remains of several hundred wooden stakes protruding from the riverbed (Plates 16-17). At least two coherent lines or rows of stakes, c.6.0m and c. 10.0m in length, were recorded as well as a separate concentration (Fig. 13). The rounded poles or stakes are c.100mm in diameter and are clearly manifest protruding above the riverbed between c.50mm-150mm. Simple hand movement of the sandy sediment further revealed that many more stakes are present within the sediment.

Due to the number of the stakes present in the rows and in the concentration only the start and end point and centre point of the concentration were plotted. The rows of stakes

are very closely set in the riverbed, c.0.10m apart, sometimes contiguously and often slightly askew or paired. This arrangement possibly reflects repairs, replacement or reinforcement of the eel weirs. The two coherent rows of stakes were overlain on a number of historic maps but did not correspond to any of the eel weirs depicted (Fig. 13). This is hardly surprising given the congestion of eel weirs that were present in this area of the river in the 19<sup>th</sup> century alone. However, the orientation does support that the two lines of stakes represent the remains of weirs and not earlier wicker bridges. The third concentration of stakes represents a multiplicity of stakes that would require in-depth archaeological underwater recording to accurately plan. However, the author is of the opinion that this concentration also reflects the remains of eel weirs.

During the 19<sup>th</sup> century, efforts were made to remove eel weirs for the improvement of navigation, particularly in 1849 when a dam was installed across the river and the water diverted through the canal. The riverbed was also reduced at this time. However, the base of a stake, firmly embedded in the compact clay would not have posed an obstruction to navigation, and it is likely that only the protruding element of the stake was removed. Ultimately, the riverbed in the study area and doubtless beyond is studded with the remains of wooden eel weirs.



Plate 16: Close up of wooden stake protruding from riverbed in study area.

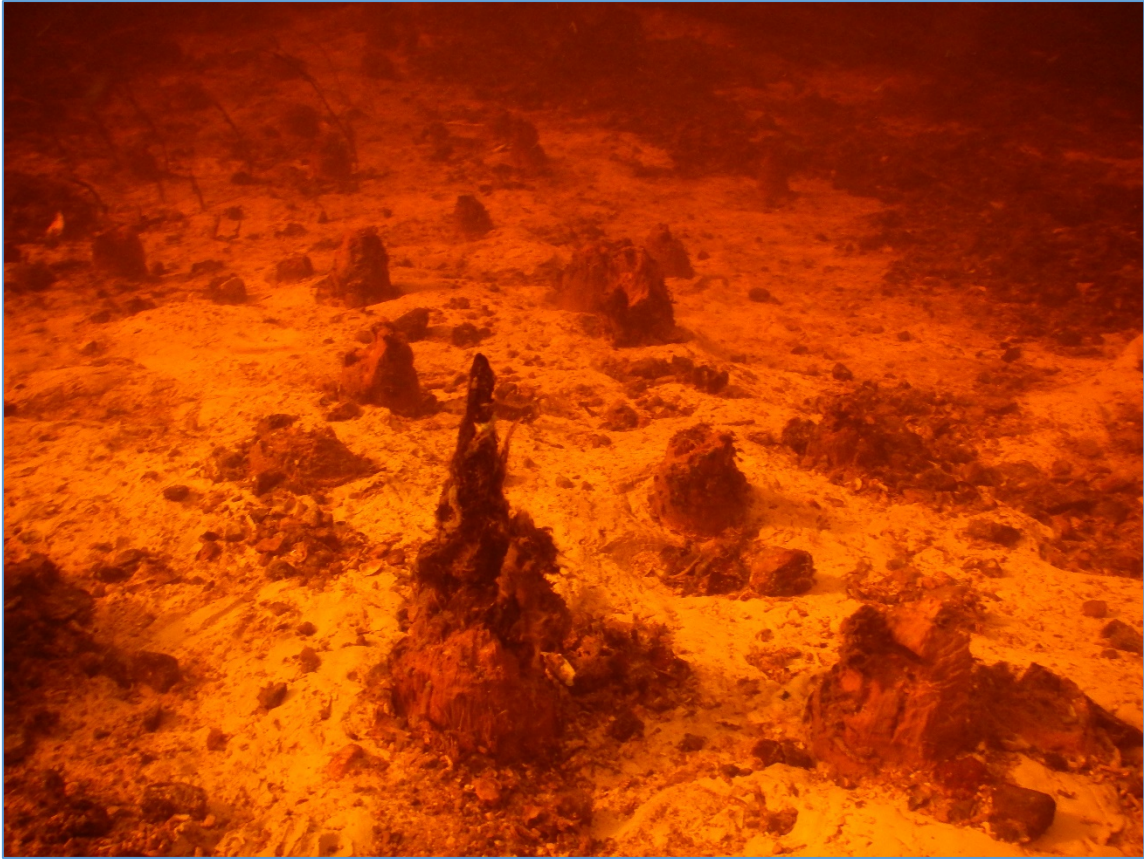


Plate 17: Riverbed in study area studded with wooden stakes.

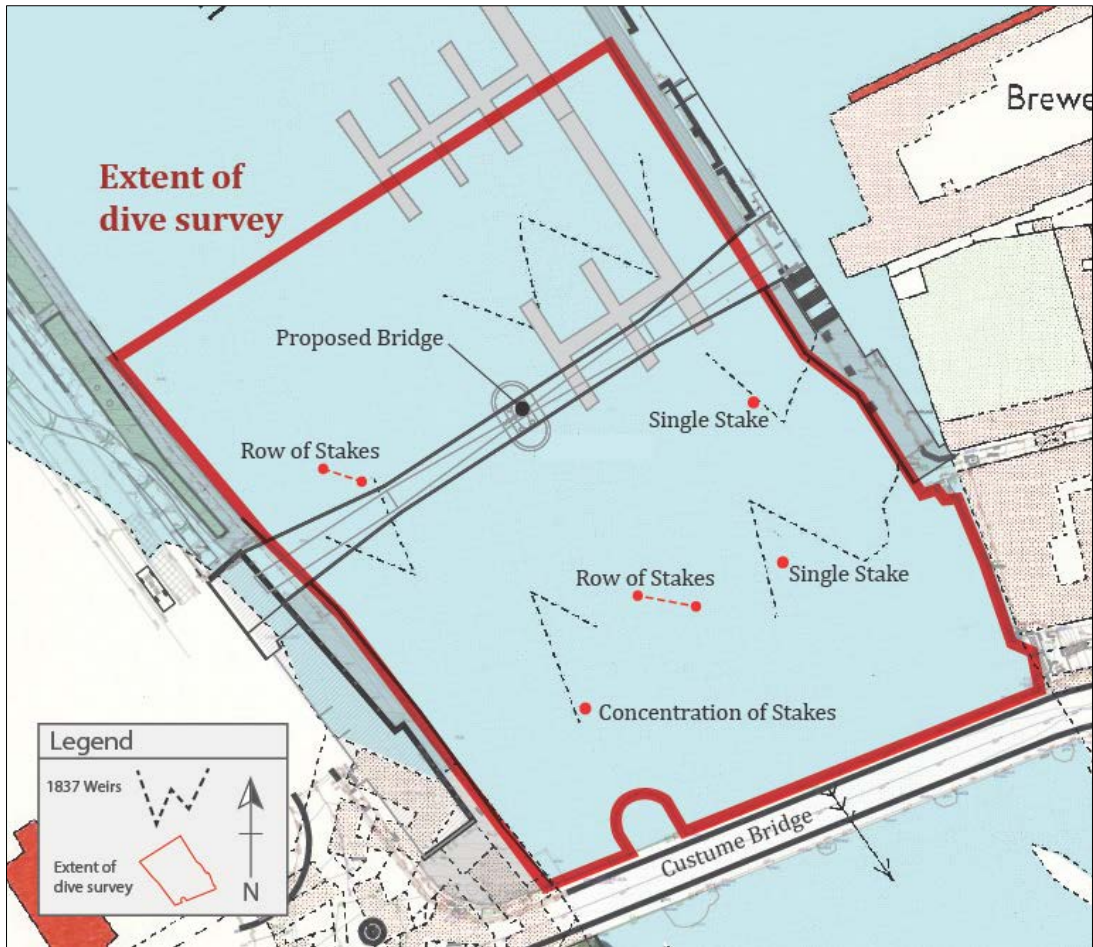


Figure 13: Plan of survey results of survey area overlain on 1837 OS map and including proposed new bridge.

## Finds

Several artefacts were recorded during the survey of the riverbed. The objects included, dressed masonry, several barrel hoops, ceramics and bullets (Plates 18-21). The masonry was discovered parallel to and beside the easternmost arch of the current bridge. It comprised of a small cluster of rectangular dressed blocks lying against the central pier of the bridge (Plate 21). The masonry most likely reflects lost or discarded building material during the construction of the bridge 1841-1844.

The bullets recovered included six 303 calibre, all of which were unfired with intact percussion caps and therefore regarded as live. The corroded remains of the extractor clamp survived on five of the rounds. Five fired blank 7.62 casings and one unfired 7.62 blank were also found along with two 5.56 blank casings (Plate 20). The 303 Lee Enfield bolt-action rifle was standard Irish Army issue between 1924- 1961 after which it was replaced by the FN light automatic rifle.

A single musket shot was also recovered immediately upstream of the bridge close to the western riverbank.

A large quantity of ceramic and glass objects was recorded on the riverbed. A total of eight claypipe fragments, fourteen glass and some 53 items of ceramic were analysed by

ceramic specialist Clare McCutcheon (Appendix 1). All of the items date from the mid-later 19th to the early 20th century.



*Plate 18: Iron barrel hoop.*



Plate 19: Assemblage of bullets recovered from the survey area.

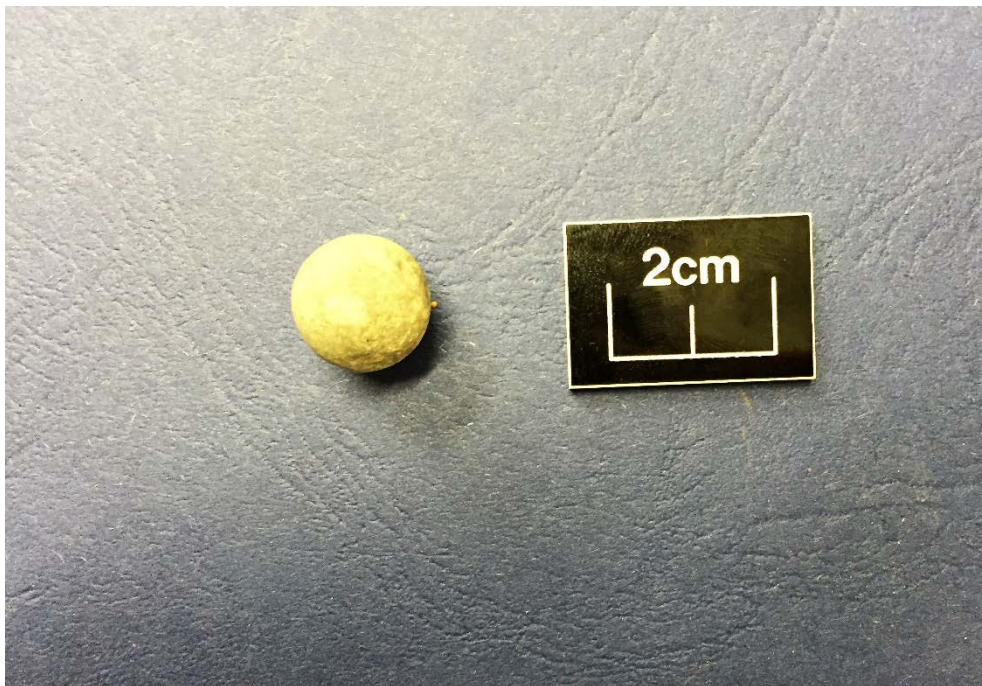


Plate 20: Lead musket shot recovered from the survey area.



Plate 21: Cluster of dressed masonry abutting pier of bridge.

## 10. Likely Impacts of the Proposed Bridge on the Recorded and Potential Underwater Archaeology

- No archaeological features, stratigraphy or artefacts were recorded on the footprint of the proposed bridge pier and coffer dam. Archaeological features and artefacts recorded on the riverbed of the wider study area will not be impacted by the proposed works.
- Considering the extensive remains of fish weirs in the wider study area, and the previous recovery of artefacts from the River Shannon, it is possible that unrecorded archaeological features and artefacts are buried within the sediment in the area of the proposed bridge pier and cofferdam. The likelihood of directly impacting previously unrecorded archaeology is potentially significant.

## 11. Mitigation

- All riverbed disturbance works associated with the bridge construction shall be monitored by an underwater archaeologist under licence from the National Monuments Service.
- The deposits excavated from the river bed within the area enclosed by the coffer dam shall be removed to the scheme compound for archaeological processing.

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## Appendix 1 Report on Claypipes, Glass and Pottery

**Written by Clare McCutcheon MA MIAI**

**Introduction:**

A total of eight claypipe, fourteen glass and some 53 items of ceramic were presented for study. All of the items date from the mid-later 19th to the early 20th century. Most of the ceramic items had red surfaces, either partial (pottery) or complete (claypipe bowls).

### **Claypipes:**

Of the eight items of claypipe, one is a complete pipe and three are complete bowls, a further complete stem and three undecorated stem fragments. A final item, although appearing similar to a clay pipe stem, is rounded and closed at one end and also has a larger bore (4mm) than the pipe stems (<2mm). Its use is uncertain

The complete pipe (16E78:20) is a dудeen or short stemmed pipe with a spur and rouletting around the bowl. The rear of the bowl is stamped with a circle containing the O'Briens Real Irish. The first of the three bowls (16D78:21) is stamped on the rear with 'Unity Pipes' with a pair of clasped hands between. There is a flat spur and rouletting around the rim. B. O'Brien from Knockcroghery won a medal for his pipes at the Dublin exhibition of 1882 (Norton 2013, 36).

The second bowl (16D78:22) has a more rounded bowl than the others and is clearly marked 'The Gladstone Pipe' in an incised circle. This more rounded type is a copy of the briar pipes of the time (Ayto 1994, 8) and the Gladstone pipes have a distinctive design with an incised line under the bowl giving the impression that the bowl was made separately and laid onto the pipe stem. The third bowl (16D78:23) is also marked on the rear, this time with a trefoil or shamrock in the centre and the name Wm Curley above and Knockcroghery below. The complete stem (16D78:24) has very deep teeth marks at the mouthpiece with the names Hynes and Galway stamped incuse on either side of the stem near the bowl. Mary J. and Michael Hynes were pipemakers at 6 Prospect Hill Galway between 1881 and 1911 (Norton 2013, 33).

The marks on the bowls, shamrock, unity, clasped hands and the name of Gladstone were all associated with the struggle for land reform and Home Rule.

## **Glass:**

The earliest of the bottles is a green moulded bottle (16D78:6) with a nipple point under the base, typical of Ricketts of Bristol who had patented a mechanism for moulding bottle (Wills 1974, 48).

A second green bottle (16D78:7) is clearly marked in relief with round cartouches on both sides. One side is blank and would have carried the paper label relating to the contents. The other side is marked 'B & E London' with a relief mark of a screw stopper in the centre. Above and below the roundel are the words 'Trade Mark' and around the bottom of the bottle is the relief mark 'Barrett & Elers London'. Under the base are the numbers 1790. In 1872, Henry Barrett invented the internal screw top ([www.tidelineart.com](http://www.tidelineart.com)) and registered his patent in August 1880. An advertisement of the time shows one of these bottles with the relief mark of the screw stopper and the second with a label for Bass & Co Pale Ale (Fig.1).

Clear glass bottles were made in the second half of the 19<sup>th</sup> century in order to differentiate between bottle and flint glass (Wills 1974, 52). A group of four small clear bottles (16D78:8-11), standing between 122-150mm, would all have been corked. Two of these are oval (8 & 9), one is round (10) and the final one is rectangular (11). This latter bottle has one flat face for a printed label while the back and the sides are indented, possibly for ease in gripping, especially for medical products.

An amber bottle (16D78:12) with ten sides might be thought to be earlier given the note re. clear glass above. This also took a cork rather than a screw top but in addition, the base is marked in relief with a diamond mark. 'A diamond mark showed that an item was designed in Britain and the design had been registered...the person registering it had legal protection against others copying it' ([www.nationalarchives.gov.uk](http://www.nationalarchives.gov.uk)). The information on the diamond shows that the design was registered on the 8<sup>th</sup> of July (I) 1866 (Q) along with seven (8) other items of glass (III). An oval brown medicine bottle, with an external screw top (16D78:13), also has an indented flat surface on one side to contain a label.

Two green bottles are marked under the base in relief with the letter 'IGB'. These were made in the Irish Glass Bottle company at Ringsend, founded in 1871 ([www.dublincity.ie](http://www.dublincity.ie)). One of these (16D48:14) is a dark turquoise oval medicine bottle, while the second is a square shaped bottle (16D48:15) with external screw top, very similar to the HP sauce bottles still in production today.

A clear milk bottle (16D78:16) is marked in relief on both sides with the logo 'Clones Creamery'. The final two clear bottles (16D78:17 & 18) are small (50mm & 70mm), both with external screw tops, the larger bottle (16D78:18) with a heavily encrusted metal top in situ.

The last item of glass (16D78:19) is a small pot (H.42mm) with a thick flared rim, used for meat paste.

**BARRETT & ELMERS'**  
**Patent Screw Stoppered Bottle,**

FOR MINERAL WATERS.

FOR BOTTLED ALES, PORTER, CIDER, BREWED GINGER BEER, MINERAL WATERS, &c.

No Corkscrew! No String or Wire!!! No Broken Corks!!!  
Easily Fitted! Easily Closed!!!  
Easily Opened!!!

Invaluable to every Householder, Hotel and Restaurant Proprietor, Publicans, &c.

*May be partly Emptyed, Closed again, and the Remainder kept in Good Condition, Perfectly Air-Tight.*

WILL SUIT ANY CLIMATE, HOT OR COLD.

**BARRETT & ELMERS'**  
**Screw Stoppered Bottle.**

By using STOPPERS instead of Corks a great SAVING is effected.

**The STOPPER will last for YEARS.**

These Screw Stoppers open or close with a turn of the fingers. The Bottle is not shaken, as in uncorking, and the whole or ANY PORTION of the contents can be poured out without disturbing any sediment. The Stoppers will last for years, and the Bottles are made to a regular size of neck to suit every Stopper.

*These BOTTLES are made in the following sizes:*

Imperial 1/2-gals. fitted with Screw Stoppers.	
" Pints " "	
" 1/2-pints " "	
Reputed Quarts " "	
" Pints " "	
Mineral Water Bottles, 10 oz. "	
" " Splits "	
Stone Bottles for Brewed Ginger .. .. .	

*Other bottles can be supplied in any reasonable shape or size. Prices on application.*

**IMPORTANT NOTICE!**  
Stoppers & Rubbers for 5/6 per Mineral Water Bottles  
Ditto, (with extra thick rubbers) 6/6  
or with Bottles included 2s. and 2s. per gross.

**THE IMPROVED FLORENTINE STOPPER,**  
20,000 Gross now in use, and giving the utmost satisfaction.

Ebonites, Wood, Glass, and all kinds of internal Stoppers supplied on best terms.

Can be filled with a very simple and inexpensive machine, by a girl, at the rate of 400 dozen a day.

Fig.1: Advertisement for Barrett & Elers. These

## **Pottery:**

The majority of the pottery consists of broken fragments of stoneware, pearlware and glazed red earthenwares.

The stonewares represent whiskey jars, one with an impressed decoration (16D78:5) round the shoulder of two horizontal bands of circles above and below four rows of six-petalled flowers. In addition, there are a number of preserve jars in stoneware, some with vertical ridges. A complete preserve jar (16D78:1) is unmarked and undecorated. A small stoneware jar (16D78:2) is an undecorated ointment pot standing 45mm in height, with indented line around the top to facilitate tying a fabric or waxed paper lid. This would have been reused constantly and originally had a paper label, similar to that used on the glass bottles above. The final complete stoneware item is a bottle (16D78:4), with a narrow neck and a pouring lip. This would have been closed with a cork and is normally termed a rennet bottle, containing the material essential in the making of cheese. An oval stamp near the base marks the bottles as the product of the 'Port Dundas Pottery Coy Glasgow'. A further fifteen sherds of stoneware are similar to the above vessels, some of the preserve jars with vertical ribbing lines as decoration.

The second largest pottery group (seventeen sherds) is in ironstone, representing general tablewares such as plates, dishes jugs etc. in addition to a complete ointment jar (16D78:3) standing 55mm in height. As with the stoneware example above this was undecorated but would have had a paper label and repeated use.

Six sherds are in glazed red earthenware and a complete strap handle is typical of a chamber pot. Seven further sherds in unglazed red earthenware may be the remains of roof or floor tiles. Two rim sherds in red clay with red and white slip represent mugs or tankards and a final sherd in porcelain was overpainted in gilding with a shamrock motif.

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[www.tidelineart.com](http://www.tidelineart.com) blog dated 1 January 2015



**Plate A:** From L-R: Complete claypipe 16D078:20, claypipe bowls 16D078:23, 16D078:23 and 16D078:22, undecorated claypipe stem fragments, claypipe stem 16D078:24 (left) and unidentified clay object (lower left).



**Plate B:** Glass bottles 16D078:6 and 16D078:7





**Plate C:** Glass bottles 16D078:12 and 16D078:16



**Plate D:** Glass bottles 16D078:14, 16D078: 15 and 16D078:13



**Plate E:** Glass bottles 16D078:9, 16D078:8 and 16D078:10



**Plate F:** Stoneware ointment pot 16D078:2, ironstone ointment pot 16D078:3, stoneware preserve jar 16D078:1 and stoneware bottle 16D078:4



**Plate G:** Glass bottles 16D078:11, 16D078:18, 16D078:17 and glass pot 16D078:19



**Plate H:** Ironstone/ pearl-ware sherds



**Plate I:** Unglazed red earthenware

## Appendix 2: Artefact Register

Find No.	Material	Description
16D078:1	Ceramic	A complete stoneware preserve jar with no marks or decorations.
16D078:2	Ceramic	Complete stoneware undecorated ointment pot 45mm high with an indented line around the top.
16D078:3	Ceramic	Complete ironstone ointment jar 55mm high. Undecorated but with indented line around the top.
16D078:4	Ceramic	Complete stoneware bottle with a narrow neck and a pouring lip. There is an oval stamp near the base marked 'Port Dundas Pottery Coy Glasgow'.
16D078:6	Glass	Green glass bottle with a nipple point under the base.
16D078:7	Glass	Green glass bottle marked in relief with round cartouches on both sides. One side is marked 'B & E London' with a relief mark of a screw stopper in the centre. Above and below the roundel are the words 'Trade Mark' and around the bottom of the bottle is the relief mark 'Barrett & Elers London'. Under the base are the numbers 1790.
16D078:8	Glass	Small oval clear glass bottle.
16D078:9	Glass	Small oval clear glass bottle.
16D078:10	Glass	Small round clear glass bottle.
16D078:11	Glass	Small rectangular clear glass bottle with one flat face and indents on the back and sides.
16D078:12	Glass	Amber glass bottle with ten sides and base marked in relief with a diamond mark.
16D078:13	Glass	Oval brown glass bottle with an external screw top and indented flat surface on one side.
16D078:14	Glass	Dark turquoise oval medicine bottle marked under the base in relief with the letter 'IGB'.
16D078:15	Glass	Square shaped green glass bottle with external screw top.
16D078:16	Glass	Clear glass milk bottle marked in relief on both sides with the logo 'Clones Creamery'.
16D078:17	Glass	Small clear glass bottle with external screw top.
16D078:18		Small clear glass bottle with a heavily encrusted external screw top in situ.
16D078:19	Glass	Small clear glass pot with a thick flared rim.
16D078:20	Ceramic	Complete claypipe with a spur and rouletting around the bowl. The rear of the bowl is

		stamped with a circle containing the O'Briens Real Irish.
<b>16D078:21</b>	Ceramic	Claypipe bowl stamped on the rear with 'Unity Pipes' with a pair of clasped hands between. There is a flat spur and rouletting around the rim.
<b>16D078:22</b>	Ceramic	Claypipe bowl marked 'The Gladstone Pipe' in an incised circle.
<b>16D078:23</b>	Ceramic	Claypipe bowl marked on the rear with a trefoil or shamrock in the centre and the name Wm Curley above and Knockcroghery below.
<b>16D078:24</b>	Ceramic	Complete claypipe stem with very deep teeth marks at the mouthpiece and the names Hynes and Galway stamped incuse on either side of the stem near the bowl.
<b>16D078:25</b>	Ceramic	Item similar to a clay pipe stem but rounded and closed at one end and with 4mm bore.
<b>16D078:26</b>	Ceramic	Fifteen sherds of stoneware some with vertical ribbing lines as decoration.
<b>16D078:27</b>	Ceramic	Fragment of stoneware.
<b>16D078:28</b>	Ceramic	Fragment of stoneware.
<b>16D078:29</b>	Ceramic	Fragment of stoneware.
<b>16D078:30</b>	Ceramic	Fragment of stoneware.
<b>16D078:31</b>	Ceramic	Fragment of stoneware.
<b>16D078:32</b>	Ceramic	Fragment of stoneware.
<b>16D078:33</b>	Ceramic	Fragment of stoneware.
<b>16D078:34</b>	Ceramic	Fragment of stoneware.
<b>16D078:35</b>	Ceramic	Fragment of stoneware.
<b>16D078:36</b>	Ceramic	Fragment of stoneware.
<b>16D078:37</b>	Ceramic	Fragment of stoneware.
<b>16D078:38</b>	Ceramic	Fragment of stoneware.
<b>16D078:39</b>	Ceramic	Fragment of stoneware.
<b>16D078:40</b>	Ceramic	Fragment of stoneware.
<b>16D078:41</b>	Ceramic	Fragment of ironstone.
<b>16D078:42</b>	Ceramic	Fragment of ironstone.
<b>16D078:43</b>	Ceramic	Fragment of ironstone.
<b>16D078:44</b>	Ceramic	Fragment of ironstone.
<b>16D078:45</b>	Ceramic	Fragment of ironstone.
<b>16D078:46</b>	Ceramic	Fragment of ironstone.
<b>16D078:47</b>	Ceramic	Fragment of ironstone.
<b>16D078:48</b>	Ceramic	Fragment of ironstone.
<b>16D078:49</b>	Ceramic	Fragment of ironstone.
<b>16D078:50</b>	Ceramic	Fragment of ironstone.
<b>16D078:51</b>	Ceramic	Fragment of ironstone.
<b>16D078:52</b>	Ceramic	Fragment of ironstone.
<b>16D078:53</b>	Ceramic	Fragment of ironstone.
<b>16D078:54</b>	Ceramic	Fragment of ironstone.
<b>16D078:55</b>	Ceramic	Fragment of ironstone.

<b>16D078:56</b>	Ceramic	Fragment of ironstone.
<b>16D078:57</b>	Ceramic	Glazed red earthenware strap handle.
<b>16D078:58</b>	Ceramic	Fragment of glazed red earthenware.
<b>16D078:59</b>	Ceramic	Fragment of glazed red earthenware.
<b>16D078:60</b>	Ceramic	Fragment of glazed red earthenware.
<b>16D078:61</b>	Ceramic	Fragment of glazed red earthenware.
<b>16D078:62</b>	Ceramic	Fragment of glazed red earthenware.
<b>16D078:63</b>	Ceramic	Seven sherds of unglazed red earthenware.
<b>16D078:64</b>	Ceramic	Fragment of unglazed red earthenware.
<b>16D078:65</b>	Ceramic	Sherd of porcelain overpainted in gilding with a shamrock motif.
<b>16D078:66</b>	Ceramic	Earthenware rim sherd in red clay with red and white slip.
<b>16D078:67</b>	Ceramic	Earthenware rim sherd in red clay with red and white slip.
<b>16D078:68</b>	metal	Bullet, 303 calibre, unfired with intact percussion cap, corroded remains of the extractor clamp attached.
<b>16D078:69</b>	metal	Bullet, 303 calibre, unfired with intact percussion cap, corroded remains of the extractor clamp attached.
<b>16D078:70</b>	metal	Bullet, 303 calibre, unfired with intact percussion cap, corroded remains of the extractor clamp attached.
<b>16D078:71</b>	metal	Bullet, 303 calibre, unfired with intact percussion cap, corroded remains of the extractor clamp attached.
<b>16D078:72</b>	metal	Bullet, 303 calibre, unfired with intact percussion cap, corroded remains of the extractor clamp attached.
<b>16D078:73</b>	metal	Bullet, 303 calibre, unfired with intact percussion cap.
<b>16D078:74</b>	metal	Bullet, fired, blank 7.62 casing.
<b>16D078:75</b>	metal	Bullet, fired, blank 7.62 casing.
<b>16D078:76</b>	metal	Bullet, fired, blank 7.62 casing.
<b>16D078:77</b>	metal	Bullet, fired, blank 7.62 casing.
<b>16D078:78</b>	metal	Bullet, fired, blank 7.62 casing.
<b>16D078:79</b>	metal	Bullet, 7.62 calibre, unfired with intact percussion cap.
<b>16D078:80</b>	metal	Bullet, fired, 5.56 calibre blank casing.
<b>16D078:81</b>	metal	Lead musket shot, diameter 15.1mm, weight 16.5g, slight flattened areas probably due to casting process rather than impaction.







Prepared by  
Roughan & O'Donovan AECOM  
Arena House, Arena Road, Sandyford, Dublin 18  
Tel: +353 1 2940800 Fax: +353 1 2940820  
Email: [info@rod.ie](mailto:info@rod.ie) [www.rod.ie](http://www.rod.ie)