

Underwater Archaeological Impact Assessment (UAIA) Grand Canal Stormwater Outfall Extension Project Grand Canal Docks and River Liffey Dublin City

20D0039, 20R0144





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LIST OF ABBREVIATIONS

ADCO	The Archaeological Diving Company Ltd
ACA	Architectural Conservation Area
DCHG	Department of Culture, Heritage, and the Gaeltacht.
DGPS	Differential Geographic Positioning System
ING	Irish National Grid
ITM	Irish Transverse Mercator
E	Easting
Ν	Northing
NGR	National Grid Reference
NIAH	National Inventory of Architectural Heritage
OD	Ordnance Datum
OS	Ordnance Survey
RMP	Record of Monuments and Places
RPS	Record of Protected Structures
SMR	Sites and Monuments Record
UAIA	Underwater Archaeological Impact Assessment
UAU	The Underwater Archaeology Unit

EXECUTIVE SUMMARY

The Archaeological Diving Company Ltd (ADCO) was appointed by The Archaeological Consultancy Services Unit (ACSU) Ltd., on behalf of J.B. Barry & Partners/ Dublin City Council, to undertake an Underwater Archaeological Impact Assessment (UAIA) of the proposed extent of the in-water works area associated with the Grand Canal Stormwater Outfall Extension Project. The project seeks to improve the water quality in the Grand Canal Docks, an area which has been adversely affected over recent years by the discharging foul sewerage, from an existing storm-water outfall, into Grand Canal; primarily during periods of high rainfall. The project will improve the public realm in the Grand Canal Docks area by relocating the surface water discharge point from the Grand Canal Tunnel to the River Liffey.

Elements of the Grand Canal Stormwater Outfall Extension (CSWOE) project (Phase 1) were completed in 2002, with the construction of a 170m long 4m x 2.7m box-culvert placed underneath Asgard Road, running between Hanover Quay and Sir John Rogerson's Quay.

The proposed Phase 2 pipeline will run north-south through the Grand Canal Docks for a distance of 448m, extending between the Grand Canal Tunnel and Hanover Quay (ITM 717526E, 733048 - ITM 717956E, 733025N). A box-culvert will be placed beneath the roadway at Hanover Quay, connecting the pipeline to the existing infrastructure located beneath Asgard Road. The pipe-outfall will be positioned at Sir John Rogerson's Quay, in line with Asgard Road, to discharge into the River Liffey at ITM 717392E, 734314N.

Planning for Phase 2 of the development was initiated in 2007/08, at which time ADCO completed a comprehensive underwater archaeological assessment of the pipeline route and outfall location.¹ However, the second phase of the project did not progress to construction, primarily due to the economic constraints.

The GCSWOE project is now in an advance stage of pre-planning and subject to EIAR. As part of this process, an update to the original archaeological assessment is required to consider minor changes to the project design/extent and to take into account the length of time that has passed since the initial UAIA was carried out.

¹ Rex Bangerter MA, 07D0061, 07R0249, <u>Underwater archaeological Assessment, Grand Canal</u> <u>Quay, Grand Canal Docks, Sir John Rogerson's Quay, and The River Liffey, Dublin City;</u> ADCO report issued to DCHG (formerly DEHLG), March 2008.

The assessment areas lies within a historically rich landscape, highlighted by the development of this section of the River Liffey and adjacent reclaimed sloblands for maritime use in the late eighteenth- and early/mid-nineteenth century; Sir John Rogerson's Quay (DU018-020201) and the Grand Canal Docks forming tangible reminders of that maritime industrial past.

The current assessment comprised the systematic non-disturbance inspection of the canal/ riverbed, extending across the in-water footprint of the proposed pipeline route. The survey recorded canal/ riverbed topography and provides a detailed account of the existing canal/ riverine environment. The assessment was carried out on the 8th September 2020, under licence from the DCHG; licence numbers 20D0039, and 20R0144. In addition, the assessment has also absorbed any pertinent observations made as part of the original survey, undertaken in 2008.

No further archaeological mitigation is required, in advance of construction, a part of the GCSWOE project. However, it is recommended that archaeological monitoring of all ground/ canal/riverbed disturbances during construction be undertaken, by a suitably qualified and experienced maritime archaeologist, with the proviso to resolve fully any archaeological material/features/deposits observed at that point. In particular, archaeological monitoring of any quayside disturbances is required; allowing a full record of any sections of quayside impacted by the development to be made. In addition, quayside masonry and/or associated fixtures and fittings that may be removed as part of the development should retained and subject to additional recording.

The recommendations in the report are subject to the approval of the National Monuments Service at the Department of the Culture, Heritage, and the Gaeltacht (DCHG).

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1.0 INTRODUCTION

The Archaeological Diving Company Ltd. was appointed by The Archaeological Consultancy Services Unit (ACSU) Ltd., on behalf of J. B. Barry and Partners/ Dublin City Council, to carry out an Underwater Archaeological Impact Assessment (UAIA) of the proposed in-water extent of the works area associated with the Grand Canal Stormwater Outfall Extension (GCSWOE) project (Figure 1).

Phase 1 of the project was completed in 2002, with Phase 2 progressed to planning in 2007/08 and an underwater archaeological assessment being undertaken by ADCO on 26th February 2008. However, due to economic constraints, the second phase of the project did not advance to construction at that time. It is now proposed to complete the GCSWOE project, which is subject to EIAR, and an updated UAIA has been carried out as part of that process.

The assessment comprised systematic visual inspection of the in-water and quayside extent of the proposed pipeline route and sought to record canal/ riverbed topography, assess the potential of riverbed deposits to retain archaeological material and identify any additional features/structures of archaeological or historic significance that are present. In addition, targeted metal-detection was employed to help assess the canal/ riverbed and highlight any metallic concentrations present within these deposits.

The UAIA was carried out in accordance with Section 5 of the National Monuments Act (2004 Amendment) by a team of underwater archaeologists and a certified surveyor on the 8th September 2020, under licence from the DCHG; licence numbers 20D0039 and 20R0144.

The following report presents the findings from the UAIA, provides locational/ methodological details relating to the underwater survey, and a set of mitigation proposals to ensure the proper observation and recording of archaeological material during the construction phase of the project.

2.0 PROPOSED DEVELOPMENT

The GCSWOE project comprises the following construction items (Figure 2):

- Transition Chamber 1 at chainage Ch.+00.00m (existing storm water outfall).
- Five x 1.5m diameter pipes from chainage Ch.+07.26m Ch.+310.00m.
- Transition Chamber 2 at chainage Ch.+310.00m Ch.+320.00m.
- Twin 2.4m dimeter pipes from chainage Ch.+320.00m Ch.+490.00m.
- Transition Chamber 3 at chainage Ch.+490.00m.
- A 4m wide x 2.7m high (internal diameter) pipe on Hanover Quay.
- A new outfall structure at Sir John Rogerson's Quay on the River Liffey.

The proposed pipeline will measure 550m in total length; requiring 450m of development within the Grand Canal Basin, and 100m along the existing road and pedestrian infrastructure on Hanover Quay.

Three (3) temporary cofferdams will be built at each of the transition chambers including;

- Transition Chamber 1 at the existing Grand Canal Tunnel Outfall;
- Transition Chamber 2 at the transition point from the five no. 1.5m diameter pipeline to two no. 2.4m diameter pipeline; and
- Transition Chamber 3 at Hanover Quay.

The proposed route will traverse (underwater) the centre of the southern portion of the docks, passing underneath MacMahon Bridge, to continue its route close to the western side of the basin area (adjacent to Grand Canal Quay). The pipeline will enter Transition Chamber 3 at Hanover Quay and will run underground (box-culvert) along the quay before adjoining with the existing pipeline on Asgard Road.

3.0 RECEIVING ENVIRONMENT

Maritime activity within the River Liffey is documented from the eighth-century onwards and it is clear that the area under assessment has a long history of human landscape intervention, adapting the topography of the river and its floodplains to conditions favourable for navigation and anchorage of vessels within the area. City Centre excavations at Winetavern Street and Wood Quay uncovered large wooden revetments dating to around 1200AD. These structures are thought to form part of an early reclamation and dockside area at Wood Quay.² In addition, extensive seventeenth to nineteenth-century land reclamation was undertaken, dramatically changing the landscape along the river's mouth. Indeed, this reclamation process coupled with the eastward shift in bridge construction across the Liffey resulted in the movement of port and shipping activity away from the city centre to the easternmost parts of the river.

Construction of the Grand Canal began in 1755, linking the city to the River Shannon in the west and the River Barrow to the southeast. It forms the southernmost of two waterways that almost encircle the inner part of the city; the other being the Royal Canal, located on the north side of the River Liffey. The Grand Canal reached Ringsend in 1791, in the same year that the Grand Canal Company purchased 24.5 acres of *slobland* (South Lotts) to facilitate construction of the Grand Canal Docks. The docks were completed in 1796 and were, at that time, to form the largest canal dock system in the British Isles. The development comprised an L-shaped harbour area with two deep-water docks and three graving docks; accessed via two ship locks and a barge lock. Two of the graving docks were leased to the Dublin

² Halpin, Andrew, *The Port of Medieval Dublin*, Four Courts Press, Dublin, pp.179-80.

Dockyard Company between 1851 and 1881, subsequently being leased to the Ringsend Dockyard Ltd who built/ repaired boats in the Grand Canal Basin up until the 1960s.

A series of quaysides comprise the perimeter of the Grand Canal Basin, with Great Britain Quay delineating its entrance (on the west side), Hanover Quay the north, Charlotte Quay the south, and Grand Canal Quay the west. A number of mill buildings (corn) delineate the east side of the docks, downstream of a canal crossing point between Pearse Street (formerly New Brunswick Street) and Ringsend Road; where McMahon Bridge stands today. A wooden bascule bridge (Brunswick Bascule Bridge) was first constructed at this location in 1791 and officially opened in 1796. This structure was subsequently replaced by Vitoria Bridge, an iron version of that structure, built in 1857. This was again replaced in the early 1900s and was also named Victoria Bridge. This structure comprised a 45ft-wide, iron, swing-bridge that also accommodated a set of rails for the tramway service between the City and Ringsend (operated by the Dublin United Tramways Service). Victoria Bridge was in turn was replaced by a concrete structure (MacMahon Bridge) in 1963, and again in 2008 by the current MacMahon Bridge. At a point *c.* 230m to the south, the docks are also traversed by a railway bridge (Dublin to Rosslare line), constructed in the early nineteen-century.

On the north side of the River Liffey, the construction of Custom House Dock (DU18-020564A), started in 1796 by the Ballast Board, was to provide direct competition to the Grand Canal Docks. A boat-building/ repair yard and Patent Slipway (completed in 1833) and a large dry-dock (completed in 1860) were to also follow as part of this development. By the mid-1800s, the increasing size of vessels seeking access to Dublin's Quays, coupled with on-going siltation along the mouth of the River Dodder, was to realise a progressive decline in the maritime use of the Grand Canal Docks. Moreover, the establishment of the Custom House and associated quayside structures would eventually facilitate a lasting shift in maritime development to the north side of the River Liffey.

3.1 Cartographic Information

Early maps of Dublin, including John Speed's Map of 1610 and Hermon Moll's of 1714, show a largely unaltered estuary environment.^{3 4} In contrast, it is evident in John Roque's map of 1756 that extensive reclamation has taken place with the construction of the north wall (1710-1718), facing the river channel, and the East Wall (1718-1729); running northwards along the line of the present day East Wall Road.⁵ These structures provided a tidal barrier behind which extensive land reclamation could take place, a process that lasted until the early part of the nineteenth-century and significantly extended the land mass on the north side of the River

³ John Speed's *Map of Dubline, 1610.*

⁴ Hermon's Molls New Map of Ireland, Dublin sheet 2, dated 1714.

⁵ John Roque, *Exact Survey of the City and Suburbs of Dublin, 1756.*

Liffey. As a result, a total of two-hundred a sixty-three (263) plots of land, ranging in size from an acre to three-and-a-half acres, were created and sold by the City Council.⁶

John Roque's map of County Dublin (1760) provides the earliest reliable mapping of the area under assessment, depicting the survey area prior to construction of the Grand Canal Docks (Figure 3). According to this map, the eastern side of the River Dodder was largely undeveloped and no housing or warehouse plots were present along the south side of the River Liffey; the present day location of Sir John Rogerson's Quay. However, the map does depict a quay wall at this location, constructed in 1716 to prevent flooding and allow reclamation of the adjacent mudflats; a process of reclamation that is clearly evident by 1760. The existing quay structure is later in date, constructed in the latter part of the ninetieth-century.

The First Edition (1837) OS map shows wide-scale development across the south side of the River Liffey, depicting a similar ground plan and street layout to that of the present day (Figure 4). However, comparison between the Frist Edition and subsequent OS mapping, including the OS 25-inch edition map, shows reclamation of the riverbed on the west side of the River Dodder, adjacent to '*Great Britain Quay*' (Figures 4-5). This reclamation work was undertaken in the late 1800s to facilitate the eastward expansion of the quayside; forming a triangular area of reclamation extending from the downstream side of the Grand Canal lock-gates to a point *c*.30m within the original river channel, located at the Dodder's confluence with the River Liffey.

Examination of the present-day street pattern and that of the OS Third Edition mapping of Dublin from 1911 (RMP Dublin Sheet 2364) shows the inclusion of two new streets, Asgard Road and Blood Stoney Road, that run parallel to Forbes Street and provide access from Hanover Quay to Sir John Rogerson's Quay (see Figures 8B). These streets represent modern insertions between two recently constructed developments along Sir John Rogerson's Quay.

Map extracts from the Dublin Port Company Archives (DPCA), Drawing Nos. 7199-7200 (1870-1875), provide a detailed record of Sir John Rogerson's Quay.⁷ The archive provides details of both the original quayside structure at Rogerson's Quay, built in the eighteenth-century, and its subsequent nineteenth-century replacement (Figure 6). The existing quayside structure remains largely unchanged to that shown within these drawings, the DPCA section-drawings providing the best record of these quayside structures to date.

⁶ De Courcy, J.W., *Anna Liffey, The River of Dublin*, (O'Brien Press, Dublin 1988), p.47.

⁷ Dublin Port Company Archives, Alexandra Road, Dublin.

3.2 Known Sites and Monuments

The Record of Monuments and Places (RMP) is a list of archaeological sites based on the Sites and Monuments Record (SMR) files, maintained by the National Monuments Section at the DCHG. SMR entries include detailed descriptions of archaeological sites based on site visits and historic studies and associated mapping where available. The SMR focuses on sites that are pre-1700AD in date. While later buildings are not well represented in the archive, all structures that are more than 100 years old are considered as archaeological sites today.

The area under assessment is located within the zone of archaeological potential defined for the historic city of Dublin (Du018-020). A number of historically significant structures are listed in the Record of Monuments and Places (RMP) within the vicinity of the proposed development (Table 1). These include: Sir John Rogerson's Quay (Du018-020-201); a Sea Wall (Du018-066); an early settlement site (Du018-053), located *c*.100mm east of the River Dodder; and a Fort and Revenue House Site (Du018-053-1), located at the junction between Thorncastle Street and York Road. However, only two (2) sites are located in close proximity (100m radius) of the area under assessment; Du018-020-021 and Du018-053 (Figure 7).

RMP Number	Classification	ITM	Townland
Du018-020-066	Sea Wall	718506E, 734063N	Poolbeg
Du018-020-021	Quay [Sir John Rogerson's]	716772E, 734373N- 717805E, 734273N	Dublin City, South
Du018-053	Settlement Cluster	718005E, 23396N	Ringsend
Du018-053-01	Fort/ Revenue house [site of]	717998E, 734164N	Poolbeg

Table 1: Known sites and monuments listed in the RMP within a 500m radius of the area under assessment.

3.3 National Inventory of Architectural Heritage

The National Inventory of Architectural Heritage (NIAH) is a county-by-county database that identifies, records, and evaluates the post-1700 architectural heritage of Ireland as an aid to the protection and conservation of the nations' built heritage. The NIAH surveys provide the basis for the recommendations of the Minister for the DCHG to the planning authorities for the inclusion of particular structures in their Record of Protected Structures (RPS).

Seven (7) entries, directly relating to Industrial Period developments along the River Liffey, are listed in the NIAH and have been tabulated below in Table 2 (Figure 7). These include the Grand Canal Basin, including its associated sea locks and two (2) remaining graving (dry) docks, a former warehouse on Hanover Quay, Sir John Rogerson's Quay, and the Dublin Port Diving Bell. Britain Quay remains absent from the NIAH inventory at present.

Registration Number	Date	ITM:	Description:
50020499 [Dam/ Reservoir/ Basin]	1795-1800	717603E, 734016N	L-plan canal basin, built 1796, as docks for Grand Canal, having trio of sea locks to north- east and dry docks to east end. Roughly coursed Calp limestone walls, with squared Calp coping and tooled granite coping, some replacement coping, having cast-iron bollards and mooring posts. Dressed granite and recent render steps. Recent road bridge, replacing earlier drawbridge, carrying Pearse Street over basin. Situated to east of city centre, south of River Liffey.
50020465 [Quay]	1860-1880	717407E, 734316N	Ashlar granite quay wall, erected c.1870, with ashlar granite coping. Cast-iron mooring hooks and mooring rings. Timber fenders to north of B. J. Marine building. Granite steps with cast-iron railings. Stone setts and inset cast-iron rails to campshire. Raised in height to east and west of Samuel Beckett Bridge as part of recent works.
50020468 [Diving Bell]	1860-1880	717288E, 734320N	Cast-iron and riveted plate-iron diving bell, fabricated c.1870, with chamber 23 feet square by 6.5 feet high, accessed by vertical shaft with iron rungs, incorporating air lock. Located to quay side of Sir John Rogerson's Quay, mounted on modern display structure.
50020495 [Warehouse]	1880-1900	717768E, 734095N	Attached triple-gable-fronted nine-bay single- storey former warehouse, built c.1890, now disused. Pitched corrugated roof with recent half-dormer windows, carved limestone coping having metal flashing to parapets to front (south) elevation, yellow brick eaves course with cogged brick, and cast-iron rainwater goods. Brown brick, laid in Flemish bond, to wall to front, carved granite string course and raised dressed granite and dressed Calp limestone plinth course, roughly coursed rubble limestone to east elevation.
50020496 [Sea Locks]	1795-1800	717817E, 734074N	Group of three sea locks, built 1796, connecting Grand Canal Dock with the River Liffey. Two central dock platforms having tooled granite walls and coping, inscribed lettering to walls showing names and dates, notches for machinery, and lock-gate emplacements to each elevation. Sign marking locks with name 'Grand Canal Docks'. Some cast-iron ladders and rings inset to walls. Three sets of double-leaf timber gates, with timber beams and some recent metal panels, to lock to west, pair of replacement gates to central and east lock. Stone sets and limestone paving to surface of platforms, winch mechanisms to platforms to east and centre. Adjoining south bank of River Liffey.
50020497 [Dry Docks]	1795-1800	717821E, 733972N	Two former graving docks, built 1796, now disused. Cut limestone retaining walls. Recent smooth rendered enclosing wall to north, east and south boundaries. Situated on east side of Grand Canal Basin.

Table 2: NIAH entries associated with the nineteenth and twentieth-century development of the River Liffey and the Grand Canal Basin.

3.4 Shipwreck Inventory

The Shipwreck Inventory in the DCHG archive is a list of recorded instances of wrecking since 1750. The details provided describe the type of vessel, the journey it foundered on, and information on the ultimate plight of the vessel and its crew, where possible. In describing the wrecking event, the records will locate the incident in relation to the nearest headland or other topographic marker where known. This is not however a record of where the wreckage lies, since the historic records generally only deal with the vessel before it sunk. Such finer details emerge from other sources, such as fishermens' records of snag points and diver records of sites located underwater. These are included in the Inventory wherever possible but it is true to say that most entries lack this final level of data. Finally, it should be pointed out that while the Inventory provides a record of wrecking incidents since 1750, it does not claim to be a comprehensive record for earlier events, and therefore the medieval and prehistoric periods are not represented in this archive.

A total of twenty-six (26) wrecks are listed in the inventory for the River Liffey and surrounding area (Appendix 1). This includes: seventeen (17) listed as River Liffey/Dublin River, five (5) for Ringsend, one (1) for Sir John's Quay, one (1) for the South Wall, one (1) for Pigeon Hole, one (1) for Halpin's Pond, and one (1) for Pigeon House. The earliest of the listed wrecks date from the 1760s, with the latest recorded dating to 1892. There are no entries listed for the River Dodder, Sir John Rogerson's Quay, or the Grand Canal Docks/ Basin area.

3.5 Topographic Archive

The National Museum of Ireland Topographical Files is the national archive of all known antiquities recorded by the National Museum. These files relate primarily to artefacts but also include references to monuments and also contain a unique archive of records of previous archaeological excavations. The Museum's files present an accurate catalogue of objects reported to that institution from 1928. There is a computerised database of finds from the 1980s onwards. They are categorised by their location into county and further into townland, town, city, street or river where they come from. There are rarely any grid co-ordinates to precisely locate find-spots. However, where find-spots of artefacts are established they can prove an important indication of the archaeological potential of the related or surrounding area.

A large number of artefacts have been recovered from excavations undertaken close to the existing River Liffey. Among the earliest artefacts encountered were those recovered from excavations at Fishamble Street, these included: two flint blades of Larnian style (similar pieces dated to about 3350BC at Sutton and on Dalkey Island), a Neolithic polished stone

axe-head, and a barbed and tanged flint arrowhead of Early Bronze Age type.⁸ However, only total of twenty-six (26) artefacts have been listed in the topographic files for the River Liffey and its associated quay structures (Appendix 2). Listed artefacts range in date from the early Bronze Age (axe-head, 1922:4) to nineteenth-century material (clay pipe fragments, etc., 1937: 2379-2416). Only eleven artefacts are listed as coming from the River Liffey itself, the rest being recovered during quayside excavation works. One (1) artefact, an iron sword (1964:1), is listed as coming directly form riverbed deposits; recovered from the River Liffey, *c*.10ft from the edge of Arran Quay. There are no items are listed in the Topographic Archive for the Grand Canal Docks.

3.6 Excavations Bulletin

The excavations bulletin provides a published and online summary of accounts of archaeological excavations undertaken throughout Ireland.⁹ Summaries may also be submitted for inter-tidal survey, underwater assessments, and the archaeological monitoring of marine dredging works. The majority of the entries relate to development-led archaeological work. Appendix 3 summarizes the entries relating to the River Liffey and its surrounding environs, including the River Liffey and the River Liffey Quays. There are also a number of underwater archaeological assessments that were undertaken (by ADCO) within the vicinity of the present assessment area.¹⁰ ¹¹ ¹² However, no archaeologically significant material/deposits/objects were encountered as part of these endeavours.

3.7 Conclusion

It evident that significant maritime activity has taken place within the city to stimulate river adaptation, the Liffey providing an essential artery for trade imports and exports to and from the city. This activity is reflected in the number of shipwreck events listed in shipwreck inventory, which records four-hundred and sixty-four (464) wrecks around Dublin and includes twenty-six (26) wrecks near or from the River Liffey; the majority dating from the eighteenth and nineteenth century, when river use by shipping was at its peak.

While there is no specific reference to archaeological material/ deposits/ features being recovered from the riverbed or canal-bed areas under assessment, it should be noted that the

⁸ Mitchell, G.F., *Archaeology and Environment in Early Dublin*, Royal Irish Academy, Dublin, p.7.

⁹ Isabel Bennett (ed.) *Excavations Bulletin: summary accounts of archaeological excavations in Ireland*, Wordwell./ www.excavations.ie

¹⁰ Rex Bangerter, 03D027, 03R046, 'Underwater Archaeological Assessment, South Link Bridge, Grand Canal Basin, Ringsend, Co. Dublin', unpublished report, ADCO, April 2003.

¹¹ Rex Bangerter, 16E0495, 16D0070, 16R0175, 'Underwater Archaeological Impact Assessment (UAIA) and Environmental Sampling Report, Dublin Bridges Project, Bridge Sites 1-4, River Liffey, Dublin City', unpublished report, ADCO, November 2016.

¹² Rex Bangerter, 19D0022, 19R0052, 'Underwater Archaeological Impact Assessment (UAIA), Dodder Public Transport Bridge Opening Project, River Dodder/ River Liffey, Dublin City', unpublished report, ADCO, May 2019.

systematic recording of maritime/riverine data is a recent phenomenon. Moreover, it is clear that the River Liffey has a long history of maritime activity and has been of importance from at least the medieval period. However, this is counter-balanced by the fact that the River Liffey would have undergone successive dredging works from the nineteenth-century onwards, an activity that would greatly limit the archaeological potential of the riverbed. Therefore, it is reasonable to anticipate a low-medium archaeological potential for the section of the River Liffey under assessment. In addition, the relatively recent construction (1796) of the Grand Canal Docks and the early-mid eighteenth century reclamation of the surrounding area has a limiting effect on the potential recovery of archaeological material; the canal-bed being more likely to retain objects of historical rather than archaeological significance.

4.0 SURVEY METHODOLOGY

Visual inspection was employed to assess the archaeological potential of the underwater environment across the canal-bed along the proposed pipeline corridor (Figure 8). Assessment was undertaken across a 448m north-south x 90m east-west area (maximum). In addition, the riverbed and quayside at the proposed location of the discharge outlet (outfall) was undertaken, across a 15m (north-south) x 40m (east-west) area (Figure 8). A significant buffer zone was incorporated into both assessments, extending the underwater survey significantly beyond the anticipated impact areas associated with the installation of the pipeline and discharge outlet.

Metal-detection survey was deemed impractical due to the high degree of metal debris found within both of the survey areas; an almost constant metallic signature being encountered. Detailed descriptions were made of the bottom topography and composition. In addition, the surrounding quaysides were inspected. A finds retrieval strategy dealing with conservation, cataloguing, and locational recording was in place to deal with the potential recovery of any artefacts encountered during the underwater survey.

Underwater visibility of between 2m-3m was experienced across the Grand Canal Docks, with a maximum recoded depth of 4m. Underwater visibility of 500mm-1m was experienced for the River Liffey at Sir John Rogerson' Quay, with a maximum record depth of 10m.

The in-water work was completed by a team of four archaeologists, a certified surveyor, and Dive Supervisor. Dive operations were carried out to HSA/HSE standard using surface supplied equipment, supported with suitable boat cover and mobile/ VHF communications to the Port Operations Centre at Dublin Port, in accordance with the Safety in Industry (Diving Operations) Regulations 1981, SI 422 (Plates 1-2). The on-site work was carried out on the 8th September 2020, under licence from the DCHG; licence numbers 20D0039 (Dive Survey) and 20R0144 (Detection Device).

4.1 Terminology

When referring to the degree of compaction observed for the riverbed deposits under inspection, the terms loose, medium, and hard are relative and do not relate to the measured properties of these deposits. All dimensions in this report are provided in either millimetres or meters according to scale. When referring to sediment grain size, the Wentworth scale has been adopted, as detailed in Table 3.

Size (mm)	Grade
>256	Boulder
>64	Cobble
>4	Pebble
>2	Granule (gravel)
>1	Very coarse sand
>1/2	Coarse sand
>1/4	Medium sand
>1/8	Fine sand
>1/16	Very fine sand
>1/32	Coarse silt
>1/64	Medium silt
>1/128	Fine silt
>1/256	Very fine silt
<1/256	Clay

 Table 3: Sediment grain size categories as applied to the riverbed deposits discussed in this report.

5.0 ARCHAEOLOGICAL ASSESSMENT

5.1 Canal/ Riverbed Topography

Grand Canal Docks

The canal-bed is composed of a compact silty-clay (20mm-30mm hand-penetration) with an overlying deposit of silt that varies in depth, up to maximum observed depth of 50mm. Occasional patches of gravel (<3mm) and small cobbles (<50mm) were also noted. The canal-bed is largely flat and featureless, with gentle undulations across its extent. In places, drag-marks are present that expose the underlying sub-stratum; composed of a silty-clay with occasional sub-angular cobbles (size range <50mm) and frequent crushed shell inclusions. A large amount of modern debris was also observed, most notably on either side of MacMahon Bridge. An intensive growth of riverweed is present throughout the survey area.

Sir John Rogerson's Quay

The riverbed across much of this area comprises light-grey silt (100mm depth) that overlies a substratum of fine silty-clay (70%/30% mix, dark-grey in colour) of medium compaction. This deposit measures 1m+ in depth. The riverbed slopes gently from the quay wall at a 20 degree

angle for approximately 6m. The central channel is relatively flat and featureless, only occasional ripples in the silt being evident. Frequent modern debris was noted along the base of the quay wall included reinforcing-bar, mobile phones, glassware, a bicycle, etc.

5.2 Visual Survey and Assessment

Grand Canal Docks

Systematic visual survey was conducted along the identified survey area and extended well beyond the boundaries of the proposed pipeline impact area. No archaeologically significant material was encountered. In addition, Grand Canal Quay and Hanover Quay were inspected (Plates 3-5).

A large amount of modern debris is scattered across the Canal-bed and includes bicycles, traffic cones, sand bags, reinforcing-bar, and miscellaneous boat-jetsam. A broken rowing-boat (timber) of modern origin was observed as part of the 2008 underwater survey, located at ITM 717865E, 733025N. This feature is no longer visible, either having been removed or further buried within canal-bed.

Grand Canal Quay, a structure of late eighteenth-century construction, is composed of roughly-faced granite blocks measuring between 250mm length x 200mm height and 1m length x 400mm height. Six (6) string-courses are visible above the waterline and the quayside appears to be regularly coursed (Plate 6). The top of the quayside is capped by a series of neatly-faced granite blocks that are fairly uniform in size and shape (average size 1m length x 400mm height). The capping stones have been replaced, using modern limestone blocks, along two sections of the quayside; one measuring 60m length (ITM 717905E, 733039N to ITM 717957E, 733026N), the other 100m in length (ITM 717292E, 733925N to 717302E, 734023N). In addition, a modern pedestrian access platform has been constructed at ITM 717908E, 733029.N. A series of eight (8) piles have been placed to accommodate this structure (Plate 7). A large amount of sediment deposition (fine silt) is occurring beneath the platform and measures in excess of 1m in depth. The quayside has undergone further modern alteration with in-water consolidation measures being evident; modern concrete shuttering (measuring c.300mm in thickness) having been placed along much of the in-water extent of the quayside (Plate 8).

The southern extent of the Grand Canal Docks is delineated by a *c*. 4m high masonry revetment wall constructed of neat-cut, roughly-coursed, limestone (Plate 9). Concrete capping stones adorn the top of the structure, above which the concrete supports for the adjacent railway-line are present. A single-arched, nineteenth-century, bridge is located at the western end of the revetment wall, in the southwest corner of the dock area, and provides

boat-access to the docks from the canal system (Plate 10). A tow-path can be seen extending beneath the bridge on its western side (Plate 11).

Four (4) nineteenth century mill-buildings are positioned along the east side of the Grand Canal Docks, adjacent to Barrow Street. Two of the buildings are currently under restoration/ conversion, while the remaining two have been converted into office spaces (Plate 12). The canal-side façades of these buildings retrain fixtures and fittings associated with the mooring of barges alongside (Plate 13). MacMahon Bridge is located immediately upstream of the first of these mill buildings (Plate 14).

Hanover Quay delineates the northern side of the dock/ basin area, extending at right angles from the north terminus of Grand Canal Quay for a distance of *c*. 480m (ITM 717312E, 734105N - ITM 717795E, 734047N). Two (2) courses of rough-cut, limestone, masonry are visible above the waterline; measuring in size between 500mm length x 400mm height and 1m length x 400mm height (Plate 15). Above this, large capping stones are present, measuring up to 750mm length x 400mm height x 650mm depth (Plate 16). A series of small, forged-iron, mooring bollards adorn the top of the quay structure; these being marked '*Athy CO OP Foundry*' (Plates 17). The quay has undergone frequent modern intervention/ remedial works along its extent. This includes repair and re-pointing (cement) of the quay wall and in places replacement of its original, limestone, capping with granite and/or modern-cut limestone. A set of river-access steps are positioned near (*c*. 6m) the quay's western terminus (Plate 18).

Sir John Rogerson's Quay

Sir John Rogerson's Quay is composed of neatly-cut/faced, regularly coursed, granite blocks measuring a uniform 1.20m in length x 300mm in height and 950mm in length x 300mm in height (Plates 19-20). This uniformity of construction is evident from the base of the capping stones to the base of the structure; the capping stones being of greater height at 400mm. A champher in the quay wall is located *c*. 2.5m from the top of the structure.

A set river-access steps are located *c*. 25m to the east of the identified location of the proposed outfall (Plate 21). A recessed mooring-hoop (250mm recess) is located at ITM 318248E, 232910N, *c*. 9m east of the outfall centre-point (Plate 22). In addition, two (2) rectangular recesses measuring 250mmm (length) x 150mm (width) x 0.25m (depth) are located at ITM 31747E, 234286N (Plate 23). These rectangular recesses are likely to represent fixtures for a wooden access ladder or wooden buffer-posts to protect the quayside. No fixtures or fittings were visible below the water-line, the only noteworthy feature being the masonry champher detail present along the quay wall.

5.3 Metal-detection Survey

Underwater metal-detection survey within the Grand Canal Docks/Basin area was deemed impractical due to the large number of targets encountered. The survey revealed an almost constant hit ratio and it was not possible to tune out the background metallic signature generated by the volume of modern metallic debris present. Meaningful survey was limited to the riverbed alongside Sir John Rogerson's Quay, where a medium-high hit ratio of 2-3 hits per m² was encountered. The majority of these were subsurface targets. Investigation of subsurface targets was limited to non-ferrous metal hits; however, these all proved to be of modern origin, e.g. aluminium drinks cans.

5.4 Conclusion

The archaeological assessment was systematic and comprehensive, extending beyond the potential construction footprint at each location. No archaeologically significant material, structures, or deposits were encountered as part of the underwater survey; features of interest being limited to Sir John Rogerson's Quay and the nineteenth-century quay structures that delineate the Grand Canal Docks.

6.0 PROPOSED IMPACTS¹³

The proposed route extends from Transition Chamber 1 and traverses (underwater) the centre of the southern portion of the Docks to pass underneath MacMahon Bridge. At this point the route moves close to the western side of the basin area (Grand Canal Quay), via Transition Chamber 2. The pipeline will enter Transition Chamber 3 at Hanover Quay and then run underground (box-culvert) along the quay before adjoining with the existing pipeline beneath Asgard Road.

Five (5) number 1500mmØ pipes will extend from Transition Chamber 1 (to be positioned at the existing outfall) to Transition Chamber 2, located 40m north of MacMahon Bridge (Chainage +310.00m – +320.00m). At this point the number of pipes is reduced, with two (2) number 2400mmØ pipes being employed. A pipe-trench is required to accommodate the pipeline route between Chainage +007.26m and Chainage +490.00m. It is anticipated that the trench will be relatively narrow in nature, measuring *c*. 8m in width, and that an open-cut method will be employed for the excavation; burying the pipes between -900mm and -1m bellow the bed-level of the canal.

A *c.* 5m section of Hanover Quay will be impacted by the construction of Transition Chamber 3, positioned at ITM 717315E, 732379N (Chainage +490.00m). This will connect the pipeline,

¹³ This section does not purport to relate to precise engineering details but is rather an attempt to understand the nature of the impact on the potential archaeological environment, based on the supplied data.

via a box-culvert, to the existing pipe infrastructure located below Asgard Road. This will constitute a direct and permanent impact to the exiting quayside at this location.

It is understood that a *c*. 7m diameter area of quay wall will be impacted by the insertion of the storm water outlet (outfall) pipe at Sir John Rogerson's Quay. Removal of the existing masonry (granite ashlar blocks) at this location is required and will constitute a direct and permanent impact to the exiting quayside at this location.

6.1 Impact Categories

Impact/effect categories will typically have regard to those set out in the 'Guidelines on the information to be contained in Environmental Impact Statements', 2002, EPA; 'Advice notes on Current Practice (in preparation of Environmental Impact Statements), 2003, EPA; Strategic Environmental Assessment (SEA), 2010; and Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes, no date, National Roads Authority. Impacts/effects are generally categorised as either being a direct impact, an indirect impact or as having no predicted impact.

Impacts are generally categorised as either being a direct impact, an indirect impact or as having no predicted impact:

Direct impact occurs when an item of archaeological or architectural heritage is located within the centreline of the proposed route alignment and entails the removal of part, or all, of the monument or feature.

Indirect impact may be caused where a feature or site of archaeological or architectural interest is located in close proximity of the proposed development.

No predicted impact occurs when the proposed route option does not adversely or positively affect an archaeological or architectural heritage site.

These impact categories are further assessed in terms of their quality i.e. positive, negative, neutral (or direct and indirect).

Negative Impact is a change that will detract from or permanently remove an archaeological or architectural monument from the landscape.

Neutral Impact is a change that does not affect the archaeological or architectural heritage.

Positive Impact is a change that improves or enhances the setting of an archaeological or architectural monument.

A significance rating for these impacts is then given i.e. slight, moderate, significant or profound.

Profound applies where mitigation would be unlikely to remove adverse effects. This is reserved for adverse, negative effects only. These effects arise where an archaeological or architectural site is completely and irreversibly destroyed by a proposed development.

Significant is an impact that, by its magnitude, duration or intensity alters an important aspect of the environment. An impact like this would be where the part of a site would be permanently

impacted upon leading to a loss of character, integrity and data about the archaeological or architectural feature/site.

Moderate is a moderate direct impact that arises where a change to the site is proposed which, though noticeable, is not such that the archaeological integrity of the site is compromised and which is reversible. This arises where an archaeological or architectural feature can be incorporated into a modern day development without damage and that all procedures used to facilitate this are reversible.

Slight is an impact that causes changes in the character of the environment that are not significant or profound and do not directly impact or affect an archaeological or architectural feature or monument.

Imperceptible is an impact capable of measurement but without noticeable consequences.

In addition, the duration of Impacts is assessed and has been sub-divided into the following categories:

- Temporary Impact, where an Impact lasts for one year or less
- Short-term Impacts, where an Impact lasts one to seven years
- Medium-term Impact, where an Impact lasts seven to fifteen years
- Long-term Impact, where an Impact lasts fifteen to sixty years.
- Permanent Impact, where an Impact lasts over sixty years.

Structure	Description	Potential Impact	Classification of Impact
Hanover Quay	Section (c. 5m) of nineteenth-century masonry quayside forming northern extent of the Grand canal Docks.	 Masonry removed to facilitate pipeline route. 	 Direct, negative, impact; moderate and permanent in nature.
Sir John Rogerson's Quay	Section (c. 7m) of nineteenth-century masonry quayside on south side.	 Masonry removed to facilitate pipe outfall. 	 Direct, negative, impact; moderate and permanent in nature.

Table 4: Nature and classification of impacts to historic quay structures arising from the proposed

 Grand Canal Stormwater Outfall Extension project.

7.0 RECOMMENDATIONS

7.1 Pre-construction Measures

The two sections of quayside impacted by the proposed development should be subject to further archaeological recording. This should be in the form of detailed elevation and cross-sectional drawings that provide a stone-by-stone account of these structures prior to any impacts taking place. No further ameliorative measures, with regard to any of the in-water works, are recommended in advance of construction commencing

7.2 Construction Phase Measures

ARCHAEOLOGICAL MONITORING. Archaeological monitoring in accordance with the terms of Section 5 of the National Monuments Act (2004 Amendment) is recommended during any riverbed and quayside disturbances associated with the proposed works. These measures will ensure that any sub-surface remains of archaeological or historic value are dealt with in an appropriate archaeological manner.

It is recommended that the removal of any quayside masonry be carried out under archaeological supervision, allowing the archaeologist to obtain additional information and undertake supplementary recoding, as may become required during that process. It is also recommended that any masonry, identified to be of particular interest, is retained and removed to suitable storage as part of the removal process. In addition, any quayside fixtures and fitting should be removed under archaeological supervision and retained as part of the development.

RETAINING AN ARCHAEOLOGIST/S. An archaeologist should be retained for the duration of the relevant works. The archaeologist should be familiar with and experienced in river/estuarine environments and have a good understanding of riverine archaeology and its associated features.

THE TIME SCALE for the construction phase should be made available to the archaeologist, with information on where and when ground disturbances and/or dredging will take place.

SUFFICIENT NOTICE. It is essential for the developer to give sufficient notice to the archaeologist/s in advance of the construction works commencing. This will allow for prompt arrival on site to monitor the ground disturbances. As often happens, intervals may occur during the construction phase. In this case, it is also necessary to inform the archaeologist/s as to when ground disturbance works will recommence.

DISCOVERY OF ARCHAEOLOGICAL MATERIAL. In the event of archaeological features or material being uncovered during the construction phase, it is crucial that any machine work cease in the immediate area to allow the archaeologist/s to inspect any such material.

ARCHAEOLOGICAL MATERIAL. Once the presence of archaeologically significant material is established, full archaeological recording of such material is recommended. If it is not possible for the construction works to avoid the material, full excavation would be recommended. The extent and duration of excavation would be a matter for discussion between the client and the statutory authorities.

ARCHAEOLOGICAL TEAM. It is recommended that the core of a suitable archaeological team be on standby to deal with any such rescue excavation. This would be complimented in the event of a full excavation.

SECURE SITE OFFICES and facilities should be provided on or near those sites where excavation is required.

FENCING of any such areas would be necessary once discovered and during excavation.

ADEQUATE FUNDS to cover excavation, post-excavation analysis, and any testing or conservation work required should be made available.

MACHINERY TRAFFIC during construction must be restricted as to avoid any of the selected sites and their environs.

SPOIL should not be dumped on any of the selected sites or their environs.

PLEASE NOTE: All of the above recommendations are based on the information supplied for the Grand Canal Stormwater Outfall Extension Project. Should any alteration occur, further assessment maybe required.

PLEASE NOTE: Recommendations are subject to the approval of The Department of the Department of Housing, Local Government, and Heritage; formerly the Department of Culture, Heritage and the Gaeltacht, and of the National Museum of Ireland (as referred to in this report).

8.0 ACKNOWLEDGEMENTS

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Location:	Name:	Date:	Ship Type:	Information:
Opposite the old coastguard station at Ringsend, River Liffey	Argo	10/12/1892	31-year old, 46- ton, Dublin, wooden fishing smack	Moored in the River Liffey.
Between the walls at Dublin	Britannia	6/5/1774		This vessel was en route from London, under Captain Williams, when she hit an anchor. She went ashore.
River Liffey	Carolina	5/10/1799	Galliot of Oporto	Ran aground and sank.
Dublin River	Commerce	25/10/1811		En route from Dublin when sank.
Between the city of Dublin Company's jetty and breakwater head	Edith	8/9/1875	London and Noth-Western Railway Company Steamer aboard.	En route from the company's wharf to Greenore. She departed at around 1.25am but collided with another London and North- Western Railway Company vessel, the Duchess of Sutherland. This vessel was under the command of Captain Beaumont and was en route from North Wall Dublin. The Edith was violently struck on the starboard bow and sank within a quarter of an hour. A fireman called Jones and his brother who slept in the forecastle were drowned. The weather was clear and calm at the time of the incident. Cargo: 60 to 80 passengers
Sir John's Quay, Dublin	Emma	17/06/1851	Smack	En route from Liverpool ran aground and listed on her beam ends. She was seriously strained and brought to Eden Quay where she filled. The cargo was damaged. Cargo: Wheat and staves
South Wall	Henry	23/11/1798	Brig of Liverpool	Wrecked
River Liffey	Hibernia	22/03/1776		Vessel was burnt
Pigeon Hole, Dublin River	James and Ann	7/2/1812		En route from Drogheda was hit by a collier brig and sank.
'Dublin River'	Langston	21/03/1812		Portsmouth vessel was reported lost.
River Liffey, Dublin	Leonard	10/01/1853		Struck by a steamer.
Entrance to Dublin River	Maria Carolina	16/8/1799		En route from Oporto to Dublin when she sank. The cargo was landed.
Abreast of no 2 bouy, River Liffey	Mermaid	16/07/1892	Unregistered wooden yacht/cutter was 5 yrs old and weighed 1 ton.	The master and owner was P. Carolan, Clontarf, Dublin. She was en route from Clontarf to Dublin, in ballast, with 6 crew. She sank in an easterly force 6 wind but was later raised. 4 lives were lost
The Liffey	Newport	20/05/1851	Montrose schooner	En-route up the Liffey when she came in contact with Hebden from Barbados, which made a hole in her stern.

Location:	Name:	Date:	Ship Type:	Information:
Dublin River	Nosha Squera de Bonamo	28/06/1798	Brig of Oporto	Ran onto a bank.
Ringsend, R. Liffey	Pelican	8/4/1889	37-ton 32-year old wooden smack of Dublin	At anchor at Ringsend when burnt. Vessel in ballst
Behind piles at Dublin	Providence	5/02/1771		En route from London, under Capt Mayne, when she was lost
Opposite Halpins Pond, River Liffey	Rat	25/05/1891	10-year old wooden pleasure sailing boat	Capsized and was wrecked during pleasure trip.
River Liffey	Times	1-2/06/1853	Dublin vessel	En route from Dublin to Liverpool encountered easterly wind. Her boilers burst while in river. Cargo: Passengers
Off Pigeon House	Times	13/09- 29/11/1851	Steamer	Steamer plying to and from Dublin went ashore but got off again after discharging some cargo.
Dublin River	William	10/01/1812		Went aground.
Ringsend	Unknown	1760s (Oct.)		A severe gale in Dublin Bay wrecked two ships.
Dublin River	Usk	8/10/1856		This vessel, en route from Dublin to Wexford, became stranded.

<u>Appendix 2:</u> Artefact Entries from the Topographic Files at the National Museum of Ireland listed for the River Liffey.

Artefact:	Find place:	NMI Reg. No.	Description:	
Glass Bead	River Liffey	4042:WK428	Found with other beads and an iron sword pommel	
Glass Bead	River Liffey	4041:WK427	Found with other beads and an iron sword pommel	
Glass Bead	River Liffey	4034:WK420	Found with other beads and an iron sword pommel	
Glass Bead	River Liffey	4034:WK419	Found with other beads and an iron sword pommel	
Glass ring	River Liffey	4031:WK417	Found with other beads and an iron sword pommel	
Glass Bead	River Liffey	4030:WK416		
Glass Bead	River Liffey	4029:WK415		
Iron sword, Sudanese?	River Liffey at Arran Quay	1964:1	Found in the bed of the River Liffey about 10ft out from the edge at Arran Quay. It is Sudanese dating from fourteenth to nineteenth century. Length 100cm, length of blade 88cm, width across cross-guard 15.5cm. The blade is long tapered and flexible tapering to a blunt rounded point.	

<u>Appendix 3:</u> Summary of Excavations Bulletin entries for River Liffey, River Liffey Quays, the North Wall, and the Grand Canal Docks [note, UAIA's highlighted in blue].

Entry Number	Location	Irish National Grid	Licence Number	Summary Description
2000:0245	River Liffey, Blackhall Place	31413E, 23429N	00E0733	Riverbed with Medieval and later artefacts. Site of eighteenth-century slipway.
2001:365	River Liffey, Blackhall Place	31413E, 23429N	01E0246	Post-medieval/early modern quays
2002:0518	River Liffey, Blackhall Place	31413E, 23429N	01E0246ext.	Post-medieval/early modern quays
2002:0543	River Liffey, Guild Street/Macken Street		02E1811	No archaeological significance
2003:509	River Liffey, City Quay/Custom House Quay	31665E, 23440N	03E1060	No archaeological significance
2003:520	River Liffey, Custom House Quay/City Quay		03D0363	Riverbed deposits and associated quayside features/walls
2003:527	7–8 Eden Quay, Dublin	31603E, 23447N	SMR 18:20 02E1713	Human skull and 13th–18th- century finds in river gravels.
2002:0516	14–18 Aston Quay	311580E, 233435N	02E1621	Urban, eighteenth-century
2003:495	14–18 Aston Quay, Dublin	31489E, 23336N	02E1621	Urban post-medieval
2003:509	River Liffey, City Quay/Custom House Quay	31665E, 23440N	03E1060	No archaeological significance
2003:520	River Liffey, Custom House Quay/City Quay		03D0363; 03R107	Riverbed deposits and associated quayside features/walls
2003:0576	Spencer Dock, Sheriff Street	317169E, 234711N	03E0654	Post-medieval industrial
2004:0565	Building C, Spencer Dock, North Wall	317169E, 234711N	03E0654	Late Mesolithic fish traps and post-medieval structures
1995:080	8 Ormond Quay Lower, Dublin	31550E, 23430N	95E063	Mid to late seventeenth- century reclamation, eighteenth-century houses
1996:106	22—23 Ormonde Quay, Dublin	31530E, 23420N	96E272	River shoreline up to the seventeenth century when land was reclaimed. Houses are eighteenth century
1997:155	40 Ormond Quay, Dublin	315550E, 234250N	97E013	Urban, eighteenth century
1997:156	15 Ormond Quay Lower, Dublin	315550E, 234250N	97E265	Urban, post-medieval reclamation
1999:222	31A-36 Ormond Quay Ormond Upper/Charles Street West, Dublin	315250E, 234200N	99E0126	Urban post-medieval
2000:280	24–27 Ormond Quay Lower, Dublin	315600E, 234208N	00E0162	Urban post-medieval
2003:520	River Liffey, Custom House Quay/City Quay, Dublin	316650E, 234400N	03D063; 03R107	Riverbed deposits and associated quayside features/walls
2003:527	7–8 Eden Quay, Dublin	316030E, 234470N	02E1713	Human skull in river gravels
2003:562	14 Ormond Quay/11– 14 Strand Street, Dublin	315500E, 234300N	03E0964	Urban post medieval

2003:563	14 Ormond Quay/11– 14 Strand Street, Dublin	31550E, 23430N	03E0964 ext.	Urban post-medieval
2004:0569	31-36 Ormond Quay Upper/Ormond Place/Charles Street West/Ormond Square, Dublin	31540E, 234230N	04E1206	Urban post-medieval
2008:412	Grand Canal Docks/ Sir John Rogerson's Quay [GCSWOE project].	317607E, 233022N	07D0061, 07R0249	Riverine/ Quayside [nineteenth-century]
2006:427	River Liffey, 100m upstream of O'Connell Bridge to Butt Bridge [Metro North project]	315869E, 234346	08D0094, 08R0310	Riverine/ Quayside [nineteenth-century]
2008:484	River Liffey, Harbour Quay, Poolbeg.	320020E,233717N	08D0067, 08R0206	Riverine/ Quayside
2016:499	River Liffey, North Wall Quay/ Sir John Rogerson's Quay [Dublin Bridges project]	317768E, 234325N	16E0495, 16D0070, 16R0175	Riverine/ Quayside [nineteenth-century]
2019:505	River Liffey, North Wall Quay/ Sire John Rogerson's Quay. [Blood Stoney Pedestrian Bridge project].	317546E, 234344N	19D0063, 19R0156	Riverine/ Quayside [nineteenth-century]
2019:508	River Dodder and River Liffey [Dodder Public Transport Opening Bridge project].	318021E, 234221N	19D0022, 19R0052	Riverine/ Quayside [nineteenth-century]



















Plate 1: ADCO SSDE Dive Support Van positioned on Sir John Rogerson's Quay.



Plate 2: Diver undertaking pre-dive checks prior to entering the water alongside Sir John Rogerson's Quay.



Plate 3: South-facing view along southern half of Grand Canal Quay.



Plate 4: North-facing view of Hanover Quay, delineating the north side of the Grand Canal Docks.



Plate 5: Northwest-facing view of transition between Grand Canal Quay and Hanover Quay; note capping stones replaced with modern granite blocks.



Plate 6: West-facing view of masonry located above the waterline along Grand Canal Quay.



Plate 7: South-facing view along Grand Canal Quay; note platform extending eastwards from quayside.



Plate 8: View of northern end of concrete shuttering used to consolidate the in-water face of Grand Canal Quay.



Plate 9: South-facing view of revetment wall and railway that delineates the southern extent of Grand Canal Docks.



Plate 10: South-facing view of a single-ached masonry bridge located in the southwest corner of the Grand Canal Docks; boat access bridge.



Plate 11: Southwest-facing view of remains of a tow-path that extends beneath the west side of the bridge structure.



Plate 12: South-east facing view of converted mill buildings located along the east side of the Grand Canal Docks, adjacent to Barrow Street.



Plate 13: Example shot of mooring chain/ hoops present on the canalside of the mill buildings; located a short distance above the waterline.



Plate 14: South-facing view of existing MacMahon Bridge, built in 2008.



Plate 15: North-facing view of Hanover Quay, taken in line with Asgard Road (1m scale).



Plate 16: Detail shot along top of Hanover Quay showing granite capping stones at this location (1m scale).



Plate 17: Example shot of cast-iron mooring posts affixed to capping stones along Hanover Quay.



Plate 18: Northwest limit of Grand Canal Docks; Grand Canal Quay to left and Hanover quay to right of picture, note river-access steps on Hanover Quay.



Plate 19: West-facing view along Sir John Rogerson's Quay, taken from centre-point of diver survey area.



Plate 20: South-facing view of Sir John Rogerson's Quay at proposed impact centre-point; discharge outlet to be placed in line with the roadway (Asgard Road).



Plate 21: East-facing view of river-access steps located *c*. 25m east of survey centre-point.



Plate 22: South-facing view of Sir John Rogerson's Quay showing recessed iron mooring hoop (250mm deep recess).



Plate 23: South-facing view of Sir John Rogerson's Quay showing two rectangular recesses for a timber ladder or mooring posts (250mm length x 150mm width x 250mm depth).





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