Chapter 10:

Cultural Heritage

10 CULTURAL HERITAGE

10.1 INTRODUCTION

This chapter assesses the potential impacts that the proposed Lower Lee (Cork City) Certified Drainage Scheme may have on the cultural heritage resource and, based on this assessment; it presents a number of appropriate mitigation measures. The term 'cultural heritage' is used to encompass the archaeological, architectural, historical and folklore heritage resource. A licenced underwater archaeological survey of the river channel in the vicinity of the scheme was undertaken by the Archaeological Diving Company (ADCO). Relevant extracts are incorporated into the chapter and the full report is presented in Appendix 10A.

In general, the proposed scheme in the lands to the west of the city will broadly comprise combinations of embankments and localised flood walls along the river's edge and within adjacent green field areas. The proposed works in the city centre will entail a combination of new quay parapet walls; raising of existing quay walls; localised in-channel sheet pile walls and regrading of localised sections of adjacent road surfaces. The works in the city will also entail repairs to the existing quay walls where required. The proposed interventions will be finished with stone cladding appropriate to their environs. There are no dredging works proposed and in-channel works are, therefore, largely confined to localised sheet-pile walls. The nature and extent of the proposed works are summarised within this chapter.

10.2 ASSESSMENT METHODOLOGY

10.2.1 Introduction

The methodology used for this assessment is based on the EPA (2003) Advice Notes on Current Practice (in the preparation of Environmental Impact Statements) relating to Cultural Heritage and the guidelines for the assessment of impacts on the cultural heritage resource published by the International Council on Monuments and Sites (ICOMOS 2011).

The chapter presents the results of a desk top survey which aims to identify all recorded and potential archaeological, architectural and other cultural heritage sites within the environs of the proposed scheme. The field and underwater surveys of the footprint of the scheme were undertaken over a number of phases during 2016. Details are provided within the chapter and extracts from the photographic record are provided in Appendix 10B.

10.2.2 Desktop Study

The principal sources reviewed for the identification of the known archaeological resource were the Sites and Monuments Record (SMR) and the Record of Monuments and Places (RMP) for County Cork. The Record of Protected Structures (RPS) and the National Inventory of Architectural Heritage (NIAH) were the main sources consulted for assessing the protected built heritage resource. These sources provide comprehensive lists of the known archaeological and built heritage resources and their legislative basis is outlined below (Section 10.3.2). Other sources consulted as part of the desktop study included:

Literary Sources

Literary sources are a valuable means of completing the written archaeological, historical and architectural record of study area and gaining insight into the history of the environs of the proposed scheme. While it is beyond the scope of the present study to present a full account of the development of Cork city and its environs, the published sources in relation to the development of riverine features such as quays, bridges and other associated features have been consulted and summarised herein. A list of all literary sources consulted as part of the assessment is provided in the bibliography.

Database of Irish Excavation Reports

The Database of Irish Excavation Reports contains summary accounts of all archaeological excavations carried out in Ireland – North and South – from 1970 to 2016. The database contains summaries of a number of excavations within the vicinity of the additional works and the relevant information is incorporated into this chapter.

Development Plans

The local authority development plans relevant to the study area were consulted as part of this assessment. These plans outline the local authorities' policies for the conservation of the archaeological and architectural heritage resource and include the Record of Protected Structures (RPS) and designated Architectural Conservation Areas (ACA). The relevant development plans for the study area comprise the Cork City Development Plan (2015-2021), the County Cork Development Plan (2014-2022) and a number of Local Area Plans published by Cork City Council.

Cartographic Sources

The detail on cartographic sources can indicate past settlement and land use patterns in recent centuries and can highlight the increased impact of modern developments. This information can aid in the identification of the location and extent of unrecorded, or partially levelled, features of archaeological or architectural interest. A range of available cartographic sources were examined for the study area and these included various historic 18th and 19th century maps depicting the outwards expansion of the city and its quays from the medieval core as well as the 1st editions of the 6-inch OS maps (surveyed and published in the 1830s & 1840s) and the 25-inch OS maps (surveyed and published 1887-1913). An analysis of these cartographic sources is presented in the underwater archaeological survey (Appendix 10A). A number of historic photographic sources were also examined, including published examples and the online databases of Cork City Library (www.corkpastandpresent.ie/) and the National Library of Ireland (www.nli.ie/). A number of relevant historical photographs are presented in Appendix 10B.

Archival Material

The Topographical Files of the National Museum of Ireland and the Cork City Archive collections were consulted as part of the assessment, in particular the collections in the latter institute that relate to the city quays.

Placenames Database of Ireland

This database provides a comprehensive management system for data, archival records and placenames research conducted by the State. Its primary function is to undertake research in order to establish the correct Irish language forms of the placenames of Ireland and to publish them on a public website (www.logainm.ie).

10.2.3 Survey

The inspections of the riverside and dryland areas to be impacted by the proposed scheme were undertaken over a number of phases by JCA staff members during 2016. A photographic record of the survey was compiled and extracts are provided in Appendix 10B. A licensed underwater archaeological survey of the entire length of the river channel adjacent to the proposed scheme was undertaken by the Archaeological Diving Company (ADCO). The in-water archaeological assessment comprised a c. 7km stretch of the River Lee, encompassing a 500m stretch of the waterway at Ballincollig, and both channels of the river as they flow through the centre of Cork. The assessment recorded riverbed topography and provides a detailed account of the existing riverside environment. On-site work comprised systematic non-disturbance underwater and waded inspection of the river channels, their attendant quayside structures, and any associated riverine features, including bridge structures (piers and foundations), weirs, culverts, river-walling, and any natural features encountered. On-site work was carried out between the 7th and 16th of June 2016, under licence from the DAHRRGA; licence numbers 16D0053 and 16R0079. This work followed consultation with the Underwater Archaeological Unit of the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. Relevant extracts from the ADCO survey are provided within Section 10.3.4 of this chapter. A full copy of the ADCO underwater archaeological report, including their photographic archive, is presented in Appendix 10A.

10.2.4 Cultural Heritage Significance and Impact Criteria

The assessment of significance and level of impacts on Cultural Heritage Assets incorporates various guidelines published by the National Monuments Service (NMS), the Environmental Protection Agency (EPA), The International Council on Monuments and Sites (ICOMOS) and the National Roads Authority (NRA).

10.3 THE EXISTING ENVIRONMENT

10.3.1 Introduction

The proposed scheme will primarily involve a series of interventions along the environs of the River Lee extending eastwards from the Innishcarra area into the city centre. This area is broadly dominated by pasture farmland in the west end and the suburbs and urban centre of Cork city at east. As detailed below, there is recorded evidence for human settlement within the lands to the west of the area now occupied by the city dating back to the Neolithic period. The farmlands adjacent to the proposed scheme in the western end are located within the river floodplain which likely accounts for a noted paucity of recorded archaeological settlements or buildings of architectural heritage significance within these areas. The pre-urban environment in the east end of the scheme is recorded in the city name Cork, which derives from the Irish root name *corcach (*marsh). The existing city centre occupies an area that comprised thirteen marshy estuarine islands prior to extensive reclamation works that commenced in the general South Gate area during the initial creation of the Viking settlement and then expanded to the north during the creation of the walled Anglo-Norman city that extends through the North and South Main Streets. The river channels during the medieval period were located directly outside the city walls and were crossed by timber bridges at the North and South Gates. The reclamation works dramatically accelerated during the 18th and 19th centuries when the city expanded in all directions outside the walled city. As will be

described below, the two channels of the River Lee within the city centre extend through reclaimed ground outside the medieval city and have been subject to widespread impacts from the post-medieval period onwards including various phases of construction, repair and re-construction of the city quays and extensive in-channel dredging works. The proposed works within the city area are confined to the existing quays and their adjacent road surfaces and, therefore, no elements of the proposed scheme extend into the area of the walled medieval city.

10.3.2 Legal and Policy Context

The management and protection of cultural heritage in Ireland is achieved through a framework of international conventions and national laws and policies. This is undertaken in accordance with the provisions of the 'European Convention on the Protection of the Archaeological Heritage' (the Valletta Convention) and 'European Convention on the Protection of Architectural Heritage' (Grenada Convention). Cultural heritage can be divided loosely into the archaeological resource covering sites and monuments from the prehistoric period until the post-medieval period and the built heritage resource, encompassing standing structures and sites of cultural importance dating from the post-medieval and modern period. In addition, local place-names, folklore and traditions are considered part of our cultural heritage.

The legislation; national policy statements, guidelines and advice notes relevant to this assessment include:

- National Monuments Act 1930 (and amendments in 1954, 1987, 1994 and 2004).
- Heritage Act (1995).
- National Cultural Institutions Act (1997)
- Policy for the Protection of the Archaeological Heritage (Department of Arts, Heritage, Gaeltacht and the Islands 1999).
- Architectural Heritage (National Inventory) and National Monuments (Misc. Provisions) Act (1999).
- Local Government (Planning and Development) Act (2000).
- Department of Environment, Heritage, and Local Government's Architectural Heritage Protection: Guidelines for Planning Authorities (2004).

The Archaeological Resource

The following section presents the legal and policy environment that relate to the protection of the archaeological resource and details on the elements of this resource within the close environs of the proposed are provided in Section 10.2.4. Since 2016, the administration of national policy in relation to archaeological heritage management is the responsibility of the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. The National Monuments Acts 1930 to 2004, the Heritage Act 1995 and relevant provisions of the National Cultural Institutions Act 1997 are the primary means of ensuring the satisfactory protection of archaeological remains, which are deemed to include all man-made structures, of whatever form or date, except buildings habitually used for ecclesiastical purposes. A national monument is described as 'a monument or the remains of a monument the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic or archaeological interest attaching thereto' (Section 2, National Monument Act, 1930).

There are a number of mechanisms under the National Monuments Act that are applied to secure the protection of archaeological monuments. These include the Register of Historic Monuments, the Record of

Monuments and Places (RMP) and the placing of Preservation Orders and Temporary Preservation Orders on endangered sites. Section 12 (1) of the National Monuments (Amendment) Act of 1994 makes provision for the establishment and maintenance of a Record of Monuments and Places (RMP) deemed to have cultural heritage potential. The record replaced the earlier Sites and Monuments Record (SMR) and provides a list of monuments and relevant places with accompanying maps. All sites recorded on the RMP receive statutory protection under the National Monuments Act 1994 and any work undertaken at these sites must be licenced by the National Monuments Service. Section 3 of the National Monuments (Amendment) Act of 1987 makes specific provisions for the protection of shipwrecks over one hundred years old and underwater archaeological objects.

The RMP sites within close vicinity to the proposed scheme are identified in Section 10.3.4 of this chapter. The published inventory descriptions of RMPs referred to in the chapter are presented in Appendix 10C and location maps are provided in Appendix 10D. It is also possible that unrecorded archaeological sites or artefacts remain buried below the existing ground surfaces or within river sediments in the vicinity of the scheme.

The Cork City Development Plan 2015-2021 defines the extent of the primary and secondary zones of archaeological potential for Cork city (Figure 10.1). It also outlines a wide range of policies and objectives in relation to the protection of the archaeological heritage within the city and examples relative to the present assessment include the following:

Objective 9.7: Preservation of archaeological remains in-situ

In accordance with national policy (and in the interests of sustainability) impacts on the buried archaeological environment should be avoided where possible.

Objective 9.16: Large-scale Development (outside the boundaries of a RMP)

Outside the Zone of Archaeological Potential of a RMP, where in the opinion of the City Council a development involves major ground disturbance; archaeological conditions may be applied particularly in the vicinity of known monuments.

Objective 9.18: Industrial Archaeology

All development proposals for industrial buildings and sites of industrial archaeological importance must be accompanied by an archaeological assessment of the building(s) and their surrounding environment. Retention and/or incorporation of industrial buildings will be encouraged. Where in exceptional circumstances demolition is permitted, a detailed building report will be required.

Objective 9.20: Underwater Archaeology

All development proposals which will impact on riverine, intertidal and sub-tidal environments should be accompanied by an archaeological assessment.

9.29 Protection of Underwater Archaeology

Under the National Monuments (Amendment) Act 1930-2004 all shipwrecks over one hundred years, underwater archaeological structures, features and objects are protected. Cork was built on estuarine islands in the marshy valley of the River Lee at a point where it formed a number of waterways. The marshland areas to the east and west of the medieval city were reclaimed in the eighteenth century. It is

possible that archaeological riverine-related features may survive. These may take the form of walkways, fish-traps, timber jetties or simple mooring posts.

The City Council have also published the *South Docks Local Area Plan 2008* and the *North Docks Local Area Plan 2005*. These outline the following policy objectives for the protection of the archaeological and architectural heritage resource within the dockland areas in the east end of the city centre:

South Docks Local Area Plan

Archaeological monitoring should precede any development involving earth removal. A licensed archaeologist shall be employed by the developer to monitor such works, reporting to the state institutions as prescribed by the National Monuments Acts. The requirement for archaeological monitoring will be dependent on the size, scale and nature of the proposed development. In particular, archaeological monitoring will be required for any bulk excavation. Any dredging or excavation work proposed for the river or adjacent to the riverfront will also require archaeological monitoring. The City Council shall outline the process to be followed

North Docks Local Area Plan 2005

The North Docks plan area is outside the zones of archaeological importance. However, since it is largely located on reclaimed river marsh, there may be a requirement for survey and monitoring where a development will involve large-scale ground disturbance. Cork's pre-eminence as an industrial centre in the late 18th and 19th centuries has created the most tangible record of historic archaeological remains in the North Docks. Many of the quay walls, shipping offices, associated warehouses and yards still survive as do the most significant structures associated with the development of the railway from the 1840s to the present. The former ship-building and repair yards are now only to be found in the extreme eastern end of the area, and are consequently of even more significance because of the rarity of what was once an important industry in the city. The area bounded by Penrose Quay, Clontarf St., Railway St. has a distinctive character reflecting its historical development as a centre for shipping offices and warehouses (following the construction in the early 19th C of the new deeper quay along Penrose Quay). It is worth noting that despite much later rebuilding; the Penrose quay wall contains large sections of fine cut limestone, which are of significance.

The Cork County Council Development Plan 2014 outlines the following policy objectives for the protection of the archaeological resource:

HE 3-1: Protection of Archaeological Sites

a) Safeguard sites and settings, features and objects of archaeological interest generally.

b) Secure the preservation (i.e. preservation in situ or in exceptional cases preservation by record) of all archaeological monuments including the Sites and Monuments Record (SMR) (see www.archeology.ie) and the Record or Monuments and Places as established under Section 12 of the National Monuments (Amendment) Act, 1994, as amended and of sites, features and objects of archaeological and historical interest generally.

HE 3-2: Underwater Archaeology

Protect and preserve the archaeological value of underwater sites and associated features. In assessing proposals for development, the Council will take into account the potential underwater archaeology of rivers, lakes intertidal and subtidal environments.

HE 3-3: Zones of Archaeological Potential

Protect the Zones of Archaeological Potential (ZAPs) located within historic towns and other urban areas and around archaeological monuments generally. Any development within the ZAPs will need to take cognisance of the potential for subsurface archaeology and if archaeology is demonstrated to be present appropriate mitigation (such as preservation in situ/buffer zones) will be required.

HE 3-4: Industrial Archaeology

Protect and preserve the archaeological value of industrial and post-medieval archaeology such as mills, lime kilns, bridges, harbours, penal chapels and dwellings. Proposals for refurbishment, works to or redevelopment / conversion of these sites should be subject to assessment.

12.3.16: Where archaeological materials are found appropriate mitigation measures shall be put in place. Preservation in situ should generally be the presumed option and only compelling reasons can justify preservation by record.

12.3.19: Previously unidentified archaeological sites may be uncovered during drainage schemes or road-making. Archaeological deposits which may be damaged by development must be recorded.

The Built Heritage Resource

Protection of the built heritage resource is provided for through a range of legal instruments that include the Heritage Act, 1995, the Architectural Heritage (National Inventory) and National Monuments (Misc. Provisions) Act, 1999, and the Local Government (Planning and Development) Act 2000. Under the Local Government (Planning and Development) Act, 2000, all Planning Authorities are obliged to keep a 'Record of Protected Structures' of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest. As of the 1st January 2000, all structures listed for protection in current Development Plans, have become 'protected structures'. Since the introduction of this legislation, planning permission is required for any works to a protected structure that would affect its character. If a protected structure is endangered, planning authorities may issue a notice to the owner or occupier requiring works to be carried out. The Act contains comprehensive powers for local authorities to require the owners and occupiers to do works on a protected structure if it is endangered, or a protected structure or a townscape of special character that ought to be restored. The following section presents the legal and policy environment that relate to the protection of the architectural heritage resource and details on the elements of this resource within close vicinity to the scheme are provided in Section 10.3.4 of this chapter.

The Heritage Act 1995 protects all heritage buildings owned by a local authority from damage and destruction. Section 2.1 of the Act describes architectural heritage as 'all structures, buildings, traditional and designed, and groups of buildings including streetscapes and urban vistas, which are of historical, archaeological, artistic, engineering, scientific, social or technical interest, together with their setting, attendant grounds, fixtures, fittings and contents, and, without prejudice to the generality of the foregoing, includes railways and related buildings and structures and any place comprising the remains or traces of

any such railway, building or structure'. The Heritage Council was also established under the Heritage Act in order to promote the interest in, knowledge and protection of Irish heritage, including the architectural resource.

The Local Government (Planning and Development) Act 2000 obliges planning authorities to keep a Record of Protected Structures (RPS) of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest. As of the 1st January 2000, all structures listed for protection in current Development Plans, have become 'protected structures'. Since the introduction of this legislation, planning permission is required for any works to a protected structure that would affect its character. If a protected structure is endangered, planning authorities may issue a notice to the owner or occupier requiring works to be carried out. The Act contains comprehensive powers for local authorities to require the owners and occupiers to do works on a protected structure if it is endangered, or a protected structure or a townscape of special character that ought to be restored. The protected structures within close vicinity to the proposed scheme are identified in Section 10.3.4 of this chapter. The County and City Development Plans do not provide location maps for these structures.

The Architectural Heritage Act 1999 (National Inventory) requires the Minister to establish a survey to identify, record and evaluate the architectural heritage of the country. The function of the National Inventory of Architectural Heritage (NIAH) is to record all built heritage structures within the Republic of Ireland. While inclusion in a NIAH inventory does not provide statutory protection to a structure the inventory is used to advise local authorities on compilation of a Record of Protected Structures (RPS) as required by the Local Government (Planning and Development) Act, 2000. The buildings in the close environs of the proposed scheme which are included in the NIAH are identified in Section 10.3.4 of this chapter. The published inventory descriptions of the NIAH features referred to in the report are presented in Appendix 10C and location maps are presented in Appendix 10D.

The Cork City Development Plan 2015-2021 contains a wide range of policies and objectives in relation to the protection of the architectural heritage within the city and examples relative to the present assessment include the following:

9.23: Record of Protected Structures

The Council will maintain a Record of Protected Structures, which shall include structures or parts of structures and their curtilage which are of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest, and which it is an objective to protect

Objective 9.28: Protection of NIAH and other structures of built heritage interest

The City Council as planning authority aims to protect structures of built heritage interest.

9.61: Other Elements of Built Heritage

Of immense importance are the 19th century elements associated with the north and south channel. Important features include quay walls, bollards, kerbing etc.

The Architectural Conservation Areas (ACAs) within Cork City are defined in the City Development Plan 2015-2021 as a place, area, group of structures or townscape that is of special architectural, historical,

archaeological, artistic, cultural, scientific, social or technical interest or contributes to the appreciation of protected structures. The purpose of these designations is, in part, to ensure uniformity in approach to a wide variety of individual planning applications within highly evolving urban areas. The city centre has been sub-divided into a number of ACAs in the Development Plan and the examples that contain river frontages and quaysides in the vicinity of the scheme are: South Parish, Patrick's Hill, Shandon and Lower Glanmire. The scheme also extends through the following areas that have been designated as Proposed ACAs: Sunday's Well, Mardyke, Albert Quay, North Mall and University College Cork. The City Development Plan provides maps for each of the ACAs and their locations are presented in Appendix 10D.

The following objectives published in the Cork City Development Plan 2015-2021 outline the City Council's objectives in relation to proposed development applications within ACAs.

Objective 9.29: Architectural Conservation Areas

To seek to preserve and enhance the designated Architectural Conservation Areas in the City.

Objective 9.30: Demolition in Architectural Conservation Areas

Demolition of structures and parts of structures will in principle only be permitted in an Architectural Conservation Area where the structure, or parts of a structure, are considered not to contribute to the special or distinctive character, or where the replacement structure would significantly enhance the special character more than the retention of the original structure.

Objective 9.31: Recording of Structures in Architectural Conservation Areas

Where in exceptional circumstances a structure or a part of a structure which is considered to contribute to the special character of the area, is permitted to be demolished, it should first be recorded prior to demolition, and where appropriate should be monitored during demolition.

Objective 9.32: Development in Architectural Conservation Areas

Development in ACAs should take account of the following:

- Works that impact negatively upon features within the public realm such as paving, railings, street furniture, kerbing etc. shall not be generally permitted;

- Acceptable design, scale, materials and finishes for new developments;

- Original materials and methods of construction should be retained. For example, timber barge boards, windows and doors should not be replaced with PVC, original roofing material types should be retained along with original forms and locations of openings etc.;

- Features of historic or architectural value should not be removed.

9.60: Other Elements of Built Heritage

Many non-structural elements such as curtilage features, historic gardens, stone walls, historic ironwork, historic plaques and street furniture (post boxes, horse troughs etc.) contribute to our built heritage. These items are often an integral part of the urban landscape or provide significant historic references which contribute to the character of an area. These elements can be vulnerable to needless, partial or total destruction and theft as well as poor reconstruction due to carelessness and a lack of awareness.

The Cork County Council Development Plan does not designate any ACAs within the environs of the proposed scheme. It does present a number of objectives to ensure the protection of the architectural heritage resource within the County and these include:

HE 4-1: Record of Protected Structures

d) Ensure the protection of all structures (or parts of structures) contained in the Record of Protected Structures.

e) Protect the curtilage and attendant grounds of all structures

HE 4-2: Protection of Structures on the NIAH

Give regard to and consideration of all structures which are included in the NIAH for County Cork, which are not currently included in the Record of Protected Structures, in development management functions.

HE 4-3: Protection of Non- Structural Elements of Built Heritage

Protect important non-structural elements of the built heritage. These can include designed gardens/garden features, masonry walls, railings, follies, gates, bridges, and street furniture. The Council will promote awareness and best practice in relation to these elements.

10.3.3 Desktop Study

The following section presents the results of a desktop study on the general archaeological, architectural and historical heritage within the environs of the proposed scheme and was undertaken in order to inform the assessment of the potential impacts. More detailed information on site specific areas is then presented in the section describing the cultural heritage resource based on the areas covered by the individual scheme drawings (Section 10.3.4).

In general, the proposed scheme extends eastwards from the Innishcarra area through low-lying lands dominated by pasture farmland on the outskirts of Ballincollig and then continues into the western edge of the city suburbs. The scheme has been designed, where feasible, to avoid all recorded archaeological sites and architectural heritage structures within the lands to the west of the city. It then follows the river as it branches into the north and south channels in the Sunday's Well and Western Road areas and then extends through the 19th century suburbs before reaching the city centre. The present river channels within the city centre are delimited by the 19th century quay sides constructed along the margins of infilled ground reclaimed during the 18th and 19th centuries in the marsh lands outside the medieval city walls. As detailed below, a wide range of archaeological investigations have been undertaken within the reclaimed ground adjacent to the existing channels and these have typically uncovered thick deposits of dumped soils that, to date, have produced little of archaeological significance. The design phase of the scheme involved a process of ongoing consultations between the design team and the City Council, including the Conservation and Archaeological Officer, in relation to proposed design of works along the city quays.

Until the recent identification of Palaeolithic human remains amongst samples recovered in the early 20th century from a cave site in County Clare, the earliest recorded evidence for human settlement in Ireland dated to the Mesolithic period (7000–4000 BC) when groups of hunter-gatherers lived on the heavily forested island. While these Mesolithic groups did not construct settlements or monuments that have left any above ground traces, their sites can often be identified during ground excavations and by scatters of

worked flints in ploughed fields. The Neolithic period (4000-2400 BC) began with the arrival and establishment of agriculture as the principal form of economic subsistence, which resulted in more permanent settlement patterns. As a consequence of the more settled nature of agrarian life, new site-types, such as more substantial rectangular timber houses and various types of megalithic tombs, begin to appear in the archaeological record during this period. While there are no recorded Mesolithic or Neolithic sites within close vicinity to the proposed scheme, riverine environments were utilised as both food and transport resources since the earliest known arrival of human settlers on the island. As noted above, the settlement sites of both periods were timber-built and leave no above ground traces but sub-surface remains are often uncovered during ground works during developments. The sub-surface remains of Neolithic settlements within the environs of the Lee valley were uncovered during archaeological investigations on the route of the Ballincollig bypass, approx. 2km to the south of the study area.

Metalworking arrived in Ireland with the advent of the Bronze Age period (c. 2400–500 BC). This new technology introduced a new artefactual assemblage into the Irish archaeological record and this period was also associated with the construction of new monument types such as standing stones, stone rows, stone circles and *fulachta fiadh*. The development of new burial practices meant that the construction of funerary monuments such as cairns, barrows, boulder burials and tumuli or cists was fairly common during this period. The later first millennium BC and the early centuries AD, which comprise the Irish Iron Age, form the most obscure period in the Irish archaeological record. While, there is general agreement that the transition to an iron-working technology was a significant factor in the eventual demise of bronze working and was associated with societal changes, the nature and form of this transition in Ireland is far from clear.

The only recorded potential Bronze Age site in close proximity to an element of the proposed scheme is a *fulacht fiadh* located in a green field area within Coolroe townland at a distance of 150m to the east of proposed works. As with the settlement sites of the early prehistoric period, the timber-built Bronze and Iron Age settlement sites tend not leave any surface traces although the discovery of approx. sixteen Bronze Age sites beneath the topsoil on the route of the Ballingcollig Bypass indicates a strong settlement pattern within the landscape surrounding the proposed scheme during this period. There are no recorded Iron Age sites within the close environs of the proposed scheme but a number of sites uncovered on the route of the Ballincollig bypass have been dated to this period. The 'Cork Horns' artefact discovered reclamation deposits near the south jetties in the Victoria Road area of Cork city during early 20th century ground works also demonstrate Iron Age activity in the area now occupied by the city centre. The horns bear ornament in the La Tène style which is typical of the later Iron Age period and they were probably once attached to a leather helmet which did not survive (O'Kelly 1961).

The early medieval period in Ireland began with the introduction of Christianity and continued up to the arrival of the Anglo-Normans in the 12th century (c. 400–1169 AD). The establishment of the Irish church was to have profound implications for political, social and economic life on the island and is attested to in the archaeological record by the presence of church sites and associated features such as formal burial sites and holy wells. The early medieval church sites were morphologically similar to ringforts but are often differentiated by the presence of features such as church buildings, graves, stone crosses and shrines. A number of the townland names in the general vicinity of the proposed scheme record historical associations with early ecclesiastical activity, i.e. Bishops-Mill-Land, Ballinanaspig, Shanakiel and Gillabbey townlands. While this period saw the emergence of the first phases of urbanisation around both the large monasteries and Hiberno-Norse ports the dominant settlement pattern of the period remained rural-based. A detailed account of the origins and development of the ecclesiastical and secular settlements at Cork city are

beyond the scope of the present study but a summary account follows hereafter. The beginning of the urban settlement appears to have developed around an ecclesiastical centre close to the present day location of St. Finbarr's Cathedral in the southern suburbs. The earliest mention of the monastery in the annals is in AD 682 when the death of Suibne, the abbot of the monastery, was recorded. The first account of Viking raiders in Cork dates to AD 821 and by the middle of the 9th century they had established a settlement centred on the river banks around the South Gate area. This initial settlement entailed localised reclamation works along the marshy lands on the river's edge. Over the course of the following centuries the Viking settlers inter-married with the native Irish and can be more accurately described as Hiberno-Norse as the period progressed. The settlement was under the control of the McCarthys and had already begun to expand into a trading port by the time the Anglo-Normans arrived in 1177 AD.

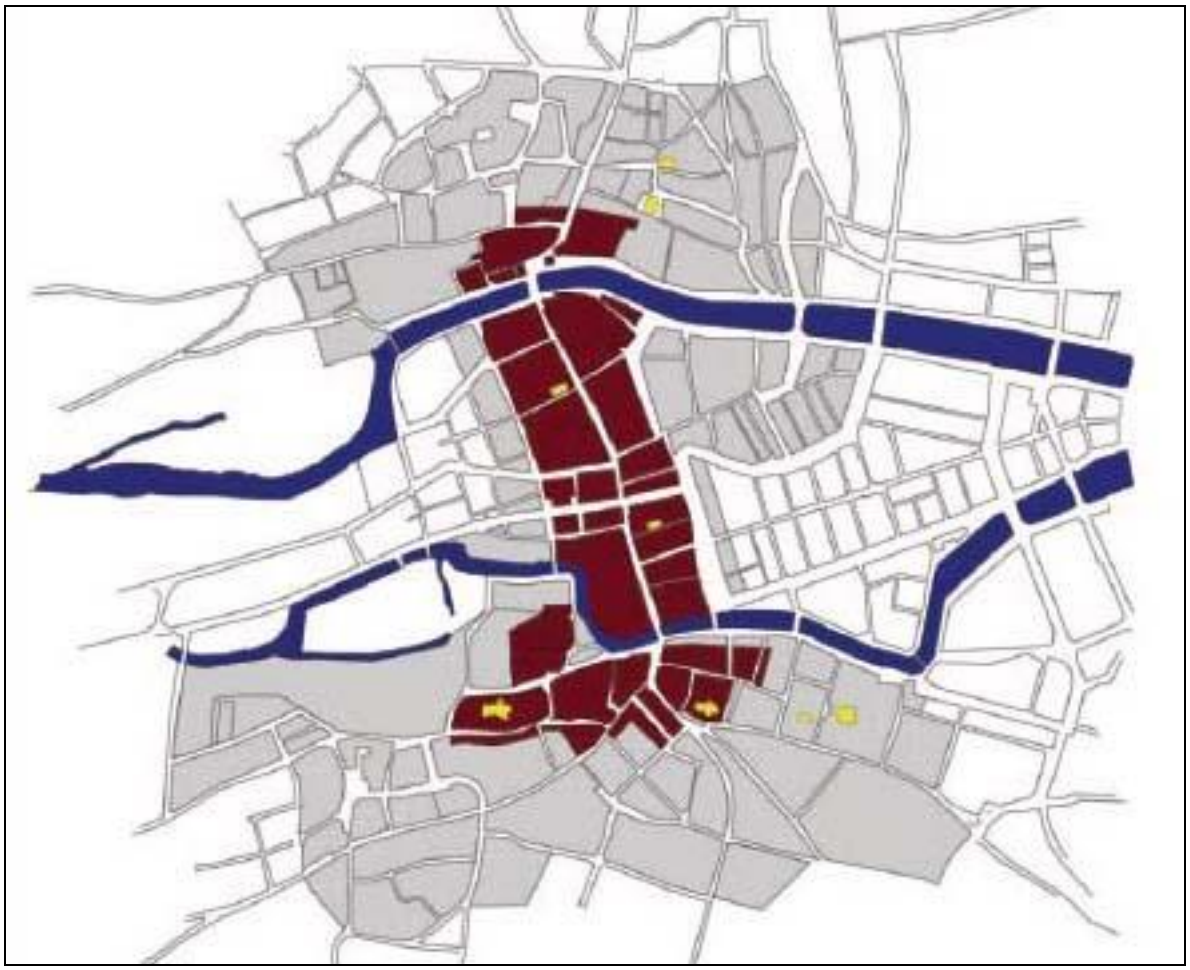

Figure 10.1 Location of Primary (red) and Secondary (grey) Zones of Archaeological Potential (Cork City Council)

The arrival and conquest of large parts of Ireland by the Anglo-Normans in the late 12th century broadly marks the advent of the Irish late medieval period, which continued up until the beginning of the post-medieval period in c.1550. The Anglo-Normans began construction of a masonry city wall in the decades following their arrival in Cork. The medieval walled city gradually incorporated two riverine islands on the footprint of the present day North and South Main Streets, which comprised the central spine of the medieval city. The two islands were initially separated by a channel which was linked by a bridge

formerly located at the junction between North/South Main Streets and Bridge Street while the river channels encircled the outside of the city walls. The walled city was accessed by timber bridges at the North and South Gates and these were gradually replaced by stone bridges during the 18th century. The walls went through a number of phases of disrepair and rebuilding throughout the medieval period and this was largely due to the instability of the underlying estuarine muds. With the development of artillery during the post-medieval period the use of walls as city defences became largely redundant. After the siege of 1690 the Cork walls were allowed to fall into disrepair and sections began to be actively demolished. There are very few surviving above ground traces of the city walls although sub-surface remains still survive under the modern streetscape. Archaeological excavations along the riverside sections of the city wall have demonstrated that it is set back from the existing quay walls beneath adjacent buildings and streets. The excavation of the riverside plot to the east of the South Gate Bridge uncovered the remains of the city wall at a distance of 12.5m to the north of the existing quay wall (Ni Loingsigh 2004). The RMP records a number of individual sites within the medieval city and the entire core settlement is encompassed under the entries for the 'historic town' (CO074-034001-) and the 'town defenses' (CO074-034002-). The proposed scheme does not contain any elements that extend onto the footprint of the city walls or within the interior of the medieval city.

While the walls no longer physically delimited the city by the start of the 18th century, the settlement was still concentrated in the overcrowded medieval core of North and South Main Streets although suburbs had begun to extend up the hillsides in areas now occupied by Shandon to the north and Barracks St. to the south. The areas that now form the main thoroughfares of the modern city centre, such as Patrick's Street, Grand Parade and South Mall, were still occupied by open river channels that extended through the undeveloped marshy islands to the east of the medieval city. The modern streetscape of the existing city centre began to form during the 18th century following the gradual reclamation of the eastern marshes. These were initially linked to the city by bridges over the channel outside the east wall which was then infilled to create Grand Parade and Cornmarket Street. The Corporation issued development leases to encourage the reclamation and development of the surrounding marshlands and also gave permission for the construction of the bridges over the channel to the east of the city. By the start of the 19th century the extensive reclamation and culverting works in the channels and creeks around the former marsh islands to the east and west of the medieval city meant that only the existing north and south river channels survived.

As extensive works were being made to reclaim the marsh islands, concurrent works were commissioned to improve shipping access to the quays developing within the reclaimed areas outside the walls. The river channels had silted up by the start of the 1800s when water depths of as little as 4 feet at low tide were recorded and this was occurring at a time when ships with increasing greater drafts were being built (Beecher 1971). Given the importance of the harbour trade to both the city and its farming hinterland, a great expense was invested during the subsequent decades on the improvement of the both the channels and quays. The works undertaken during the 18th and 19th centuries were immense in scale and have been usefully summarised in recent decades (e.g. Rynne 1999 & Leland 2001) and the following account is largely based on these sources. As noted by Rynne (1999, 197), while the deep channels of the sheltered lower Cork harbour were well suited for shipping traffic, this attribute steadily decreased in the increasingly shallower approaches to the city where water depths as shallow as three feet were recorded. Prior to the early 19th century the construction and maintenance of the quay walls was undertaken on a piecemeal basis and to varying quality by private property owners and were described by Alexander Nimmo in 1815 as "imperfect masses of rubble stone" (Ove Arup 1976). Much of the focus of the initial

phase of navigation improvement works was the construction of a "navigation wall" (also known as "the New Wall") along the south bank of the river channel initially extending eastward for some 800 yards from the area now east of Albert Quay. The navigation wall was intended to regularise the current in the river channel and to allow vessels to be drawn up-stream by horses. As vessel sizes increased in size it became necessary to dredge the upper harbour and city channels in order to facilitate access to the city. The poor condition of the city quays formed a constant constraint to this work as the poorly built walls were built directly on top of estuarine muds and dredging led to their collapse. The mooring capacity of the quays was further constrained by the fact that sections of the poorly bonded rubble-stone quay walls were prone to collapse when ships were tethered to them.

The formation of the Cork Harbour Commissioners in 1813 concentrated responsibility for the improvement and maintenance of the shipping channels and quays into one organisation. During the following decades the Commissioners instigated an extensive programme of repairing and re-building the quays in limestone ashlar construction and this included the insertion of 8,000 timber toe-piles driven to depths of 21 feet in order to facilitate dredging close to the quays. Lewis (1837) records that the Commissioners spent total of £34,389, raised from harbour fees, between 1827 and 1834 on the improvement of the city quays. Once the quays were in a stable condition the river channels were extensively dredged and the extracted material was used to reclaim areas of slob-land, including the City Park area behind the Navigation Wall. Timber wharfs began to be constructed along a number of the quays in the second half of the 19th century, including Albert, Union, Victoria, Patrick's and Penrose Quays. These features extended the docking location into the channel and allowed dredging to be carried out to increased depths at safer distances from the quay walls. In 1874 timber wharves were added to the south jetties. There were seven jetties constructed, each 43 ½ feet wide and initially separated by 120 feet of clear space which were subsequently filled in (Beecher 1971, 142).

The existing city quay walls are in the ownership of Cork City Council and they, along with their associated mooring features, are typically of 19th century date. While the survival of these masonry features in a riverine location for two centuries is a testament to the engineering skill involved in their design and construction, sections have required extensive programmes of remedial works in recent decades. An extensive program of quay repairs and complete rebuilding of sections along Albert, Penrose and Anderson's Quays was commissioned by the Council in the late 20th century and this was, in part, instigated by a collapse of a section of the quayside along Albert Quay during the 1970s. The section of quay walls along the east end of Lapp's Quay was removed and later reconstructed as part of an early 2000s commercial development along the quayside.

Although the various quays and associated features, such as river steps, mooring posts, docking rings and wharfs, within the city are not listed in the RMP or RPS, many have been included in the NIAH and these are identified in Section 10.3.4. The city centre has been sub-divided into a number of Architectural Conservations Areas (ACAs) in the Development Plan and the ACAs that encompass, or are adjacent to, the riverside in the environs of the proposed scheme are: North Main St, South Parish, Patrick's Hill, Shandon, Blackpool and Lower Glanmire. As previously noted, the Cork City Council Development Plan (2015-2021) states that "*of immense importance are the 19th century elements associated with the north and south channel. Important features include quay walls, bollards, kerbing, etc*".

As the city expanded outside the medieval core the two bridge crossings at the former medieval gates no longer sufficed to connect the new areas and new bridges within the reclaimed sections of the city began to be constructed from the 18th century onwards. Ferry crossings were an important element of the social

and economic life of Cork during the 17th and 18th centuries as they provided for the transport of passengers, livestock and goods in the period before the construction of many of the historic city bridges. The ferry operators were understandably recorded as objectors to the proposed construction of Patrick's Bridge and raised a petition that was presented to parliament in 1785 (Lenihan 2009). Despite their protestations the bridge was granted permission and, although they were compensated, they were also notified that if they did not dispose of their ferry rights then the operations would be valued and compulsorily acquired (*ibid.*). Nonetheless, the use of ferries between the city quays continued on, albeit, a much smaller scale into the 20th century.

The river bridges in Cork city centre are owned by Cork City Council and the main structural types are stone arch, metal (steel and cast iron) and concrete. The stone arch city bridges within the vicinity of the scheme were constructed between 1713 and 1902. Three of the metal bridges were constructed between 1875 and 1911 while a modern example, Cornmarket Bridge, was constructed in 2004. The concrete road bridges were built between 1961 and 1999. The Cork City Council RPS includes 13 of the bridges within the study area (Table 10.1) and one of these, South Gate Bridge, is also listed in the RMP (CO074-034012-). A number of the bridges within the city are also included in the NIAH (Table 10.1). The Cork County Council RPS includes two bridges in close vicinity to the scheme in the area to the west of the city and both of these are also listed in the RMP, i.e. the road bridges at Inniscarra (PS00458 / RMP CO073-045----) and at Carrigrohane Beg (PS00457 / RMP CO073-045----). The County Council RPS also includes a weir in the section of the River Lee (PS00459) to the east of Inniscara Bridge. This appears to be associated with the Ballincollig Gun Powder Mills on the south shore of the river, which is listed in the RMP (CO073-043----) and is a national monument in the ownership of Cork County Council. There are no works proposed within the Gun Powder Mills property or in the vicinity of the associated weir.

In general, the structural composition of bridge structures provides a good indication of the engineering, construction and transport practices dominant at the time it was built and this holds true for the examples within the study area. For example, many of the narrower stone arch bridges were constructed in the 18th and 19th centuries when pedestrian and horse-drawn traffic was common; while the majority of the metal bridges date to the late 19th and 20th centuries and include two rail bridges that reflect the dominant transport system in that period. The advent of the widespread use of private motor cars during the 20th century resulted in the construction of more than eleven bridges over the channels on either side of the city island (O' Callaghan 2012, 125). These were typically of concrete construction and comprised both multi-lane road bridges to accommodate car traffic and pedestrian bridges to encourage a concurrent increase of foot traffic in the rapidly congesting streets and to serve the expanding 19th century suburbs on the outskirts of the former medieval core.

It is noted that the flood relief works have been largely designed to avoid or minimise impacts on the bridges within the study area and the summary descriptions within this chapter are intended, nonetheless, to provide a context for development of these features over the river channels in recent centuries.

The oldest surviving bridge in the city comprises elements of the three-span South Gate Bridge, the upriver end of which dates to 1713, and the next oldest is Clarke's Bridge erected in 1766. The early maps of the city show that it was connected to the north and south by timber bridges (North and South Gate) connecting to the walled city during the 16th and 17th centuries while a series of later bridges were constructed over the channels between the walled area and the reclaimed marshes to the east. While there are no extant remains of these early Cork bridges the Council Books of Cork Corporation does

contain the following records relating to their construction and maintenance (from O'Keeffe, P.J. & Simmington, T. 1991):

Early 1600s – mention of taxes used for the repair of the city walls and bridges

1635-36 – attempt to construct stone bridge commences at North Gate but followed by references to difficulties encountered with building stone bridge in silty river bed.

14 Nov 1639 – Council Books states "the North Bridge shall be substantially built with sound and good timber and that the same shall be well paved over with stone, gravel and sand according as the best bridges of that nature and quality within the Kingdom of Ireland…"

1639 – reference to residents of East Marsh being given permission to erect a bridge at Kearle's Key provided it was at their own cost

1697 – funding raised for repair of North Bridge

1698 – Captain Dunscombe given liberty to build at his own cost a stone bridge from Tuckey's Quay to the great marsh as long as it had an arch high and broad enough to allow the passage of lighters at spring tide

Early 1700s – references to other bridges extending from the area of the walled city to the surrounding marshes. These references demonstrate the role of private enterprise in bridging the former channels outside the city wall in order to facilitate the expansion of the city into the surrounding marshy islands. The records also convey the Corporation's instructions that these bridges were not to impinge on the navigation of the channels.

7th May 1711 – Council book records that it was agreed "that a new stone bridge be built over the north river where the old timber bridge is"

1712 – record of purchase of oak timber piles for the support of the North and South Bridges.

1713 - Agreement with Thomas Chatterton, mason, and John Coltsman, stone cutter, to build the South Bridge and refers to use of tarass material left over from North Bridge. Tarass was a ground basaltic rock, imported from Holland, which was mixed with lime to form a hydraulic mortar.

An attempt to provide a definitive descriptive account of the origins and design of the existing bridge infrastructure within the study area is beyond the scope of the present assessment and the summary descriptions of each structure presented hereafter are sourced from the following publications: *National Inventory of Architectural Heritage*, *The Industrial Archaeology of Cork City and its Environs* (Rynne 1999), *Heritage Bridges of County Cork* (Tobar Archaeology 2013) *Irish Stone Bridges: History and Heritage* (O'Keeffe & Simmington 1991) and most especially *Where Bridges Stand: The River Lee Bridges of Cork City* (O' Callaghan 2012). Further details on the bridge infrastructure within the vicinity of the scheme are presented in the ADCO survey report (Appendix 10A).

Table 10.1 Bridge structures in the vicinity of the proposed scheme

Bridge	Status	Details
Patrick's Bridge	NIAH 20513133 RPS (no ref.)	The existing St. Patrick's Bridge was opened in 1861 to a design by Sir John Benson. This three-span stone-arched structure replaced the previous stone bridge, opened in 1789, which collapsed during floods in 1853. Cork Corporation borrowed funds for the reconstruction of the replacement bridge through the 1856 Cork Bridge and Waterworks Act at a cost of £19,000. The foundations are 14' below the low water line and support piers are formed with iron reinforced concrete. The main base and under-works were constructed of Foynes Limestone with good quality local limestone for the superstructure, which is built of finely jointed ashlar. The foundation stone to the north-east abutment is a two-tonne block of Foynes limestone with a glass vase inserted, containing coins and scrolls of the mid 19th century and the names of local dignitaries and building contractors. Effigies of Saint Patrick, Saint Bridget, Neptune and three sea goddesses adorn the key-stones of each elliptical arch and were sculpted by Scannell's of Douglas St. Most of the original moulded stone balusters have been replaced with cast, reinforced concrete as part of various reconstruction works in 1961 and 1981. Cast iron gas lamps were mounted on stone pedestals on the parapets in 1861 and have since been replaced with electric lighting. The traffic lights on the north end are mounted on the old gas lighting poles, from which the lanterns are missing. The bridge presently carries an asphalt-covered road with 3.2m wide footpaths of concrete paving flags on either side.
South Gate Bridge	RPS 328 RMP CO074-03412	The original part of South Gate Bridge was approx. 15 ft wide. There are two relatively thin 4ft 5in. river piers. The central arch is 26 ft span with a three-centred intados. The 21 ft and 23 ft side arches are also three-centred. The ring stones are properly wedge-shaped voussoirs… Brunicardi states that Alexander Deane, architect, designed the downriver extension in 1824"… A council book entry of 1745 states that the bridge was greatly endangered by rubbish being thrown in the channel and the water bailiff was directed that "no boat take ballast in any other area until the rubbish was removed. (O'Keeffe & Simmington 1991)
Clarke's Bridge	RPS 026 NIAH 20503247	Clarke's Bridge was designed by Thomas Hobbs and, when opened in 1776, it was the largest span stone arch in Ireland at 68 feet although it was superseded by Thomas Ivory's bridge in Lismore ten years later. Its design may have been influenced by William Edward's 1750s Pontypridd Bridge in Wales over the River Taft. The main arch is of limestone while the rest of the structure is built of red-clay slate. The low parapet walls are built of red sandstone with limestone coping. A brick surrounded opening with steel lintel has been inserted on the south west parapet wall although its purpose is unclear. The quay parapet walls to the north west abutment have been truncated and the stone wall replaced with steel railings. Corrugated steel sheeting has been bolted to the north east spandrel presumably to protect the bridge from any accidental damage from construction works taking place on the adjacent quayside. The bridge was refurbished and widened to the east in 1993 and presently accommodates a single vehicular lane. There are concrete footpaths on either side of the carriageway. Some inappropriate repairs have been made to the parapet coping of this bridge and adjacent quay walls, both where stone was replaced with concrete blocks and where damage has been repaired with an unsuitable stone indent.
Alderman O' Reilly Bridge	RPS 814 NIAH 20500786	(NIAH) This double-arch stone road bridge was built c. 1770, with brick U-shaped cutwater. Ashlar limestone voussoirs with rubble stone walls and parapet. This bridge was built in the late 18th century to connect Reilly's Marsh with the North Mall and was later incorporated into the North Mall Distillery which was founded in 1779.

Bridge	Status	Details
Vincent's Bridge	NIAH 20500785	This bridge was constructed to serve Sunday's Well and Shanakiel which were developing as residential areas in the mid19th century. A timber bridge used as a temporary structure during building of Patrick's Bridge was relocated to this area in 1862. This was then replaced by the existing 3.5m wide pedestrian bridge, funded under the 1875 Cork Improvement Act, and is named after the nearby Saint Vincent's Church in Sunday's Well. The three-span structure consists of a concrete walkway supported on braced steel beams supported, in turn, on structural steel lattice girders along the edges of the bridge, which double as parapets. The intermediate supports are pairs of steel caissons, filled with concrete, attached to cast-iron pillars at deck level and tied in to the lattice girders. The concrete walkway has an exposed aggregate finish with drains to both sides. Lighting is provided by means of fluorescent light fittings under the handrails on both sides. A single cable duct has been mounted externally on the eastern side of the deck structure. The design of this bridge is unique among Cork bridges and represents the increasing popularity throughout Britain and Ireland of iron architecture in the late 19th century when there were still a reasonable number of foundries in the city. The detailed cast iron parapet pillars are significant in terms of their level of decoration and they create elegant dressings to the lattice framework of the parapets.
Clontarf Bridge Brian Boru Bridge	NIAH 20508001 NIAH 20506355 Both bridges are included in RPS (no reference numbers assigned)	Opened 1 January 1912; Clontarf and Brian Boru Bridges comprise scherzer-rolling lift, bascule railway bridges over the south and north channels in order to link the former West Cork Railway terminus at Albert Quay with the Great Southern and Western terminus. Both bridges featured steel spans supplied by the Cleveland Bridge and Engineering Company fitted onto 6 circular piers. Following re-decking in 1957, and replacement of a fractured supporting girder after collision of a boat in November 1965, Clontarf Bridge functioned as a lifting railway bridge until 1976 when the lifting gear counterweights were removed along with the railway system and the structure was transformed into a stationary road bridge. The bridges were reconstructed in the late 20th century and are no longer operational. They have composite steel and concrete superstructures comprising four simply supported unequal spans. The bridge extremities are supported on stone or concrete abutments set into the quay walls and the internal supports consist of braced pairs of stone columns with steel collars. The steel superstructure is made up of braced girders connected by means of a combination of bolts and rivets and sitting on elastomeric bearings. Three discrete reinforced concrete slabs support the eastern footpath, the carriageway and the western footpath respectively. The old steel truss bascule supports rise above carriageway level in the longitudinal opening between the concrete slabs. The footpaths are separated from the central road area by a railing of bolted steel plates. Decorative steel railings are supported on concrete edge beams on both sides of the bridge. The footpaths and carriageways have asphalt surfaces.

Bridge	Status	Details
Parnell Bridge	None	The existing Parnell Bridge was opened in 1971 and comprises a concrete-built structure. It rests on newly reconstructed stone abutments and features limestone cladding over the concrete ends and the railing plinth of the parapet. The asphalt-surfaced bridge carries two lanes of traffic in each direction with flagged footpaths on both sides and a concrete central reserve. It has three unequal spans, the northernmost span being significantly shorter than the other two. The deck is made up of precast concrete beams and in-situ concrete slab simply supported on profiled concrete piers and concrete abutments cast into the quay walls. A flight of steps down to the river forms part of the south west abutment of the bridge. A gate, which formerly restricted access from the street to the steps and the small paved landing beside the bridge has been removed. This crossing was originally spanned by the Sir Thomas Deane designed, stone-arched, Anglesea Bridge which opened in the 1830s. This was then replaced in 1882 by a steel lattice girder bridge, which had a swinging central span and 2 fixed ends and was designed by T. Claxon Fiddler of London. The limestone abutments of this bridge were retained under the existing structure and two lamp standards were moved to the open public area to the north west of the bridge.
Parliament Bridge	RPS 270	This single-arch limestone bridge, with cut limestone balustrade, fine voussoirs and modillion cornice, was opened in 1806 and replaced an earlier structure dating to the 1760s, which was damaged by a flood in 1804. It was designed by Andrew Hargrave and constructed at a cost of £4,000. The span measures 65' 4", with an overall width of 44', and has 8' wide concrete footpaths on either side. The bridge was re-furbished in the 1990s and there is also evidence that it was damaged in 1922 during the Civil War, after which some of the limestone balustrades were replaced with concrete (O' Callaghan 2012, 57).
Thomas Davis / Wellington Bridge	NIAH 20865053 RPS (no. ref.)	This triple-arch road bridge was built c.1830 in order to provide a crossing the expanding Sundays Well area and was constructed by the Paine Brothers to a design by the engineer Richard Griffith. It was initially named Wellington Bridge and this name remains in common usage, although it was later renamed as Thomas Davis Bridge. The cut limestone structure has a central arch of 50' in width and two side arches each measuring 45' wide. It has dressed limestone walls with segmental-arched openings, ashlar voussoirs, string course at road level, spandrels, parapet and U-cutwaters. Inscribed plaques in Irish and English to parapet. Tarmacadam to carriageway with footpath to east side.
Gaol Bridge	RPS 698 NIAH 20866133	This road bridge was constructed in 1835 in order to connect the County Gaol with the recently constructed Western Road and is of particular note as it was built to a design by the internationally renowned engineer, Marc Isambard Brunel. It comprises a single arch structure of cut limestone with a 50' wide span and a width of 31' 6" with a 3' wide footpath. Segmental arch having margined channelled ashlar limestone voussoirs, cut-stone string course with dressed stone blocks to parapet having segmental-coping and tooled bands.
Donovan's Road Bridge	NIAH 20503318	This single arch road bridge crossing south channel of River Lee was constructed in 1902 to link College Road with housing developments developed by Thomas Donovan, who provided much of the funding. The limestone structure has low parapet limestone walls and has an arch span of 29' long by 29' wide. It was designed by the Cork engineering firm W.H. Hill & Son and was constructed by Patrick Murray builders. The construction required the excavation of the riverbed to build abutments and piles were driven under the northern end (O' Callaghan 2012, 96).
Daly's Bridge	RPS 722 NIAH 20866038	This single-span suspension footbridge was built 1927 at the former Dooley's Ferry crossing between the Mardyke and Sundays Well. It is of wrought-iron lattice construction supported by wrought-iron towers on blocks at either side and has a lattice parapet and a wooden plank walkway. It is suspended from cables anchored from supports on both banks and has a span of 160'. While it is named after James Daly who part funded its construction, it is widely known as the Shaky Bridge due to the movement of its carriageway. Designed by Cork City Engineer S.W. Farrington with steelwork by the London-based David Rowell & Company of Westminster, it is the only suspension bridge in Cork city.

Bridge	Status	Details
Trinity Bridge	none	This footbridge was constructed in 1977 to connect Morrison's Island with Union Quay and is named after the nearby Holy Trinity Church. Designed by Cyril Roche and built by Public Works Ltd, the concrete, iron-railed structure has a 100ft span and measures 12ft wide.
Nano Nagle Bridge	none	This footbridge was constructed in 1985 as part of the Cork 800 celebrations. The single arch concrete, metal-railed structure was constructed by Site Services Ltd to a design by John O' Donovan, engineer, and is named after the founder of the nearby Presentation Order school on Cove Street in 1777 (O' Callaghan 2012, 131).
Michael Collins and Eamon de Valera Bridges	none	These two multi-lane road bridges underwent parallel construction by Ascon Ltd, to a design by J.D. Shinwick, during the early 1980s as part of the development of a new road system within the east end of the city centre.
Christy Ring Bridge	none	This multi-lane road bridge was constructed by Ascon Ltd in the late 1980s and the project was commissioned order to ease traffic congestion on Patrick's Bridge
Shandon Bridge	none	The construction of this foot bridge in the early 2000s was commissioned as part of the Millennium celebrations and the design, by McGarry Ní Éanaigh Architects/Muir Associates Engineers, was chosen as the winning entry in an international competition commissioned by the City Council. Its main features include two symmetrical steel side arches, enhanced with ambient lighting, and a walkway constructed of tropical hardwoods (O' Callaghan 2012, 128).
Mardyke Bridge	none	This foot bridge was constructed in 2005 as part of the Banks of the River Lee project adopted by the City Council in the *Cork City Development Plan 2004* and to coincide with the city's year as European Capital of Culture (O' Callaghan 2012, 129). The purpose of the bridge was to form part of the development of the Lee Fields to the west of the city as an amenity area and to facilitate pedestrian and bicycle traffic. The bridge was constructed by Harland & Wolff of Belfast to a design by Fehilly Timoney Gifford Engineers and installed by Fleming Construction. The steel bridge contains a 3m wide walkway with a span of 57m and the main feature is an inclined single arch on the east side. The structure was transported to the site by road and then lifted into position with a crane to rest on concrete pile supports set into both banks.
St Finbarr's Bridge	none	This road bridge was constructed in the late 1990s by P.J. Hegarty & Sons and formed part of a wider attempt to ease traffic congestion in the city, which included the development of a nearby multi-storey car park.
Innishcarra Bridge	PS00458 NIAH 20907328 RMP CO073-045	(Tobar 2013) Innishcarra Bridge is a 19th century structure crossing the Lee River at the western end of Ballincollig town, immediately north of the west entrance to the Gunpowder Mills and Regional Park.It has twenty four arches, with twelve crossing the river and the remainder being flood arches ranged across the grassy flood plain to the south. The height of the arches increases to the centre, creating a hump backed carriageway. For its time it is a narrow bridge with a width of 5.37m and just about accommodating two way traffic. The arches are defined by rubble limestone voussoirs. The central arch has been repaired. The piers are built of coursed rubble stone, protected by pointed cutwaters that rise unusually to the top of the parapet wall. These full height cutwaters may have originally accommodated pedestrian refuges in the parapet wall, but if so, they are now all blocked. The inner faces of some arches have niches to support the centering. There has been extensive damage to the parapet walls, and repairs are much in evidence, however, some vertically set coping stones remain along the parapet walls. Charles Wilkes, superintendent of the Ballincollig Gunpowder mills from 1805, rebuilt Innishcarra Bridge to provide safe transport for the product of the mills (Cox and Gould 2003, 76). The bridge is very much atypical of 19th century bridges in Cork, it is much closer in style to bridges built in the 1700s, with a narrow carriageway, semi-circular arches, fairly undressed stonework, and a pronounced hump. Nonetheless, the bridge is clearly well built, and has stood the test of time, accommodating an exponential increase in the volume of traffic passing over it.

Bridge	Status	Details
Carrigrohane Beg (Bannow Bridge)	PS00457 NIAH 20907354 RMP CO073-045	(NIAH description) Triple-arch hump back road bridge, built c.1780, spanning Shournagh River. Segmental-headed arches with limestone voussoirs, springing from dressed limestone piers, with V-cutwaters to east elevation. Rubble sandstone spandrels and parapet walls with concrete capping. The masonry construction of this road bridge is of particular interest and was clearly executed by expert craftsmen. Originally named Leemount Bridge, it was renamed Bannow Bridge when the new Leemount Bridge was built to the south-east in the mid nineteenth century.

Potential Underwater & Riverine Archaeological Features

All shipwrecks over one hundred years old, including underwater archaeological structures, features and objects are protected under the National Monuments Acts 1930-1994. The Record of Monuments and Places does not include all underwater archaeological sites and as a result riverine schemes can potentially negatively impact unrecorded underwater heritage resources such as bridge footings, weirs, millraces and mooring features. While many of these features may be of recent origin it is possible that some may have been sited at advantageous crossing points, fishing spots and landing areas that were also utilised. An example of their possible importance is the potential for the presence of artefacts that may have been accidentally lost during centuries of repeated use of localised crossing point. The Cork City Development Plan (2015-2021) notes that all development proposals which will impact on riverine, intertidal and sub-tidal environments should be accompanied by an archaeological assessment as "*it is possible that archaeological riverine-related features may survive. These may take the form of walkways, fish-traps, timber jetties or simple mooring posts*".

An underwater survey of the entire length of the river channel subject to flood defence works was undertaken by ADCO in June 2016 and relevant extracts are provided in Section 10.3.4. The riverine features identified during the underwater survey, an assessment of impacts on these features and proposed mitigation strategies are presented in Table 10.4 of this chapter, which is directly sourced from the ADCO report (Appendix 10A).

Excavations Database

The Excavation Database contains summary accounts of all licensed archaeological investigations carried out in Ireland (North and South) from 1970 to 2016. The database contains numerous summaries of archaeological excavations within the Cork city section of the study area and occasional site investigations in the County Council area to the west. These range in scale from small monitoring and testing investigations within individual properties to large scale excavations of sites that have produced evidence that traces the development of Cork from the original Hiberno-Norse settlement, its development into an Anglo-Norman walled city and the extensive land reclamation works as it expanded outside the walled centre during the post-medieval period. The full extracts from the relevant database entries are presented in Appendix 10E while summary details on the excavations undertaken in close proximity to individual elements of the scheme are provided in Section 10.3.4.

While the majority of the excavations in the areas outside the medieval city walls have produced little of archaeological significance, it is possible that unrecorded, sub-surface post-medieval archaeological features or artefacts may still remain undetected below the present ground surface along areas of the existing quaysides.

Townland names

The boundaries and nomenclature of the Irish townlands were recorded and standardised by the Ordnance Survey of Ireland during the 19th century. The Irish roots of townland names often refer to natural topographical features but some name elements may also give an indication of the presence of past human activity within the townland, e.g. dun, lios, rath indicate the presence of a ringfort while names such as temple, saggart, termon, kill suggest an association with a church site. A number of the townland names within the study area record the presence of known ecclesiastical sites, i.e. Gillabbey and Shanakiel.

Table 10.2 Translation of Townland Names in vicinity of study area (Source: www.logainm.ie)

Townland	Translation
Curraghbeg	An Chora Bheag (the small weir / ford / fence)
Coolroe	An Chúil Rua (the red corner / nook)
Coolyduff	Cúil Uí Dhuibh (O'Duff's corner or angle)
Lackenshoneen	Leacain tSeoinín (little John's hill side)
Carrigrohane	Carraig Ruacháin (Rohane's rock)
Inchigaggin	Inse Gaigín (Goggin's river meadow / island
Farranmacteige	Fearann Mhic Thaidhg (Mac Teige's land)
Gillabbey	Mainistir Ghiolla Aodha (abbey of Finbar alias Gilley)
Shanakiel	An tSeanchoill (old church)

10.3.4 Area specific cultural heritage environment (incorporating underwater survey details)

This section presents area specific details on the cultural heritage environment in close proximity to the footprint of the proposed scheme. In each instance, proposed general interventions for each area are summarised and this will include grouting the city quay walls and foundations as well as repointing, cleaning and, as required, repairing the quay wall façades. Details on the protected archaeological and built heritage resource in close proximity to proposed works are provided in each area with brief summaries of relevant historic information. This section also provides relevant extracts from the ADCO underwater survey report and should be read in conjunction with the full report which is presented in Appendix 10A.

Curraghbeg Townland

The proposed flood defences in this area will comprise a combination of an embankment and wall (1.8m high) in the ground surface adjacent to the bank. This area forms part of a modern commercial yard and is shown as undeveloped fields on the historic OSI mapping. Two archaeological sites: Innishcarra Church (CO073-037002-) and an associated graveyard (RMP CO073-037001-) are situated in lands adjacent to the opposite river bank, at a distance of 150m from proposed works. The church is also listed as a Protected Structure (PS00853) in the County Development Plan. The church was recorded as being in poor condition in 1615 and there are other later references to repairs during the 18th century before it was abandoned in 1820. The northern section of the area to be impacted by the proposed flood wall is occupied by a modern yard surface while the embankment in the southern area follows the east side of the access road leading to the yard area. The river bank is at an average distance of 10m east of the proposed works and a line of trees along the section of the river's edge directly opposite the church and graveyard will act as a visual screen between the defences and these recorded archaeological sites (Plate

10.1). No potential cultural heritage sites were noted during the inspection of the area of the proposed works.

Garravagh Townland

The flood defences in this area will comprise a 2m high embankment and pumping station within a pasture field adjacent to south side of the R618 road and are approx. 240m to the north of the river channel. This area is shown as undeveloped fields liable to flooding on the historic OSI maps and there are no recorded cultural heritage sites in close vicinity to works. Innishcarra Church (CO073-037002-) and Graveyard (CO073-037001-) are 270m to the southwest of the nearest element of proposed works in this area. The area to be impacted by the proposed works comprises an area of level pasture adjacent to a tree-lined field boundary (Plate 10.2) and no potential cultural heritage sites were noted during the inspection.

Garravagh Townland

The flood defences in this area will comprise 2.5m high embankments and a pumping station within pasture fields adjacent to the west and east sides of the public road extending north from Innishcarra Bridge (RPS 00458/NIAH 20907328/RMP CO073-038----). The bridge is located approx. 20m to south of the nearest element of proposed works and no other works are proposed in the vicinity of this protected structure. The footprint of the proposed defence areas on both sides of the road are shown as undeveloped fields liable to flooding on the historic OSI mapping. The proposed embankment on the east side of the road extends around the rear of a row of modern road side houses while the works on the west side extend around the car park of the Inniscara Inn and then continues south through a green field area. The areas to be impacted by the proposed works comprise sections of level pasture fields and no potential cultural heritage sites were noted during the inspection (Plate 10.3). The views to the proposed works are screened from the bridge by a tree-line extending along the river bank.

Coolroe Townland

The flood defences in this area will comprise a combination of an embankment and a flood wall (0.8m above existing ground) within a section of a field adjacent to a private house and regrading of adjacent section of the public road to the east. A structure is shown in the location of the existing cottage on the OSI maps while the area of the proposed defences within the adjacent field is shown as undeveloped ground. The cottage is not a listed structure and no works to this building are proposed. The area to be impacted by the proposed works around the house comprises a level green field area and a localised ramp of hardcore stone on the south side appears to have been deposited as an informal flood defence (Plate 10.4). The adjacent tarmac-covered road to the east is present on the OSI maps and the proposed regrading works will entail raising the surface to a maximum of 0.6m above existing. While a tall random rubble boundary wall around the Gun Powder Mill property is set back from the north side of the road in the area further to the east, the section of the road to be regraded is flanked by a low random rubble roadside wall of differing construction that appear to have been created to define a bend in the road. There are no recorded cultural heritage sites within close vicinity to the proposed works. A *fulacht fiadh* (RMP CO073-089----) is located in a green field area 150m to the east; Innishcarra Bridge (NIAH 20907328/RMP CO073-038----) is 120m to the north and the west entrance to Ballincollig Gun Powder Mill lands (CO073-043----) is 70m to the north, on opposite side of the adjacent public road. No potential cultural features were noted during the site inspection of the footprint of the proposed work areas.

Coolyduff and Lackeenshoneen Townlands

The flood defences in these two areas are located to the south of the R618 and to the north of the river channel. The works in Coolyduff townland will comprise a 2m high embankment and pumping station within a green field area extending to the south of a row of modern private houses. The proposed works are located 40m north of the channel at the closest point in an area shown as undeveloped fields on the historic OSI mapping. The proposed works in Lackeenshoneen townland will comprise two sections of 1m-1.7m high sheet-pile flood walls faced with random rubble cladding that will extend along the river bank to the rear of modern private houses. The lands containing Ballincollig Gun Powder Mill (CO073-043----) are located on the opposite side of the channel at a distance of 40m to the south of the proposed flood walls in this area. There are no recorded cultural heritage sites in the vicinity of the works and both areas are shown as undeveloped lands on the OSI historical maps. No potential unrecorded features were noted during the site inspection. The views to the proposed location of the works were inspected from the park lands within the Gun Powder Mills landholding and are screened by the existing tree-line along the south river bank (Plate 10.5).

The following provides the details on the underwater archaeological survey of the section of the river channel within this area. The riverbed is composed of rounded cobbles (<60mm) and pebbles (<30mm) along this stretch of the waterway. These deposits overlie pockets of coarse gravel (depth of 50mm). Occasional boulders are present (400m-500m size range) and sections of bedrock are frequently exposed on the riverbed. The central channel is remarkably clean, any portable objects having been washed further downstream to suitable collection points. In contrast, a considerable amount of modern material is located adjacent to the riverbank, on the north side of the channel, where house-plots back onto the river. Building rubble has been frequently dumped along this side of the river to provide a form of rock-armour protection and prevent erosion of the riverbank. Some of this materiel has been washed into the north side of the flow-channel (during flood waters) and comprises concrete rubble blocks, breeze blocks, car tyres, scaffolding sections, miscellaneous steel objects, an engine block, and a washing machine drum, etc. Riverbed deposition was observed along the easternmost extent of the survey area, where river pebbles and gravels have accumulated to a depth of c. 300mm. Frequent modern debris is located within the deposit matrix and comprises fragments of water-eroded pottery, fishing weights, and other small objects. Given the compact, shallow, nature of the riverbed deposit encountered, coupled with the high water-velocity present during flood-water events, the archaeological holding content for this stretch of the river can be considered extremely low.

Carrigrohane Road

The flood defences in this area will entail the construction of embankments within the green field areas on the north side of Carrigrohane Road and will include a section extending behind a cluster of 20th century houses at the west end. There is also a section of a roadside flood wall proposed at the east end of the road. There are no recorded cultural heritage sites on the footprint of the works and the area is shown as undeveloped land liable to flooding on the historic OSI maps. The NIAH lists a gate lodge (ref. 20907361) and country house (ref. 20907367) in the property located on the opposite side of the road from the west end of the works. The views from the lodge to the proposed embankment were assessed and are screened by the existing tree-lined field bank to the south of the proposed embankment (Plate 10.6). The 1st edition 6-inch OSI map indicates that the construction of a new road on the line of the existing Carrigrohane Road was in progress by the late 1830s. The former line of the Cork and Muskerry Light Railway is shown extending on the line of the road on the 25-inch OSI map (1888-1913 series). This

narrow gauge line (3 feet) was opened in the 1880s and continued in operation until the 1930s, when much of the track was removed. The existing road and adjacent footpath on the north side appear to occupy the extent of the former rail track. There are no associated rail features, such as stations, platforms or sidings, shown on the 25-inch OSI map within the lands that will be impacted by the proposed flood defences. Nothing of cultural heritage significance was noted during an inspection of the lands to be impacted by flood defence works in this area.

Kingsley Hotel

A glass flood wall will extend along the existing footpath between the modern Kingsley Hotel and the river channel. The construction of a concrete wall and regrading of the footpath and car park to the east of the hotel are also proposed. The existing river wall in this area will be retained. There are no recorded cultural heritage sites on the footprint of works and the area shown as occupied by osiery (willow) growth on 1st edition 6-inch map. The modern hotel premises are built on the former location of an unroofed public swimming pool known as the 'Lee Baths' that opened in 1934 and closed in 1986. The former baths are not a listed structure and no surface traces remain. There are no recorded cultural heritage sites on the footprint of works and the area is shown as undeveloped ground on the historic OSI maps. Nothing of cultural heritage significance was noted during an inspection of the lands to be impacted by flood defence works in this area.

Lee Road and Modern Extension to Waterworks

The flood defences in this area will entail the creation of new section of embankment at the west end and augmentation of the existing riverside embankment within a 20th century extension to the City Council waterworks complex. The works will also include regrading of a section of the Lee Road located to the south of Clanloughlin House, which is listed in the NIAH (20865004). The house is located approx. 100m to the northwest of the proposed road regrading works. The grounds of Our Lady's Hospital (City Council PS620) and associated buildings and curtilage features are approx. 100m to the north east of the proposed road regrading works. This section of road is present on the historic OSI maps and is presently surfaced with modern tarmac with a concrete footpath along the random rubble boundary wall delimiting the south end of the Clanloughlin House property on the north side of the road (Plate 10.8). Refurbishing works to the boundary wall are proposed as part of the works. The proposed new section of embankment to the south of the road extends through an overgrown area adjacent to a modern UCC building and west of the modern extension to the waterworks property. The existing embankment within the waterworks extension comprises a tree-lined, earthen feature extending adjacent to the river bank (Plate 10.9). The west end is located 460m west of the historic core of a waterworks complex listed in the RMP and the east end of the proposed works terminates to the east of this area. There are no recorded cultural heritage sites on the footprint of these works and the area is shown as undeveloped ground 'Liable to Flooding' on the historic OSI maps. Based on consultation with waterworks staff at time of inspection, the area within the modern extension to the waterworks was extensively infilled during reclamation works in the 20th century.

Waterworks

The flood defences in this area will entail a roadside 1.5m high flood wall with random rubble limestone finishing along south side of the section of Lee Road that extends through the historic core of the waterworks complex. The historic core of the waterworks complex is listed in the RMP (CO074-056----) and the proposed wall extends in close vicinity to the north side of the waterworks engine house which is also listed in the RPS (PS619) and NIAH (20865039). This building was constructed in 1888 and occupies

the site of an earlier turbine house built in 1858. It is constructed with alternating courses of red sandstone and limestone and the round-headed window openings, including those on the roadside, have limestone hood mouldings alternating polychromatic stone voussoirs, cut limestone sills and fixed timber windows (NIAH). The round-headed double-leaf timber panelled door is located on the western elevation while cast-iron pipes exit from base of the eastern elevation. The boundary with the roadside is formed with cut limestone kerbing and cast-iron railings (Plate 10.10). There are no direct impacts indicated to the building and the roadside limestone kerb and cast-iron railing which are adjacent to the line of the proposed flood wall. The low random rubble boundary wall extending along the south side of the Lee Road to the west of the waterworks is on the line of the proposed flood wall. This is not listed in the NIAH or RPS and forms a roadside boundary which is not interpreted as a curtilage feature associated with the waterworks.

Sundays Well and Thomas Davis Bridge

The proposed in-channel sheet pile wall to the west of the north end of Thomas Davis Bridge is shown abutting the bridge structure and will have random rubble limestone cladding on the wet side. Works on the east side do not extend to the bridge and will comprise a random rubble limestone clad sheet pile wall to be constructed in-channel, adjacent to the existing river wall, and will extend along the back gardens of three riverside houses (2m above existing ground) at the east end of this area (Plate 10.11). Thomas Davis Bridge is listed in the RPS (no ref.) and NIAH (20865053) and is also within the Proposed Sundays Well ACA. The boundary of the Proposed ACA to the east of the bridge comprises the terrace of houses on the opposite side of road from the river and the proposed in-channel sheet pile wall on the wet side of the existing river wall is outside this area (Plate 10.12). The random rubble river wall in this area is not listed and an entire section at the east end has been rebuilt in recent years (Plate 10.14). A concrete step feature with poorly preserved random rubble riverside wall extends down to the channel opposite Janeville Terrace (ITM 565361, 571624) (Plate 10.13). Access to the steps is via a low section of the river wall partially blocked with modern steel rod inserted into the river wall. These steps are not indicated on the 1st edition 6-inch OSI map but are present on the 25-inch edition indicating a possible construction date in the second half of the 19th century. The steps are not listed in the RPS or NIAH. The east end of the sheet-pile wall will extend along the tree-lined back gardens of three riverside houses on the south side of Sunday's Well (Plate 10.15). The wall will also extend partially around the west and north sides of the westernmost building, which is listed in the NIAH (20866031). These three houses are also located within the Proposed Sunday's Well ACA. The Sunday's Well area takes its name from a well reputably located on the hillside formerly occupied by woodland known as *Sionnach-Coill* (foxes wood). While a settlement in the Sundays Well area was recorded in the 18th century, the majority of the existing streetscape dates to the 19th century.

The following provides the results of the ADCO survey of Thomas Davis Bridge. This bridge, formerly named Wellington Bridge, is located on the North Channel, spanning the river between the Western Road and Sunday's Well Road. Lewis's Topographic dictionary describes the structure as follows:

> Wellington Bridge, at the western extremity of the city, near the termination of the Mardyke, and close to the division of the main channel of the Lee, is a noble structure of hewn limestone, erected by Messrs. Pain, from a design by Richard Griffiths, Esq.: it consists of a centre arch of 50 feet and two side arches each of 45 feet span, with solid parapets, the piers of the arches sunk in caissons; and opens a fine communication with the new western road, near George the Fourth's bridge.

The bridge was built c. 1830 and is depicted a short time later on the OS Frist Edition Map of 1843. It was constructed of dressed limestone and comprises three archways. The arch-rings are segmental in form, composed of 42 arch-stones with ashlar voussoirs. Triangular cutwaters are present on both the upstream and downstream side of the structure. The bridge measures 50m in length x 9.28m in width.

Western Road

The flood defences in the area to the southwest of Thomas Davis Bridge will comprise a 1.9m high embankment and regrading of a modern pathway close to the divergence of north and south channels (Plate 10.16). The construction of an in-channel flow control structure is also proposed in the adjacent section of the south channel at the location of a modern footbridge. This general area is shown as undeveloped ground on the historic OSI maps and there are no recorded cultural heritage sites on the footprint of these works. The NIAH includes the Sacred Heart Church (20865054), located 70m to east of works, and Thomas Davis Bridge (20865053) which is located 25m to northeast of the proposed works.

The following provides the results of the ADCO survey of the location of the flow control structure. A 50m section of riverbed surrounding the location of the proposed flow-control structure was visually assessed; an area located close the south channel's starting point. Water depth at this location was shallow (500mm max.) and negated the need for dive survey; a waded/ snorkel survey of the area being undertaken. The riverbed is composed of rounded- sub-rounded pebbles (<30mm) and occasional cobbles (<65mm). This forms a compact deposit, measuring c.300mm in depth that overlies a substratum of course sand and gravel. The riverbed retains its natural character and can be considered to have a medium holding-content. Very little modern debris was encountered on the riverbed along this section of the channel. The riverbed along the upstream survey area is composed of rounded to sub-rounded cobbles, ranging in size from 50mm x 40mm to 70mm x 60mm, and rounded pebbles; forming a compact deposit that ranges in depth of between 80mm and 100m. A hand-penetration depth of 40mm was achieved in places, where the underlying river gravel was exposed. As observed for the North Channel, little surface debris was encountered. The riverbed appears to retain is natural character and it is likely that any archaeological material, structures, or features would lie buried at depth within riverbed sub-stratum.

UCC Sports Ground

The flood defences in the area between the UCC Sports Complex and the channel will entail the demolition of the existing modern concrete kerb and railing and replacement with a reinforced concrete flood defence typically 1.4m above existing wall level. The proposed flood wall terminates at a distance of approx. 15m to the east of Thomas Davis Bridge. The entire area now occupied by the sports ground and the riverside concrete footpath and railing (Plate 10.17) is shown as undeveloped on the historic OSI mapping. The 20th century clubhouse within the adjacent sports ground is listed in the NIAH (ref 20865066) and a modern extension is located 10m to south of the nearest section of the modern railing to be replaced. The club house was impacted by flooding in 2008 and has been subject to repairs. This area is located within the Proposed Mardyke ACA. The existing concrete kerb and railing boundary is a modern feature and is not interpreted as a curtilage feature associated with the clubhouse.

Daly's Bridge

Works in this area will involve the regrading of the northern section of the Ferry Walk road that extends between the sports ground and Fitzgerald's Park to the east (Plate 10.18). A roadway on the existing line of Ferry Walk is shown leading to a former ferry crossing on the historic OSI mapping in the area now

spanned by Daly's Bridge which is a Protected Structure (PS722). The NIAH also lists the bridge (20866038) as well as its adjacent gates/railings/walls (20866065) and riverside ferry steps (20866214) (Plate 10.19). All of these features are located outside the scope of the proposed road regrading works. This area is also located within the Proposed Mardyke ACA.

Fitzgerald's Park

A proposed 1.2m high glass flood defence wall will be constructed adjacent to the river bank on a reinforced concrete flood defence wall to flood defence level of 5.10m OD. The reinforced concrete wall is typically 1.1m above existing ground levels. The section of defences adjacent to the modern garden installation will entail a proposed flood defence sheet pile glass wall to be constructed in channel to flood defence level typically 1.2m above existing ground levels. The 20th century footpaths in the vicinity of the proposed works will be ramped and a new section of footpath will be constructed at existing ground level on the west side of the modern museum extension.

The eastern half of the area now occupied by the park is shown as a designed garden (labelled as 'The Shrubbery') on the 1st edition OSI map of 1842, which was surveyed before the house now occupied by the city museum was constructed by Charles Beamish in 1845. The western half of the park is shown as an undeveloped field labelled as 'liable to flooding' on the opposite side of a stream flowing into the river channel. The 25-inch OSI map shows the east end of the park as a less formally arranged garden around the house at the end of the 19th century while the west end remains as undeveloped land on the opposite side of the stream. The east end of the riverside area is shown as a tree-lined pathway within the garden on both maps and no riverside features are indicated in the western half. The property was chosen as the site of the Cork International Exhibition of 1902 and grounds were laid out meticulously with temporary structures (some canvas-built and painted white), pavilions, kiosks, ornamental walks, tea houses, a riverside water chute and a switchback railway featuring among the attractions (www.corkcity.ie/aboutcork/historyofcork/20thcenturycork/). The grounds were donated to Cork Corporation as an amenity area after the completion of a second fair in 1903 and were opened as Fitzgerald's Park in 1906, named after Edward Fitzgerald, the Lord Mayor who instigated the exhibition. The existing park retains a centrally located fountain feature from the exhibition (now named 'Father Matthew Memorial Fountain') while Charles Beamish's house is now occupied by the Cork Public Museum. The NIAH lists the following features within the park: Cork Museum (20866124); gates/railings/walls (20866122); Apple Woman (ref. 20866125); plaque on former band stand (20866211); Girl Dancer statue (20866123); and the Father Matthew Memorial Fountain (20866210). The RPS includes the fountain and Lord Mayor's Pavilion within the park (no reference numbers assigned) and the park is within the Proposed Mardyke ACA. While none of the features listed in the NIAH or RPS are located on the footprint of the proposed flood works, the interventions within the park will impact on the historic relationship between the amenity space and the river as well as views from Daly's Bridge. The siting of the defences adjacent to the river will, however, not impinge on the historic physical connection between the park and the Mardyke which formed the main access to the area during the 1902/3 Exhibitions and during the past century. The siting of the defences along the riverside will also avoid any interruption on the views to the museum building from the Mardyke. The visual impact and landscape assessments should be consulted in relation to wider impacts on the public amenity space within the park.

The park has been subject to extensive ground works in the past century as part of landscaping works such as tree / flower planting and playgrounds. The section of the riverside in the west end of the park, in the former undeveloped land during the 19th century, comprises an open river bank planted with trees (Plate

10.20). The area to north of the museum building, in the vicinity of the proposed flood defence works, has been the most modified part of the park and recent works have included the construction of a museum extension, café, footpaths and a modern garden installation (Plate 10.21). There has also been replacement of sections of the boundary railings at the west end of the park. These modern interventions have extensively modified the setting of the north end of the museum building and are not interpreted as curtilage features associated with the protected structure. There are no proposed works to the protected structure; the relatively undisturbed ground to south; the main entrance gate; the Lord Mayor's Pavilion and the historic boundary railings along the Mardyke.

The Excavation Database does not contain any entries for archaeological investigations associated with any of the developments undertaken within the park. Archaeological monitoring of geotechnical trial pits excavated within the park as part of the design of the present scheme revealed shallow garden soils, containing modern inclusions, to the west of the museum extension while thick deposits of infilled soil were noted to the east of the fountain feature and adjacent to the railings extending west from the park gate. These deep deposits contained modern inclusions and appeared to be formed during modern landscaping works with upcast soil, perhaps originating from the creation of adjacent park features during the 20th/21st centuries.

Mardyke

The proposed flood defences extending along the north side of the tennis/boat club to the east of the park will comprise an in-channel sheet-pile flood wall with a 1.6m high glass parapet. The section of the in-channel sheet pile wall to the east of the tennis club will be clad on the wet side with limestone random rubble and concrete finish on the dry side. The tennis clubhouse is listed in the NIAH (20866119) as are an early 20th century riverside house (20866117) and an in-channel weir (20866203) to the east. This area is also located within the Proposed Mardyke ACA. The proposed flood defence wall will not directly impact on the clubhouse and private house, both listed in the NIAH, but does extend through the area where the line of the weir connects with the south bank. The weir is present on the historic OSI maps while the area now occupied by the tennis club and house are shown as an undeveloped field with a tree-lined river's edge.

The proposed flood works in the area extending east of the tennis club property will comprise a 2.5m high riverside embankment within the green field area to the north of Mardyke House. A 2.5m high sheet pile flood wall, clad with random rubble limestone on the wet side and concrete fair finish on the dry side, will then extend in-channel along the north side of the modern Presentation Brothers School at east and then continues to Grenville Place. The works also entail the regrading of an existing footpath close to the west end of the embankment. Two of the roadside houses to the south of the embankment are protected early 19th century structures: the east house is an archaeological site listed in the RMP (CO074-093----) and the adjacent Mardyke House is listed in the NIAH (20503002). The proposed embankment works are located approx. 70m to the north of the houses and are outside the Archaeological Zone of Notification, as designated in the RMP, surrounding the eastern house (CO074-093---). This area is also located within the Proposed Mardyke ACA.

The Mardyke was created in 1719 through marshlands owned by the Duke of Devonshire. The developer was Edward Weber, a Dutchman, who named the area after a promenade in Amsterdam known as the *Meer Dyke,* which translates as 'sea dyke' (Cooke 1999, 137). The area continued to develop into the 19th century and gates at both ends were erected in 1807 and stood until they were removed in 1952. The

walkway had deteriorated by the end of the 19th century but was improved as part of the 1902 Exhibition sited in Fitzgerald's Park in the west end and was converted into the existing roadway in the 1970s. The tennis club occupies the Sundays Well Boating and Tennis Club which was constructed in 1899. A curvilinear mill race belonging to Lee Mills formerly ran through the area now partly occupied by the modern Presentation Brothers School, constructed in 1985, and formed a garden island known as Love's Island which was connected to the mill by a bridge. This millrace was infilled in the early 20th century and there are now no surface traces of this feature. The west end of the proposed wall traverses the south terminal of a salmon weir which is present on the historic OSI mapping. While the former millrace and weir are not protected features any sub-surface remains will be considered of general cultural heritage significance worthy of recording.

North Mall Distillery

This area comprises the former site of a water-powered distillery complex that now houses the UCC North Mall Campus. The works will also include the creation of a concrete footbridge above the River Lee Distillery Branch which comprises a historic millrace associated with the former distillery. The bridge will tie into the proposed embankments at both sides of the millrace and will provide access to the proposed penstock. Details on the underwater archaeological survey in this area are presented in Appendix 10A. The proposed works in the west end of the property will comprise a combination of embankment and concrete fair finish wall in the green area to the north of the public footpath that extends along the river bank. The proposed interventions will be screened by the tree-line that extends along the river bank to the south (Plate 10.23). The flood defences in the east end of the former distillery complex will comprise a flood wall with a concrete flood finish that changes to limestone random rubble cladding to the south of Alderman O'Reilly Bridge and this design continues as the wall extends over the east side of the bridge and along the existing random rubble wall at the distillery gate (Plate 10.24). The section of the proposed limestone random rubble flood defence wall to be constructed on the tarmac-covered bridge will be offset from the existing parapet and at the western edge of the existing pedestrian walkway and will be 1.2m above existing ground levels on the bridge (Plate 10.27).

The distillery complex was originally founded as the North Mall Distillery by the Wise family during the late 18th century, although the potential that it was built on the site of the medieval Dominican Abbey mill has been noted (Rynne 1999, 61). The distillery drew water from the north channel via an upstream diversion weir which channelled water into a millrace that then extended through the site before re-entering the river under Alderman O'Reilly bridge in the Wise's Quay area adjacent to the east gate of the complex. The double-arched stone road bridge was built in c. 1770 with ashlar limestone voussoirs and rubble stone parapets. The majority of the distillery was destroyed by a fire in the 1920s and further structures, such as the malt mill and bonded stores on Wise's Hill, were demolished in the late 20th century. The millrace, bridge and a number of stores and a cooperage to the south now form the only extant structures associated with the former distillery and much of the north end of the property is now in use as a UCC car park.

The historic OSI maps show a number of distillery buildings on the north side of the millrace and a mill building spanning the east end of the channel. The area to the south of the millrace is shown as largely undeveloped on the 1st edition 6-inch OSI map while a bond store is shown in the west end of this area on

the 25-inch edition. The area on the footprint of the proposed riverside defence along the south end of the property is shown as an embankment on the 1st edition 6-inch map and is tree-lined on the 25-inch map. The west end of the proposed riverside embankment, in the area where it turns to the north, is occupied by two now absent buildings labelled as 'North Fishery' sited directly north of an in-channel salmon weir on both OSI maps. While the fishery buildings and adjacent weir are not protected structures any sub-surface remains will be considered of general cultural heritage significance and worthy of recording if revealed during ground works. The riverside area within the property is now occupied by a tree-lined public footpath with a tarmac-covered road and a green area to the north. There is no surface trace of the embankment shown on the 1st edition 6-inch map. Archaeological monitoring of trial pit excavations undertaken during the design of the scheme indicated that the ground levels in this area were extensively raised by the introduction of rubble and soil infill material during the 19th and 20th centuries.

The RPS lists the Distillery House and Chimney (PS813) Alderman Reilly's Bridge (PS814) while the NIAH lists the late 19th century cooperage building (ref. 20500776), the house on the north of the entrance (ref. 20500784) and Alderman Reilly's Bridge (20500786). All of these are located in the east side of the property. The east end of the property extends into the Proposed North Mall/Marsh ACA and the Secondary Zone of Archaeological Potential as identified in the Development Plan.

The proposed flood defence works in this area will also entail localised regrading of the access road in the area outside the distillery gates (Plate 10.28). The recorded site of a former holy well, known as *Tobar Bhrianach*, in the area approx. 40m to the northwest of the proposed regrading works is an archaeological site listed in the RMP (CO074-074----). The well was covered over at some stage during the 18th/19th century and no surviving surface traces remain. The proposed works will not extend to within 40m its recorded former location.

The following provides the result of the ADCO survey of Alderman O'Reilly Bridge. This structure, built c.1770 and depicted Roques Map of 1773, also retains much of its original build. The bridge is located on the North Channel, at the terminus of the tailrace for the North Mall Distillery (built 1779). The bridge provided access from Wise's Quay on the north to reclaimed land, Reily's Marsh, on the south. The structure measures 16m in length x 6.6m in width and comprises two segmental archways (measuring 4.5m in width), with ashlar voussoirs and limestone masonry forming the arch-rings. Thirty-two arch stones from the arch-ring, measuring 450mm in length x 200mm in width x 250mm in depth. Rubble-stone has been used to construct the spandrel and parapet areas, while limestone masonry has been sued for the arch-walls. A triangular shaped cutwater (brick-built) is located on the upstream side of the bridge, while a rounded cutwater is present on the downstream side.

North Mall

The works on this quay will entail the moving the existing quayside railing to the opposite side of the footpath and constructing a new flood defence parapet, with a concrete fair finish, typically 1.2m above existing ground level. The flood wall will tie in with the west side of Griffith's Bridge and the defences along both bridge parapets will comprise the replacement of the existing steel railings with a solid defence parapet sympathetic to existing architecture. This bridge is of modern construction and is not a protected archaeological or built heritage structure. The road and modern footpath adjacent to the quay will be regraded to reduce the relative height of proposed flood defence wall. The regrading works will not extend within the environs of the north end of St. Vincent's Bridge and the line of the proposed flood wall also has a localised diversion in order to avoid this area. St. Vincent's Foot Bridge was constructed in

1878 and is listed in the RPS (no. ref.) and NIAH (20500785). Details on this structure are presented in Table 10.1 and in the underwater archaeological survey (Appendix 10A). The ashlar limestone quay wall and steps along the North Mall were built in the 1820s and are listed in the NIAH (20500035) (Plate 10.30). The cast iron railings to be removed from quay were installed in 1900 and are also listed in the NIAH (20500016). The railings are set into the top of the quay wall and are flanked by a concrete paved footpath on the north side (Plate 10.29). The proposed works in the west end of North Mall will extend through the Archaeological Zone of Notification designated in the RMP which surrounds the former location of a medieval Franciscan friary, demolished in 1804, which is a protected archaeological site (RMP CO074-028002-) The exact location of the friary is unknown but stood in the area now occupied by the houses to the north of the street, the majority of which are listed in the NIAH. The Secondary Zone of Archaeological Potential as identified in the Development Plan extends to the north of the west end of the North Mall. Archaeological monitoring of water main repairs along the centre of the North Mall road uncovered a fragment of cut limestone and a possible floor surface beneath the modern road fill material (Avril Purcell *pers. comm.*). Archaeological testing behind 6-7 North Mall uncovered human remains that showed clear signs of having been autopsied and probably originated from a surgical school that is reputed to have been in existence on North Mall in the 19th century (Appendix 10E; McCarthy, Licence 04E0607). Testing at 19-22 North Mall identified re-deposited medieval material introduced within later reclamation deposits (Appendix 10E; Lane, Licence 95E0221).

The following provides a summary of the ADCO survey of the North Mall quay wall and St. Vincent's Bridge. The wall comprises thirteen (visible) courses of limestone masonry, measuring between 300mm length x 200mm width and 800mm length x 450mm width. Large coping stones, measuring 1m in length x 400mm in width, form the topmost course. Three rectangular drain features are located along the quay's extent. A line of in-river timber shuttering runs parallel to the quayside, stepped into the channel by approximately 1.2m. Poured mass-concrete has been placed behind this shuttering to consolidate the quay's foundation elements. A flight of masonry access steps, eighteen in total, provide river access at a point 130m along the quay's extent (NGR: 166929E, 721462N). The access steps are contemporary to the construction of the quayside. Upstream of these steps, the quayside is subject to modern repair; concrete blocks replacing masonry and poured mas-concrete forming the coping. A modern access ladder has been fastened to the quay wall and a modern drainage pipe protrudes from the quayside at a point c.50m upstream of Griffith Bridge. A rectangular drain placed to accommodate run-off from the adjacent roadway is also present.

St. Vincent's Bridge was built in 1878 and funded under the 1875 Cork Improvement Act. The bridge is supported by two sets of tubular pillars/caissons, reinforced with iron cross-beams, and filled with concrete. Two parallel wrought iron lattice girders are attached to the caissons and are tied into the adjacent quay structures. Wrought iron pillars also extend from the outer edge of the caissons to provide reinforcement to the bridge's superstructure. The deck consists of a concrete walkway supported on braced cross-beams that extend between the parallel girders. Cast floral tie-plates have been used on the bridge exterior elevations. The bridge measures 41m in length x 3.8m in width.

Grenville Place

The proposed works along Grenville Place will entail the removal and salvage of the existing parapet wall and replacing it with a flood wall, clad with cut limestone and measuring 1.2m above street level. The proposed works will also involve regrading of the adjacent road surface along the west end of the quay

in order to reduce the height of the proposed flood defence wall. The works between the Presentation School property and Grenville Place will entail an in-channel sheet piled wall located with the section of the channel to the north of the UCC Lee Maltings Complex.

The UCC complex occupies the former Lee Mill (flour) and River Lee Porter Brewery properties (Plate 10.32). The east end of the complex was acquired by Beamish and Crawford in 1813 and converted into a maltings and storehouse and, after they bought the Lee Mills at the end of the 19th century, the site formed the largest maltings within the city. The Lee Maltings is listed in the RPS (PS597) and two of the buildings within the complex are listed in the NIAH (Main Maltings building ref. 20500770 and Miller's House ref. 20500771). The quay walls in Grenville Place were included the extensive phase of works to the city quays undertaken by the Harbour Commissioners in the 1830s. The existing quay wall in this area is not listed in the RMP, RPS or NIAH and it contains sections of recently constructed repairs following the damage created by the 2008 floods (Plate 10.33). The historic OSI maps do not indicate the presence of any associated mill features within the section of the channel on the footprint of the proposed in-channel flood wall. However, the underwater archaeological survey identified the remains of a timber barge landing feature adjacent to the riverside (north) wall of the former mill. This rests on a gravel deposit within the intertidal zone and is outside the area to be impacted by the in-channel sheet-pile wall but will be covered by fill material deposited behind the proposed wall.

The ADCO survey identified the remains of a large timber structure (F055) on the intertidal foreshore adjacent to the former site of Lee Mills. The structure is composed of eleven sections of greenheart timber that have been fastened together to form a horizontal platform. In addition, the remains of a timber jetty/walkway (F056a-F056b) are located a short distance to the west of the platform structure. Both structures are positioned at the Low Water Mark and are fully exposed during spring-low tides. Four archways (F057), now blocked-up, are located along the riverside wall of Lee Mills, three of which are located directly opposite the timber structures. Feature F050 is thought to be part of a possible barge landing area/platform, designed to allow a river barge or similar vessel to safely bottom-out at this location; access to the foreshore and platform area being provided by one of the adjacent archways. Further details on these features are presented in written, photographic and drawn formats in the ADCO survey report, which also provides mitigation strategies for this area (Table 10.4 and Appendix 10A).

Bachelor's Quay

The proposed works along Bachelor Quay will entail the removal and salvage of the existing parapet wall and replacing it with a new wall measuring 1.2m above street level and clad with cut limestone (Plate 10.36). The proposed works will also involve regrading of the adjacent road surface along the west end of the quay in order to reduce the height of the proposed flood defence wall (Plate 10.35). As with proposed works on the north side of St. Vincent's Bridge, the proposed riverside flood defences on this quay will be set back from the south end of the bridge in order to avoid impacting on this protected structure. The detail on the historic maps demonstrates that Batchelor's Quay had been developed by the mid-18th century while the area now occupied by Grattan Street is shown as a channel that divided the quay side and was bridged by a wooden structure known as Batchelor's Bridge. The quay continued to develop into the 19th century and contemporary trade directories list the presence of commercial buildings, including a bank, coal stores, ice houses as well as private residences .The NIAH (20500036) lists the Bachelor Quay ashlar limestone quay and parapet walls, which were built in the 1820s, and also

incorporates the limestone steps to water front elevation and their cast-iron hand rails. The west end of the quay is located within the Proposed North Mall/Marsh ACA while the east end is in the Secondary Zone of Archaeological Potential as identified in the Development Plan. Archaeological testing within a property to the south of this quay depth of 2.5m and were found to contain loose 18th-20th century deposits to depth of 2.5m in and nothing of archaeological significance was noted (Appendix 10E; Lane, Licence 98E0283). Archaeological monitoring of a geotechnical trial pit directly behind the quay wall identified rubble and reclamation fills behind the wall and 19th century inclusions were noted (Appendix 10E; Cummins, Licence 14E0139).

The following provides a summary of the ADCO survey of the Bachelor Quay wall. Two build-phases can be observed for this structure. The lower part of the quay wall being composed of medium to small, rough-coursed, limestone which rises to a maximum height of approximately 3m (for the first 60m), after which it is only present to a height of c.1.5m. Neatly-cut limestone masonry forms the upper courses; ranging between three and eight courses. Much of the quayside dates to the 1820s, however, the aforementioned lower sections are likely to be of eighteenth-century date. Approximately 145m of the quay has undergone consolidation, identical to that observed on the north side of the channel. However, the original timber piles/shuttering elements, used to underpin the quay, are partially visible along the downstream half of the structure (c.112m section). The coping and topmost masonry course has suffered collapse, along a c. 20m section, and has been subject to modern repair (NGR: 166826E, 720659N centre-point). Collapsed masonry is viable at Low Water, lying immediately beneath the repaired section. Modern river-access ladders have been retro-fitted to the quay wall at two locations along its extent.

Pope's / Farren's Quay

The works in the west end of this quay will involve the retention of the existing parapet wall at its existing level (Plates 10.37 and 38). The works along the east end of the quay will involve the temporary removal of the parapet coping stones and the construction of a new line with cut limestone cladding fitted into existing parapet wall with dowel bars drilled into masonry, creating a total wall height of 1.2m above existing street level. The 19th century ashlar limestone quay walls, limestone steps and their cast-iron hand rails along this quay are included in the NIAH (20512164) and the east end of the quay extends into the Shandon ACA. The limestone steps on Pope's Quay are to be retained and extended to flood defence level with new concrete steps (Plate 10.39). The existing quay was constructed in 1820 and was named after the Pope family, local merchants.

The west end of the Pope Quay works shown on this drawing extends through the Zone of Notification surrounding a graveyard that is a protected archaeological monument (CO074-031001-). This archaeological site is located approx. 50m to the north of the quay side. The west end of the quay is in the Secondary Zone of Archaeological Potential while the east end extends into the Primary Zone. The Shandon area located uphill to the north of this section of the riverside was developed as a suburb during the late medieval period while the existing ground behind the quay walls was infilled during recent centuries. An east-west archaeological test trench was excavated in 2002 on the southern side of the road adjacent to the Farren quay wall in advance of the installation of services (Appendix 10E; Johnson, Licence 02E1378). At 1.3m below road surface a 5m stretch of a slightly curved limestone and sandstone wall, rendered on its north face, was recorded. The wall had previously been disturbed during insertion of electricity cables but was not interfered with during the 2002 service works. Given its limited exposure, the

exact nature of the structure is not known, but it may have been associated with an 18th-century bridge in this position. There have been seven archaeological test excavations undertaken to the rear of properties located on the north side of the quay and, apart from occasional stray finds and disarticulated human remains, no archaeological features were encountered (see Appendix 10E).

The following provides a summary of the ADCO survey of the Pope's Quay wall. The quay wall comprises fourteen-courses of string-coursed limestone masonry (including the coping) that range in size from 450mm in length x 450mm in width to 1m in length x 450mm in width. A viewing balcony has been incorporated into the upper part of quay wall, 70m downstream of Griffith Bridge. This balcony is also depicted on an early twentieth-century photograph of French's/Pope's Quay; shown as a boxed-off structure, probably of timber construction, rising from the same quayside location. The existing viewing area has been constructed using cement blocks which rest on three ornate limestone supports. A flight of masonry river-access steps (twenty-one in total) are located at NGR: 167261E, 721693N, a short distance upstream of Shandon Footbridge. A small mooring-ring, with an internal diameter of 150mm, is located on the riverside edge of the tenth-step and is a contemporary feature of the build. Another mooring-ring, of the same dimensions, is located next to a small drain, located c. 20m upstream of the access steps. This drain measures 450mm in width x 300mm in height. Two identical drain features can also be found across the quayside's extent, along with six rectangular drains measuring 750mm in height x 550mm in width. In addition, opposing flights of river-access steps are present, situated close the eastern terminus of Pope's Quay; 50m downstream of Shandon Bridge. Both features comprise twenty-steps in total, with a landing area positioned mid-point down each flight; positioned just below the high-water mark. Wrought iron mooring-rings are located on the riverside of each set of steps. Evidence of repair work in the form of pressure grouting is present and the section of quay wall running between the two access-steps is bulging outward in a number of areas.

Camden Quay

Camden Quay is listed in the NIAH (20513132) and the works will entail the maintenance of the existing parapet wall and undertaking required repairs to the quay wall. No works are proposed to Patrick's Bridge at the east end of the quay, which is a Protected Structure (RPS no. ref.) and is also listed in the NIAH (20513133). The flood defences along both parapets of Christy Ring Bridge at the west end of the quay will comprise the replacement of the existing steel railings with a solid defence parapet sympathetic to existing architecture. This bridge is of modern construction and is not a protected archaeological or architectural heritage structure. The area is named after Lord Camden, Lord Lieutenant of Ireland, who visited Cork in 1795 and the street adjacent to the present quay was created when the area was reclaimed in the 1820s (Cooke 1999, 199). Archaeological investigations at the western bank of the River Kiln, close to its confluence with the River Lee, uncovered a number of timber planks within a layer of dark-brown organic material in which 17th-century pottery sherds were noted (Appendix 10E; Purcell, Licence 05E0257). Reclamation layers dating to the 18th century onwards have been identified in a property to the north of this quay (Appendix 10E; Ní Loingsigh, Licence 03E1071). Details on the River Kiln culvert extending north of the river channel in this area are provided in the underwater archaeological survey (Appendix 10A).

The following provides a summary of the ADCO survey of the Camden Quay wall and Patrick's Bridge. The nineteenth-century quay measures 300m in length, running between the downstream-end of Pope's

Quay and the upstream side of St. Patricks Quay. A modern bridge, Christy Ring Bridge, truncates the structure approximately half-way along its extent. The quay comprises fourteen visible courses of neatly-cut, sting-coursed, limestone masonry. A series of drain features are located along its extent, predominantly situated just below the High Water Mark. A number of drain features are also located higher up the quay wall, c. 2m from the top of the structure. Two drain sizes area present, the first measuring 450mm in width x 300mm and the second 750mm in height x 550mm in width. A number of small wrought iron mooring-hoops were also encountered, along with seven modern river-access ladders. The quay wall terminates c. 10m upstream of St. Patricks Bridge; the transition point being marked by a pilaster associated with the construction of the aforementioned bridge. The bridge structure measures 66m in length x 18.5m in width and comprises three elliptical archways with carved archivolts. Effigies that include St. Patrick, St. Bridget, Neptune, and three sea goddess adorn the keystones of each arch-ring. Pilasters rise from the cutwater, crossing the haunch area, and triangular shaped cut-waters are located on the upstream and downstream sides of the bridge. The structure has a carved limestone balustrade with four cast-iron lamp standards and paired lanterns set along parapet walls. The bridge's foundations lie approximately 4.5m below the low-water mark and are supported on piers formed of reinforced concrete.

Kyrl's Quay

The proposed works along Kyrl's Quay will entail the removal and salvage of the existing ashlar limestone parapet wall and replacing it with a wall clad in cut limestone and measuring 1.2m above street level. The line of the proposed new wall has localised step backs in the area of the steps extending down to the river and these steps are to be retained and extended to flood defence level with new concrete steps (Plate 10.42). The NIAH lists the Coal Quay/Kyrl's Quay ashlar limestone quay and parapet walls (20513140), which were built c. 1820, and also incorporates the limestone steps to water front elevation. Sections of the existing parapet wall have been rebuilt in recent decades (Plate 10.43). This area extends through ground reclaimed during the post-medieval period outside the north side of the walled medieval city and the sub-surface remains of the city wall extend under the buildings on the opposite side of the road, approx. 40m to the south. Archaeological testing at within a property on the opposite side of the road from the quay uncovered 2.5m deep reclamation layers dating to the 18th century onwards (Appendix 10E; Lane 98E0283).

The following provides a summary of the ADCO survey of the Kyrl's Quay wall. The structure was built in the nineteenth-century and comprises twelve courses of neat-cut limestone masonry; measuring between 1m in length x 400mm in width and 500mm in length x 400mm in width. Two flights of masonry river-access steps are incorporated into the quayside at NGR: 167120E, 721674N and NGR: 16717E, 721614N. In addition, an access slip is also present, immediately upstream of Shandon Footbridge, NGR: 167243E, 721325N. The upstream river-access point comprises twenty-one steps and incorporates a lading step, close to the High Water Mark. The downstream access point comprises eighteen-steps and similar landing step, also near the High Water Mark. A small arched-culvert (F027a), now blocked-up, is located approximately 30m downstream of the latter river access-point. The culvert is segmental in form, with an arch-ring comprising ten net-cut arch-stones and one larger wedge-shaped keystone. The culvert measures c.1.5m in height x 1m in width. The downstream access slip is of similar overall design to the access steps located upstream; the access simply being ramped rather than stepped. Three mooring rings (200mm internal diameter) are located along the extent of the quay wall.

Coal / Lavitt's Quay

The proposed flood defences in this area will comprise a combination of interventions to the parapet walls. The existing stone parapet is to be removed, salvaged and replaced with a new parapet wall, with cut limestone cladding, to flood defence in the Coal Quay area. The existing river steps and slipway will be retained as part of the proposed works (Plates 10.44 and 10.45) and works will not extend to Patrick's Bridge. There will be a temporary removal of the parapet coping stones and the construction of a new line of cut limestone cladding fitted into existing parapet wall with dowel bars drilled into masonry within some sections of Lavitt's Quay while other sections at the east end are at flood defence level and will be retained. The existing section of reinforced concrete parapet at the west end is to be demolished and replaced with a new parapet, with cut limestone cladding. The limestone steps on the quay walls are to be retained and extended to flood defence level (Plates 10.47). Sections of the parapet wall are of 20th construction that replaced former bollard and cast-iron railing riverside boundary visible on historic photographs (Plate 10.48). The bollards appear to have been reset in a public plaza adjacent to the Opera House to the south of the quay (Plate 10.49). The NIAH lists the Lavitt's (20513139) and Coal Quay (20513140) ashlar limestone quay walls, which were built c. 1820, and also incorporates the limestone steps to water. In 1620 the corporation granted Dominick Roche rights to operate a ferry service across this area of the channel while timber bridges were being replaced with stone-built bridges. The historical maps indicate that the area now occupied by the Coal Quay Market to the south formed part of an open channel flanked by Potato and Newmans's Quay prior to reclamation in the 1820s. Archaeological testing in two properties to the south of Lavitt's Quay uncovered thick reclamation clays that contained nothing of archaeological significance (Appendix 10E; Ní Loingsigh Licence 06E0911 and Cummins 03E1491).

The following provides a summary of the ADCO survey of the Lavitt's and Coal Quay walls. These quays from a single nineteenth-century structure that extends along the south side of the North Channel, between Shandon Bridge and St. Patrick's Bridge. The quayside is truncated by Christy Ring Bridge, at a point c. 240m downstream of Shandon Bridge. The first c. 70m of quay retains its original build, while a c.170m section, located between NGR: 167328E, 721027N and NGR:16749E, 720906N, has been be subject to modern reconstruction works (undertaken in 1990s); the topmost courses having been replaced using poured mass-concrete sections. These sections extend above ground-level to from a barrier wall. Downstream of Christy Ring Bridge, the quay wall retains its original build again. The quay is composed of fourteen visible courses of limestone masonry of regular size and shape; measuring between 900mm in length x 360mm in width and 570mm in length x 360mm in width. A number of mooring rings and a series of drain features are located along the extent of Coal Quay/Lavitt"s Quay.

Two sets of opposing river-access steps are located on Coal Quay, immediately downstream of Shandon Bridge. The first comprises two flights, both with sixteenth masonry steps, which lead away from a central landing. Landing-steps (measuring 1.6m x 1.5m) are located at the High Water Mark and the steps terminate at Low Water Mark. An arched-culvert (F029a) has been built into the wall, directly between the two flights of steps. The arch is segmental in form and comprises seven arch-stones. The archway measures c. 2.5m in height x 2m in width and has been blocked-off using cast concrete blocks. An iron-flap for a storm drain is centred within this blocked-off section of the culvert. A second set of access steps is located 26m downstream. This structure differs in layout to the previous; the flights of steps running towards, rather than away from each other. The two flights comprise sixteen-steps with an additional landing step at the High Water Mark.

Patrick's Quay

The proposed flood defences along Patrick's Quay will entail the replacement of the existing 20th century concrete kerbs and railings with a new concrete wall measuring 0.6m above street level and then mounted with guard railings to 1.2m above street level. The limestone river steps adjacent to Patrick's Bridge will be retained and the proposed new flood wall is set back from the quayside wharf adjacent to Brian Boru Bridge. The NIAH lists the 1820s Patrick's Quay ashlar limestone quay wall (20512612), incorporating the limestone steps to the river, and four cast iron mooring posts (20512623) set into the modern footpath surface in the section of the quay to the west of Brian Boru Bridge. The proposed works will not extend to Patrick's Bridge. Historic photographs show the quay lined with bollards and link chains set back from the wall prior to the installation of the existing steel railings and concrete kerbs (Plate 10.54).

The following provides a summary of the ADCO survey of Patrick's Quay. The structure measures c. 450m in length and is truncated 247m along its extent by a timber wharf located on the upstream side of Brian Boru Bridge. The section of quayside, running between St. Patrick's Bridge and Brian Boru Bridge, is of nineteenth-century date. Downstream of Brian Boru Bridge the quayside is replaced with a modern quay of concrete construction. This modern component of St. Patrick's Quay runs as far as Michael Collin's Bridge, after which it is replaced by Penrose Quay; the latter structure also being formed by a modern concrete quayside, the original build being retained approximately 1m below ground level and 3m north of the existing riverside façade.

The historic section of St. Patrick's Quay comprises ten course of net-cut limestone masonry. The quay's foundations have been underpinned by a continuous line of tight-set timber piles and a series of twenty-four timber fenders. These fenders are stepped-out from the base of the quay wall by c. 400mm. From this point the fenders rise at an 80 degree angle to extend the full height of the quay wall. The fenders are composed of Greenheart timber (Ocotea Rodiaei), a timber-type commonly used in twentieth-century marine and river works. The insertion of these fenders and the underpinning of the quay wall are likely to be contemporary to the construction of the timber wharf downstream.

A flight of masonry steps is located a short distance downstream of St. Patrick's Bridge. This river-access point comprises twenty-four steps and has a landing step at the High Water Mark. A wrought iron mooring-ring measuring 400mm in dimeter is fastened to the quay wall, immediately behind this landing area. Cast iron railings, of early twentieth-century date, adorn the quayside at this lactation. These are subsequently replaced by modern railings a short distance downstream.

A timber wharf (F031a) is inset into the quayside on the upstream side of Brian Boru Bridge. The structure measures 63.4m in length x 3.6m in width. Concrete and timber bracing has been used to consolidate St. Patricks Quay, where the quay wall has been impacted to accommodate the insertion of the timber wharf. A series of timber fenders delineate the riverside edge of the structure. The fenders are formed of paired timbers that have been bolted together. Horizontal cross-beams run along the base of the fenders, below the Low Water Mark, and provide additional strength. The fenders are fastened to the wharf's deck by two horizontal beams that run the length of the structure, above and below the deck-level. The deck rests upon a series of closely spaced (c.1m) timbers that extend from the quay wall. These are also fastened to the aforementioned horizontal timbers. Vertical timbers are located at the quay wall and extend to deck level. Carpenter marks, incised into a number of the structural timbers, were also encountered. As noted for the fenders positioned upstream, the wharf also appears to be constructed of Greenheart timber. The

timber wharf is of early twentieth-century construction and is most likely associated with the insertion of Brian Boru Bridge in 1911. Four cast-iron mooring bollards, dating to c.1860, protrude from the modern pavement adjacent to the timber wharf.

Brian Boru Bridge

The east end of the works in this area encompasses Brian Boru Bridge and the proposed flood defences along the bridge footpaths will comprise steel flood gates at the footpaths on the north and south ends as well as the installation of steel parapet to tie in with existing steelwork. This Scherzer rolling lift bascule bridge was erected in 1911, with reconstruction works in 1987, and is listed in the RPS (no ref.) and the NIAH (20506355) (Plate 10.55). Further details on this bridge are presented in Table 10.1 and in the underwater archaeological survey (Appendix 10A).

Merchant's Quay / Anderson's Quay

The proposed flood defences along Merchant's and Anderson's Quays will entail the replacement of the existing 20th century concrete kerbs and railings with a new concrete wall measuring 0.7m above street level and then mounted with guard railings to 1.2m above street level (Plate 10.58). The line of the proposed new wall has localised step backs around the limestone steps extending down to the river and these features will be retained as part of the scheme (Plate 10.57). The NIAH (20513136) lists the Merchant's Quay ashlar limestone quay wall and also incorporates the limestone steps to water front elevation. The quay name reflects the importance of this area during the 19th century when the street to the south was lined with commercial buildings that were levelled when the existing shopping complex was constructed in 1987. Historic photographs show the quay in the early 20th century prior to the construction of the modern railings and the removal of a wharf at the east end (Plate 10.56).

The following provides a summary of the ADCO survey of the Merchant's and Anderson's Quay walls. Merchant's Quay extends from the downstream side of St. Patricks Bridge for a distance of 205m where it abuts Anderson's Quay, 186m upstream of Brian Boru Bridge. A large arched-culvert (F032a) is located immediately downstream of St. Patrick's Bridge. The culvert measures 5.40m in width and 3.50m in height. The arch-ring is segmental in form and comprises nineteen arch-stones. The original extent of the arch opening has been reduced using cast-concrete blocks, leaving a reduced opening measuring c. 1.5m in width x 1m in height. This culvert is a contemporary build to St. Patrick's Bridge, being inset into the bridge's downstream buttress wall. This culvert is likely a discharge point for water-flow from the waterway that once ran the length of St. Patrick's Street; the waterway being culverted and reclaimed in the late 1700s. Downstream of this feature the historic quay wall forming Merchant's Quay slopes gently towards a set of river-access steps. The quayside has been built-up along this section, using modern cement blocks to remove the slope in quayside. Cast-iron mooring bollards can be seen protruding from the top of the original quay, now encapsulated by the modern addition above. The quay wall is composed of neat-cut limestone measuring between 500mm length x 300mm width and 900mm length x 400mm width. The quay's foundations have been underpinned along this section; close-set vertical timber piles being positioned c.1.5m from the base of the quay wall. A layer of cement extends from the quay wall to the inner edge of these piles. Three timber fenders are also present, rising vertically from positions immediately in front of the timbers piles used to underpin the quay wall.

A river-access point, now sealed-off from use, is located nearby at NGR: 167710E, 72057N. This access point comprises three flights of steps. The first set of steps leads towards the channel, at which point the structure turns at right angles to run parallel to the quay wall; the second/third flights leading down to the Low Water Mark. Three landing areas are incorporated into the design and provide access to the river at high water, mid-water, and low water. Another set of access steps, of similar design, are located c. 40m downstream. From this point the quay wall extends for a further 125m downstream to meet Anderson's Quay. The original quayside forming Merchant's Quay is upstanding to a height of c. 3m, above which a modern wall and railings have been inserted. A final set of river-access steps is located at the downstream terminus of Merchant's Quay and comprises seventeen masonry steps.

Anderson's Quay runs from the downstream terminus of Merchant's Quay to a point c. 240m downstream at Michael Collins Bridge. The existing structure is composed of both historic and modern elements. The section running upstream of Brian Boru Bridge has been raised in height using modern concrete sections, as found along sections of the adjoining Merchant's Quay. The quay's foundation have been consolidated using timber piles, inserted parallel to the structure (offset c. 1.5m from the wall), behind which concrete has been placed. The quay survives to a greater height on the downstream side of Brian Boru Bridge where it stands to a height of c.4m. A recessed iron access-ladder is located along this section of quayside. Modern pre-cast concrete has been placed along the top of the quay, into which steel railings have been inset. A number of timber fenders rise vertically from the base of the quay, attached to the quay wall using two sets of forged iron strap-fastenings. At a point c. 70m downstream of Brian Boru Bridge, the historic elements of the quayside are replaced by a modern poured mass-concrete structure, lined using Larson clutch-piles and timber fenders.

A short length of timber wharf is located immediately downstream of Brian Boru Bridge (F033a). This structure measures 10m in length by 6m in width. The structure is most likely of contemporary build date to the adjacent bridge and aforementioned timber wharf on St. Patrick's Quay. The structure comprises a timber deck resting on cross-beams that in turn are attached to an outer beam that runs the full length of the quayside. Three large, vertically set, timber piles support the outer edge of the wharf, with internal cross-bracing timbers also being used to provide additional strength. An interesting array of carpenter's marks was observed as part of the inspection, incised into the cross-beam timbers that are located beneath the structure.

Penrose Quay / Horgan's Quay

Works on Penrose Quay will entail the replacement of the existing 20th century concrete kerbs and railings with a new concrete wall measuring 0.6m above street level and then mounted with guard railings to 1.2m above street level. Work commenced on Penrose Quay in 1876 and in 1894 a decision was made to extend it and to reconstruct Patrick's Quay at the same time. The existing quay wall was extensively reconstructed in 20th century and the existing quay is not listed (Plate 10.60). The modern build seals the original quay wall which comprises an outer skin of cut stone with bonded rubble masonry to rear. The original wall is retained approx. 1m below modern street level and is 3m back from new wall façade (Ove Arup 1980). The proposed flood defence works terminate at the west end of Horgan's Quay and no works are proposed to this quay wall and wharf, which are listed in the NIAH (20506358). The

works in the area adjacent to the west end of this quay will entail localised ramping of the existing modern road and path levels.

Custom House Street

Proposed flood defence works in this area will also entail localised regrading of the existing road surface extending south along Custom House Street and onto the south end of Michael Collins Bridge. Retaining walls will be constructed on the west side of the street. There are no protected cultural heritage features on the direct footprint of these works although the Custom House complex (Plate 10.61) on the east side of the street is a protected archaeological monument (RMP CO074-118----) and various buildings and mooring features within the property are listed in the RPS (PS818) and NIAH (20506372). There are no works proposed within the Custom House property.

Lapp's Quay

The proposed works along the east end of Lapp's Quay will entail the construction of glass flood defence wall along a modern boardwalk (Plate 10.62) in the area between Eamon de Valera and Clontarf Bridges. The riverside works along the section of Lapp's Quay to the west of Clontarf Bridge will entail the replacement of the existing 20th century concrete kerbs and railings with a new concrete wall measuring 0.6m above street level and then mounted with guard railings to 1.2m above street level. The proposed works in this area will also include re-grading the existing road surface and construction of a 3m wide footpath along the quayside. The NIAH lists a number of groups of cast iron mooring posts set into the existing ground surface adjacent to the quayside along the east and west sides of Lapp's Quay (ref. 20513145, 20506388 and 20515168) (Plates 10.63 and 10.64). The mooring posts along the west end of the quay are in vicinity of the proposed road regrading in this area. The Lapp family, local merchants, bought the marshlands in this area during the 18th century and began developing the west end, now occupied by the Custom House complex, by the end of that century. The east end continued as marginal ground at that time and was used as a burial area for those executed in the Gallow's Green and disease victims (Cooke 1999).

The following provides the results of the ADCO survey of this quay. This nineteenth-century structure extends along the north side of the channel, running between Parnell Bridge and Eamon De Valera Bridge. It is truncated mid-way along its extent by Clontarf Bridge. The structure is composed of neatly-cut, string-coursed, limestone masonry measuring up to 1m in length x 450mm in width. A series of timber fenders are positioned along the quayside on the upstream of Clontarf Bridge; these being identical to those observed elsewhere along the south channel. Two mooring posts and three cast-iron mooring bollards are located along Lapp's Quay. The mooring bollards are embossed with their makers mark: 'R. Perrott & Sons, Cork, 1887. These bollards were produced by the Hive Foundry, once located on Hanover Street, which has been responsible of much of the nineteenth-century ironwork to be found throughout city. Downstream of Clontarf Bridge, a large boardwalk measuring 80m+ in length x 6m in width has been inserted.

Albert Quay

The proposed flood defence works at the east end of Albert's Quay will entail the replacement of the roadside concrete kerb and crash barrier separating the public road and the riverside wharf to the north (Plate 10.66). The NIAH lists the Albert Quay limestone quay wall, c. 1860, later timber wharf extension and cast iron mooring posts located to the north of the proposed works (ref. 20506391). The only works

indicated on the wharf structure is a proposed pumping station at the east end of the quay and its location is indicated in an area between two of the mooring posts. The works in this area will also entail regrading of the existing road surface at the junction of Albert Quay East and Victoria Road, which has been subject to re-surfacing in recent years (Plate 10.65). There are no protected cultural heritage sites on the footprint of the proposed regrading works although a number of adjacent buildings are listed in the NIAH: The Idle Hour Bar (ref. 20506392), warehouse (ref. 20508024) and Marina Bar (ref. 20508024) on the west side of Victoria Road and a 1930s office building on the east corner of Victoria Road (ref. 20506395). The proposed works will not directly impact on any of these buildings but sub-surface traces of former railway tracks may exist beneath the existing road surface. The proposed works on the west end of Albert Quay will entail the reconstruction of this section of the quay. This will involve the construction of a new sheet pile wall on the riverside of the existing quay to 1.2m above ground and removal of the wharf (Plates 10.67 and 10.68). As noted above, the NIAH lists the Albert Quay limestone quay wall and later timber wharf extension (20506391) and associated iron mooring posts (20508002). Archaeological monitoring of bulk soil excavations within the One Albert Quay development site across the road from the west end of the quay revealed deep reclamation deposits and nothing of archaeological significance was noted (Appendix 10E; Murphy Licence 14E0323).

The following provides the result of the ADCO survey of this quay. The quay is constructed of neatly-cut, string-coursed, limestone masonry measuring between 1.5m in length x 500m in width and 600mm in length x 500m in width. Eight masonry courses are visible at Low Water. The quay wall has been underpinned the same method observed for Union Quay, located upstream of Parnell Bridge. The quay was constructed in the mid to late nineteenth-century and the quayside retains three of its original cast-iron mooring bollards, located along its downstream side. As observed for Lapp's Quay, these were manufactured by 'R. Perrott & Sons, Cork' of the Hive Foundry, which operated from its Hanover Street location in the nineteenth-century. A timber wharf (F045a) adjoins the downstream half of the structure, between Clontarf Bridge and Eamon De Valera Bridge. This structure is likely to be associated with the construction of Clontarf Bridge in 1911 and mimics a similar structure located on the upstream side of Brian Boru Bridge (on the North Channel). The structure measures 87m in length x 8m in width. The sub-structure is constructed of greenheart timber with concrete being used to cover the deck-level. A series of paired, vertical, timbers support the outer side of the structure. Timber beams run between the outer, vertical, timbers and the quayside wall; each beam being tied-into the masonry of the quay wall. Cross-bracing has also been used to provide additional support. Deck timbers run longitudinally across the top of the wharf structure, providing a surface upon which the concrete has been laid. Upstream of the wharf, timber fenders run parallel to the quay wall. These are of similar design and dimensions to those observed elsewhere along the channel.

Clontarf Bridge

The proposed works in this section will also entail the modification of Clontarf Bridge to incorporate a 0.5m high steel upstand between the bridge road and footpaths and the construction of four demountable flood gates at the entrances to the footpaths. Clontarf Bridge is a scherzer rolling lift bascule bridge; erected 1911 and is listed in the RPS (no. ref.) and NIAH (20508001). This bridge structure has been subject to remedial/repair works in recent years. Further details on this bridge are presented in Table 10.1 and in the underwater archaeological survey (Appendix 10A).

Terence McSwiney Quay and Parnell Bridge

The proposed works along Terence McSwiney Quay will entail the replacement of the existing 20th century concrete kerbs and railings with a new concrete wall measuring 0.8m above street level and then mounted with guard railings to 1.2m above street level. The Anglesea Street area was occupied formerly by Seigh's Marsh, named after the landowner, and was initially leased by the Corporation in the mid-18th century although the reclamation works were not completed until 1820. Anglesea Bridge was then constructed in order to connect the new lands to the area now known as Parnell Square (Cooke 1999). The quay wall in this section has been subject to extensive 20th century reconstruction works while Parnell Bridge at the west end of the quay is of modern construction and neither of these structures is listed.

The following provides the results of the ADCO survey of Parnell Bridge. This bridge stands on the site of two former bridge structures, named Anglesea Bridge. The original structure was built on the South Channel in 1830 to provide access from Anglesea Road/Corn Exchange to the south and Warren Place to the north. An extract from the Topographic Dictionary of Ireland (Lewis 1837) provides a description of the bridge, shortly after it was completed:

> Anglesey bridge, erected in 1830 by Sir Thomas Deane, from a design by Mr. Griffiths, is a very handsome structure of hewn limestone, with parapets of cast iron; and consists of two elliptic arches 44 feet in span, with a rise of eleven feet, having between them a waterway of 32 feet crossed by two parallel drawbridges of cast iron, which are raised to admit vessels above it.

By the late 1800s, increased traffic levels on the bridge required its replacement, its foundations having become unsafe. Anglesea Bridge was replaced, in 1882, by a steel lattice girder structure of swing-bridge design. The swing bridge, renamed Parnell Bridge, was designed by T. Claxon Fiddler (London) to allow greater shipping access to the South Channel; the bridge comprising a swinging central-span with two fixed ends. A journal extract from 1884 provides a detailed description of the newly built bridge shortly after its construction:

> two abutments and two intermediate piers, each consisting of a pair of cast-iron cylinders or columns, as shown by the dotted circles upon the general plan. The central opening is that which serves for the passage of vessels. The swing bridge extends over two openings, from the north abutment to the southern pier, its centre of revolution being situated over the centre of the northern span, and revolves upon a turntable, which is carried upon a lower platform or frame of girders extending across the northern span of the bridge. The southern opening is spanned by an ordinary pair of lattice girders in line with the girders and superstructure of the swing bridge.

The remains of this phase of bridge construction are evident below the modern Parnell Bridge. A semi-circular section of bridge abutment, composed of neat-cut limestone masonry, is located on the south side of the bridge; an extended abutment once formed the pivot-point of the swing-bridge. A set of masonry steps are inset into the southern quayside, on the upstream side of the bridge and immediately downstream of Union Quay. These steps formed part of the original Parnell Bridge, providing access to the river and the southern bridge abutment. Bridge remains are also evident on the north side of the channel with nine courses of neat-cut limestone (measuring a uniform 1m in length x 0.50m in width) forming the northern bridge abutment. The swing bridge was removed and replaced by the existing three-

span Parnell Bridge in 1971, a pre-cast mass concrete structure supported by two in-water piers. The current Parnell Bridge measures 47m in length x 25.6m in width.

Morrison's Quay and Father Mathew Quay

The proposed works along Morrison's and Father Mathew Quays will entail the replacement of the existing railings a concrete flood wall 0.6m above footpath level and topped with 0.6m of railings. The road surface flanking both quays is also to be regraded. The quay walls and river steps along Morrison's and Father Mathew Quays, which are not listed in the RPS or NIAH, will be retained with necessary repairs as part of the scheme. The NIAH does list a number of buildings in the vicinity of proposed road regrading, i.e. Assembly Rooms (20514336), College of Commerce (20514333) Holy Trinity Church (20514326), Capuchin Monastery (20514325), a terrace of three Georgian houses (20514321, 20514322 and 20514323) and a corn store warehouse (20514320). The NIAH also lists a 1915 post box (20514337) set into the wall of the Assembly Rooms on Morrison's Quay. While the proposed road regrading works extend up to these buildings, no interventions to their structures are proposed. The plaza area to the west of the north side of Parnell Bridge contains a number of sculptures and historic lamp posts that, while not listed, are deemed to be of culture heritage interest. A green cast-iron vent shaft set into the road adjacent to the west end of Morrison's Quay is also not listed but is deemed to be of built heritage significance (Plate 10.73).

Morrison's Island was formerly known the East Marsh, Dunbar's Marsh and Lavitt's Island up to the late 18th century when the undeveloped marshy island was reclaimed and named after a prominent Cork family of the period. The expansion of the city into this area began in 1760 when a row of houses were built along the south side of the South Mall which was still an open channel at that time. The existing street layout was in place by the start of the 19th century and establishments along the quayside included the Sutton's Coal premises, the Cork Distillery Bond and Bottling Store and Gamble's preserved provision firm. The Church of the Holy Trinity dominates the streetscape along Father Mathew Quay began construction in 1832 but was not completed until the early 20th century. Historic photographs show both quays lined with stone bollards and link chains set back and adjacent to the wall (Plate 10.71 and 10. 72) prior to the installation of the existing steel railings and concrete kerbs. Three of the bollards survive at the west end of the latter quay, adjacent to Parliament Bridge (Plate 10.76). A line of granite blocks is set along the top of the Father Mathew quay wall in the west end of quay, opposite the Holy Trinity Church, while limestone is used elsewhere (Plate 10.77). This may indicate a section of localised repairs, perhaps involving inserting a heavier stone type to consolidate the underlying masonry.

The following provides the results of the ADCO survey of these two quays. These quays from one continuous structure of early nineteenth-century date that delineate the north side of the channel, surrounding Morrison's Island. The quay measures 520m in length and has been constructed of neatly-cut, string-coursed, limestone masonry; a total of ten-courses being visible at Low Water. The masonry is fairly regular in size and shape, measuring between 700mm in length x 450mm in with and 1m in length x 450mm in width. The entire structure has been subject to consolidation work along it foundations. Two types of consolidation works are present. The first comprising a series of close-set vertical timber piles, behind which concrete has been poured; this being identical in type to that observed for the opposing George's Quay/Union Quay. The second type comprises vertical timbers that are set flush to the quay

wall, extending to a height of c.1.4m and spaced 200mm-300m apart; the spaces between these timbers having been in-filled with a rough-mix concrete.

A series of greenheart timber fenders, numbering 100m in total, have been placed at regular intervals along approximately 90% of the quayside structure; the fenders only being absent from a small c. 50m section of Father Matthew Quay. The fenders found along Morrison's Island conform in design/fabric to that observed elsewhere along the South Channel quays. A flight of masonry river-access steps are located approximately mid-point along Father Matthew Quay and two others are located on Morrison's Quay; placed mid-point along the quay and at its downstream terminus. These river-access points are all of similar design, each flight comprising eighteen masonry steps with a larger landing-step located mid-way (High Water Mark) down the structure. The bottom steps all terminate a short distance above the Low Water Mark. A series of rectangular drain features, forty-two in total, are present along the structures extent, located along the base of quay wall (below the High Water Mark). These features are uniform in size and shape and measure 600m in height x 400m in width. An arched-culvert (F042a) is located c.180m along Morrison's Quay. This structure has been subject to modern repair using concrete blockwork and cement render. Little remains of the arch-ring, although it is likely to have been of similar design to the culvert encountered on Union Quay (F041b).

Parliament Bridge

The existing Parliament Bridge was constructed in 1806 and is listed in the NIAH (20515061) and RPS (PS270). An early 19th century building extending to the north end of the west parapet is listed in the NIAH (20514316). A new section of boardwalk is proposed to extend from Grand Parade to the north end of the bridge and adjacent building but no interventions to either structure are indicated as part of the flood defence works. The following provides the results of the ADCO survey of this structure. The bridge was replaced in 1806, following flood damage sustained in 1804. The replacement bridge still stands today and forms an elegant, single-ached, bridge composed of neat-cut limestone masonry, with cut-stone balustrade, fine voussoirs, and modillion cornices. Timber shuttering is evident on the in-river sides of the bridge's north pier. This comprises close-set vertical timbers with horizontal shutters, behind which the pier's foundations have been laid (comprising bonded rubble-stone and mortar). A laid-stone apron, which originally covered these foundations, remains partially intact; its southernmost extent having become eroded. A series of substantial timber piles protrude from the foundations and are likely to be associated with the previous eighteenth-century bridge at this location. Parliament Bridge measures 29m in length x 13m in width.

Union Quay and George's Quay

The proposed works along these quays will entail the replacement of the existing modern railings, with by a concrete flood wall typically 1.2m above existing ground levels. The existing limestone river steps and wharf will be retained in this area (Plates 10.78, 10.79, 10.83 and 10.84). The quay walls in these areas, which are not listed in the RPS or NIAH, will be retained, with necessary repairs, as part of the scheme. Remedial works undertaken at George's Quay in the 1980s entailed construction of a concrete backing wall (1350mm max width at base) with numerous services to south and grouting of the rubble backing wall (Ove Arup 1980). The existing facade joints were cleaned repointed as part of the remedial works.

The area to the south of these quays was known as 'Allen's Marsh' in the 18th century, named after a family of local merchants, and the first development was the in the middle of that century when an inlet

quay was built extending southwards from the river bank. This was named 'Copley's Dock' after another local merchant family who also gave their name to the existing Copley Street at its former location. By the start of the 19th century Copley's Dock was closed and the marsh was renamed 'Union Island' to commemorate the 1801 Act of Union. The area underwent reclamation during the early decades of the century and the existing quays were in place by the 1840s. Shipping continued to berth along Union and George's and Morrison's Quays until the 1950s and gained access to the quaysides via Clontarf (raised) and Parnell (swivelled) Bridges to the east. The ships berthing at Union Quay often contained salt cargo for the nearby Lunham's meat factory while slates and coals were unloaded closer to Parliament Bridge. Historic photographs show the George's Quay lined with metal bollards and link chains set back from the wall (Plate 10.81) prior to the installation of the existing steel railings and concrete kerbs. Archaeological test trenching at 12-13 Union Quay identified 19th century reclamation deposits (Appendix 10E; Lane, Licence 01E0368), as did investigations at two properties on the south side of the road from George's Quay (Appendix 10E; Lane, Licence 03E1705 and Ní Loingsigh, Licence 07E0112).

The following provides the results of the ADCO survey of these two quays. The George's Quay structure is of nineteenth-century date and is composed of neatly-cut, string-coursed, limestone masonry; measuring up to 900mm in length x 350mm in width. George's Quay measures c. 240m in length and comprises seven-courses of masonry, visible at low water. The original coping has been removed and replaced using sections of pre-cast concrete. A flight of river-access steps are located 14m downstream of Parliament Bridge. In addition, two wrought iron mooring-rings are located along the quay's extent. A line of vertically set timber piles, set side-by-side and placed parallel to the quay, have been used to underpin the quay wall. These piles are positioned 500mm from the base of the wall, behind which horizontal shuttering has been inserted. Poured mass-concrete has been laid behind the shuttering to consolidate the quay's foundations. A series of greenheart timber fenders (thirty in total) are spaced at regular intervals along the quayside, running between the downstream side of the aforementioned access-steps and the upstream side of a timber/concrete wharf, which is located 132m downstream. Vertical timbers, which abut the quay wall, have been used to form the inner side of each fender. Additional timbers, attached to the outer side of the fender assemblage, are stepped-out from the quay wall at its base; allowing them to rise at an 80 degree angle to join the top part of the aforementioned inner timber. The timbers are joined using an iron-cap/strap that encases the timber head. Iron-ties have also used to fasten the timbers together. A composite timber and poured mass-concrete wharf (F040a) is located c. 30m upstream of the quay's terminus. This structure measures 47m in length x 3.8m in width and comprises a concrete-deck, supported on its riverside by sixteen timber piles. These piles are similar in size (300mm x 300mm) and design to those used elsewhere along the quayside. Five timber fenders are also located downstream of the timber wharf. A large horizontal beam also forms part of the assemblage, running along to the top of the quay wall and interlocking with the head of each fender. These horizontal components are no are no longer in situ at Georges Quay. However, they can be observed in a number of places along Union Quay (F041), where the quayside has been lined with an identical fender assemblage.

Union Quay delineates a 200m section of the channel on its south side, running between the southeast terminus of Georges Quay (near Trinity Footbridge) and Parnell Bridge. The existing structure is thought to date to the early nineteenth-century and comprises ten courses of neatly-cut limestone masonry; measuring between 1m in length x 450mm in width x 600mmin length x 450mm in width. A narrow timber platform

or wharf is located immediately downstream of Trinity Footbridge (F041a). This structure originally measured 30m in length x 1m in width. However, it is presently in a state of disrepair with a c. 10m section from its downstream side having suffered collapsed. The remaining structure is supported along its outer edge by seven timber fenders, spaced 1.35m apart. Equally, the inner side is also supported by vertical timbers that abut the quay wall; iron-straps have been used to fasten these timbers to the wall. Cross-beams link the supporting timbers and provide a sub-structure to which the deck-level planking timbers are fastened. The quay's foundation have been consolidated this location, mass concrete having been poured behind horizontal timber shuttering that runs the length of the timber wharf.
An ornate, keyhole-shaped, arched culvert/drain (F041b) is located towards the downstream extent of the timber wharf, at a point 22m downstream of Trinity Footbridge at NGR: 167774E, 714956N. The culvert measures 1.45m in height, 1m in width at the base of the ach-ring, and 400mm at its base. The arch-ring is segmental in form, comprising fifteen arch-stones which measure a uniform length of 400mm, with width varying between 70mm to 240mm. Large interlocking ashlar blocks surround the culvert feature. The culvert intrados and adjoining walls have been rendered using cement and the feature has been block-off using concrete blocks (c.1.6m within the structure).

A flight of river-access steps (now disused) are located c. 8m downstream of the culvert. Twelve masonry steps are visible, leading directly to the Low Water Mark. Immediately downstream of the access-steps, the quayside extends 1.6m into channel to form a new northern limit to the quay wall. This new limit delineates the channel until reaching another set of river-access steps at Parnell Bridge. The entire length of the quay wall has been underpinned using vertically-set timber piles measuring 300mm x 330mm. The piles are closely spaced, with a gap of 6mm to 10mm between each timber, and are stepped out approximately 500mm from the base of the Quay wall. Concrete has been poured behind these piles to consolidate the quay's foundations. A total of six-hundred and sixty of these timbers have been used as part of the consolidation measures. In addition, a series of seventy-six timber fenders, of identical composition to that observed along George's Quay, adorn the quay frontage. A total of twelve drain features are located along Union Quay, with three drain sizes were encountered: 500mm x 500mm, 700mm height x 500m width, and 600mm height x 500mm width. Four large wrought iron mooring-rings are also present and measure 500mm in internal diameter. A flight of river-access steps, comprising twenty-four masonry steps, is located at the downstream terminus of Union Quay, NGR: 167912E, 717122N. The quayside has been truncated at this point by the insertion of the modern Parnell Bridge, built in the 1971. Seven electricity cables protrude from the quay wall and cross the south-channel at point 12m upstream of Parnell Bridge.

South Mall / Grand Parade / City Car Park

The proposed works on the section of the channel extending west from the north end of Parliament Bridge will entail a sheet pile wall and boardwalk to be constructed in channel with a section of the existing modern boardwalk to the west to be removed to connect the defence wall to the quay. The proposed use of an in channel sheet-pile wall in this area will avoid direct impacts on the rear of the riverside South Mall buildings which are listed in the NIAH although it will extend across the north end of the in-channel weir to the west of Parliament Bridge. This weir is not shown on the 1st edition 6-inch OSI map but is present on the 25-inch edition and is not included in the NIAH or RMP and details are provided in the underwater archaeological survey (Appendix 10A). No interventions to Parliament Bridge are indicated as part of the flood defence works. The proposed works on the south end of the Grand Parade will entail the

construction of a combination of walls and flood gates set back from the quay wall which is obscured by the modern boardwalk that extends over the river's edge. The proposed line of these defences extends approx. 10m to the south of the war memorial, known as 'The National Monument'. This is a monument is a Protected Structure (PS121) and is also listed in the NIAH (20514119). Remnant traces of the historic railing that extended along the quay edge in the 19th century survive on west side of Nano Nagle footbridge (Plates 10.87 and 10.90).

The proposed works to the former Bank of Scotland on west end of the Grand Parade will entail local raising of stone wall 0.5m above existing levels and raising of four window sills to flood defence level typically 0.15m above existing levels and also waterproofing of existing wall. This building is a Protected Structure (PS115) and is also listed in the NIAH (20514094) (Plate 10.91).

The proposed works within the City Car Park site will entail a 0.2m concrete kerb, to be tied into the existing masonry wall along the quay in order to raise existing ground levels to flood defence level. The RPS and NIAH do not list the random rubble quay walls along the rear of the South Mall properties; the limestone ashlar walls along Grand Parade and the random rubble walls along the City Car Park site. These walls will be retained, with required repairs, as part of the proposed scheme. The river wall to the west of Grand Parade and along the City Car Park site extends through ground reclaimed during the post-medieval period and is approx. 12m outside the south side of the medieval city wall. The City Car Park also contains the former site of the City Gaol by the bridge and formed part of the South Corporation Quay following the demolition of the city wall. Daniel Lane founded the South Gate Brewery within the property in 1811 and this operated until 1901 when it was bought by the adjacent Beamish and Crawford Brewery. The buildings within the site had gone into ruin by the mid-20th century when the site was cleared and converted into use as an open car park which still operates (Plate 10.93). Portions of the random rubble river wall associated with the former brewery survive (Cooke 1999) although sections of modern replacement masonry are also present. Archaeological excavations within this property were undertaken in 2003-4 by Máire Ní Loingsigh and Deborah Sutton (Licences 03E1170 and 04E0132) and the results are presented in *Archaeological Excavations at South Main Street* (ed.s Hurley and Brett 2014). This identified extensive archaeological remains, including the city wall, the remains of 19 medieval timber buildings and various reclamation fences including a substantial east-west oak-built revetment feature. The line of the city wall delimited the southern end of the medieval area and is located 12m to the north of the existing river wall. A 17th century quay wall was uncovered against the outer face of the city wall and the excavators concluded that the existing quay wall to the south was built in the early 19th century (*ibid.* 114). Test trenching in the area to the south of the city wall identified features associated with the 18th-century brewery and 19th century houses. The existing ground surface within the river side of the car park was found to rest on a 0.8m deep rubble layer associated with late 20th demolition activity.

The following provides a summary of the results of the ADCO survey of this area. A short section of quayside, measuring c. 60m in length, is located on the north side of the channel, opposite the downstream side of Sullivan's Quay. This structure originally provided access to the river from the west end of the South Mall. The structure is currently hidden beneath a boardwalk that protrudes 3.6m from the quay wall. Poured mass-concrete has been used to anchor the boardwalk to the quayside, resulting in the removal of two/three courses of masonry from the structure. The existing quay wall comprises eight courses of

limestone masonry measuring between 800mm in length x 450mm in width and 500mm in length x 300mm in width. A flight of river-access steps are located c. 40m along its extent. A small arched-culvert (F039a) is located at NGR: 167468E, 715769N, close to the downstream terminus of the quayside. The arch is segmental in form and comprises thirteen arch-stones. The culvert has been blocked-off using cast-cement blocks and a storm drain has been inset into the culvert opening.

The upstream side of South Gate Bridge forms a triple-span limestone bridge with arch-rings that are of elliptical design. It is composed of rubble-stone walls with limestone coping, ashlar buttresses, and ashlar voussoirs. Triangular cutwaters extend almost the full height of the bridge. In contrast, the downstream side differs markedly in style and is composed of neatly-cut, sting-coursed, limestone masonry. The central arch is elliptical in form, while the two adjoining arches are of segmental design. Triangular cutwaters extend into the haunch area, terminating in line with second lowest arch-stone in the arch-ring. South Gate Bridge measures 19.8m in length x 10.6m in width.

A wide arched-culvert (F002a) is located beneath South Gate Bridge, built into the bridges north abutment wall. The culvert measures 7.20m in width and 1.35 in height. The arch is segmental in form and comprises fifty neat-cut arch-stones (limestone) measuring 480mm in length x 25mm in width. The culvert has been blocked-off using limestone masonry, leaving a keyhole drain at a point a little off centre to the archway. It is likely that this arched-culvert is contemporary to the original bridge build; the culvert being later adapted as part of the bridge widening endeavour undertaken in the 1824.

Sullivan's Quay

A proposed flood wall, with cut limestone cladding, will be constructed along the quayside, typically 1.2m above existing ground levels (0.8m wall with 0.4m railing). The footpath along Sullivan's Quay is to be widened to 4m and existing historical bollards and cast-iron railings are to be removed along the east end of the quay (along a section extending 132m west of Parliament Bridge) (Plate 10. 94) and to be retained at the west end (Plate 10.95). The riverside along this quay was reclaimed in the 1720s and the existing limestone ashlar walls were constructed in 1825. The ashlar limestone quay walls and its associated limestone steps and railings/bollards along Sullivan's Quay, which are not listed in the RPS or NIAH, will be retained, with required repairs, as part of the proposed scheme. As remnant traces of late 19th/early 20th century river boundary features within the city; the railings and bollards along Sullivan's Quay, while not listed, are interpreted to be of local built heritage significance. No works to South Gate Bridge are proposed. This quay extends through the Primary Zone of Archaeological Potential identified in the City Development Plan this general area was located within the original Viking settlement. Archaeological excavations under the Enterprise Bar property located to the south of the west end of the quay uncovered medieval levels, including remains of a timber trackway (Appendix 10E: Lane, Licence 99E0650).

The following provides a summary of the results of the ADCO survey of this quay. This structure delineates the south side of the channel between South Gate Bridge and Parliament Bridge. Sullivan's Quay is of nineteenth-century construction, comprising large pieces of limestone masonry that are of regular size and shape; the average block size being 900mm in length x 350mm in width. Fourteen string-courses are visible at Low Water. A flight of river-access steps are located at a point c. 50m downstream of South

Gate Bridge. A modern access-ladder has also been retro-fitted of the quay wall, approximately 10m downstream of the aforementioned bridge structure. The quayside is truncated, roughly half-way along its extent, by Nano Nagle Footbridge (built in 1985). Cut-stone balustrades and cast-iron railings line the quayside. A weir site (F054) within the adjacent section of the channel comprises a large, u-shaped, structure located on the upstream side of Parliament Bridge. This has been subject to modern remedial works and has been repaired/consolidated using poured mass-concrete.

Frenche's Quay

The existing parapet wall along Frenche's Quay is above the required flood defence level and will be maintained. As noted above, the bridge over the culvert at the west end of this quay is listed in the NIAH (20503317), as is an adjacent slipway (20503316) (Plates 10.95 and 10.96). The bridge was constructed to serve the milling area on Crosses Green and was originally named Crosses Green Bridge and St. Brigit's Bridge. It is now referred to as Proby's Bridge, named after local merchants who also lent their name to the former quay to the west. There is also historical cartographic evidence for the presence of a bridge extending from this area to the lands to the south at the start of the 17th century. Frenche's Quay extends through the Primary Zone of Archaeological Potential identified in the City Development Plan and archaeological excavations in the area to the north of the road flanking the quay have identified sub-surface deposits dating to the 12th century (Appendix 10E: O' Brien, no licence ref).

The following provides a summary of the results of the ADCO survey of this quay. The quayside comprises two build phases, with an overall structure that measures c. 120m in length. The majority of the structure is composed of randomly coursed limestone, with masonry ranging in size from 200m length x 150mm width to 400mm in length x 300mm in width. This part of the structure is thought to date to the mid eighteenth-century. A small rectangular drain feature, measuring 450mm in length x 250mm in width is located along the downstream section of the quayside. A c.15m section of the quayside, running between NGR: 167222E, 715081 and NGR: 167234E, 715124N, has been subject to nineteenth-century replacement. This section comprises neat-cut, sting-coursed, limestone masonry measuring up to 800mm in length x 400mm in width. Two sections of this later addition are subject to recent collapse, exposing the rubble-core that forms the main body of the quayside behind. Nineteenth-century repair-work is also evident elsewhere along the extent of French's Quay, localised to sections from the upper part of the quay wall.

An arched-culvert is located towards the western end of French's Quay at NGR: 167180E, 715015N (F037a). This culvert facilitates a waterway that formerly ran along Proby's Quay, the waterway having been culverted in the 1800s. The culvert measures 3.6m in width x c. 3m in height. The archway is segmental in form and comprises thirty-two arch-stones. The arch-walls, measuring 1.4m in height, are composed of neat-cut limestone masonry with an intrados formed of red-brick. A slipway (F037b) is located a short distance upstream of this structure. The slipway is of masonry construction and appears to be contemporary with the eighteenth-century build-phase at French's Quay. The slipway measures 10m in length and 2.5m in width. A modern weir (F053) is also located a sort distance upstream of South Gate Bridge and comprises a poured mass-concrete structure.

Crosses Green

The proposed works in this area will comprise a sheet pile wall, with random rubble limestone cladding, to be constructed in-channel adjacent to the riverbank (Plate10.97). The proposed in-channel wall will

continue northwards adjacent to existing random rubble river and is to be constructed 1.2m above existing ground levels. Both the wet and dry side of sheet pile is to be clad with salvaged random rubble limestone. This area extends through the Primary and Secondary Zones of Archaeological Potential identified in the City Development Plan. The area around Crosses Green is located adjacent to the former site of the medieval Dominican Priory of St. Mary (CO074-037----) and 166 skeletons, possibly associated with the priory, have recently been excavated in the riverside property adjacent to the proposed wall between C02_1310 and C02_1350 (Plate 10.98). The excavations did not extend to the riverside due to potential flooding of the site but archaeological test trenching indicated that burials and remains of a riverside 19th century mill building wall were present in this area (Appendix 10E: O'Rourke, Licence 04E1616 and A. Purcell *pers. comm*). The 16th century priory records refer to surrounding ancillary features including burial grounds, orchards/gardens, salmon weir, fish pond and a mill building with an associated channel (Cooke 1999, 144). The south end of Crosses Green area was developed as a milling centre and market green during the 18th century and Crosses Green Quay along the west side of the channel was created during the 1780s. The channel that formerly ran along Proby's Quay and St Finbarr's was culverted in the 19th century and is still crossed via the existing Proby's bridge at the point where it exits into the Lee channel at the river bend (*ibid.*).

The following provides a summary of the results of the ADCO survey of this quay. This nineteenth-century quay structure runs along the south side of the river channel (south-south-east direction) from the western terminus of Wandesford Quay for a distance of c. 60m. The lower, original, section of the quayside is formed of un-coursed limestone masonry, while the upper elements of the quay wall comprise a rubble-stone wall; the latter structure being a later addition. A small arched-culvert (F036a) is located immediately downstream of the structure's southernmost extent. The culvert measures 3.2m in length x 1.4m in height. Its arch is segmental in form and is composed of thirty-two arch-stones. The culvert has been blocked-off using poured mass-concrete, although a flow of raw-sewage was observed emanating from below this point. No other features of interest were identified along the extent of this quay.

Wandesford Quay

Proposed reinforced concrete wall to flood defence typically 1.2m above existing ground levels will extend along this quay with localised sections of glass flood defences and walling along the west end where the river wall has been rebuilt with modern random rubble walls and sections of railings. Works will also entail repairs to existing quay wall. The existing culvert over the former mill race extending south of the west end of the quay is to be pressurised during a flood event and repairs to the existing culver to be carried out where necessary. There are no proposed works indicated at Clarke's Bridge, which is a Protected Structure (PS026) and is also included in the NIAH (20503247). The existing random rubble river wall within this area is not listed and sections at the west end have been replaced with modern random rubble walling and railings (Plates 10.100 and 10.101). This area extends through the Secondary Zone of Archaeological Potential identified in the City Development Plan. This area was formerly known as Clarke's Marsh and was reclaimed and developed as Wandesford Quay during the late 18th century. The quay was named after Lord Wandesford whose family had a landholding in the area and the existing Clarke's Bridge commemorates the former name of the area (Cooke 1999, 144). Archaeological testing within two properties on the south side of the road uncovered reclamation deposits dating from the 18th century onwards and nothing of archaeological significance was identified (Appendix 10E; Lane, Licences 94E140 and 98E0205).

The following provides a summary of the results of the ADCO survey of this quay and Clarke's Bridge. The original section of Wandesford Quay dates to the early nineteenth-century. It is located on the south side of the channel, running from the northern end of Crosse's Green Quay, on its downstream side, to a point c. 150m upstream. The structure is truncated by Clarke's Bridge, at a point 19m from its eastern terminus. A modern structure has been built onto the western terminus of Wandesford Quay, extending the quayside as far west as St. Finbarre's Bridge. The original quay measures approximately 2m in height and comprises un-coursed, limestone, masonry that ranges in size and shape; measuring between 500m in length x 350mm in width and 300mm in length x 300mm in width. The original height of the quay has been raised with the placement of the rubble stone wall, running the length of the quayside; this wall likely inserted in the late nineteenth- or early twentieth century. A river-access ladder has been fastened to the quay wall and a number of twentieth-century service pipes protrude from the base of the structure. Several small drain features are also present along its extent.

The Clarke's Bridge arch is constructed of rough-cut limestone and the arch-ring is segmental in form. Narrow arch-stones alternate in paired lengths for decorative effect while neat-cut limestone has been used for keystones and springing stones on both sides of the bridge. The arch-walls and bridge façades are composed of local red sandstone. Thin cut limestone has been used for the coping. Small springing arches are located either side of the bridge on its south side, these appear to be later additions designed to widen the approach to the bridge on that side. Clarke's Bridge measures 22m in length x 7.8m in width.

Welfare Office/ Fisherman's Wharf

The existing modern concrete kerb and railing along the riverside of the Social Welfare Office are to be demolished and replaced with a new reinforced concrete flood defence parapet typically 0.6m above existing ground level. The welfare office dates to the 1980s and occupies the former location of houses known as Queen's Place (Plates 10.102 and 10.103) and an iron works to the west. The works to the west of the Welfare Office will entail a sheet pile wall, with limestone random rubble cladding on the wet side, to be constructed in channel along the south side of a former Hive Iron Works listed in the NIAH (20503242), most of which was demolished when the existing modern structures were constructed in the 1980s. While the development has removed much of the iron works, remnants of the former factory wall are still extant along the riverside adjacent to the Welfare Office and the proposed in channel defences will result in the retention of this feature Plate 10.104). The sheet pile wall will extend through the east end of a salmon weir in the river bend at the east end of Lancaster Quay. The salmon weir, known as Fryer's Weir, located in the river bend at the north end of this area is not a listed structure, but is present on the historic OSI maps (Plate 10.105). The ADCO survey notes that this weir site (F052) has been replaced by a modern concrete structure; built upon the foundations of the original historic structure at that location. The proposed works to the west of the former iron works will entail local raising of flood defences along the balcony and boardwalk of a restaurant that occupies the location of a demolished house which had formerly been listed in the NIAH (20503237). The Hive Iron Works were established in c. 1800 and continued in operation into the 20th century. The furnaces were demolished in the mid 1960's and other sections were removed when the Welfare Office and the apartments were constructed in the 1980s.

Lancaster Quay

The existing river wall parapet is to be retained and existing open railings to be replaced with flood defence wall to tie into adjacent existing walls. A 19th-century cast-iron water trough is set .into the parapet wall along the east end of Lancaster Quay (Plate 10.107). This feature was moved to its present location in recent decades and is listed in the NIAH (20503234).The area to the west of Washington Street was reclaimed from Forsyth's Marsh and the quay is named after Joseph Lancaster, a prominent Quaker who in 1812 founded a school in the area now occupied by the Square Deal retail premises. Western Road was constructed through the Duke of Devonshire's marshlands and was built to create an access to the city from the west. The Jury's Hotel complex is built on a small estuarine island formerly known as both Twigg's Island and Bishop's Island. This area was the location of a rail terminus from 1898 to 1931 and was used by both the Cork and Muskerry Light Rail Co. and the Cork Electric Tramway Company (Cooke 1999).

The following provides a summary of the results of the ADCO survey of this quay. The structure dates from the mid to late nineteenth-century; a period during which significant development of the western reaches of the city took place. The structure has been truncated by three bridge structures; St. Finbarre's Bridge and two unnamed bridges. The quay wall is composed of six, visible, courses of limestone masonry measuring up to 1m in length x 300mm in width. The quay is upstanding to a height of approximately 2m, above which a rubble-stone wall has been constructed.

Western Road and UCC

The proposed flood defence works in the area Western Road to the east of UCC will comprise a combination of localised embankments and walls extending along the riverside back gardens of a number of houses along Inishcarrig Terrace. An embankment will extend adjacent to the river bank within a former petrol station property to the east of the terrace (Plate 10.110) and the riverside back garden wall of the eastern house will be remediated to ensure capacity for flood loading. An embankment will be constructed to the rear of the houses at the west end of the terrace and no works to O' Donovan's Bridge are proposed.

The section of the river channel between the hotel and Inniscarrig Terrace contains a weir and the footings of a former railway bridge (Plate 10.109). The weir is labelled 'Gilabbey Weir (site of)' on the historic OSI maps, indicating an association with the site of an Augustinian ecclesiastical site in the high ground to the south of the river (RMP CO074-036----). The ADCO survey of the existing weir notes that the weir remains intact at its original location, although the structure has been subject to modern improvement and concrete has been used to re-face the structure. The bridge footings within the channel form the remains of a 19th-century railway crossing that led to the former Cork and Muskerry Light Railway terminus in the area now occupied by the hotel and apartment developments to the east. There are no works proposed to either in-channel feature and the proposed works in the area adjacent to the weir will entail repairs to an existing garden wall. The NIAH lists four houses (1-4) along Inishcarrig Terrace (20503264, 20503263, 20503262 and 20503261) and no works are proposed to these buildings.

The proposed flood defences along the boundary with Western Road to west of the University gate will entail the temporary removal of the railings, the construction of a 0.35m high concrete wall and the

replacement of the railings on top of new build. These existing railings form part of the NIAH listing for the gate/walls/railings (20866156) at the University entrance on Western Road (Plate 10.112). The proposed flood defences to the rear the houses along Western Terrace (no.s 1-5 are listed in the NIAH 20866107), will entail the construction of a concrete flood wall typically 0.5m above existing ground with guard railings to 1.2m above existing. No impacts to the houses listed in the NIAH are proposed and the existing river's edge in this area is covered in poorly sorted stone rubble, apparently created to protect against soil erosion along the back gardens (Plate 10.113). No works are proposed to Newman's Bridge (20866155) and a gate lodge (20866154) located to the southwest of the university gate.

The ADCO survey provides the following description of the former railway bridge built to accommodate the Cork and Muskerry Light Railway. This bridge is depicted on the OC 25-inch map, crossing the South Channel between to the present-day location of Inniscarrig Terrace and the River Lee Hotel. Two bridge abutments remain and two circular steel piles, designed to support the structures mid-point, are visible in-river. The eastern abutment is constructed using red brick with rock-faced ashlar forming the corner stones. Limestone masonry has also been used as coping along the abutments north and south sides. The structure measures 2m in height x 3m in length and is located at NGR: 166621E, 7157444N. A section of the narrow-gauge track can be seen extending, c. 0.30m, from the abutment, fastened upon a large railway sleeper. The tubular steel bridge supports are located roughly mid-point across the waterway. These measure 0.80 in diameter, are upstanding 1.8m from the riverbed, and are positioned 2m apart. The west abutment is formed by a retaining wall that is set back 1.8m from the channel. The base of the wall is composed of concrete, with the upper parts built up using redbrick. The bridge was constructed to provide access to and from the railway station that occupied a position adjacent to Lancaster quay, c. 200m downstream. The railway was completed in 1887, giving a late nineteenth-century date to the remaining bridge features. The ADCO survey also notes that a narrow bridge is depicted on the OS 25-Inch Map, crossing the South channels at a point c. 60m upstream of Gill Abbey Weir. No in-water remains of this bridge were encountered, although the remains of a possible bridge abutment are located on the north side of the channel, NGR: 166479E, 714959E; incorporated into a modern house developed at that location. Cartographic evidence suggests a structure was built at this location post-1843.

Carrigrohane West

The proposed flood defence works will entail and embankment with a sheet pile wall at east to flood defence level typically 1.0m above existing ground level surrounding water treatment tank in field to west of Carrigrohane Road. This area is adjacent to former site of mill listed in RMP (CO073-048----). The former location of mill building shown on OSI historic maps is now under widened roadway to southwest. No works to former mill channel to southwest of water treatment area are proposed. The ground surface within the fenced off area around the water tank appears to have been disturbed by associated works (Plate 10.114).

Bannow Bridge

The proposed flood defence works in this area will entail a sheet pile flood defence wall, clad in limestone random rubble on wet side and typically 1.0 m above existing ground along the river bank to the east of the north side of Bannow Bridge. A flood defence embankment is also proposed in green field areas around an adjacent private residence with localised road regrading to the north of the house. The County Development Plan designates Bannow Bridge as a Protected Structure (PS00457) and it is also included in the NIAH (20907354). The bridge is also listed in the RMP (CO073-045). No works to the bridge are

indicated but the proposed sheet pile wall extends to east side. This area is overgrown but traces of rubble visible along the bank may have may have been deposited as an erosion protection measure (Plate 10.115).

ADCO river bed survey

An underwater assessment was carried out along a 500m section of the River Lee and the sub-tidal sections of the North at South Channels at selected locations; undertaken using SSDE to HSE/HSA standards. No archaeologically or historically significant material, structures, or deposits were encountered as part of this endeavour. A summary description of the riverbed deposits observed as part of the underwater survey is provided below.

North Channel: underwater survey of the sub-tidal channel extended from a point 50m upstream St. Vincent's Bridge, opposite Lee Mills, to a point c. 1.5km downstream at Michael Collins Bridge. Upstream of St. Vincent's Bridge, the riverbed in compact in nature, comprising >400mm boulders and >70mm cobbles. A number of large boulders measuring up to 1.5m length x 1m width were also noted. Occasional tree-branch martial was present and a large pile of masonry was encountered close to river-wall at Grenville Place, where a c.15 section of the wall has collapsed and later been replaced. Travelling beneath St. Vincent's Bridge the central-channel becomes more pronounced, the sides of the channel sloping at a c. 40 degree angle. The riverbed is now composed of rounded pebbles and small cobbles overlying gravel (<2mm) and coarse sand. A hand-penetration depth of 500mm was observed at this point. Approaching Griffith Bridge the channel edge becomes less defined and slopes at between 10 and 20-degrees. The riverbed is composed of cobbles with occasional boulders that overlie a coarse gravel sub-stratum. Under Griffith Bridge rock-armour is present surrounding the bridge piers. No indication of the foundation elements from earlier bridge structures at this location was present. Continuing downstream, along Kyrl's Quay and Pope's Quay, the sides of the channel slope at a 30-degree angle and the riverbed becomes finer in nature; now comprising rounded pebbles and coarse gravel with occasional cobbles. A hand-penetration depth of 80mm was observed along this stretch of the riverbed. The character of the riverbed remains unchanged as far as Brian Boru Bridge, with a riverbed composed of coarse gravel and rounded pebbles. Frequent pottery fragments (modern) were noted, along with miscellaneous metallic debris. All observed material was small in nature, any larger objects likely to have been removed during flood-water events. Hand-pentation depths of between 50mm and 100m were achieved along this section of the riverbed. Downstream of Michael Collins Bridge the riverbed changes in composition, the river gravels/cobbles being replaced with a soft silty-clay with 600mm of penetration. In general, the North Channel appears to retain a natural character and the riverbed deposits present can be considered to have a medium to good holding-content.

South Channel: the underwater survey of the sub-tidal channel was undertaken along four sections of the South Channel; the location of the proposed flow-control structure; St. Finbarre's Bridge to the Parliament Bridge; Parliament Bridge to Parnell Bridge; and Clontarf Bridge to a point 200m along Albert Quay East. The riverbed located between Parliament Bridge and Parnell Bridge is less compact in nature and predominantly composed of small pebbles (<40mm) with frequent cobbles (<70mm) also present; only occasional boulders, measuring up to 300mm in length x 200m in width being noted. The aforementioned deposits overlie a sub-stratum of gravel (<2mm) and coarse sand. This sub-stratum is frequently exposed and a hand-pentation depth of 300mm can be achieved for these areas. This section of the riverbed retains its natural character and has a good holding-content, particularly for those riverbed areas adjacent to George's Quay and the upstream side of Union Quay.

The riverbed downstream of Clontarf Bridge slopes at a c. 20-degree angle from the base of the two opposing quays. It is composed of a silty-clay with a penetration depth of 800mm+. Moving downstream, underneath Eamon De Valera Bridge, the slope increases its angle to c. 30 degrees. The central channel is composed of soft silty-clay with a hand-penetration depth of 600mm. Alongside Albert Quay East the channel slopes from the clutch-piles that delineate the quayside at a 70-degree angle. This area appears to have been dredged or subject to frequent prop-wash from cargo vessels using the quayside. Moving out into the channel, c.15m, the riverbed rises by approximately 1.5m (45-degree angle). The riverbed along this downstream section of the South channel is composed of a dark-grey silty-clay with a penetration depth of over 1m.

In general, the riverbed between Clontarf Bridge and Albert Quay East remains flat and featureless and largely sterile of surface debris. A good holding-content can be ascribed for this area, the silty-clay providing an ideal environment of the retention and preservation of archaeological material. However, much of this riverbed area is also likely to have been subject to modern dredging, an activity that would greatly reduce the archaeological potential of the riverbed deposits present. Underwater visibly for this downstream section of South Channel was poor, ranging between 0-300mm. As such, no useful underwater photography was achieved.

Metal-detection survey was attempted at a number of other locations, however, the background metallic signatures present negated meaningful survey. As such, metal-detection use was restricted to a section the intertidal foreshore adjacent to Lee Mills, on the North Channel, which also underwent an intensive visual survey. As previously discussed, this intertidal area has formed a catchment area for waterborne sediments and portable objects lost/discarded into the waterway. A high target ratio of 3-4 hits per m^2 was encountered. Metal-detection of the surface layers revealed a mix of modern metallic debris and older material dating to the early twentieth-century. Modern material included frequent coins, spoons, lead-fishing weights, re-bar, mobile phones, etc. Older material of historic interest included three rifle bullets and a military or constabulary dress-button. Small finds form the visual survey include two honing stones, of a type still produced in the 1950s, a selection of clay pipe bowl and stem fragments of late nineteen- to early twentieth-century date, and ceramic fragments (glazed red earthenware) of a type produce from the seventeenth-century onwards. An additional find of interest was recovered from the riverbed a short distance downstream of Mardyke Footbridge. This find constitutes a silver band from the wooden base of a trophy/presentation cup. A total of nine names are listed on the cup, starting with '1942 C.J. Daly' and ending with '1956 W.J. Dwyer'. The find is believed to be associated with the Sunday Wells Boat and Tennis Club, located a short distance upstream; the wooden base of the cub having been discarded into the waterway sometime after 1956.

10.4 PREDICTED IMPACTS

The following section provides a general summary of the overall impacts of the proposed scheme on the cultural heritage resource in its environs. Details on potential impacts to protected archaeological and built heritage features in close vicinity to the scheme are presented in Table 10.3. Details on potential impacts to in-channel features noted by ADCO during the underwater archaeological survey report are presented in Table 10.4 and their full report should be read in conjunction with this table (Appendix 10A).

The design of the proposed scheme has endeavoured to minimise negative impacts on elements of the archaeological and architectural heritage resource wherever possible. Where it has not been possible to avoid all potential adverse impacts, mitigation measures are proposed below (Tables 10.3 and 10.4).

There are no dredging works proposed within any sections of the river channels and the in-channel interventions will be largely confined to the construction of localised sheet-pile walls. This will result in a low potential for negative impacts on any underwater archaeological features or artefacts that may exist within the river channel sediments.

The proposed scheme with the city area is located outside the medieval walled area and minimal ground works are envisioned along the within the 18th and 19th century reclamation deposits along the existing quaysides. A wide range of archaeological excavations have been undertaken in properties adjacent to the quays and these have typically uncovered extensive, thick reclamation soils containing little or nothing of archaeological significance. The location and shallow nature of proposed ground works will result in a low potential for negative impacts on unrecorded, sub-surface archaeological features or artefacts within the vicinity of the quays.

The proposed works will entail localised minor direct impacts on the parapet walls along a number of these quays and repairs to the existing walls where required. The city quay walls are not included in the Record of Monuments and Places or in the City Council's Record of Protected Structures although sections of limestone ashlar quays and associated features are listed in the National Inventory of Architectural Heritage. The quay walls contain various features associated with their use as docking features during the 19th and early 20th century, including quay steps, wharfs, mooring posts and docking rings. These features form physical remains of the former maritime heritage of the city and will be for the most part retained as part of the proposed works. The stabilisation and repair of the 19th century quay walls has been an ongoing process since their construction and the requirement for this is attested to by the collapse and cracking of sections of the walls along Albert, Penrose and Andersons Quays during the late 20th century. The repairs proposed as part of the present scheme will form a part of this process and will contribute to the retention of the historic quay structures. In general, the impacts to the city quays are interpreted as ranging from **a)** slightly positive impacts through repair, **b)** neutral and **c)** slight, indirect negative impacts to sections of parapet walls. These impacts are itemised and assessed in Table 10.3.

A number of the historic bridges in the environs of the scheme, both within both the County and City Council areas are listed in the RMP, RPS and NIAH. While the scheme has been designed, where feasible, to avoid any direct impacts on these structures, localised interventions are proposed to a number of bridges and the levels of impact are detailed in Table 10.3.

The City Development Plan lists over 1,000 buildings and features within the city area in the Record of Protected Structures and many of these are located within the streetscape in the environs of the river channels. The scheme also extends through, or adjacent to, a number of ACAs and Proposed ACAs

designated by the City Council. The use of appropriate stone cladding to the proposed interventions will result in a neutral impact on the built heritage resource within the surrounds of the scheme and the alleviation of potential significant, negative direct impacts by flood events will result in slight positive impacts on the Protected Structures and ACAs in the streetscape adjacent to the proposed scheme.

The creation of flood defence walls and embankments within the predominately agricultural lands in the County Council area in west end of the proposed scheme will largely impact on green field areas that do not contain any recorded cultural heritage sites. Any proposed in-channel impacts or ground works within undeveloped green field areas are, nonetheless, assessed as having the potential to create potential negative impacts on any unrecorded sub-surface archaeological features or artefacts that may exist on their footprint. As the nature and extent of any such unrecorded features is known, an exact assessment of level of potential negative impacts is not quantifiable. (Appendix 10A).

The following provides extracts from the ADCO survey report's general assessment of impacts and should be read in consultation with their full report and area specific assessments which are presented in Table 10.4.

Bridges: six bridge structures will be impacted by the proposed drainage scheme. However, in the most part, interventions are limited in nature and restricted to the upper elements of each of the bridge structures. Only one bridge structure (F005; Alderman Reily's Bridge) is subject to significant impact and requires additional mitigation prior to the flood defences works commencing.

Quays: the majority of the impacts associated with the proposed flood defence work to the city's quays are limited to street-level interventions. The level of impact and proposed mitigation for these street-level interventions has been undertaken separately by John Cronin and Associates. Proposed interventions to the lower components of each quay structure constitute, in the main part, localised maintenance and repair of the quay-façade and the insertion of micro-piles along their foundations. This intervention work does not have a significant impact on the existing structures, and can be considered to have a slight positive impact.

Direct in-river impacts, in the form of sheet-pile walls, are restricted to two sections along the South Channel. These works will impact Crosse's Green Quay (F036/F036a) and an unnamed quay (F039) located off the Grand Parade/South Mall (upstream of Parliament Bridge). These quays will be buried behind the new in-river extent created by the insertion of these sheet-piles walls. In addition, a large weir structure (F054), located on the upstream side of Parliament Bridge, will be impacted by sheet-pilling along its northern side.

The most significant potential impact to features identified from the underwater survey is along the intertidal foreshore at Lee Mills; two previously unrecorded timber structures (F055 and F056) being situated at that location. It is proposed to insert of a new sheet pile wall along the south side of the sub-tidal channel, roughly along the Low Water Mark. It is also understood that the area of foreshore to south of this wall will be subject to reclamation. As a result, these structures will be directly impacted by the proposed reclamation works. In addition, a series of four archways (F057), built into the riverside façade of Lee Mills will also be buried as a result of these works.

10.5 MITIGATION MEASURES

The following section provides a general summary of the mitigation strategies to be enacted as part of the proposed scheme to protect the cultural heritage resource in its environs while details on site specific mitigation strategies are presented in Tables 10.3 and 10.4.

Mitigation measures, both at pre-construction and construction phases, will be undertaken in compliance with national policy guidance and statutory provisions for the protection of the archaeological, architectural and cultural heritage resource. It is recommended that any proposed ancillary works outside the present design should be subject to a Cultural Heritage Impact Assessment.

In general, any interventions to built heritage structures in close vicinity to the scheme should be overseen by a historic building consultant both prior to and during the construction phase. This will be to ensure that a pre-works record of these structures is compiled and that proposed interventions are undertaken to conform to appropriate conservation standards. A method statement(s) outlining proposed interventions to built heritage features should be compiled by the consultant in advance of works and following consultation with the Conservation Officer in the relevant council area.

Details on the localised mitigation strategies for features identified during the ADCO underwater archaeological survey are presented in Table 10.4. In general, the report recommends that further archaeological work in advance of construction is required at five locations; to include Alderman Reily's Bridge (F005), Crosses' Green Quay (F36/F036a), an unnamed quay (F039), the downstream side of Albert Quay and its associated timber Wharf (F045/F045a), and a section of riverside wall at Lee Mills (F057) (see Table 10.4 and Appendix 10A). This work is to include detailed survey of each structure, carried out to a level that would constitute preservation by record of these structures. In addition, timber structures F055 and F056 are to be removed under archaeological supervision or subject to an engineering strategy to allow their preservation in situ. It is also recommended that archaeological monitoring of ground disturbances during construction be undertaken, with the proviso to resolve fully any archaeological material observed at that point.

Any proposed excavations works in green field areas and within river sediments will be monitored by a suitably qualified archaeologist licensed by the National Monuments Service. In the event that any unrecorded archaeological features, deposits or artefacts are identified the monitoring archaeologist will consult with the OPW (and/or a Project Archaeologist appointed by the OPW), the relevant planning authority and the National Monuments Service in order to determine the appropriate mitigation strategy.

Table 10.3: Summary of site specific impact assessments and mitigation strategies

Area	Summary overview of main works	Built Heritage	Archaeological	Potential impacts to cultural heritage sites	Mitigation	Residual Impact
Curraghbeg	Embankment and wall in brown field area adjacent to the west bank. Within modern commercial yard 150m west of Innishcarra Church	Innishcarra Church on the opposite river bank located 150m from proposed works is a Protected Structure (PS853).	Innishcarra Church (CO073-037002-) and its associated graveyard (CO073-037001-) are also included in RMP.	Neutral impact to church and graveyard. Existing riverside trees adjacent to proposed works will screen views from church. Potential negative impacts to unrecorded, sub-surface archaeological sites	Archaeological monitoring of ground works	None
Garravagh	1.5m high embankment and pumping station within a pasture field adjacent to south side of R618 public road (approx. 240m north of channel).	No protected structures within 200m.	No recorded sites within 200m.	No impacts to recorded sites. Potential negative impacts to unrecorded subsurface archaeological features in green field areas	Archaeological monitoring of ground works	None
Garravagh	2m high embankments and a pumping station within pasture fields adjacent to the west and east sides of the public road extending north from Innishcarra Bridge. Works terminate approx. 20m north of bridge and are screened by tree line along north river bank	Bridge located 20m south of works is listed in RPS 00458 and NIAH 20907328.	Bridge is also included in RMP (CO073-038----).	Neutral impact to bridge. Potential negative impacts to unrecorded, subsurface archaeological features in green field areas	Archaeological monitoring of ground works	None
Coolroe (south of Innishcarra Bridge)	Embankment and flood wall (0.8m above existing ground) within a section of a tillage field surrounding a private house in area to south of Innishcarra Bridge. Also involves regrading of adjacent section of public road.	Innishcarra Bridge (NIAH 20907328/ RPS 00458) is 120m to the north.	A fulacht fiadh (RMP CO073-089) is located in a green field area 150m to east of proposed works; Innishcarra Bridge (RMP CO073-038----) is 120m to the north and the west entrance to Ballincollig Gun Powder Mill lands (CO073-	Neutral impacts to recorded sites. Potential negative impacts to unrecorded, subsurface archaeological features in green field areas	Archaeological monitoring of ground works	None

Area	Summary overview of main works	Built Heritage	Archaeological	Potential impacts to cultural heritage sites	Mitigation	Residual Impact
			043----) is 70m to the north on opposite side of road. .			
Coolyduff (Opposite bank from Gun Powder Mills)	O.8m high embankment and pumping station within a green field area to the rear (south) of a row of modern private houses and approx. 40m north of the channel	No protected structures in close vicinity to works.	Nearest element of embankment is approx. 50m north of gun powder mill lands on opposite bank (CO073-043----).	Treeline along south bank screen location of proposed works from gun powder mills. Neutral impact to gun powder mills. Potential negative impacts to unrecorded, subsurface archaeological features in green field areas	Archaeological monitoring of ground works	None
Lackeenshoneen (Opposite bank from Gun Powder Mills)	Two sections of 1m-2m high flood sheet pile wall along the north river bank to rear of modern houses. Works will also include a pumping station.	Nearest mill structure listed in NIAH (20842004) is approx. 70m to the south.	Ballincollig Gun Powder Mill (CO073-043----) which is located on opposite side of channel at a distance of 40m to the south.	Treeline along south bank screen location of proposed works from gun powder mills. Neutral impact to gun powder mills. Potential negative impacts to unrecorded, subsurface archaeological features along river bank and green field areas	Archaeological monitoring of ground works	None
Carrigrohane Road	Embankment and flood walls on the north side of Carrigrohane Road. Includes sections extending behind modern houses at west end and Kingsley Hotel at east end	The NIAH lists a gate lodge (20907361) on the opposite side of the road (20m south) from the west end of the proposed embankment. The embankment in this area will be screened by existing tree-lined field boundary along footpath on north side of road. Carrigrohane Road is built on the former line of Cork and Muskerry Light Railway. No associated features are shown on the 25-inch	No recorded sites in vicinity.	Neutral impact to gate lodge (NIAH 20907361) on opposite side of road. Potential negative impacts to unrecorded, subsurface archaeological features in green field areas	Archaeological monitoring of ground works	None

Area	Summary overview of main works	Built Heritage	Archaeological	Potential impacts to cultural heritage sites	Mitigation	Residual Impact
		OSI map within the green field areas to be impacted by proposed flood defences. The modern Kingsley Hotel is built on the former location of an unroofed public swimming pool known as the 'Lee Baths' that opened in 1934 and closed in 1986. The former baths are not listed and no surface trace remains. There are no other identified built heritage sites in the vicinity of the proposed works				
Lee Road	New embankment and augmentation of existing riverside embankment within 20th century extension to the City Council waterworks complex. Works also entail regrading of road surface	Works will include regrading section of Lee Road adjacent to random rubble boundary wall associated with Clanloughlin House. This house is listed in the NIAH (20865004) and is approx. 100m northeast of proposed works. Refurbishing works to the boundary wall are indicated.	Proposed works are located to west of waterworks buildings listed in RMP (CO074-056)	Neutral impact on Clanloughlin House and waterworks. Slight positive direct impact by repairs to associated boundary wall. Potential negative impacts to unrecorded, subsurface archaeological features in green field areas	Archaeological monitoring of ground works Historic building specialist to record any required interventions to Clanloughlin House boundary wall	Permanent slight positive direct impact by repairs to boundary wall
Waterworks	Works entail augmenting existing riverside embankment within the modern western extension to waterworks complex and a roadside flood wall with limestone cladding along south side of Lee Road	Roadside flood wall extends close to engine house (NIAH 20865039).	Roadside flood wall extends through historic core of waterworks (CO074-056)	Slight indirect negative impact waterworks engine house. Augmentation of existing riverside embankment will have neutral impact. Potential negative impacts to unrecorded,	Historic building specialist to record any required interventions to historical railings Any sections of historic railings and limestone kerbing to be removed to be salvaged for reuse by City Council	Permanent slight indirect negative impact to setting of waterworks' engine house Permanent slight positive indirect impact by flood protection to historic

Area	Summary overview of main works	Built Heritage	Archaeological	Potential impacts to cultural heritage sites	Mitigation	Residual Impact
				subsurface archaeological features during excavations	Archaeological monitoring of all ground excavations in vicinity of waterworks.	waterworks
Sunday's Well	Proposed in-channel sheet pile wall west of the north end of Thomas Davis bridge is shown abutting the structure. Wet side finish indicated as limestone random rubble cladding. Works on east side do not extend to bridge. Sheet pile wall with limestone random rubble cladding to be constructed in-channel to east of bridge adjacent to river wall and will extend back gardens of three riverside houses (1.25m above existing ground).	Thomas Davis Bridge is listed in the RPS (no ref.) and NIAH (20865053) and is also within the Proposed Sundays Well ACA. The boundary of the Proposed ACA in the area to the east of the bridge comprises the terrace of houses on the opposite side of the road from river and the majority of the proposed in-channel sheet pile wall is outside this area. The random rubble river wall to the east of the bridge area is not listed and an entire section at east end has been rebuilt in recent years. The wall will be retained as part of the scheme. A concrete step feature with poorly preserved random rubble side wall extends down to channel The east end of the sheet-pile wall will extend along the back gardens of three riverside houses on the south side of Sunday's Well. The westernmost building is listed in the NIAH (20866031) and there will be direct impact to this structure. These houses are within the Proposed Sunday's Well ACA	No recorded sites in vicinity	Slight indirect negative impact to Thomas Davis Bridge. Slight positive impact to NIAH house (20866031) at east end of works by alleviation of potential flood damage. Use of random rubble finish on proposed wall will result in neutral impact to Proposed Sunday's Well ACA. Slight positive indirect impact to the ACA by flood protection	Archaeological monitoring of any in-channel excavation works Historic building specialist to record any required interventions to bridge, concrete river steps along and NIAH property at east end	Permanent slight positive indirect impact to Proposed ACA and NIAH house by flood protection Permanent slight indirect impact to Thomas Davis Bridge
Western Road (east side)	Flood defences will comprise a 1.7m high embankment and regrading extending along a modern pathway close to divergence of	NIAH lists the Sacred Heart Church (20865054), located 70m to east of proposed works. Thomas Davis Bridge is 25m northeast of the proposed works in this area	No recorded sites in vicinity	Slight positive indirect impact to Sacred Heart Church by alleviation of potential flood damage Neutral impact to	No mitigation required	Permanent slight positive indirect impact to church to south by flood protection

Area	Summary overview of main works	Built Heritage	Archaeological	Potential impacts to cultural heritage sites	Mitigation	Residual Impact
	north and south channels.			Thomas Davis Bridge		
UCC Sports Ground	Works include a flood wall and regrading along modern footpath on north side of UCC Sports Complex. Will include demolition of existing modern concrete kerb/railing along north boundary and replacement with concrete flood defence typically 1.4m above existing wall level	The proposed flood wall terminates at a distance of approx. 15m to the east of Thomas Davis Bridge. 20th century clubhouse within Sports Ground is listed in the NIAH (20865066). A modern extension on north side is 10m south of the nearest section of the existing kerb/railing subject to proposed demolition works. The existing concrete kerb/railing is modern in origin and is not a curtilage feature associated with the clubhouse.	No recorded sites in vicinity	Slight positive impact to Club House by alleviation of potential flood damage	No mitigation required	Permanent slight positive indirect impact to club house to south by flood protection
Daly's Bridge	No works to bridge but ramping of Ferry Walk to south and glass flood barrier are proposed in area adjacent to south end	Bridge is listed in RPS (PS722) and NIAH (20866038) as are the adjacent gates/railings/walls (20866065) and riverside ferry steps (20866214) on the south bank. Adjacent section of park railing appear to be 20th century replacement	No recorded sites in vicinity.	Slight indirect negative impact to setting of NIAH features on south side of Daly's Bridge. Neutral impact to bridge	Historic building specialist to record any required interventions to adjacent NIAH features	Permanent slight indirect impact to NIAH features on south side of bridge
Fitzgerald's Park	Proposed defences extend along river side. Combination of embankment (1m high and 4m wide crest) with concrete wall on top typically 2.5m above existing ground and 1.2m above crest of embankment. Sheet pile wall to be constructed in channel in east end (around modern garden installation).	The works in this area are within the Proposed Mardyke ACA. The museum building, lord mayor's pavilion and fountain are listed in the RPS. The area between the proposed flood defences and the building is partially screened by a modern extension and garden feature. The NIAH also lists various sculptures within the park. Any sub-surface remains of features associated with the 1902 Exhibition will be deemed to be of cultural heritage significance and worthy of recording.	No recorded sites in vicinity.	Moderate negative impact to setting of protected structure and historic park. Area between museum and river has been much altered by modern extension to museum building and recent landscaping. Slight positive indirect impact to museum building and historic park by protection from	Archaeological monitoring of any required excavations Any relocation of public sculptures in close proximity to works should be carried out in consultation with Council	Permanent slight positive impact to Proposed ACA and museum building by protection from flooding Permanent slight/moderate indirect negative impact to previously altered setting of historic park

Area	Summary overview of main works	Built Heritage	Archaeological	Potential impacts to cultural heritage sites	Mitigation	Residual Impact
				flooding		
Tennis Club	Sheet pile wall to be constructed in channel with glass defence parapet to retain the river views from the existing balcony.	The riverside tennis clubhouse is listed the NIAH (20866119) as are an early 20th century riverside house (20866117) and an in-channel weir (20866203) to the east. The proposed wall will not directly impact on the clubhouse and house but it does extend through the area where the line of the weir connects with the south bank. This area is within the Proposed Mardyke ACA.	No recorded sites in vicinity	Slight/Moderate indirect negative impact by flood wall on Tennis Club and NIAH house to east reduced to slight by use of appropriate random rubble finish and protection from flooding Slight positive indirect impact to ACA by flood protection Potential negative impacts to unrecorded, subsurface archaeological features in green field areas	Archaeological monitoring of any required in-channel and dryland excavation works Pre-works record of any section of weir to be impacted and archaeological monitoring	Permanent slight negative indirect impact to setting of tennis club and house listed in NIAH. Permanent slight direct impact to weir location at south bank
Mardyke	A 2.5m high embankment set back from river bank in west end and sheet pile flood defence wall to be constructed in channel behind Presentation School (on the wet side of the existing boundary wall, typically 2.5m above existing ground).	Mardyke House is listed in the NIAH (20503002) and is located approx. 70m south of proposed works. No recorded curtilage features in vicinity of works. This area is within the Proposed Mardyke ACA.	A roadside house 70m to the south of the embankment is listed in the RMP (CO074-093----). The proposed works are outside the designated Zone of Notification surrounding the structure. No recorded curtilage features in vicinity of works	Slight positive impact to house listed in RMP (CO074-093----) and Mardyke House by alleviation of flooding Slight positive impact to ACA by flood protection Potential negative impacts to unrecorded, subsurface archaeological features in green field areas	Archaeological monitoring of any required excavations	Permanent slight positive indirect impact to the two listed houses and Proposed ACA by flood protection
North Mall Distillery	Embankment and localised section of wall in west end of property. A flood wall with random rubble limestone cladding	The RPS lists the Distillery House/Chimney (PS813) and Alderman Reilly Bridge (PS814) Three of the existing structures within the east end of distillery are	No recorded archaeological sites located within distillery but area occupies a historic mill site. The east end of the property extends into the	Slight/Moderate negative direct impact to Alderman O' Reilly Bridge reduced to slight direct negative impact	Bridge and locations of penstock to be recorded in advance of works by historic building specialist, who will also	Permanent slight negative direct impact to Alderman O'Reilly Bridge and area

Area	Summary overview of main works	Built Heritage	Archaeological	Potential impacts to cultural heritage sites	Mitigation	Residual Impact
	is proposed within east end of site. Defences set back from river on north side of footpath Two proposed headwalls and penstocks within millrace. Will normally be in the open position and closed to prevent flooding during high water levels	included in the NIAH: cooperage building (ref. 20500776), house to the north of the entrance (20500784) and Alderman Reilly Bridge (20500786). Flood defences extend 10m to west of cooperage and across bridge. The east end of the property extends into the Proposed North Mall/Marsh ACA	Secondary Zone of Archaeological Potential Archaeological monitoring of geotechnical investigations indicated that riverside areas of the property have been infilled with 19th/20th century reclamation deposits. Former site of holy well listed in RMP is approx. 40m north of proposed road regrading outside gate.	by use of appropriate masonry Permanent slight positive indirect impact to ACA and listed buildings by flood protection Potential negative impacts to unrecorded, subsurface archaeological features Neutral impact to location of former site of holy well (RMP CO074-074----) and Secondary Zone of Archaeological Potential	oversee proposed interventions Appropriate cladding to proposed walls in northeast area of property Archaeological monitoring of any required excavations	of headwalls and penstocks within millrace Permanent slight positive indirect impact to ACA and listed buildings by flood protection
Grenville Place	Proposed sheet pile wall to be constructed in channel along north side of Lee Maltings and extending to Grenville Place (typically 2m above road levels). The existing stone parapet along Grenville Place is to be removed, salvaged and replaced with a new parapet wall, with cut limestone cladding, typically 1.2m above existing ground level	Area is located within the Proposed North Mall/Marsh ACA. The Lee Maltings are listed in the RPS (PS597). Two of the buildings within the complex are also listed in the NIAH (Main Maltings building: 20500770 and Miller's House: 20500771). No direct impacts to these structures are indicated. The quay walls along Grenville Place are not listed and have been subject to recent repairs.	Remains of an in-channel barge landing feature uncovered adjacent to north side of Lee Maltings is in proposed area of fill south of proposed in-channel wall	Consult with ADCO report in relation to landing feature (Appendix 10A) Slight/Moderate negative direct impact on Lee Maltings river elevation by in-channel wall and fill Removal of parapet wall and use of appropriate cladding on replacement will result in neutral impact to the quay Slight positive direct impact to quay wall by appropriate repairs	Consult with ADCO report in relation to landing feature (Appendix 10A) Existing parapet wall and river façade of Lee Maltings to be recorded by historic building specialist in advance of works.	Consult with ADCO report in relation to landing feature (Appendix 10A) Permanent Slight/Moderate negative direct impact on Lee Maltings river elevation by in-channel wall and fill Permanent slight positive indirect impact to ACA and adjacent listed buildings by flood protection Permanent slight

Area	Summary overview of main works	Built Heritage	Archaeological	Potential impacts to cultural heritage sites	Mitigation	Residual Impact
						positive direct impact by appropriate quay repairs
North Mall	The existing railing is to be removed and replaced with a new flood defence parapet with a concrete fair finish. Sections of the existing historical railing to be relocated to run along the inside of the footpath Road and footpath to be regraded to reduce the relative height of proposed flood defence wall.	West end of North Mall is located within the Proposed North Mall/Marsh ACA and east end is within Shandon ACA The proposed flood defences avoid north end of St. Vincent's Bridge, listed in the RPS (no ref.) and NIAH (20500785). A steel flood gate to be erected north of bridge (same treatment on south side). The ashlar limestone quay wall and steps along the North Mall are listed in the NIAH (20500035) as are the cast iron railings extending along the top of the quay wall (20500016).	The proposed works in the west end of the North Mall will extend through the Zone of Notification surrounding the former location of a medieval Franciscan friary which is a protected archaeological site (RMP CO074-028002-). Exact location of this site is unknown but is recorded as being in the area to the north of the street. The Secondary Zone of Archaeological Potential extends along the west end of the North Mall area	Removal the of cast iron railings will entail a direct significant negative impact to quay Slight indirect negative impact on setting of St Vincent Bridge Slight positive impact on quay wall by any required repairs and on adjacent ACAs by protection from flooding Neutral impact on Secondary Zone of Archaeological Potential	Railings to be recorded in advance of works by historic building specialist, who will also oversee proposed resetting on footpath, storage and reuse. Archaeological monitoring of any required excavations during road regrading	Permanent moderate negative direct impact to cast-iron railings Permanent slight positive impact on quay wall by appropriate repairs and on ACAs by flood protection Permanent slight indirect negative impact on setting of St Vincent Bridge
Bachelor's Quay	The existing stone parapet along Bachelor's Quay and is to be removed, salvaged and replaced by a parapet wall cut limestone cladding typically 1.2m above existing ground level.	West end of Bachelor's Quay is located within the Proposed North Mall/Marsh ACA. The NIAH (20500036) lists the Bachelor Quay ashlar limestone quay and parapet walls and also incorporates the limestone steps to water and their cast-iron hand rails.	No recorded sites. East end of quay extends into Secondary Zone of Potential	Removal of parapet wall and use of appropriate cladding on replacement will result in neutral impact to the quay Slight positive indirect impact on ACA by flood protection Slight positive direct impact by appropriate quay repairs Neutral impact on Secondary Zone of Archaeological Potential	Appropriate cladding and quay repairs. Existing parapet to be recorded by historic building specialist, who will also oversee proposed interventions	Permanent slight indirect positive impact on ACA by flood protection Permanent slight positive direct impact by appropriate quay repairs

Area	Summary overview of main works	Built Heritage	Archaeological	Potential impacts to cultural heritage sites	Mitigation	Residual Impact
Farren/ Pope's Quay (west)	Existing stone parapet to be maintained at existing level with repairs. Works to Griffith's Bridge will entail installing new parapets	The Shandon ACA extends to the quayside along west section of Pope's Quay The ashlar limestone quay walls, limestone steps and their cast-iron hand rails are included in the NIAH (20512164). Griffith Bridge is a modern structure and is not listed	The works at the west end Pope Quay extend through the Zone of Notification surrounding a graveyard listed in RMP (CO074-031001-). The archaeological site is located approx. 50m to the north of the quay wall.	Neutral impact on graveyard to north Slight positive indirect impact on ACA by flood protection Slight positive direct impact to quay wall by appropriate repairs	None required	Neutral impact on graveyard to north Permanent slight positive impact on ACA by flood protection Permanent slight positive impact to quay wall by appropriate repairs
Pope's Quay (east)	Parapet wall to be raised with appropriate finish to new element and existing coping stone reinstated upon completion.	The ashlar limestone quay walls, limestone steps and their cast-iron hand rails are included in the NIAH (20512164).	No recorded sites in vicinity Area to north is within Secondary Zone of Archaeological Potential	Interventions to stone parapet wall and use of appropriate cladding on addition will result in neutral impact to the quay Slight positive direct impact to quay wall by appropriate repairs Neutral impact on Secondary Zone of Archaeological Potential	Impact mitigated by appropriate replacement and repairs. Historic building specialist to oversee proposed interventions to parapet wall	Permanent slight positive direct impact by repairs to quay wall
Camden Quay	Existing stone parapet is to be maintained as part of the flood defence system and repaired where required	The NIAH lists the quay walls (20513132). No works are proposed at Patrick's Bridge which is listed in the RPS (no. ref.) and in the NIAH (20513133).	No recorded sites in vicinity	Slight positive direct impact by appropriate repairs to quay wall Neutral impact on Patrick's Bridge	No mitigation required	Permanent slight positive direct impact to quay wall by appropriate repairs
Kyrl's Quay	The existing stone parapet is to be removed, salvaged and replaced by new parapet wall with cut limestone cladding. The existing access steps	The North Main Street ACA is located to the south of this section of the channel The NIAH (20513140) lists the Kyrl's Quay ashlar limestone quay and parapet walls and also	Area south of quay is in Primary Zone of Archaeological Potential. The sub-surface remains of the city wall are under buildings on the opposite side of the road, c.40m to	Removal of parapet wall and use of appropriate cladding on replacement will result in neutral impact to the quay	Impact mitigated by appropriate and repairs. Existing parapet to be recorded by historic building specialist, who will also oversee proposed	Permanent slight positive impact on ACA by flood protection Permanent slight positive impact to

Area	Summary overview of main works	Built Heritage	Archaeological	Potential impacts to cultural heritage sites	Mitigation	Residual Impact
	are to be maintained and extended to flood defence with new reinforced concrete steps.	incorporates the limestone steps to water.	the south.	Slight positive direct impact by appropriate repairs to quay wall Slight positive indirect impact on ACA by flood protection Neutral impact on city wall and Primary Zone of Archaeological Potential	interventions	quay wall by appropriate repairs
Coal/Lavitt's Quay	Similar intervention as described for Pope's Quay (east) apart from section of Lavitt's Quay to west of Christy Ring Bridge where existing reinforced concrete parapet is to be demolished and replaced with a new reinforced concrete parapet wall	The NIAH lists both the Coal Quay (20513140) and Lavitt's Quay (20513139) ashlar limestone quay/parapet walls and also incorporates the limestone steps to water.	Area to south is within Secondary Zone of Archaeological Potential. The sub-surface remains of the city wall extend behind buildings on the opposite side of the road, approx. 40m to the south of quay.	Removal of parapet wall and use of appropriate cladding on replacement will result in neutral impact to the Coal Quay Interventions to Lavitt's Quay stone parapet wall and use of appropriate cladding on replacement will result in neutral impact to the quay Neutral impact on Patrick's Bridge Neutral impact on city wall and Primary Zone of Archaeological Potential	Mitigated by appropriate replacement and repairs. Existing parapet to be recorded by historic building specialist, who will also oversee proposed interventions	Permanent slight positive impact by appropriate repairs to quay wall
Patrick's Quay	Existing concrete kerb and railing are to be demolished and replaced with a new concrete flood defence parapet typically 0.7m above existing	The Saint Patrick's Hill ACA extends to the north of this section of the channel The NIAH lists the Patrick's Quay ashlar limestone quay wall	No recorded sites in vicinity.	Slight indirect impact to mooring posts and east side of north end of Parliament Bridge Slight positive direct	Mooring posts at east end of quay to be protected during works. Historic building specialist to oversee any	Permanent slight positive impact by appropriate repairs to quay wall

Area	Summary overview of main works	Built Heritage	Archaeological	Potential impacts to cultural heritage sites	Mitigation	Residual Impact
	ground levels. Guard railing is to be installed on the proposed parapet (0.5m of railing)	(20512612), incorporating the limestone steps to the river, and four cast iron mooring posts (20512623) set into the modern footpath surface in the section of the quay to the west of Brian Boru Bridge.		impact by appropriate repairs to quay wall Slight positive impact to ACA by flood protection	proposed interventions in vicinity of Patricks Bridge	Permanent slight positive impact to ACA by flood protection
Merchant's/ Anderson Quay	Existing concrete kerb and railing are to be demolished and replaced with a new reinforced concrete flood defence parapet typically 0.7m above existing ground levels. Guard railing is to be installed on the proposed parapet (0.5m of railing)	The NIAH (20513136) lists the Merchant's Quay ashlar limestone quay wall and also incorporates the limestone steps to water front elevation. Anderson's Quay was extensively reconstructed in the 20th century and is not listed. Regrading of road surface extends onto Michael Collins Bridge which is a modern structure and is not listed	No recorded sites in vicinity.	Slight positive impact by appropriate repairs to quay wall at Merchant's Quay	Historic building specialist to oversee any proposed interventions in vicinity of Patricks Bridge	Permanent slight positive direct impact by appropriate repairs to quay wall
Brian Boru Bridge	Steel flood defence parapet to be constructed along bridge footpaths. Parapet to tie in with existing bridge steelwork. Steel flood gates to be created at footpaths on both banks	Listed in the RPS (no ref.) and the NIAH (20506355) and was subjected to reconstruction works in 1987	Bridge not listed in RMP	Slight/Moderate direct negative impact to bridge	Bridge has been subject to modern repairs. Bridge has been subject to modern repairs. Impact mitigated by recording of works by historic building specialist	Permanent slight direct negative impact to previously repaired bridge
Penrose/ Horgan's Quays	*Penrose Quay:* same as Patrick's Quay (replacement of modern kerb/railings with wall) *Horgan's Quay:* Localised ramping of existing road and path levels. No riverside works	*Penrose Quay*: This quay was extensively reconstructed in 20th century and is not listed *Horgan's Quay*: No works to quay. The NIAH lists Penrose House (ref. 20506339) located to the west of the section of the road to be ramped and a railway station warehouse (ref. 20506289) in the property to the north.	No recorded sites in vicinity	Neutral impact	No mitigation required	None
Custom House Street	Regrading of the existing modern road surface along Custom House	Adjacent Custom House complex contains various buildings and mooring features listed in the RPS	The Custom House complex adjacent to road regrading works is a protected	Slight indirect negative impact to setting of Custom House.	Works in vicinity of Custom House to be overseen by historic	Permanent slight indirect negative impact to setting

Area	Summary overview of main works	Built Heritage	Archaeological	Potential impacts to cultural heritage sites	Mitigation	Residual Impact
	Street. Retaining walls will be constructed on the west side of the street.	(PS818) and NIAH. There are no proposed riverside defences within the Custom House property.	archaeological monument (CO074-118----). No works indicated within property		building specialist	of Custom House
Lapp's Quay	*Lapp's Quay (east):* Proposed glass flood defence wall to flood defence *Lapp's Quay (west)*: Regrading of road surface and concrete flood defence parapet typically 0.6m above proposed ground levels.	*Lapp's Quay (east):* The quay wall in this area was reconstructed in recent decades. Adjacent Eamon De Valera Bridge to east is a modern structure and is not listed *Lapp's Quay (West)*: The quay is not listed in the NIAH but it does list the cast iron mooring posts set into road adjacent to the quay..	No recorded sites in vicinity	Neutral impact at east end Slight positive direct impact by appropriate repairs to quay wall at west end	Mooring posts to be protected during works	Permanent slight positive direct impact by appropriate repairs to quay wall at west end
Albert Quay	*Albert Quay East:* Proposed reinforced concrete wall to be constructed to1.2m above existing ground levels. The existing concrete kerb and crash barriers are to be demolished. Regrading of road surface at junction with Victoria Road *Albert Quay West:* Reconstruction works to be undertaken along entire quay length, existing wharf to be demolished. Proposed sheet pile wall to be constructed on riverside of existing quay typically 0.9m above existing ground levels.	The NIAH lists the Albert Quay limestone quay wall, the later timber wharf extension and cast iron mooring posts located to the north of the proposed works (20506391). There are no protected cultural heritage sites on the footprint of the proposed road regrading works in the east end of this area although a number of adjacent buildings are listed in the NIAH. Potential sub-surface remains of rail tracks may also exist beneath existing road surface The works in the east end of this area extend into the Proposed Albert Road ACA	No recorded archaeological sites in close vicinity to works	The proposed removal of wharf and mooring posts in west end of quay will comprise a moderate negative direct impact to the quay Slight positive indirect impact to ACA by flood protection	Mitigated by pre-works recording of interventions by historic building specialist, who will also oversee works. Any mooring posts to be removed will be salvaged and Council will be consulted in relation to resetting Archaeological monitoring of any required ground works during road regrading	Permanent slight/moderate direct impact to west end of quay
Clontarf Bridge	Four no. proposed demountable pedestrian access gates. Existing bridge structure to incorporate steel flood defence upstand c.0.5m	Bridge is listed in the RPS (no ref.) and the NIAH (20508001) and has been subject to repair works in recent years.	Bridge is not listed in RMP	Slight/Moderate direct negative impact to bridge	Bridge has been subject to modern repairs. Impact mitigated by recording of works by historic building specialist	Permanent slight direct negative impact to previously repaired bridge

Area	Summary overview of main works	Built Heritage	Archaeological	Potential impacts to cultural heritage sites	Mitigation	Residual Impact
	high between road and footpath.					
Terence McSwiney Quay	Proposed reinforced concrete flood defence parapet to flood defence level (typically 0.8m above existing ground levels). Guard railing is to be installed on the proposed parapet to 1.2m above existing ground level (0.4m of railing).	The quay wall in this area has been subject to extensive 20th century reconstruction works and it is not listed in the NIAH.	No recorded sites in vicinity	Neutral impact	No mitigation required	None
Morrison's / Father Mathew Quay	The proposed works along Morrison's and Father Mathew Quays will entail road regrading and replacement of the existing parapet and railings with new parapet	The NIAH does not list the quay walls or any associated features. While the proposed road regrading works extend towards NIAH buildings no proposed works to their structures are indicated. The plaza area at the east end of the South Mall contains a number of public sculptures and historic lamp posts that, while not listed, are deemed to be of culture heritage interest.	No recorded sites in vicinity.	Slight/Moderate direct impact to Father Mathew Quay by removal of historic bollards adjacent to Parliament Bridge Slight positive direct impacts appropriate repairs to quay walls Slight positive impact to adjacent listed buildings by flood protection Slight indirect impact to plaza in area at east end of South Mall	Bollards to be recorded by historic building specialist and salvaged. Council to be consulted in relation to storage and appropriate resetting. Historic built specialist will also oversee any proposed interventions in vicinity of NIAH buildings, South Mall plaza area and environs of Parliament Bridge	Permanent slight direct impact to quay by removal of remnant historic bollards adjacent to Parliament Bridge Permanent slight direct positive impact by appropriate repairs to quay walls
Union Quay and George's Quay:	A concrete parapet to be constructed typically 1.2m above existing ground levels	The NIAH does not list the quay walls or any associated features along these quays. The South Parish ACA and Secondary Zone of Potential extends along the area to the south of the channel	No recorded sites in vicinity. The streets to the south of the river in this area are within the Secondary Zone of Archaeological Potential identified in the City Development Plan.	Slight positive impact to ACA by flood protection Slight positive direct impact by appropriate repairs to quay walls Neutral impact to Secondary Zone of Archaeological Potential	Historic built specialist will oversee any proposed interventions to river steps, wharf and environs of Parliament Bridge	Permanent slight positive impact by appropriate repairs to quay walls

Area	Summary overview of main works	Built Heritage	Archaeological	Potential impacts to cultural heritage sites	Mitigation	Residual Impact
Parliament Bridge and South Mall	In-channel sheet pile wall and boardwalk to be constructed in-channel between Grand Parade and Parliament Bridge Drawings indicate boardwalk terminates to west of bridge.	Parliament Bridge is included in RPS (PS270) and NIAH (20515061). Building extending to northwest corner of bridge is also listed in NIAH. The weir to the west of bridge is not listed but is of built heritage significance	No recorded sites in vicinity	Slight/Moderate indirect impact to setting of Parliament Bridge and adjoining NIAH structure. Potential slight direct impact to weir (consult with ADCO report: Appendix 10A)	Historic building specialist to record proposed interventions in vicinity of Parliament Bridge	Permanent Slight/Moderate indirect impact to setting of Parliament Bridge and adjoining NIAH structure. Slight direct impact to weir (consult with ADCO report: Appendix 10A)
Grand Parade	Combination of flood wall (cut limestone cladding) and flip up barriers along public space set back from quay. The works along the south side of the former Bank of Scotland are indicated as proposed local raising of stone wall to flood defence level (typically 0.5m above existing levels) and waterproofing of existing wall	The random quay wall in this area is not listed. The RPS and NIAH both list the war memorial in the plaza north of the channel, known as 'The National Monument' (PS121 / NIAH 20514119). The former Bank of Scotland building adjacent to the river is also listed (PS115 / NIAH 20514094).	Sub-surface line of city wall extends under buildings located on west side of Grand Parade	Slight/moderate direct impact to former Bank of Scotland (PS115). Slight indirect impact to setting of 'National Monument' memorial Neutral impact on city wall	Historic building specialist to oversee proposed interventions in vicinity of Bank of Scotland	Permanent slight direct impact to former Bank of Scotland. Permanent slight indirect impact to setting of 'National Monument' memorial
City Car Park	A 0.2m high concrete kerb along quay to raise existing ground levels. Kerb is to tie into existing masonry wall.	Adjacent random rubble quay wall is not listed but traces of former brewery wall and former Gaol building (adjacent to bridge) may nonetheless survive. No works to South Gate Bridge RPS (PS328) and NIAH (20515065). The bridge is also listed in the RMP (CO074-034012-)	The works in this area extend through the Primary Zone of Archaeological Potential. The sub-surface remains of the city wall have been identified a distance of approx. 12.5m north of the river wall. Excavations in site uncovered 0.8m deep 20th rubble inside river wall	Neutral impact on city wall Slight positive direct impact by appropriate repairs to quay walls Neutral impact on Primary Zone of Archaeological Potential	Historic building specialist to oversee proposed interventions in environs of South Gate Bridge	Permanent slight positive direct impact by appropriate repairs to quay walls
Sullivan's Quay	A proposed wall with cut limestone cladding will be constructed along the	The South Parish ACA extends along the area to the south of the channel	The works in this area extend adjacent to the south side of the Secondary Zone	The proposed works will have a moderate direct negative impact on the	Bollards and railings to be recorded in advance of works by historic	Permanent slight/moderate impact to quay by

Area	Summary overview of main works	Built Heritage	Archaeological	Potential impacts to cultural heritage sites	Mitigation	Residual Impact
	quayside (0.8m wall with 0.4m railing). Historical bollards and cast-iron railings are to be removed along the east end of the quay (along section extending 132m west of Parliament Bridge) and to be retained at the west end.	The quay wall and associated steps and bollards in this area are not listed but are interpreted as being of built heritage significance.	of Archaeological Potential identified in the City Development Plan.	quay by the removal of section of the bollards and cast iron railings Slight positive indirect impact to ACA by flood protection Slight positive direct impact to quay wall by appropriate repairs Neutral impact on Secondary Zone of Archaeological Potential	building specialist, who will also oversee proposed interventions and consult with Council in relation to their salvage and reuse Historic building specialist to oversee proposed interventions in environs of South Gate Bridge	removal of sections of historic bollards and railings Permanent slight positive indirect impact to ACA by flood protection Permanent slight positive direct impact to quay wall by appropriate repairs
Frenches Quay	Existing parapet extends over flood defence and is to be maintained Existing culvert in Proby's Quay to be pressurised during a flood event. Repairs to the existing culvert and work to internal joints to be carried out where necessary	The quay wall is not listed. The bridge over the culvert at the west end of this quay is included in the RPS (no ref.) and the NIAH (20503317). An in-channel weir to west of South Gate Bridge is not listed	This quay extends adjacent to the Primary Zone of Archaeological Potential identified in the City Development Plan.	Slight positive impact to quay wall by appropriate repairs Neutral impact on weir to west of South Gate Bridge Neutral impact on Primary Zone of Archaeological Potential	Historic building specialist to oversee any proposed interventions in vicinity of Proby's Quay Bridge	Permanent slight positive direct impact to quay wall by appropriate repairs
Crosses Green (south)	Proposed sheet pile wall with limestone random rubble cladding to be constructed along river edge	Slipway to the river is listed in the NIAH (20503316).	The works in this area extend through the Primary Zone of Archaeological Potential identified in the City Development Plan. Burials have been uncovered during excavations in the riverside property in this area (now car park). Excavation did not extend to the river's edge.	Any ground works within car park site for in-channel sheet-pile wall may have direct negative impact on unrecorded burials. Level of potential impact not quantifiable Slight indirect negative impact on setting of slipway	Historic building specialist to oversee any proposed interventions in vicinity of slipway Project archaeologist to advise on any required excavations works in vicinity of burial ground in advance of construction.	Slight indirect negative impact on setting of slipway

Area	Summary overview of main works	Built Heritage	Archaeological	Potential impacts to cultural heritage sites	Mitigation	Residual Impact
Crosses Green (north) and Wandesford Quay (east):	Proposed wall with to be constructed on the wet side of the existing boundary wall 1.2m above existing ground levels. Proposed parapet is to be clad with salvaged stone.	The random rubble quay wall in this area is not listed. While there are no proposed works indicated to Clarke's Bridge, which is included in the RPS (PS026) and NIAH (20503247), the defences are shown extending to the east and west sides of the structure on both banks	This area extends through the Secondary Zone of Archaeological Potential identified in the City Development Plan.	Slight indirect impact in vicinity of Clarke's Bridge Neutral impact on Secondary Zone of Archaeological Potential	Mitigated by appropriate cladding in vicinity of bridge Historic building specialist to oversee any proposed interventions in vicinity of bridge Archaeological monitoring of any required in-channel excavation works	Permanent slight indirect impact in vicinity of Clarke's Bridge
Wandesford Quay (west)	Flood wall with random rubble limestone cladding extending from Clarke's Bridge and around river bend. Existing culvert west of Sharman Crawford St to be inspected for uplift stability. Internal joints to be sealed and all internal outfalls to be fitted with non-return valves.	The random rubble quay wall in this area is not listed and sections of the west end of the parapet wall have been rebuilt in recent decades	The area extends through the Secondary Zone of Archaeological Potential	Neutral impact on Secondary Zone of Archaeological Potential	Archaeological monitoring of any required in-channel excavation works	None
Welfare Office/ Fisherman's Wharf	*Welfare Office:* The existing modern concrete kerb and railing are to be demolished and replaced with a new parapet (typically 0.6m above existing ground levels with 0.6m of railing fitted on top). *Fisherman's Wharf:* Proposed sheet pile wall to be constructed in channel with random limestone cladding on west side. Local raising of flood defence line along	*Welfare Office:* No protected features along riverside in area west of bridge *Fisherman's Wharf:* The modern apartment complex occupies a former iron works factory listed in the NIAH (20503242). Remnants of the former factory wall extant along section of riverside adjacent to the Welfare Office. Consult ADCO survey report in relation to salmon weir	No recorded sites in vicinity. The section of river in this area extends through the Secondary Zone of Archaeological Potential identified in the City Development Plan.	Neutral impact on former iron works wall. Neutral impact on Secondary Zone of Archaeological Potential	Historic building specialist to record any proposed interventions to weir	Permanent slight direct negative impact to salmon weir

Area	Summary overview of main works	Built Heritage	Archaeological	Potential impacts to cultural heritage sites	Mitigation	Residual Impact
	balcony's and restaurant boardwalk typically 0.3m above existing ground levels					
Lancaster Quay	The existing river wall and foundation zones are to be gravity and pressure grouted. Existing open railings to be replaced with reinforced concrete flood defence wall to tie into adjacent existing walls	A 19th century cast-iron water trough is set into north side of parapet wall along the east end of Lancaster Quay. This feature was moved to its present location in recent decades and is listed in the NIAH (20503234).	No recorded sites in vicinity	Slight positive direct impact by appropriated repairs to wall	Cast iron trough to be protected during works	Permanent slight positive indirect impact by wall repairs
Western Road and UCC	The proposed flood defence works in this area comprise a combination of embankments and walls extending along the riverside back gardens of a number of houses facing onto Western Road. Proposed flood defence wall to be constructed along UCC boundary with Western Road to west of gate. Existing steel fencing to be removed and replaced with reinforced concrete wall. Typically 0.3m above existing ground with 0.9m high guarding railing on top of wall.	The NIAH lists row of four houses (1-4 Inishcarrig) to the east of the university entrance and a terrace of five houses (1-5 Western Terrace) to the west of the entrance. Donovan's Bridge is included in the RPS (no ref.) and the NIAH (20503318). No works to bridge are indicated The gate and railings at the university entrance to the university are also listed in the NIAH (20866156) The works in university grounds extend through the Proposed UCC ACA.	The section of the river channel contains a weir and footings of a former railway bridge at the west end of the River Lee Hotel. While these features are not listed, they are deemed to be of cultural heritage significance. The weir is labelled 'Gilabbey Weir (site of)' on the historic OSI maps	Neutral impact on UCC railings following replacement in present setting Neutral impact on in-channel weir, remains of rail bridge and O'Donovan's Bridge Slight positive indirect impact by alleviation of flooding to ACA and NIAH buildings facing onto Western Road	Historic building specialist to oversee proposed interventions to UCC boundary railings.	Permanent slight positive impact by alleviation of flooding to ACA and NIAH buildings facing onto Western Road
Victoria Cross	Localised in-channel works for pumping station/flow control structure. Works involve removal of modern foot bridge and replacement	No listed features in close vicinity	No sites in vicinity	Neutral impacts	Archaeological monitoring of any in-channel excavation works	Neutral impact
Carrigrohane	Localised defences	No listed features	Adjacent to former site of	Neutral impact on	Archaeological	None

Area	Summary overview of main works	Built Heritage	Archaeological	Potential impacts to cultural heritage sites	Mitigation	Residual Impact
(west end)	around water treatment site at west end of Carrigrohane road		mill listed in RMP (CO073-048----). Former location of mill building shown on OSI historic maps is now under widened roadway to southwest. No works to former mill channel to south of water treatment plant are proposed. Ground surface around tank has been disturbed	former mill	monitoring of ground works	
Bannow Bridge	Proposed sheet pile flood defence wall, with random rubble limestone cladding, typically 1.0 m above existing ground level to east of Bannow Bridge. Proposed flood defence embankment in green field areas around private residence. Also localised road regrading to north of house.	County Development Plan designates Bannow Bridge as a Protected Structure (PS00457) and is also included in the NIAH (20907354)	The bridge is also listed in the RMP (CO073-045)	Slight indirect impact to bridge by in-channel wall to east. Location of interventions not visible from bridge or surrounding roads	Mitigated by appropriate cladding in vicinity of bridge Historic building specialist to oversee any proposed interventions to bridge Archaeological monitoring of any in-channel and dryland excavation works	Permanent slight indirect impact to setting of bridge

Table 10.4: Summary of Underwater impact assessments and mitigation strategies (See Appendix 10A for further details)

Feature No.	Feature Name/Type	Proposed works	Potential Impacts	Archaeological Mitigation
F001	Griffith Bridge [site of North Gate Bridges]	Installation of new bridge parapets.	No impact to historic bridge structure	None
F002	South Gate Bridge	----	No Impact	None
				Permanent indirect impact to setting of Parliament Bridge; slight/moderate
F003	Parliament Bridge	In-channel sheet pile wall and boardwalk to be constructed in-channel between Grand Parade and Parliament Bridge	Possible indirect impact to setting of Parliament Bridge; slight/moderate	Permanent Slight indirect impact
F004	Clarke's Bridge	Flood wall with random rubble limestone cladding extending eastward from Clarke's Bridge.	Slight indirect impact	Permanent moderate negative direct impact to Alderman O'Reilly Bridge.
F005	Alderman Reily's Bridge	Proposed penstock to be placed on upstream face of the existing bridge. Remedial works to the existing bridge (as required) to ensure that the masonry arches have capacity for potential uplift.	Direct Impact: moderate	None
F006	St. Patricks Bridge [site of earlier bridge]	----	No Impact	None
F007	O'Neill Crowley Bridge [Georg IV Bridge]	----	No Impact	None
F008	Parnell Bridge [site of Anglesea Bridges]	----	No Impact	None
F009	Thomas Davis Bridge [Wellington Bridge]	----	No Impact	None
F010	Gaol Bridge	----	No Impact	None
F011	Unnamed footbridge [site of]	----	No Impact	None
F012	Unnamed footbridge	----	No Impact	None
F013	Unnamed footbridge	----	No Impact	None
F014	Unnamed footbridge [site of]	----	No Impact	None
F015	St. Vincent's Bridge	----	No Impact	None
F016	Unnamed bridge [site of tramway crossing]	----	No Impact	None
F017	Donovan's Bridge	----	No Impact	Permanent slight direct negative impact

Feature No.	Feature Name/Type	Proposed works	Potential Impacts	Archaeological Mitigation
F018	Brian Boru Bridge	Steel flood defence parapet to be constructed along bridge footpaths. Parapet to tie in with existing bridge steelwork. Steel flood gates to be created at footpaths on both banks	Direct Negative Impact; slight/moderate	Permanent slight direct negative impact
F019	Clontarf Bridge	Four proposed demountable pedestrian access gates. Existing bridge structure to incorporate steel flood defence upstand c.0.5m high between road and footpath. Flood wall to tie into high ground on bridge.	Direct Negative Impact; slight.	None
F020	Newman's Footbridge	----	No Impact	Indirect Negative Impact to setting; slight
F021	Daly's Bridge	Ramping of Ferry Walk to south of bridge and glass flood barrier proposed nearby. No impact to Bridge.	Indirect Negative Impact to setting; slight Neutral impact to bridge.	Permanent slight direct positive impact by appropriate repairs to quay walls
F022	Wise's Quay	The existing river wall and foundation zones are to be grouted. The granular soil backing zone is to be grouted. The face of the existing wall is to be cleaned and repointed and the stonework repaired where necessary.	The maintenance and repair of the existing quay wall will result in a Slight Positive Impact.	Permanent slight direct positive impact by appropriate repairs to quay walls
F023	North Mall	The existing river wall and foundation zones are to be grouted. The granular soil backing zone is to be grouted. The face of the existing wall is to be cleaned and repointed and the stonework repaired where necessary.	The maintenance and repair of the existing quay wall will result in a Slight Positive Impact.	Permanent slight direct positive impact by appropriate repairs to quay walls
F024	Bachelors Quay	The existing river wall and foundation zones are to be grouted. Possible additional strengthening works may include the incorporation of micro-piles. The face of the existing wall is to be cleaned and repointed and the stonework repaired where necessary. The existing stone parapet along Bachelor's Quay and is to be removed, salvaged and replaced by a parapet wall cut limestone cladding typically 1.2m above existing ground level.	The maintenance and repair of the existing quay wall will result in a Slight Positive Impact. Removal of the parapet wall will result in a neutral impact.	Permanent slight direct positive impact by appropriate repairs to quay walls
F025	Farrens Quay	Existing stone parapet to be maintained at existing level with repairs. The existing river wall and foundation zones are to be grouted. The granular soil backing zone is to be grouted. The face of the existing wall is to be cleaned and repointed and the stonework repaired where necessary.	The maintenance and repair of the existing quay wall will result in a Slight Positive Impact	Permanent slight direct positive impact by appropriate repairs to quay walls
F026	Pope's Quay	Existing stone parapet to be maintained at existing level with repairs.	The maintenance and repair of the existing quay wall will result	Permanent slight direct positive impact by appropriate repairs to quay walls

Feature No.	Feature Name/Type	Proposed works	Potential Impacts	Archaeological Mitigation
		The existing river wall and foundation zones are to be grouted. The granular soil backing zone is to be grouted. The face of the existing wall is to be cleaned and repointed and the stonework repaired where necessary.	in a Slight Positive Impact	
F027	Kyrl's Quay	The existing stone parapet is to be removed, salvaged and replaced by new parapet wall with cut limestone cladding. The existing access steps are to be maintained and extended to flood defence with new reinforced concrete steps.	The maintenance and repair of the existing quay wall will result in a Slight Positive Impact	None
F027a	Culvert	----	No Impact	Permanent slight direct positive impact by appropriate repairs to quay walls
F028	Camden Quay	Existing stone parapet is to be maintained as part of the flood defence system and repaired where required The existing river wall and foundation zones are to be grouted. The granular soil backing zone is to be grouted. The face of the existing wall is to be cleaned and repointed and the stonework repaired where necessary.	The maintenance and repair of the existing quay wall will result in a Slight Positive Impact	Permanent slight direct positive impact by appropriate repairs to quay walls
F029	Cole Quay	Similar intervention as described for Pope's Quay. The existing river wall and foundation zones are to be grouted. The granular soil backing zone is to be grouted. The face of the existing wall is to be cleaned and repointed and the stonework repaired where necessary.	The maintenance and repair of the existing quay wall will result in a Slight Positive Impact	None
F029a	Culvert	----	No Impact	Permanent slight direct positive impact by appropriate repairs to quay walls
F030	Lavitt's Quay [part of former Seven Haven's Quay]	Similar intervention as described for Pope's Quay (east) apart from section of Lavitt's Quay to west of Christy Ring Bridge where existing reinforced concrete parapet is to be demolished and replaced with a new reinforced concrete parapet wall The existing river wall and foundation zones are to be grouted. The granular soil backing zone is to be grouted. The face of the existing wall is to be cleaned and repointed and the stonework repaired where necessary.	The maintenance and repair of the existing quay wall will result in a Slight Positive Impact	Permanent slight direct positive impact by appropriate repairs to quay walls
F031	St. Patrick's Quay	Existing concrete kerb and railing are to be demolished and replaced with a new concrete flood defence parapet typically 0.7m above existing ground levels. Guard railing is to be	The maintenance and repair of the existing quay wall will result in a Slight Positive Impact	None

Feature No.	Feature Name/Type	Proposed works	Potential Impacts	Archaeological Mitigation
		installed on the proposed parapet (0.5m of railing) The existing river wall and foundation zones are to be grouted. The granular soil backing zone is to be grouted. The face of the existing wall is to be cleaned and repointed and the stonework repaired where necessary.		
F031a	Culvert	----	No impact	Permanent slight direct positive impact by appropriate repairs to quay walls
F032	Merchants Quay	Existing concrete kerb and railing are to be demolished and replaced with a new reinforced concrete flood defence parapet typically 0.7m above existing ground levels. Guard railing is to be installed on the proposed parapet (0.5m of railing).	The maintenance and repair of the existing quay wall will result in a Slight Positive Impact	None
F032a	Culvert	----	No Impact	Permanent slight direct positive impact by appropriate repairs to quay walls
F033	Anderson Quay	Existing concrete kerb and railing are to be demolished and replaced with a new reinforced concrete flood defence parapet typically 0.7m above existing ground levels. Guard railing is to be installed on the proposed parapet (0.5m of railing). The existing river wall and foundation zones are to be grouted. The granular soil backing zone is to be grouted. The face of the existing wall is to be cleaned and repointed and the stonework repaired where necessary.	The maintenance and repair of the existing quay wall will result in a Slight Positive Impact	None
F033	Timber Wharf	----	No Impact	Permanent slight direct positive impact by appropriate repairs to quay walls
F034	Lancaster Quay	The existing river wall and foundation zones are to be gravity and pressure grouted. Existing open railings to be replaced with reinforced concrete flood defence wall to tie into adjacent existing walls.	The maintenance and repair of the existing quay wall will result in a Slight Positive Impact	Permanent slight direct positive impact by appropriate repairs to quay walls
F035	Wandersford Quay	Proposed wall to be constructed on the west side of the existing boundary wall 1.2m above existing ground levels. Proposed parapet is to be clad with salvaged stone. Flood wall with random rubble limestone cladding extending eastward from Clarke's Bridge. Internal joints to be sealed and all internal outfalls to be fitted with non-return valves. Possible additional strengthening works may include the incorporation of micro-piles. A new mass concrete backing wall is	The maintenance and repair of the existing quay wall will result in a Slight Positive Impact	Permanent Direct Negative Impact; slight

Feature No.	Feature Name/Type	Proposed works	Potential Impacts	Archaeological Mitigation
		to be provided. The face of the existing wall is to be cleaned and repointed and the stonework repaired where necessary.		
F036	Crosse's Green Quay	Proposed sheet pile wall with limestone random rubble cladding to be constructed along river edge	Direct Negative Impact; slight.	Permanent Indirect Negative Impact; moderate
F036a	Culvert	Proposed sheet pile wall with limestone random rubble cladding to be constructed along river edge.	Indirect Negative Impact; moderate	None
F037	French's Quay	Existing parapet extends over flood defence and is to be maintained	No Impact	Permanent slight direct positive impact by appropriate repairs to masonry
F037a	Arched-Culvert	Existing culvert in Proby's Quay/French's Quay to be pressurised during a flood event. Repairs to the existing culvert and work to internal joints to be carried out where necessary	The maintenance and repair of the existing culvert will result in a Slight Positive Impact	Repair of the existing culvert will result in a Permanent Slight Positive Impact
F038	Sullivan's Quay	The existing quay wall and foundation zones are to be grouted. Possible additional strengthening works may include the incorporation of micro-piles. The face of the existing wall is to be cleaned and repointed and the stonework repaired where necessary.	The maintenance and repair of the existing culvert will result in a Slight Positive Impact	Permanent Direct Negative Impact; moderate
F039	Unnamed Quay, off the South Mall	Proposed sheet pile wall to be constructed in channel to 3.00mOD. Section of existing boardwalk to be removed to connect defence wall to quay. Pedestrian access ramp to be incorporated on dry side of sheet pile wall, connecting Grand Parade quay to Parliament Bridge. Steel plates to be fitted along west side of ramp.	Direct Negative Impact; moderate	None
F039a	Culvert	----	No Impact	Permanent Direct Negative Impact; moderate
F040	George's Quay	A concrete parapet to be constructed typically 1.2m above existing ground levels.	Direct Negative Impact; moderate	None
F041a	Timber Wharf	----	No Impact	Permanent slight direct positive impact by appropriate repairs to quay wall
F041	Union Quay	A concrete parapet to be constructed typically 1.2m above existing ground levels Possible additional strengthening works may include the incorporation of micro-piles. The face of the existing wall is to be cleaned and repointed and the stonework repaired where	The maintenance and repair of the existing quay wall will result in a Slight Positive Impact.	None

Feature No.	Feature Name/Type	Proposed works	Potential Impacts	Archaeological Mitigation
		necessary.		
F041a	Timber Wharf	----	No Impact	None
F041b	Culvert	----	No Impact	-----
F042	Father Matthey Quay	Proposed public realm works at Morrison's Island. Works to be progressed under the Planning and Development Act.	----	-----
F043	Morrison's Quay	Proposed public realm works at Morrison's Island. Works to be progressed under the Planning and Development Act.	----	-----
F043a	Culvert	----	----	Permanent slight direct positive impact by appropriate repairs to wall
F044	Lapp's Quay	The existing quay wall and foundation zones are to be grouted. The granular soil backing zone is to be grouted. The face of the existing wall is to be cleaned and repointed and the stonework repaired where necessary.	The maintenance and repair of the existing quay wall will result in a Slight Positive Impact	Permanent Direct Negative Impact
F045	Terrance MacSweeney Quay/ Albert Quay	*Terrance MacSweeney*: proposed reinforced concrete flood defence parapet to flood defence level (typically 0.8m above existing ground levels). Guard railing is to be installed on the proposed parapet to 1.2m above existing ground level (0.4m of railing). *Albert Quay*: reconstruction works to be undertaken along entire quay length, existing wharf to be demolished. Proposed sheet pile wall to be constructed on riverside of existing quay typically 0.9m above existing ground levels.	Direct Negative Impact	Permanent direct negative impact
F045a	Timber Wharf at Albert Quay	Existing wharf to be demolished and reconstruction works to be undertaken along entire quay length. Proposed sheet pile wall to be constructed on riverside of existing quay to flood defence level of 3.40mOD, typically 0.6m above existing ground levels. 0.6m of railing to be fitted on top of parapet to1.2m above proposed ground levels. Parapet ties into high ground at each end. All drainage outfalls to be fitted with non-return valves.	Direct Negative Impact	None
F046	Weir and fish-pass [unnamed]	----	No Impact	None
F047	Salmon Weir [unnamed]	----	No Impact	None
F048	In-river walling/tailrace	----	No Impact	None

Feature No.	Feature Name/Type	Proposed works	Potential Impacts	Archaeological Mitigation
F049	Weir [unnamed]	----	No Impact	None
F050	Salmon Weir [unnamed]	----	No Impact	None
F051	Gill Abbey Weir	----	No Impact	None
F052	Salmon Weir [unnamed]	----	No Impact	None
F053	Weir [unnamed]	----	Direct Impact	Potential permanent slight direct impact to weir from insertion of sheet pile wall
F054	Weir [unnamed]	Proposed sheet pile wall to be constructed in channel to 3.00mOD. Section of existing boardwalk to be removed to connect defence wall to quay. Pedestrian access ramp to be incorporated on dry side of sheet pile wall, connecting Grand Parade quay to Parliament Bridge. Steel plates to be fitted along west side of ramp.	Potential slight direct impact to weir from insertion of sheet pile wall	Permanent Direct Negative Impact
F055	Timber structure at Lee Mills; landing platform	Proposed sheet pile flood defence wall to be constructed in channel to flood defence level of 4.70mOD, typically 1.5m above existing ground levels. Flood wall to tie into proposed flood defence embankment at western end. All drainage outfalls to be fitted with non-return valves.	Direct Negative Impact	Permanent Direct Negative Impact
F056	Timber structure at Lee Mills; possible jetty timbers	Proposed sheet pile flood defence wall to be constructed in channel to flood defence level of 4.70mOD, typically 1.5m above existing ground levels. Flood wall to tie into proposed flood defence embankment at western end. All drainage outfalls to be fitted with non-return valves.	Direct Negative Impact	Permanent Indirect Negative Impact; slight
F057	Arched-culverts; Lee Mills	Proposed sheet pile flood defence wall to be constructed in channel to flood defence level of 4.70mOD, typically 1.5m above existing ground levels. Flood wall to tie into proposed flood defence embankment at western end. All drainage outfalls to be fitted with non-return valves.	Indirect Negative Impact; slight	None

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