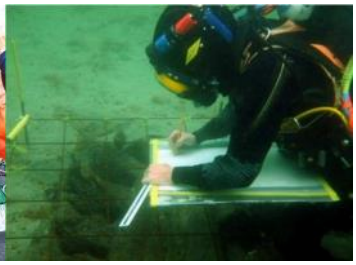
Port of Waterford

Navigation Maintenance Dredging Programme 2026-2033

Underwater Archaeological Impact Assessment



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Underwater Archaeological Impact Assessment

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Abbreviations

ADCO -	Archaeological Diving Company Ltd
DHLGH -	Department of Housing, Local Government and Heritage
E -	Easting
EIAR -	Environmental Impact Assessment Report
EIS -	Environmental Impact Statement
ITM -	Irish Transverse Mercator
N -	Northing
NGR -	National Grid Reference
NIAH -	National Inventory of Architectural Heritage
OD -	Ordnance Datum
RMP -	Record of Monuments and Places
SMR -	Sites and Monuments Record
UAIA -	Underwater Archaeological Impact Assessment
WwTP -	Waste water Treatment Plant

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Executive Summary

Subject: Maintenance Dredging Programme 2023
Location: Port Waterford
ITM: various
Licences: n/a
Planning ref: pre-planning

Introduction

An Underwater Archaeological Impact Assessment (UAIA) was carried out by the Archaeological Diving Company Ltd (ADCO), for Malone O'Regan, Consulting Engineers, on behalf of the Port of Waterford, to inform the Navigation Maintenance Dredging Programme 2026-2033.

A series of sixteen locations are regularly dredged by the Port of Waterford to maintain the ruling depth of the approach channel and quaysides, between Waterford city upstream and Creadan Bank in Waterford Harbour. The proposed marine disposal area is also considered.

The UAIA is based on a desktop assessment of the dredge areas and the marine disposal area, informed by known archaeological sites and existing archaeological intervention reports.

Receiving environment

The estuarine areas of the River Suir and Waterford Harbour retain a series of known archaeological sites and a series of unregistered sites that are recorded on the historic Ordnance Survey maps. The sites for the most part include shipwrecks, historic quaysides and historic fish traps.

Maintenance Dredging programme

The archaeological risk is assessed for each of the maintenance dredging locations.

Impact assessment

There are no known archaeological assets within the proposed dredge footprints of any of the maintenance dredging locations.

Three dredging/loading locations are proposed to be extended in area: at DA-6, O'Brien's Quay; DA-9, Cheekpoint Lower, and DA10, Cheekpoint Harbour Access.

Recommendations

It is recommended that annual high resolution multibeam survey data acquired on DA-15, Duncannon Channel is reviewed archaeologically by a marine archaeologist experienced in marine dredging projects, to monitor the effectiveness of the Archaeological Exclusion Zones established at both the Duncannon Wreck (W18543)

and Duncannon 2 (W11617) in maintaining the protective covering sands over both sites, and to advise ameliorative measures where necessary.

Where the existing dredge footprints are to be maintained, the need for archaeological monitoring on site is not required. An exception to this is at DA-15, Duncannon Channel in the vicinity of W18543 and W11617 if the bathymetry surveys reveal exposure of elements of the buried sites.

A protocol should be prepared and in place to report any discoveries that might occur in the course of maintenance dredging. The protocol would be prepared by a marine archaeologist experienced in marine dredging projects and would conform to the guidelines and requirements of the National Monuments Service and the National Museum of Ireland for the recording of and reporting of archaeological finds found in the course of construction works.

Where the dredge footprint is to be enlarged at DA-6, O'Brien's Quay and DA-9, Cheekpoint Lower, it is recommended that archaeological monitoring licensed by the Department of Housing, Local Government and Heritage is carried out where the use of TSHD and/or mechanical dredging is to be conducted. The archaeological monitoring will take place during Year 1 of the maintenance dredging programme or when the enlargement works will take place. The archaeological monitoring will establish a baseline information. The requirement for further archaeological monitoring in future dredging seasons will be reviewed on foot of the observations and findings from Year 1 activity.

The maintenance dredge footprint at DA-10 includes the pier head. Impacts and undermining of the pier head should be avoided during dredging operations. .

It is recommended that the requirement for archaeological monitoring on DA-15, Duncannon Channel is kept under constant review and will be activated if it is believed that additional monitoring is needed in the vicinity of W18543, Duncannon Wreck and W11617, Duncannon 2.

A series of archaeological management recommendations are included.

Recommendations are subject to the approval of the National Monuments Service at the Department of Housing, Local Government and Heritage.

1.0 Introduction

The Archaeological Diving Company Ltd (ADCO) has carried out an Underwater Archaeological Impact Assessment (UAIA) for Malone O'Regan, Consulting Engineers, on behalf of the Port of Waterford, to inform the Navigation Maintenance Dredging Programme 2026-2033.

Sixteen locations are regularly dredged by the Port of Waterford to maintain the ruling depth of the approach channel and quaysides, between Waterford city upstream and Creadan Bank in Waterford Harbour (Figure 1).

The UAIA is based on a desktop assessment of the dredge areas, informed by known archaeological sites and reports on existing archaeological interventions.

2.0 Receiving environment, overview

The estuarine areas of the River Suir and Waterford Harbour retain a series of known archaeological sites and a series of unregistered sites that are recorded on the historic Ordnance Survey maps. For the most part, the sites include shipwrecks, historic quaysides and historic fish traps.

The known shipwreck sites are presented in Table 1, and illustrated across Figures 5–11. There are 28 known wreck sites in the sea area extending from Waterford City south through Waterford Harbour to the existing licensed marine disposal area some 4km south of Dunmore East. The majority of the known sites are not close to any of the maintenance dredging locations, and none of the sites lie within any dredge area. The wreck site of principal interest lies on Duncannon Bar, next to the Duncannon Channel maintenance dredging area (DA-15). The Duncannon Wreck (W18543) was identified during archaeological monitoring of dredging in 2002. It remains on the seabed on the edge of the navigation channel. It is a significant timber vessel armed with a line of iron cannon and it remains largely intact below decks if buried. It is considered to date to the seventeenth century. The National Monuments Service believes there is the remains of a second wreck (W11617, Duncannon 2) to the north of the Duncannon Wreck and suggests Duncannon 2 may be somewhat earlier in date. Both sites are protected from dredging impacts by the existence of an Archaeological Exclusion Zone, within which it is not permitted to conduct any dredging without the express permission of the National Monuments Service, and subject to the requirements of the National Monuments Service.

Three other known wreck sites lie adjacent to the maintenance dredging locations: at Waterford City, an unknown vessel referred to as W10645 is located at Ferrybank just upstream of Frank Cassin Wharf; at Little Island, another unknown vessel (W11329) is located within the main channel downstream; and at Cheekpoint, W11328 is an unknown wreck located at the confluence of the Barrow and the Suir.

Reference	Name	Date of Loss	DD Lat	DD Long	Within Maintenance Dredge area
W10615	Unknown	Unknown	52.263880	-7.106380	×
W10616	Unknown	Unknown	52.261030	-7.100320	
W04951; GSI298	SS *Harvard*	07/04/1870	52.259600	-7.100330	×
W10614	Unknown	Unknown	52.259170	-7.098170	×
W10613	Unknown	Unknown	52.250970	-7.063620	×
W10612	Unknown	Unknown	52.248350	-7.061830	×
W10611	Unknown	Unknown	52.245790	-7.052330	×
W11336	Unknown	Unknown	52.252560	-7.041080	×
W11329	Unknown	Unknown	52.256470	-7.036340	×
W11335	Unknown	Unknown	52.297430	-7.005780	×
W11328	Unknown	Unknown	52.276950	-7.001090	×
W10664	Unknown	Unknown	52.222220	-6.937220	×
W18543	Duncannon Wreck	Unknown	52.192920	-6.940330	×
W11617	Duncannon 2	Unknown	52.193800	-6.939760	×
W10664	Unknown	Unknown	52.222220	-6.937220	×
W18578	Unknown	Unknown	52.177800	-6.969170	×
W30675	SS *Harmione*	14/04/1917	52.158890	-6.952780	×
W099451	SS *Patrick*	Unknown	52.150000	-6.916670	×
W05520	UC-44	04/08/1917	52.150000	-6.983330	×
W05520	UC-44	04/08/1917	52.150000	-6.983330	×
W09580	*Dark Island*	23/03/1987	52.148880	-6.989450	×
W09762	*Jack Buchan*	11/02/1958	52.133330	-6.933330	×
W09762	*Jack Buchan*	11/02/1958	52.133330	-6.933330	×
W09569	*Croghan*	19/03/1973	52.129720	-6.936580	×
W05149	*Royal Arthur*	22/04/1871	52.126670	-6.93000	×
W04334	*St Margaret*	07/12/1919	52.121940	-6.931940	×
W04931	*George Milburn*	12/07/1917	52.124000	-6.980700	×
W10075	*Sustain*	01/08/1975	52.129170	-7.025000	×

Table 1: Known shipwreck locations in the River Suir and Waterford Harbour.

Source: Historic Shipwreck Inventory, Wreck viewer download 28/07/2023.

There are many recorded archaeological sites and sites of architectural heritage interest along the shorelines either side of the maintenance dredging locations but none of these sites intrude on to the dredge footprints. The sites, as recorded in the Register of Monuments and Places (RMP) and the National Inventory of Architectural Heritage (NIAH), help to frame the wider landscape context of what is a rich cultural heritage area that is associated with the development of Waterford Harbour as one of the principal navigable estuaries in Ireland and the principal such location in the southeast. The sites will be considered where relevant as the report comments on each dredge location.

The same approach is taken when considering the unregistered sites that lie on the foreshore areas next to the dredge locations. The foreshore remains a largely unrecorded zone in the archaeological record. However, the historic Ordnance Survey maps are useful in establishing a baseline of potential information because the mapping, which commenced in the mid-1800s, recorded piers and quays as well as fish traps where they existed. This record can be complemented by the results of licensed archaeological interventions where they have taken place and reports submitted to the National Monuments Service.

3.0 Impact Assessment, Dredge Areas (DA) 1–3, Waterford City

3.1 Location

There are three maintenance dredge locations in the River Suir in Waterford City (Figures 5–6):

- DA-1, Frank Cassin Wharf, off the north bank
- DA-2, North Wharf, off the north bank
- DA-3, Forde Wharf & Merchant's Quay Marina, off the south bank

The dredging is along the footprint of existing berthing pockets.

At low water, the sand flats that naturally accumulate in these locations are evident.

3.2 Archaeological environment

DA-1, the Frank Cassin Wharf location was open water when the Ordnance Survey (OS) recorded its First Edition 6-inch map in 1823, with fields backing away from the shoreline (Figure 6). The old shoreline was subsequently absorbed as part of the Fishguard and Rosslare Railway line by 1906, with mud flats on the shoreline extending into the river channel. A small pier was located at the head of Pierhead Road, on the upstream side, and a Ferry Slip was recorded on the downstream side. The pier and slipway were recorded again on the Third Edition OS map (*c.* 1930s), where the pier had been developed as a floating wharf. A shipwreck of unknown name and date of loss is located immediately upstream of the wharf against the shore, W10615, some 16 m outside DA-1.

In constructing Frank Cassin Wharf, the entire area was reclaimed and the new wharf reached into the channel.

Archaeological underwater assessment has taken place of the foreshore at Ferrybank, immediately downstream of Frank Cassin Wharf.[1] Modern rock-armour defines much of the foreshore area assessed at Ferrybank, behind which lies made-ground. Frequent industrial period items were observed, protruding from the rock armour, many of which appear to be associated with the historic railway line. Two features of archaeological interest were recorded, comprising a wrought-iron Mooring Ring/Bollard of nineteenth-century date, and a cast-iron Mooring Bollard of twentieth-century date (Figure 6, ADCO 22D0025-F2). These quayside fixtures/fittings appear to be *in situ*, indicating that an associated nineteenth century quay wall may remain sub-surface, associated with the former 'Ferry Slip'. A third feature of interest (Figure 6, ADCO 22D0025-F3) lies *c.* 260 m further downstream and is the remains of a nineteenth-century masonry quay, which extends for approximately 40 m and retains a clearly defined terminus and corresponds to a quay depicted on the OS 25-inch edition map.

[1] Rex Bangerter and Matthew Conway, 'Underwater archaeological impact assessment, proposed outfall, River Suir, Abbeylands, Co. Waterford. 23D0035, 23R0135', report of the Archaeological Diving Company Ltd for Irish Water, 2023.

There are no recorded archaeological sites or buildings of recorded architectural heritage at the Frank Cassin Wharf today.

DA-2, the North Wharf, as recorded on the First Edition OS 6-inch map (1823), accommodated a dock yard and retained a substantial patent slip (Figure 5). With the development of the rail head in later decades, the dock yard was replaced with railway sidings, a goods shed was built upstream and the North Wharf was constructed, formalising the shoreline. Underwater archaeological assessment of the river channel has taken place to inform the proposed footbridge scheme as part of the North Quays Redevelopment project.[2] The assessment confirmed that sections of historic quay and associated timber wharfing depicted on the OS 25-inch map remain *in situ* beneath the concrete quay that currently delineates the north side of the river channel at this location. Features are located 8.5 m and 6.7 m outside DA-2 (Figure 5 ADCO 17D0025-F1/F2). There are no recorded archaeological sites or buildings of recorded architectural heritage at the North Wharf today.

DA-3, the medieval quayside of Waterford was located on the south side of the channel downstream of Merchant's Quay, between Barronstrand Street and Henrietta Street, on the site of Coal Quay, Custom House Quay and the Parade.[3] The medieval quays were stone-built and by the 1680s there were already references to a series of wharves (referred to as 'peers') that reached into the deeper channel away from the mud flats, which were building up on the quayside.[4] In terms of the present-day landscape, the medieval quayside and its wharves lie more than 27 m inland from the current waterfront, which has extended north over time by way of progressive reclamation.

A map of the city in 1764 records Black Peg's Slip upstream of the medieval quayside, at the east end of what is now Merchant's Quay. The OS First Edition 6-inch series map (1823) recorded further development of the quays. Black Peg's Slip is not shown but Merchant's Quay is recorded, and a small indentation along its length served as a graving bank for boat repair (Figure 5). The Butter Market was located on Merchant's Quay, and a small series of short T-shaped wharves reaching into the channel below the Low Water Mark were also recorded. The numbers of such wharves multiplied by 1911 and the numbers reduced by the 1930s. Since the second half of the twentieth century, there has been progressive reclamation out into the channel and today many of the old wharves are subsumed under Ford Wharf and Merchant's Quay, with new floating pontoons extending further north again.

[2] Rex Bangerter, 'Underwater Archaeological Impact Assessment, Waterford City North Quay Footbridge, River Suir, Waterford City. 17D0025, 17R0044', report of the Archaeological Diving Company Ltd for IAC Ltd, 2018.
[3] John Bradley and Andrew Halpin, 'The topographical development of Scandinavian and Anglo-Norman Waterford', in W. Nolan and R. Thomas Power (eds), *Waterford History and Society* (Dublin 1992), pp 105-130, at p. 116.
[4] John Bradley, Andrew Halpin and Heather King, 'Waterford City', unpublished archival study of the Urban Archaeology Survey for the National Monuments Service (no date).

Since 2000, archaeological assessment and recording of the older quaysides has taken place to inform infill reclamation along the quayside.[5] It has presented the opportunity to record the stonework of the older quaysides along with repair works, and to note the moorings and chain lengths that lay on the sand flats.

Underwater archaeological assessment of the river channel to inform the proposed footbridge scheme as part of the North Quays Redevelopment project observed the presence of wreck-related material some 50 m downstream of DA-3, comprising two planking timbers and part of a rigging-block from a sailing vessel (Figure 5 ADCO 17D0025-F3).[6]

There are no recorded archaeological sites or buildings of recorded architectural heritage at Ford Wharf & Merchant's Quay Marina today.

3.3 Impact assessment

The maintenance dredging will be conducted to maintain the existing berthing pockets at all three sites in Waterford City.

The dredging will be achieved using a plough dredge

While the dredging may encounter flotsam and wash-in of material from further upstream, there is no record of archaeological sites or features at any of the three sites.

3.4 Mitigation

Assuming the dredge footprints remain as they are proposed at present both in terms of a real extent and depth, it is not anticipated that the dredging will expose new archaeological material.

A protocol should however be in place to report any discoveries that might occur in the course of such work.

The need for additional archaeological inputs during dredging should not be required.

4.0 Impact Assessment, Dredge Areas 4–8, Belview

4.1 Location

The maintenance dredging will take place in five locations at Belview (Figures 7–8):

- DA-4, Belview Berths, along the north quay
- DA-5, Belview Turning Area, in central channel
- DA-6, O'Brien's Quay, along the north quay
- DA-7, Belview to O'Brien's Quay, along the north quay

[5] Niall Brady, 'Archaeological intertidal assessment, Merchant's Quay, Waterford. 00D0067', report of the Archaeological Diving Company Ltd for the Port of Waterford, 2006; David McCullough, 'Archaeological assessment of the quay wall and adjacent seabed deposits, Merchant's Quay, Waterford. 02E0539', report of the Archaeological Diving Company Ltd for the Port of Waterford, 2005.
[6] Bangerter, 'Underwater Archaeological Impact Assessment. 17D0025, 17R0044'.

- DA-8, Split Light and Queen's Channel, in central channel

4.2 Archaeological environment

DA-4, Belview Berths was open water when recorded by the OS First Edition map in 1823, with green fields and a tree-lined shoreline back on to land (Figure 8). A salmon weir was recorded at the most upstream part of what is now the berths, some 61m m outside DA-4. A laneway reached the shore at Glass House. Later editions of the historic OS maps do not record the salmon weir but otherwise show similar detail and add a short quay reaching into the river channel from the laneway. The later maps also indicate the shingle nature of the shoreline. By 1995, when the first series of ortho images are available for the OS, the development of the Belview berths was well underway, and reclamation of the seabed upstream of Glass House had occurred. By 2000, the berths had been extended further downstream and reached their current length by 2012. There are no recorded archaeological sites or buildings of recorded architectural heritage at Belview Berths today.

DA-5, Belview Turning Circle, is located in mid-channel in front of DA-4. The historic OS mapping does not record any feature within the central area of the river channel at this location. There are no recorded archaeological sites or features at the Belview Turning Circle today.

DA-6, O'Brien's Quay is located along the north quay and was open water when recorded by the OS First Edition map in 1823, with green fields backing on to land (Figure 8). Later editions of the historic OS maps show similar detail and add the shingle nature of the shoreline. By 1995, O'Brien's Quay was already being constructed and reached its current state by 2000. There are no recorded archaeological sites or buildings of recorded architectural heritage at O'Brien's Quay today.

DA-7, Belview to O'Brien's Quay retained a boat house as recorded on the OS First Edition map in 1823, some 51 m outside DA-7. The proximity of the boat house to Belview House suggests it served the house. (Figure 8). By 1911, a small quay is recorded on the channel side of the boat house. However, by 1995 there is no clear record of the boat house and the foreshore was being slowly reclaimed for port use. Between 1996 and 2005, a fixed floating jetty is recorded, with a walkway or gangway access to the shore, but the jetty and its shore access is removed by 2006. There are no recorded archaeological sites or buildings of recorded architectural heritage in the location between Belview Berths and O'Brien's Quay today.

DA-8, Split Light and Queen's Channel is located within the main channel of the River Suir off the downstream end of Little Island (Figure 7). Little Island retains one archaeological site, the location of a castle (WA010-008) on its western end, whose origins lie certainly in the seventeenth century and whose fabric is incorporated into Waterford Castle, itself a site of architectural heritage interest (NIAH 22001002). There is no indication of recorded archaeological remains within the wider curtilage of Little Island, and there is no indication of features of interest on the 1823 OS map at the location of DA-8. However, later editions of the historic OS maps record the Guide Bank breakwater and Lighthouse that extend off the tail of

Little Island, as well as a pier extending into the main channel from the south bank a little further downstream in Faithlegg. There is also an array of sea walling and embankments along the shores of Little Island and Faithlegg that speak to the challenges of maintaining coastal defence along the King's Channel, which runs south of Little Island. None of these features are recorded archaeological sites, but they do retain cultural heritage interest and should be considered to inform the archaeological risk of the location. In addition, there are a series of known shipwreck sites recorded off Little Island (Figure 1, Table 1). There is no information posted online concerning wreck W11329, but it is located 90m downstream of the eastern limit of DA-8. The charted locations of historic wrecks should be regarded as approximate where supporting information does not exist. This leaves open the possibility that the actual location could be refined by new data sets and survey.

4.3 Impact assessment

The maintenance dredging will be conducted to maintain the existing berthing pockets in Belview and to maintain the approach channel at DA-8.

The dredging will employ a combination of Trailer Suction Hopper Dredging (TSHD) supported by plough dredging to assist in bed levelling.

Mechanical dredging is also proposed to support the work at DA-4, DA-6 and DA-7. This would be deployed using a grab or backhoe and would be used to address material that is not accessible to either the TSHD or the plough dredger.

The maintenance dredging proposed at DA-4, DA-5, DA-7 and DA-8 will maintain the existing dredge areas.

The dredging proposed at DA-6, O'Brien's Quay, is to extend the dredge footprint upstream, enlarging the footprint from 0.5ha to 0.6ha (Figure 4A).

While the dredging may encounter flotsam and wash-in of material from further upstream, there is no record of archaeological sites or features at any of the five sites. However, caution should be given to assuming the location of W11329 lies outside the footprint of DA-8.

4.4 Mitigation

Assuming the dredge footprints at DA-4, DA-5, DA-7 and DA-8 remain as they are proposed at present both in terms of areal extent and depth, it is not anticipated that the dredging will expose new archaeological material.

A protocol should be in place to report any discoveries that might occur in the course of such work.

The need for additional archaeological inputs during dredging for DA-4, DA-5, DA-7 and DA-8 should not be required.

The enlargement of DA-6, at O'Brien's Quay, from 0.5ha to 0.6ha in size will over-reach the existing maintenance dredging footprint. The dredging will employ a TSHD, mechanical dredging and plough dredging.

Archaeological monitoring may be anticipated during use of TSHD and mechanical dredging, as both methods provide the opportunity to recover material as part of the dredging process. In contrast, archaeological monitoring is not possible when deploying a plough dredge because the risings are not recovered to the surface. Archaeological monitoring is subject to licensing by the Department of Housing, Local Government and Heritage, and will be carried out by experienced licence-eligible maritime archaeologists.

5.0 Impact Assessment, Dredge Areas 9–12, Cheekpoint

5.1 Location

The maintenance dredging will take place in four locations at Cheekpoint (Figure 8):

- DA-9, Cheekpoint Lower, an extended area that crosses the confluence of the River Barrow with the River Suir.
- DA-10, Cheekpoint Harbour Access, close to the south shore.
- DA-11, Great Island Jetty, in the area of the dolphin moorings off the southwest side of Great Island.
- DA-12, Cheekpoint Upper, in the central and northern area of the channel close to the Four Mill.

5.2 Archaeological environment

DA-9, Cheekpoint Lower, is an extended area that includes the navigation channel and also the northern slope, reaching upstream towards Snowhill House. The historic OS mapping does not record any feature within the river channel at this location (Figure 8). There is, however, a small quay associated with Snowhill House on the shoreline that is recorded on the historic OS maps, an associated boat house and the remains of a wooden fish weir. All three features have been inspected during intertidal archaeology surveys conducted in 2002 and 2014 respectively, and none of the three features are recorded on the RMP or NIAH registers (Figure 8, ADCO 14D0044-F1–F3).[7] The feature closest to the DA-9 is the fish weir (ADCO 14D0044-F3), and it lies 56m outside the dredge area boundary. In addition, a medieval pottery vessel was recovered from the river by a local fisherman, some 100 m off Drumdowney Point, at a location that is north of the maintenance dredge footprint. The pot is a Leinster Cooking Ware vessel

[7] John Tierney, 'Belview Port, Co. Kilkenny, Archaeological Report. 01E0276', Eachtra report, 2002; Niall Brady, 'Belview Port, future training wall, archaeological inspection, Drumdowney Upper, Co. Kilkenny. 14D0044' report of the Archaeological Diving Company Ltd for the Port of Waterford, 2015.

and is registered in the National Museum of Ireland's (NMI) collections, NMI 2006:87 (Figure 8, NMI 2006:87).

Two historic wreck sites are recorded north of the dredge footprint; W11328 is an unknown vessel located 61 m north of the dredge footprint, and W11335 is an unknown vessel located off Drumdowney Point (Figure 8, W11328, W11335). No further details are available on either vessel from the online Historic Shipwreck Inventory portal.

A large swathe of the dredge footprint has been subject to multibeam survey, followed by underwater archaeological inspection in 2014.[8] The seabed is covered in soft mud and silt, and the dredged navigation channel slope is clearly discernible. Two target features recorded in the multibeam data were inspected underwater and were reported to be a boulder and a rock with a length of rope attached. No archaeological features were observed underwater within the surveyed area.

Further underwater archaeological survey conducted in 2022 took place within the dredge footprint to inform the Port of Waterford's training wall project at this location.[9] No additional archaeological observations were made. There are no recorded archaeological sites or features at the Cheekpoint Lower dredge area today.

DA-10, Cheekpoint Harbour Access. The historic OS maps record a series of features that constitute the small harbour at Cheekpoint (Figure 8). The First Edition OS 6-inch map shows a short pier and a watch tower overlooking the point at Sheagh Rock, while a salmon weir lay offshore. Later editions show that the pier was extended in length, that a boat house and slip were added to the watch tower complex, and that a breakwater was added to the east of the pier. The salmon weir is no longer recorded. Its position is located 31 m outside the dredge area boundary. Since 2013, a further quay has been added that extends approximately 190 m northeast from the breakwater. The pier and the watch tower are recorded on the NIAH: NIAH 22901008 and NIAH 2290106 respectively. The pier was built in 1884-86 by Thomas Ingham Dixon for the Board of Works. It was extended in 1902 and is associated with the landing of arms in 1921 from the tug, *Frieda*. The watch tower was extant in 1843 but is now ruined and appears to have had a medieval Gothic style in its construction.

The maintenance dredge footprint includes the pier head, impacts and undermining of which should be avoided during dredging operations.

DA-11, the Great Island Jetty is located off the southwest corner of Great Island. Historic OS mapping shows a natural shoreline and the presence of a salmon weir in the mid-1800s (Figure 8). Later editions record the shingle shoreline and do not record the salmon weir. Construction of the jetty is associated with the construction of the Great Island Power Station in 1965, and

[8] Brady, 'Belview Port, future training wall. 14D0044'.
[9] The work was conducted under licences 22D0060 and 22R0206 granted to Matthew Conway of ADCO Ltd. The report remains to be finalised.

the jetty offers deepwater mooring for attendant shipping. There are no recorded archaeological sites or buildings of recorded architectural heritage in the location of the Great Island Jetty today.

DA-12, Cheekpoint Upper extends along the navigation channel between Belview and Snowhill. The First Edition OS 6-inch map records a weir off the north shore in Drumdowney Upper townland in a location that lies close to but 60 m north of the dredge footprint (Figure 8). The weir is not recorded in later editions of the map but survives as a timber construction that is V-shape in plan and measures approximately 30 m in length with a northwest-southeast orientation.[10] The timbers examined were considered to be pine and not of great antiquity. A series of beacons are recorded on the historic 25-inch OS map along the north shore and these would have served as navigation aids. They are not visible today. A little upstream of the fish weir are the remains of a former Flour Mill, at the townland boundary of Drumdowney Upper and Gorteens. The mill is recorded on the First Edition OS map and is referred to as a Corn Mill in later editions. The mill was fed by a mill pond to its northwest. The site is not registered on the RMP or NIAH and is ruinous today. The rail line, now out of use, runs between the mill site and the shore and the development of the port at Belview is evident adjacent to the site. However, a short length of stone-built quay survives on the foreshore. The quay was subject to archaeological intervention in 2002, when two test-pits revealed between two and four further courses of stonework beneath the already visible extents of the quay wall.[11] The quay measures 40 m in length and lies parallel to the river. It is of uneven drystone construction. The north-eastern end of the wall has been covered by artificial infill, while the top of the wall has been repaired with cement. A flight of steps located towards the south-eastern end may or may not be original. The quay was also observed in 2022 and will be recorded more fully for the Port of Waterford.[12]

The south side of the channel leads to a swathe of salt marsh. The construction of two groynes that reach into the channel reflect attempts to stabilise the shoreline.

There are no recorded archaeological sites or buildings of recorded architectural heritage in the location of the Cheekpoint Upper dredge area today.

5.3 Impact assessment

The maintenance dredging will employ a combination of TSHD, mechanical dredging and plough dredging at DA-9, DA-10, DA-11 and DA-12.

The maintenance dredging proposed at DA-9 Cheekpoint Lower and DA-10 will extend the dredge areas from 8.64 ha to 16.53 ha and from 0.8 ha to 2.84 ha respectively (Figure 4B).

While the dredging may encounter flotsam and wash-in of material from upstream, there is no record of archaeological sites or features at any of the four sites.

[10] Tierney, ‘Belview Port, Co. Kilkenny’, site 5.
[11] Tierney, ‘Belview Port, Co. Kilkenny’, site 3.
[12] The new work will be conducted by ADCO and will take place as part of 22D0060 and 22R0206.

5.4 Mitigation

Assuming the dredge footprints at DA-11 and DA-12 remain as they are proposed at present both in terms of areal extent and depth, it is not anticipated that the dredging will expose new archaeological material.

A protocol should be in place to report any discoveries that might occur in the course of such work.

The need for additional archaeological inputs during dredging for DA-11 and DA-12 should not be required.

The enlargement of DA-9 at Cheekpoint Lower and DA-10 at Cheekpoint Harbour Access will over-reach the existing maintenance dredging footprint in both instances. The dredging at DA-9 will employ a TSHD and plough dredging. Archaeological monitoring may be anticipated during use of the TSHD, as the method provides the opportunity to recover material as part of the dredging process. In contrast, archaeological monitoring is not possible when deploying a plough dredge because the risings are not recovered to the surface.

Care will need to be taken at DA-10 to ensure that the dredging does not undermine the pier head, which is a registered site of architectural heritage, NIAH 22901008.

Archaeological monitoring is subject to licensing by the Department of Housing, Local Government and Heritage, and will be carried out by experienced licence-eligible maritime archaeologists.

6.0 Impact Assessment, Dredge area 13–14, Passage East

6.1 Location

The maintenance dredging will take place in two locations at Passage East (Figure 9):

- DA-13, Passage East, Boathouse Quay, just offshore of Passage East Harbour.
- DA-14, Passage East Shoal, extending northeast into the channel from DA-13.

6.2 Archaeological environment

DA-13, the Boathouse Quay dredge area is located immediately offshore of the present-day harbour at Passage East, which is an amalgamation of three historic piers that are each registered in the NIAH: NIAH 22807067, Hackett's Quay; NIAH 22807068 Middle, Quay, and NIAH 22807069, Boathouse Quay. A still further pier is recorded a little to the north on the OS First Edition map as Little Quay or Blind Quay and this survives today albeit in a ruinous condition (Figure 9). The historic maps show the extent of sands within the harbour area, and it is no surprise that, with the exception of Blind Quay, the nineteenth-century structures were extended seawards in 1960, 1935 and 1985 respectively. Today, a piled pontoon is extended out from Boathouse Quay, and Passage East Harbour receives the ferry from Ballyhack. There

are no recorded archaeological sites or buildings of recorded architectural heritage in the location of the Passage East Boathouse Quay dredge area today

DA-14, Passage East Shoal, is a larger dredge area that extends north from DA-13. The historic OS maps do not record features of archaeological interest in the seabed at this location and there is no instance of known shipwreck from here (Figure 9). There are no recorded archaeological sites or buildings of recorded architectural heritage in the location of the Passage East Shoal dredge area today.

6.3 Impact assessment

The maintenance dredging will employ a combination of TSHD, mechanical dredging and plough dredging at both DA-13 and DA-14.

While the dredging may encounter flotsam and wash-in of material from upstream, there is no record of archaeological sites or features at either of the two sites.

6.4 Mitigation

Assuming the dredge footprints at DA-13 and DA-14 remain as they are proposed at present both in terms of areal extent and depth, it is not anticipated that the dredging will expose new archaeological material.

A protocol should be in place to report any discoveries that might occur in the course of such work.

The need for additional archaeological inputs during dredging for DA-11 and DA-12 should not be required.

7.0 Impact Assessment, Dredge areas 15–16, Duncannon Channel and Creadan Bank

7.1 Location

The maintenance dredging will take place in two locations at Passage East:

- DA-15, Duncannon Channel, extended dredge area within approach channel.
- DA-16, Creadan Bank, extended dredge area within approach channel.

7.2 Archaeological Environment

DA-15, Duncannon Channel is dredged regularly within the approach channel to maintain access across Duncannon Bar to Belview Port and other locations upstream. Archaeological inputs to the dredging programme commenced in 1999 with a marine geophysical survey that recorded four magnetic targets at the north end of the Bar and one at its south end (Figure 10).[13]

[13] Donal Boland, 'Geophysical survey of proposed dredging sites in the River Suir and an existing disposal site off Hook Head', report by Management for Archaeology Underwater Ltd, 1999.

Certain monitoring of the dredging campaign was also conducted and the work recovered two ships' timbers. This led to further geophysical survey and a more formal programme of archaeological monitoring of the dredging work in 2000 led by ADCO, which recovered a series of six ships' timbers and one metal piece.[14] An underwater dive inspection of the seabed was also carried out but it did not locate archaeological material. Further archaeological monitoring in 2001 recovered significantly larger numbers of finds, totalling 54 objects.[15] In addition to ships' timbers, a piece of copper sheathing, a millstone, and two lumps of ferrous-metal concretions with three iron cannon balls were recovered, suggesting that the dredging had impacted on a previously unknown shipwreck. ADCO's dive work in 2001 identified the principal source location as an *in situ* ship of timber construction armed with a line of iron cannon. The remains were mapped over an area measuring 33 m in length. The results of the 2001 campaign established an Archaeological Exclusion Zone (AEZ) around the site that has become known as the Duncannon Wreck (W18543). In 2002, ADCO continued with further underwater survey, identifying a larger footprint for the wreck sites that reached *c.* 40 m long and 20 m wide.[16] Three more cannon were recorded, along with hull fragments and a concentration of lead vessels, perhaps the site of the kitchen. It was clear that the wreck lay reasonably intact on the seabed, and on her side. The iron cannon lay in a line along the port side.

A series of further studies of the wreck site have taken place since 2002, with inputs from the National Monuments Service's Underwater Archaeology Unit, and marine geophysical survey by Hydromaster.[17] In addition to the Duncannon Wreck, a second possible wreck site is considered to the north, known as Duncannon 2 (W11617). The Duncannon Wreck appears to date to the seventeenth century, while Duncannon 2 may be somewhat earlier. The presence of such sites calls attention to the high archaeological potential of Duncannon Bar. ADCO completed a further season of archaeological monitoring at the site in 2007.[18] The need to maintain a monitoring programme of the known shipwreck sites and respect for the AEZs as part of the Port of Waterford's operational work is recommended.

[14] Niall Brady, 'Archaeological interpretation of side-scan sonar and magnetometer data from Duncannon Bar, Cos. Waterford/Wexford', Valerie J. Keeley Ltd., 2000; Niall Brady, 'Archaeological monitoring and assessment, Cheekpoint Lower and Duncannon Bar, Waterford Harbour, Cos Waterford and Wexford. 00E0949, 00D0049, 00R091', report of the Archaeological Diving Company Ltd for the Port of Waterford, 2001.
[15] Niall Brady, 'Summary Statement, Waterford Harbour Dredging 2001 Wrecksite Identification. 01E0363', report of the Archaeological Diving Company Ltd. for the Port of Waterford, 2002.
[16] Niall Brady and David McCullough, 'Archaeological Assessment of the Wrecksite on Duncannon Bar, Waterford Harbour, 01E0363', report of the Archaeological Diving Company Ltd. for the Port of Waterford, 2002.
[17] Brian Smith, Marie Talarmin and Connie Kelleher, 'Geophysical survey and archaeological overview report for the Duncannon Shipwrecks and their exclusion zone' Hydromaster for the Port of Waterford, 2016.
[18] David McCullough, 'Archaeological monitoring: Waterford Harbour Maintenance Dredging 2007, Duncannon Bar, Co. Waterford. 01E0363 extension', report of the Archaeological Diving Company Ltd. for the Port of Waterford, 2008.

DA-16, Creadan Bank, lies immediately south of DA-15 and covers an extensive area of seabed within the southern part of Waterford Harbour, south of Creadan Head. There are no known shipwrecks within the dredge area, but several wreck sites are known either side of it, with the steel steamship SS *Hermione* located some distance to the west (Figure 10, W03675). The *Hermione* was lost on 14/04/1917.

7.3 Impact assessment

The maintenance dredging will employ TSHD and plough dredging on DA-15, Duncannon Channel. TSHD and plough dredging will be employed on DA-16, Creadan Bank.

While the dredging may encounter flotsam and wash-in of material from upstream and from tidal flow, there is no record of archaeological sites or features at either of the two sites.

7.4 Mitigation

Assuming the dredge footprints at DA-15 and DA-16 remain as they are proposed at present both in terms of areal extent and depth, it is not anticipated that the dredging will expose new archaeological material.

A protocol should be in place to review archaeologically the annual high resolution multibeam bathymetric surveys of Duncannon Channel, to assess the bed levels and to monitor the effectiveness of the AEZs established at both the Duncannon Wreck (W18543) and Duncannon 2 (W11617) in maintaining the protective covering sands over each site, and to advise ameliorative measures where necessary.

A protocol should be in place to report any discoveries that might occur in the course of the maintenance dredging programme.

Assuming the stability of the AEZs on W18543 and W11617, the need for additional archaeological inputs during dredging for DA-15 should not be required.

The need for additional archaeological inputs during dredging for DA-16 should not be required.

8.0 Impact Assessment, Marine disposal site

8.1 Location

The marine disposal site is located outside the mouth of Waterford Harbour and has been used in this capacity by the Port of Waterford for some time (Figure 11).

8.2 Archaeological environment

There is one known shipwreck site located close to but outside the marine disposal site. The *George Milburn* (W04931) was a mine sweeper that was lost on 12/07/1917.

8.3 Impact assessment

The wreck site lies outside the marine disposal area.

8.4 Mitigation

Care should be taken to ensure that the disposal of silts are retained within the boundary of the marine disposal area and should not be permitted to migrate towards the site of W04931.

9.0 Impact assessment

The navigation maintenance dredging programme 2026-2033 will have no impact with the known cultural heritage assets. The impacts have been assessed in sections 4–8 above and are summarised in Table 2.

Dredge Area	Dredge Area Name	Shipwreck	Quay	Weir	Other
DA-1	Frank Cassin Wharf	×	×	×	×
DA-2	North Wharf	×	×	×	×
DA-3	Forde Wharf & Merchant's Quay	×	×	×	×
DA-4	Belview Berths	×	×	×	×
DA-5	Belview Turing Circles	×	×	×	×
DA-6	O'Brien's Quay	×	×	×	×
DA-7	Belview to O'Brien's Quay	×	×	×	×
DA-8	Split Light and Queen's Chanel	×	×	×	×
DA-9	Cheekpoint Lower	×	×	×	×
DA-10	Cheekpoint Harbour Access	×	×	×	×
DA-11	Great Island Jetty	×	×	×	×
DA-12	Cheekpoint Upper	×	×	×	×
DA-13	Passage East Boathouse Quay	×	×	×	×
DA-14	Passage East Shoal	×	×	×	×
DA-15	Duncannon Channel	×	×	×	×
DA-16	Creadan Bank	×	×	×	×
Disposal Area	Disposal Area	×	×	×	×

Table 2: Summary of impacts on known cultural heritage features within maintenance dredge areas.

Key: ✓ impact; ✗ no impact

10.0 Recommendations

10.1 Pre-dredge recommendations

It is recommended that annual high resolution multibeam bathymetry survey data acquired on Duncannon Channel is reviewed archaeologically by a marine archaeologist experienced in marine dredging projects, to monitor bed levels and the effectiveness of the AEZs established at both the Duncannon Wreck (W18543) and Duncannon 2 (W11617) in maintaining the protective covering sands over both sites, and to advise ameliorative measures where

necessary. The resolution of the survey data should be consistent with identifying small objects on the seabed, as well as mapping bed levels.

10.2 Maintenance dredge phase recommendations

Where the existing dredge footprints are to be maintained, the need for archaeological monitoring on site is not required. An exception to this is at DA-15, Duncannon Channel in the vicinity of W18543 and W11617 if the bathymetry surveys reveal exposure of elements of the buried sites.

A protocol should be prepared and in place to report any discoveries that might occur in the course of maintenance dredging. The protocol would be prepared by a marine archaeologist experienced in marine dredging projects and would conform to the guidelines and requirements of the National Monuments Service and the National Museum of Ireland for the recording of and reporting of archaeological finds found in the course of construction works.

Where the dredge footprint is to be enlarged at DA-6, O'Brien's Quay and DA-9, Cheekpoint Lower, it is recommended that archaeological monitoring licensed by the Department of Housing, Local Government and Heritage is carried out where the use of TSHD and/or mechanical dredging is to be conducted. The archaeological monitoring will take place during Year 1 of the maintenance dredging programme or when the enlargement works will take place. The archaeological monitoring will establish a baseline information. The requirement for further archaeological monitoring in future dredging seasons will be reviewed on foot of the observations and findings from Year 1 activity.

The maintenance dredge footprint at DA-10 includes the pier head. Impacts and undermining of the pier head should be avoided during dredging operations

It is recommended that the requirement for archaeological monitoring on DA-15, Duncannon Channel is kept under constant review and will be activated if it is believed that additional monitoring is needed in the vicinity of W18543, Duncannon Wreck and W11617, Duncannon 2.

In relation to the marine disposal area, care should be taken to ensure that the disposal of dredged silts is retained within the boundaries of the disposal site.

10.3 Archaeological management measures

The project sponsor will appoint an experienced underwater archaeologist to manage and resolve the archaeological requirement.

Archaeological interventions are licensed by the Department of Housing, Local Government and Heritage. The Licence applications take four working weeks to be processed and must be granted before archaeology-related site-work can commence. An excavation licence will be required for the monitoring work. Since 2017, excavation licence applications must be accompanied by a letter from the client on client letterhead that follows a prescribed format. Supporting licence applications will be required: Detection Device and Dive Survey.

THE TIME SCALE works will be made available to the archaeologist, with information on where and when the various elements and ground disturbances will take place.

SUFFICIENT NOTICE. The project sponsor will provide sufficient notice to the archaeologist/s in advance of the pre-construction and construction works commencing. This will allow for prompt arrival on site to undertake additional surveys and to monitor ground disturbances. As often happens, intervals may occur during the construction phase. In this case, it will also be 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, any machine work will 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 will be facilitated. If it is not possible for the construction works to avoid the material, full excavation is recommended. The extent and duration of excavation will be a matter for discussion between the project sponsor and the archaeological licensing 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 will be complimented in the event of a full excavation.

SECURE TEMPORARY SITE OFFICES and facilities will be provided on or near those sites where excavation is required within the site boundary

SECURE WET AND DRY STORAGE for artefacts recovered during the course of the monitoring and related work should be provided on or near those sites within the site boundary where excavation is required.

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

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

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

POST-CONSTRUCTION PROJECT REPORT AND ARCHIVE. It is a condition of archaeological licensing that a detailed project report is lodged with the DHLGH within 12 months of completion of site works. The report will be to publication standard and will include a full account, suitably illustrated, of all archaeological features, finds and stratigraphy, along with a discussion and specialist reports. Artefacts recovered during the works will meet the requirements of the National Museum of Ireland.

PLEASE NOTE: the above observations and conclusions are based on the information supplied for the Port of Waterford's Navigation Maintenance Dredging Programme 2026-2033. Should any alteration occur, further assessment may be required.

Recommendations are subject to the approval of the National Monuments Service at the Department of Housing, Local Government and Heritage.

11.0 References

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Wreck Viewer, https://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=89e50518e5f4437abfa6284ff39fd640

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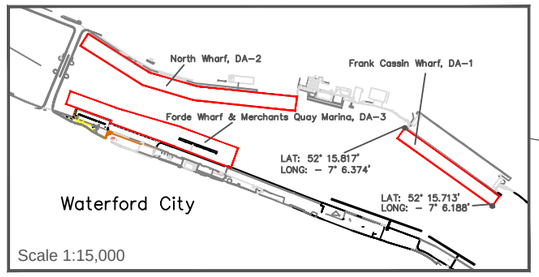
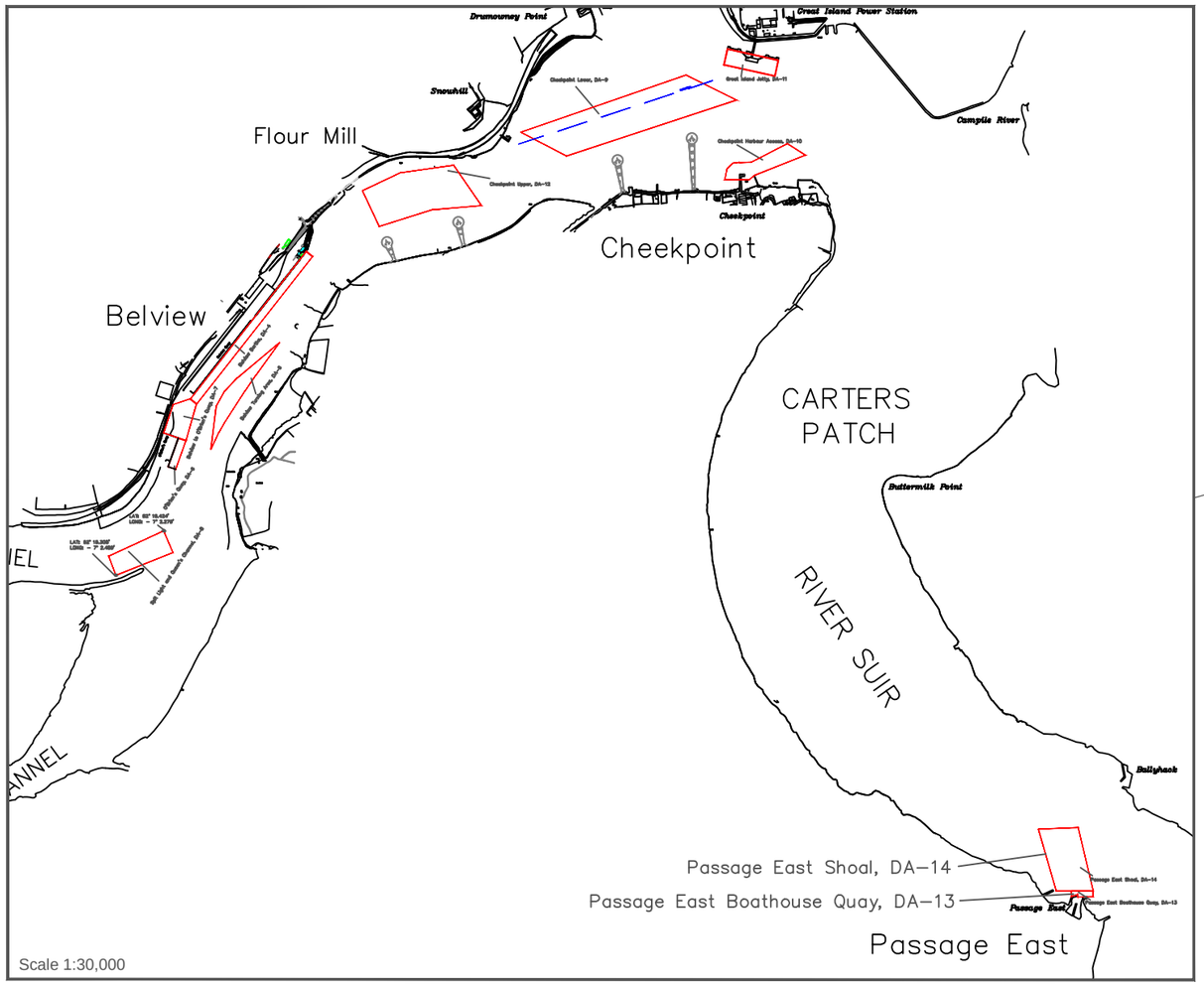
Notes
Source:
Background Map- OS (1:50,000) Discovery Series Mapping- map tiles OS2608 and OS2610.
Dredge Areas- extent taken from Project Drawing Proposed Dredge Areas 636_consultaion_PreApp [Anthony D Bates Partnership LLP].

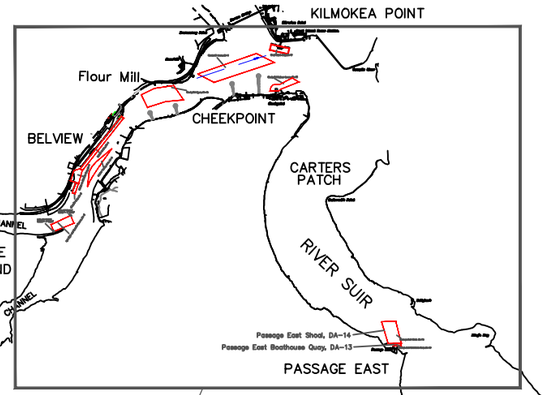
A4

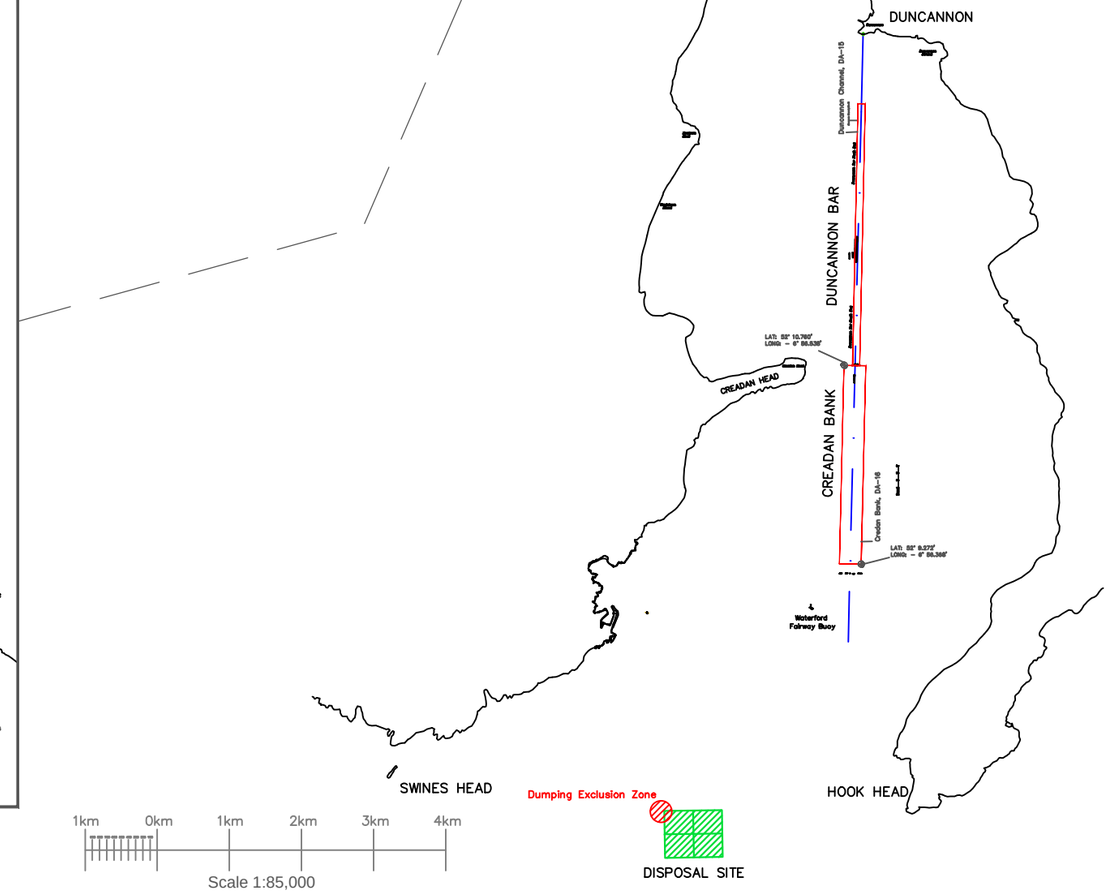
Title
Figure 1- Location of proposed Dredge Areas under consultation as part of the Port of Waterford Maintenance Dredging.

Project	Job/Exc No.	Compiled by	CAD reference	Date	Scale	Drawing No.
Port of Waterford, Navigation Maintenance Dredging Programme 2026-2033.	ADCO20/037	R.Bangerter	Waterford_Dredging	20.19.23	1:50,000	Figure 1









N

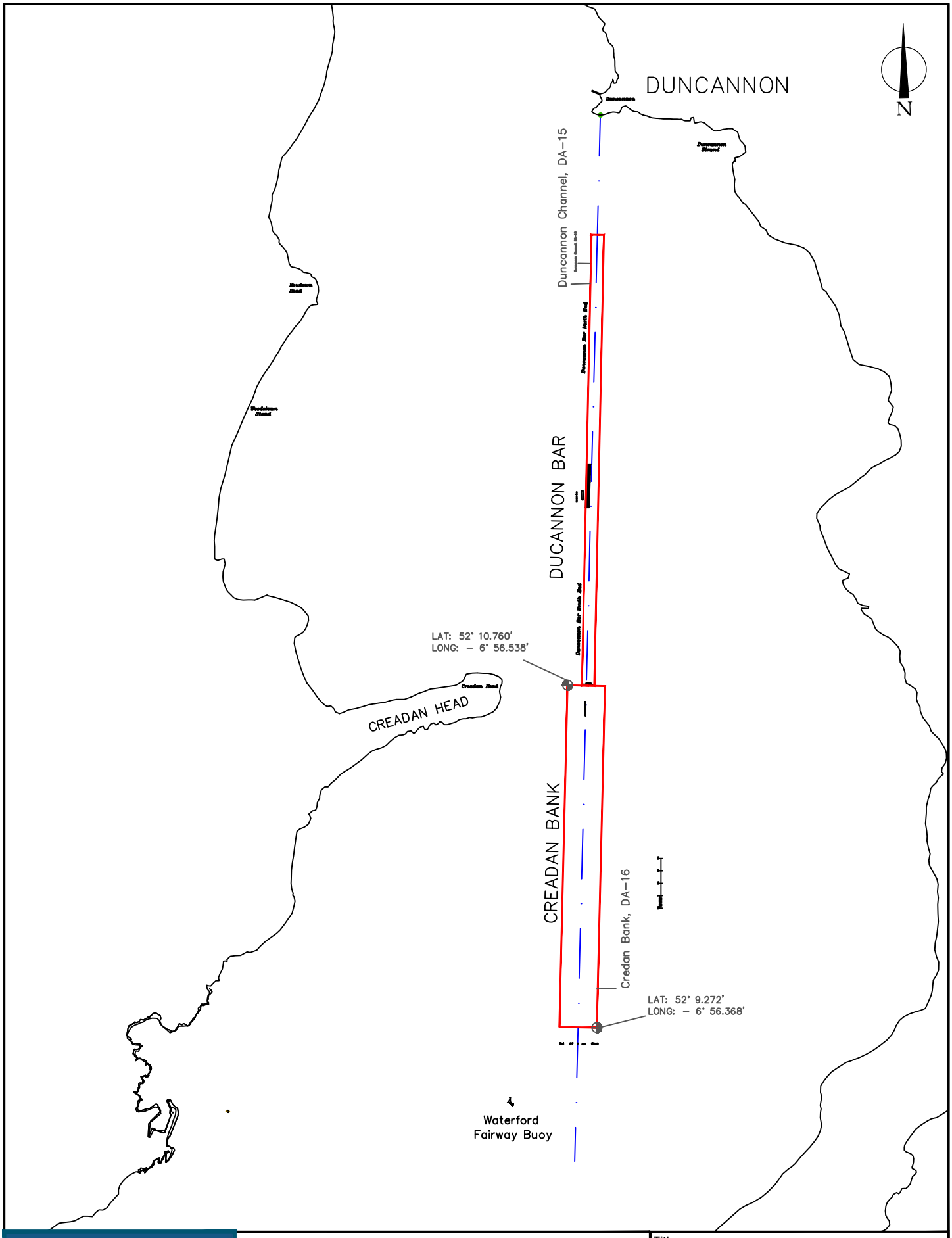
ADCO

Notes
Source: details extracted from Project Drawing supplied by the client [Dredge Area Overview_R2- 636_Consultation_PreApp, September 2022, Anthony D. Bates Partnership LLP].

A3

Job/Exc No. ADCO20/037	**Compiled by** R.Bangerter	**CAD reference** Waterford_Dredgeing	**Client** Malone O'Regan for Port of Waterford.
Date 20.09.23	**Scale** As shown	**Drawing No.** Figure 2	**Project** Port of Waterford, Navigation Maintenance Dredging Programme 2026-2033.

Title
Figure 2- Location and extent of proposed Maintenance Dredging, River Suir and Estuary, Port of Waterford.



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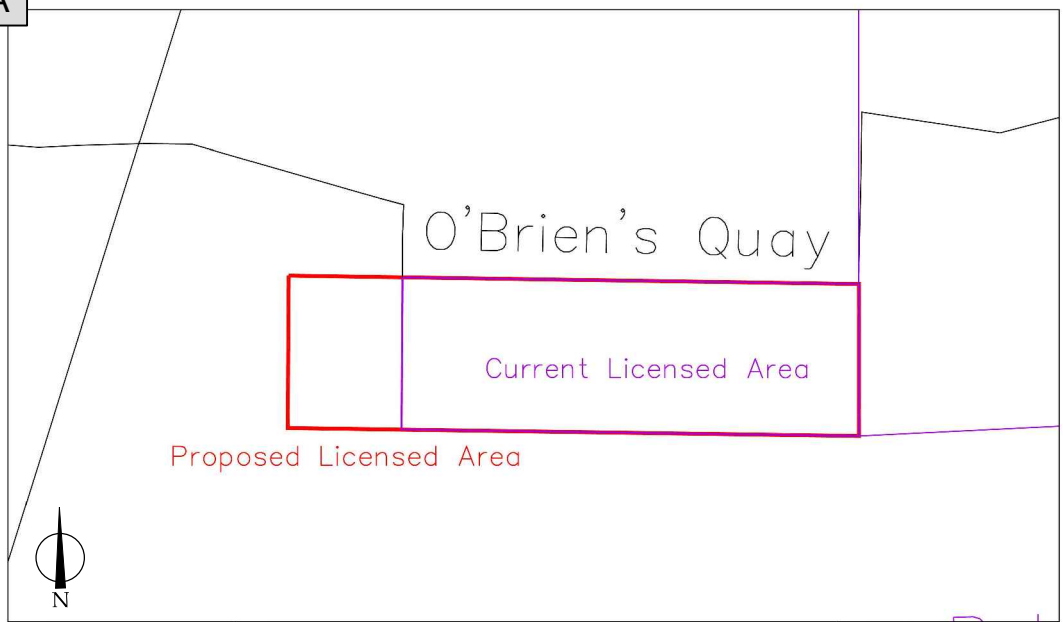
Notes
Source: Figure adapted from Project Drawing supplied by the client [Dredge Area Overview_R2- 636_Consultation_PreApp, September 2022, Anthony D. Bates Partnership LLP].

A4

Title
Figure 3- Location of proposed Dredge Areas at Duncannon Bar and Creadan Bank.

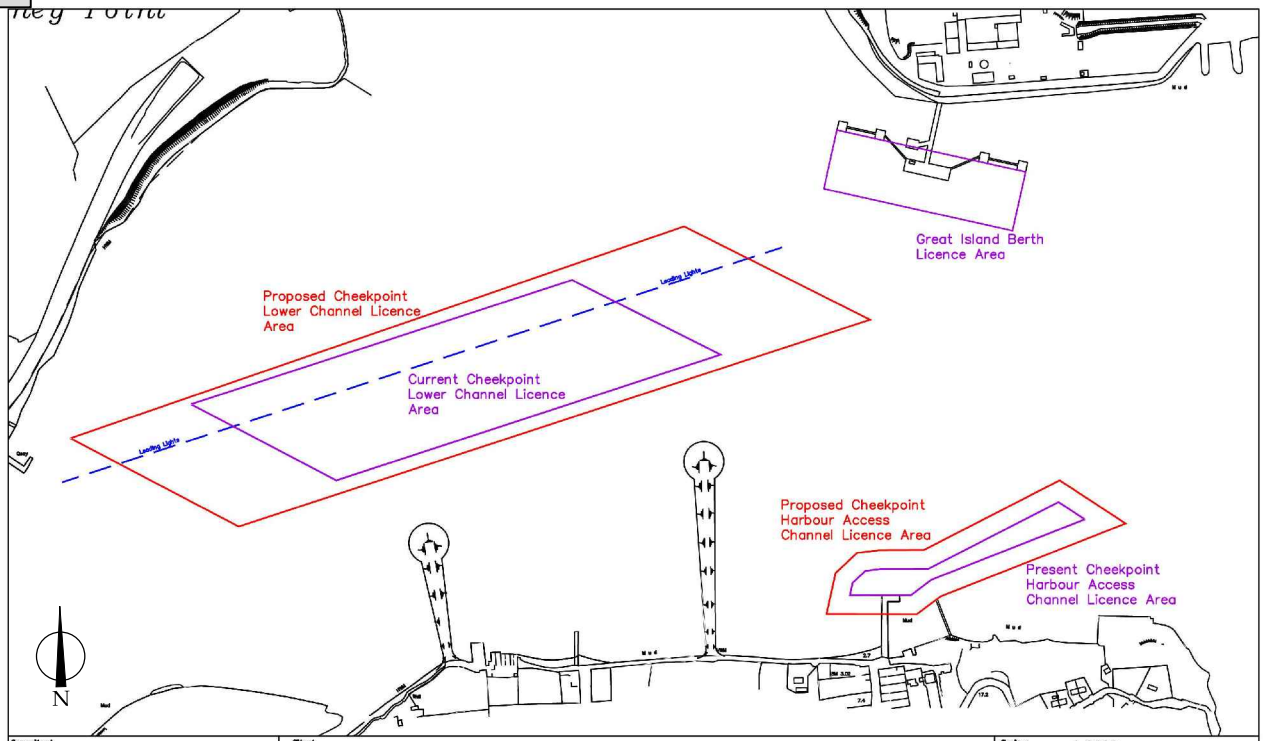
Project	Job/Exc No.	Compiled by	CAD reference	Date	Scale	Drawing No.
Port of Waterford, Navigation Maintenance Dredging Programme 2026-2033.	ADCO20/037	R.Bangerter	Waterford_Dredging	20.19.23	1:40,000	Figure 3

A



Consultant	Client		
Anthony D Bates Partnership LLP Caislean Beag Windsor Ovens, Cork Ireland info@anthonybates.co.uk www.anthonybates.co.uk	PORT OF WATERFORD	Scale :	1:2000
		Dwg Date :	November 2021
		Survey Date	N/A
	Title O'BRIEN'S QUAY AREA FIGURE 2	Drg.No.	453_2021_PLAN_02
		Drawn CMS	Checked MCM

B



Consultant	Client		
Anthony D Bates Partnership LLP Caislean Beag Windsor Ovens, Cork Ireland info@anthonybates.co.uk www.anthonybates.co.uk	PORT OF WATERFORD	Scale :	1:6000
		Dwg Date :	November 2021
		Survey Date	N/A
	Title CHEEKPOINT AREAS FIGURE 1	Drg.No.	453_2021_PLAN_01
		Drawn CMS	Checked MCM

ADCO

Client
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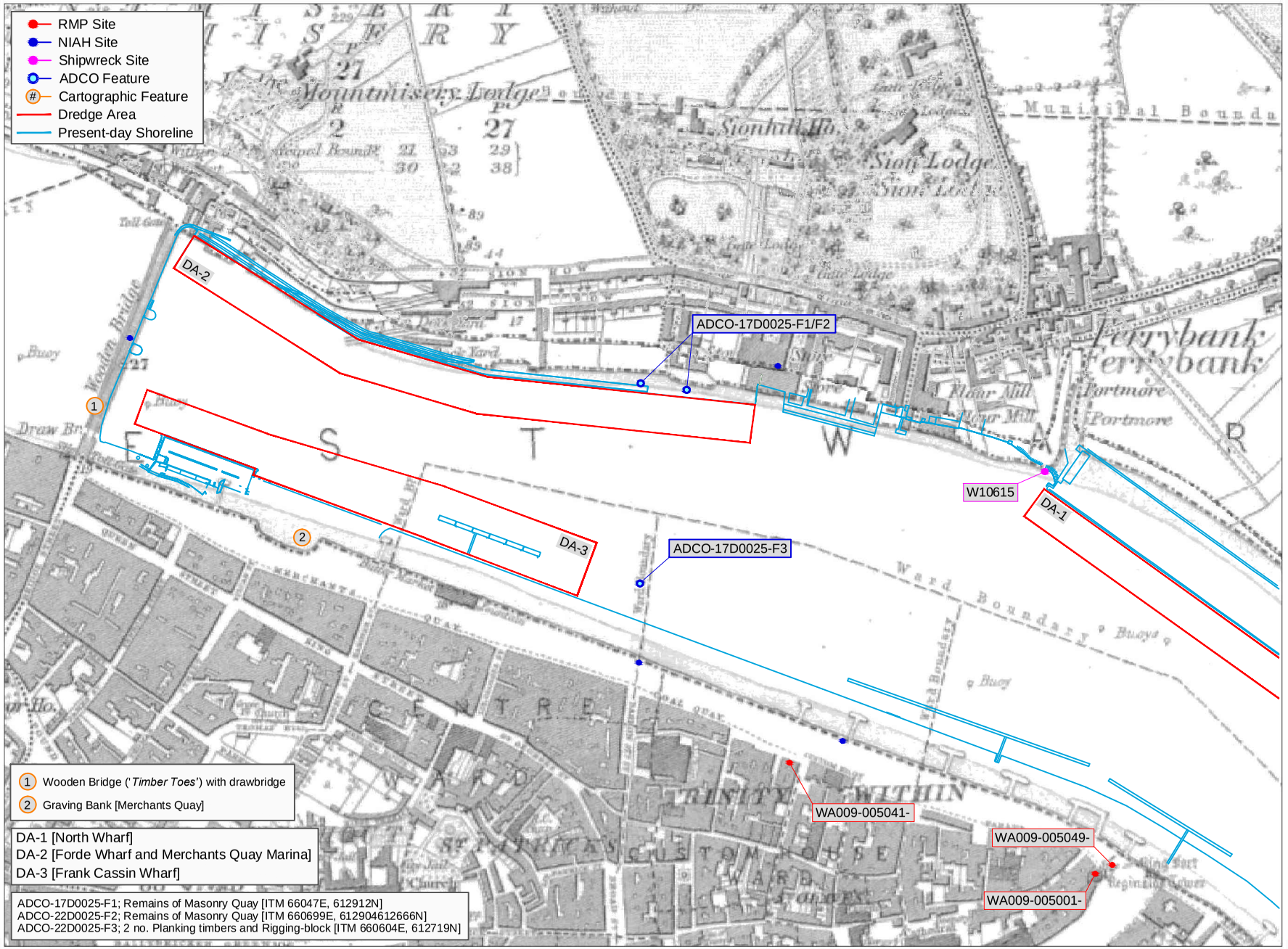
Notes
Source:
[A] Project Drawing- Cheekpoint Areas 453_2021_Plan_01
[B] Project Drawing- O'Brien's Quay Area 453_2021_Plan_02

A4

Title
Figure 4- Location of extended ploughing areas at [A] O'Brien's Quay and [B] Cheekpoint.

Project	Job/Exc No.	Compiled by	CAD reference	Date	Scale	Drawing No.
Port of Waterford, Navigation Maintenance Dredging Programme 2026-2033.	ADCO20/037	R.Bangerter	Waterford_Dredging	20.19.23	1:2000/ 1:10,000	Figure 4



ITM CENTRE PT. COORDS.

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DESCRIPTION

MAP SHEETS

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Authorised Internet Map

0m 50m 100m

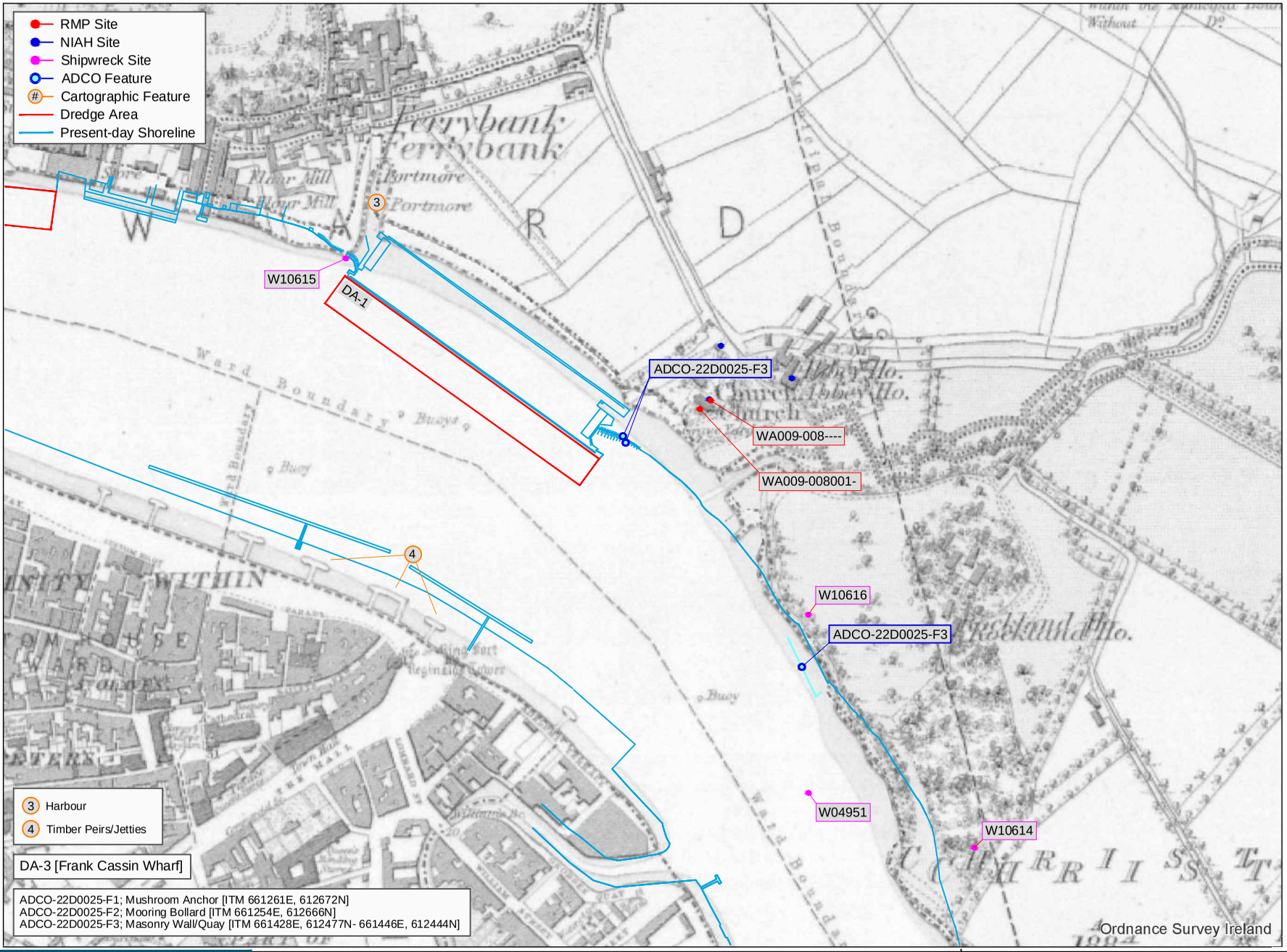
ADCO

Notes
Map Source: Historic Map Archive, Tailte Eireann (formerly OSi).

A4

Job/Exc No.	Compiled by	CAD reference	Client
ADCO20/037	R.Bangerter	Waterford_Dredging	Malone O'Regan for Port of Waterford
Date	**Scale**	**Drawing No.**	**Project**
28.09.2023	1:5000	Figure 5	Port of Waterford, Navigation Maintenance Dredging Programme 2026-2033.

Title
Figure 5- Extract from OS First Edition (1842) map with location of Dredge Areas DA-2/DA-3 (North Wharf/Forde Wharf) and nearby Cultural Heritage Assets superimposed.



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0m 50m 100m

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Notes
Map Source: Historic Map Archive, Tailte Eireann (formerly OSi).

A4

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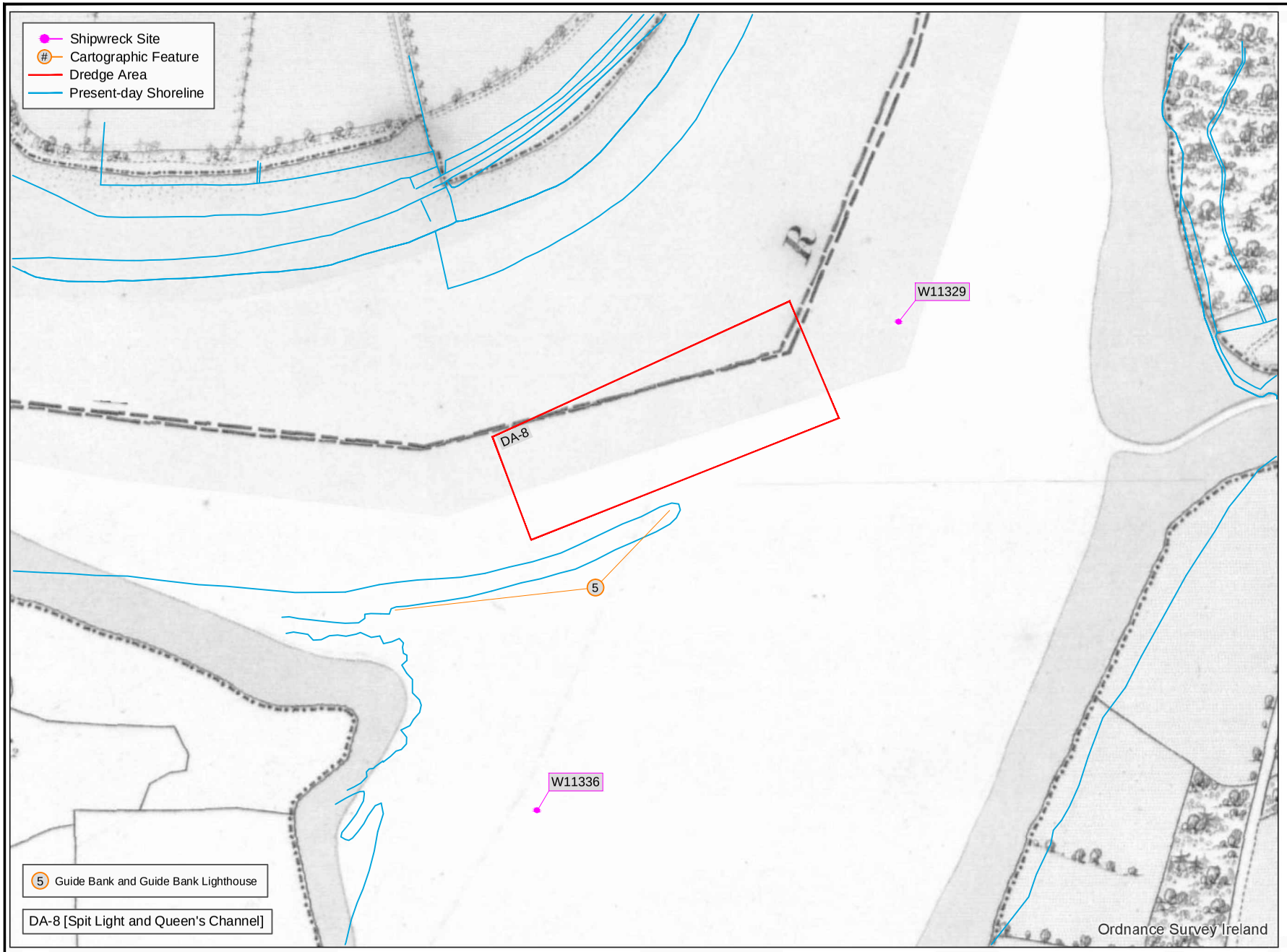
ADCO20/037	R.Bangerter	Waterford_Dredging	Malone O'Regan for Port of Waterford
Date	**Scale**	**Drawing No.**	**Project**
28.09.2023	1:5000	Figure 6	Port of Waterford, Navigation Maintenance Dredging Programme 2026-2033.

Title
Figure 6- Extract from OS First Edition (1842) map with location of Dredge Area DA-1 (Frank Cassin Wharf) and nearby Cultural Heritage Assets superimposed.



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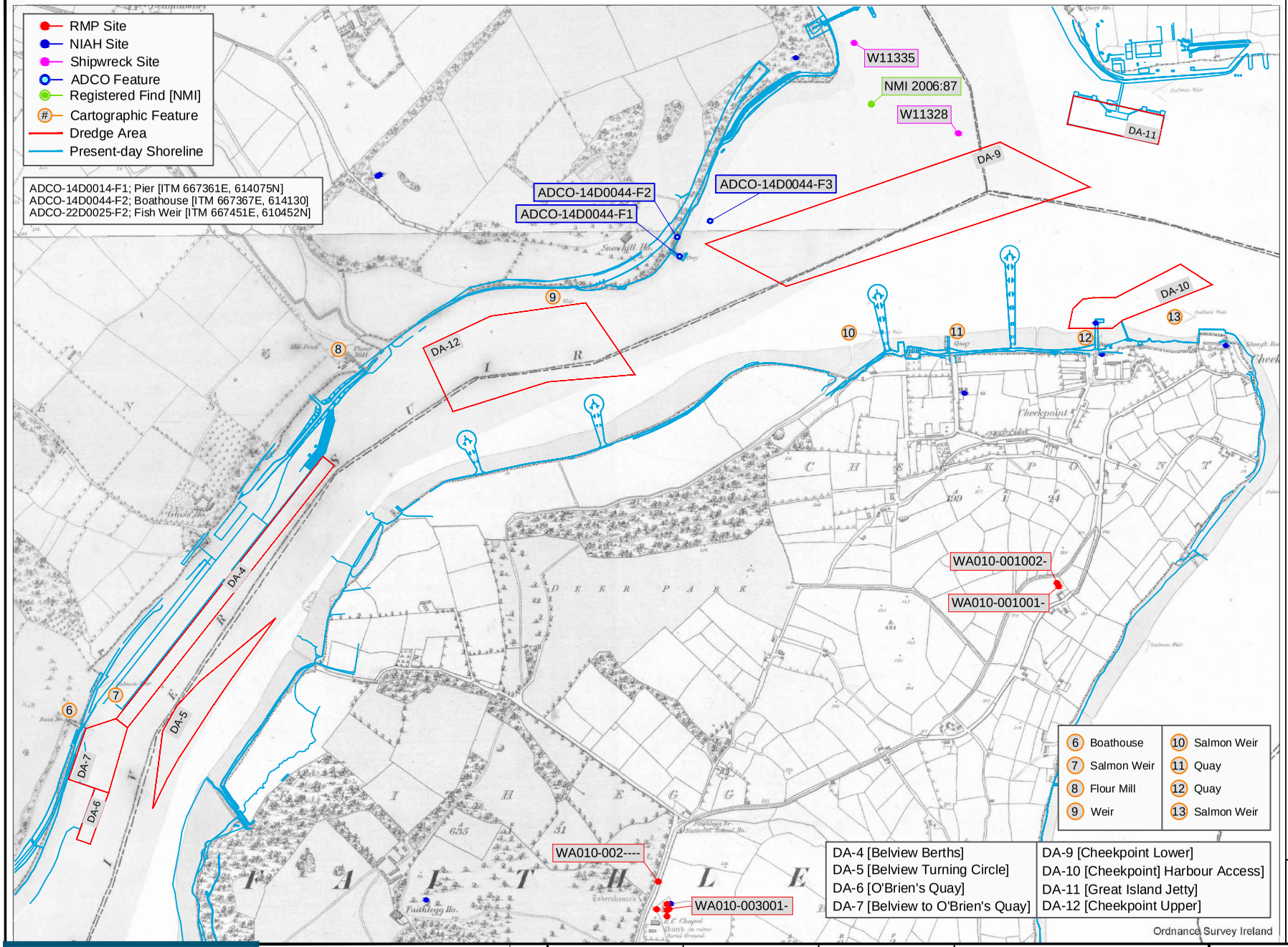
Notes
Map Source: Historic Map Archive, Tailte Eireann (formerly OSi).

A4

Job/Exc No.	Compiled by	CAD reference	Client
ADCO20/037	R.Bangerter	Waterford_Dredging	Malone O'Regan for Port of Waterford
Date	**Scale**	**Drawing No.**	**Project**
28.09.2023	1:5000	Figure 7	Port of Waterford, Navigation Maintenance Dredging Programme 2026-2033.

Title
Figure 7- Extract from OS First Edition (1842) map with location of Dredge Area DA-8 (Spit Lighthouse/Queen's Channel) and nearby Cultural Heritage Assets superimposed.



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50359400_1

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0m 100m 200m 300m

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Notes
Map Source: Historic Map Archive, Tailte Eireann (formerly OSi).

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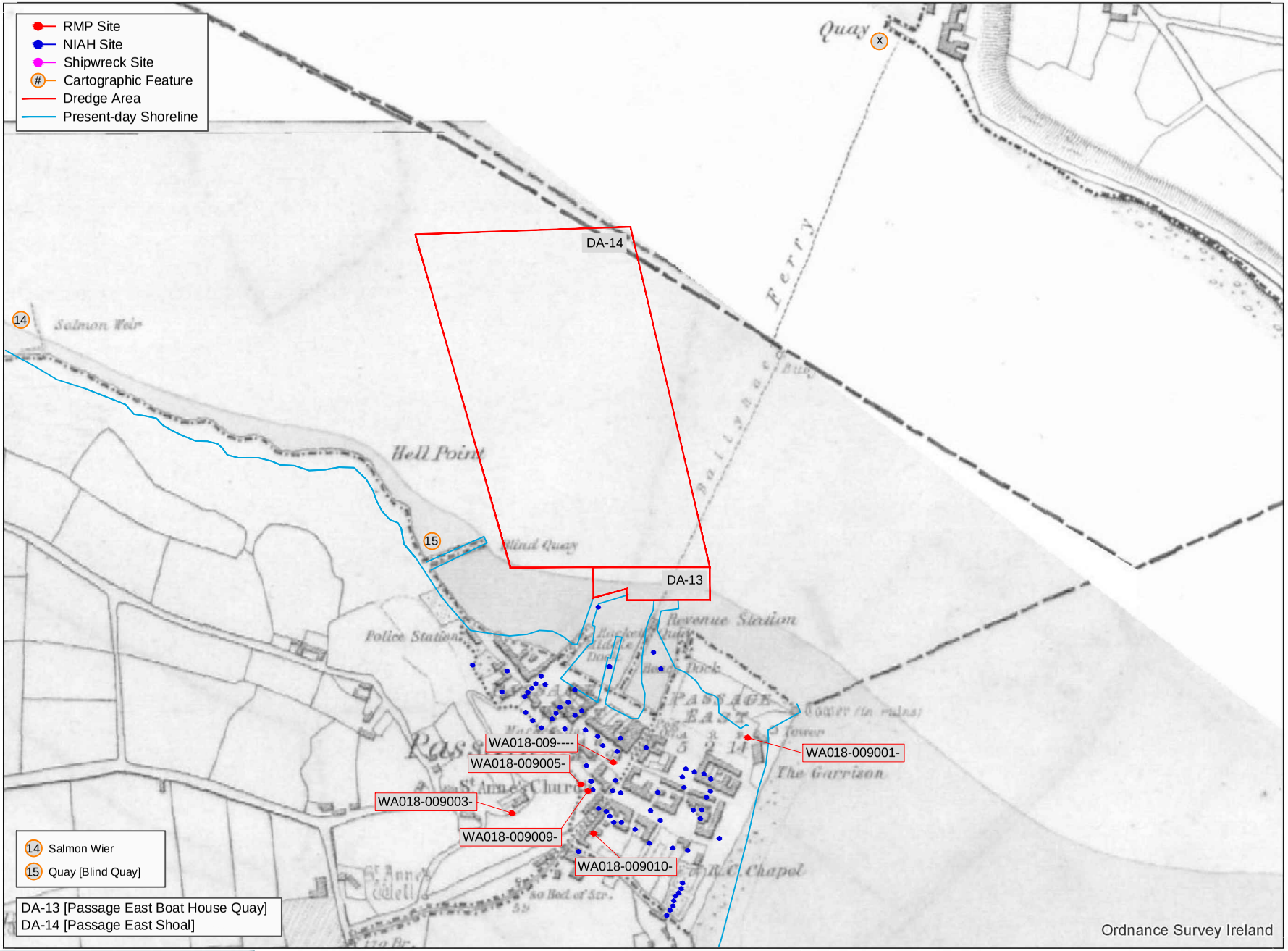
Job/Exc No. ADCO20/037	**Compiled by** R.Bangerter	**CAD reference** Waterford_Dredging	**Client** Malone O'Regan for Port of Waterford
Date 28.09.2023	**Scale** 1:15,000	**Drawing No.** Figure 8	**Project** Port of Waterford, Navigation Maintenance Dredging Programme 2026-2033.

Title
Figure 8- Extract from OS First Edition (1842) map with location of Dredge Areas DA-4 - DA-7 and DA9 - DA12 and nearby Cultural Heritage Assets superimposed.



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CENTRE COORDINATES:
ITM 670199,610458

PUBLISHED: 26/09/2023
ORDER NO.: 50359400_3

MAP SERIES:	MAP SHEETS:
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6inch BW ED01	WD010
6inch BW ED01	WD018
6inch BW ED01	WX044

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Notes
Map Source: Historic Map Archive, Tailte Eireann (formerly OSi).

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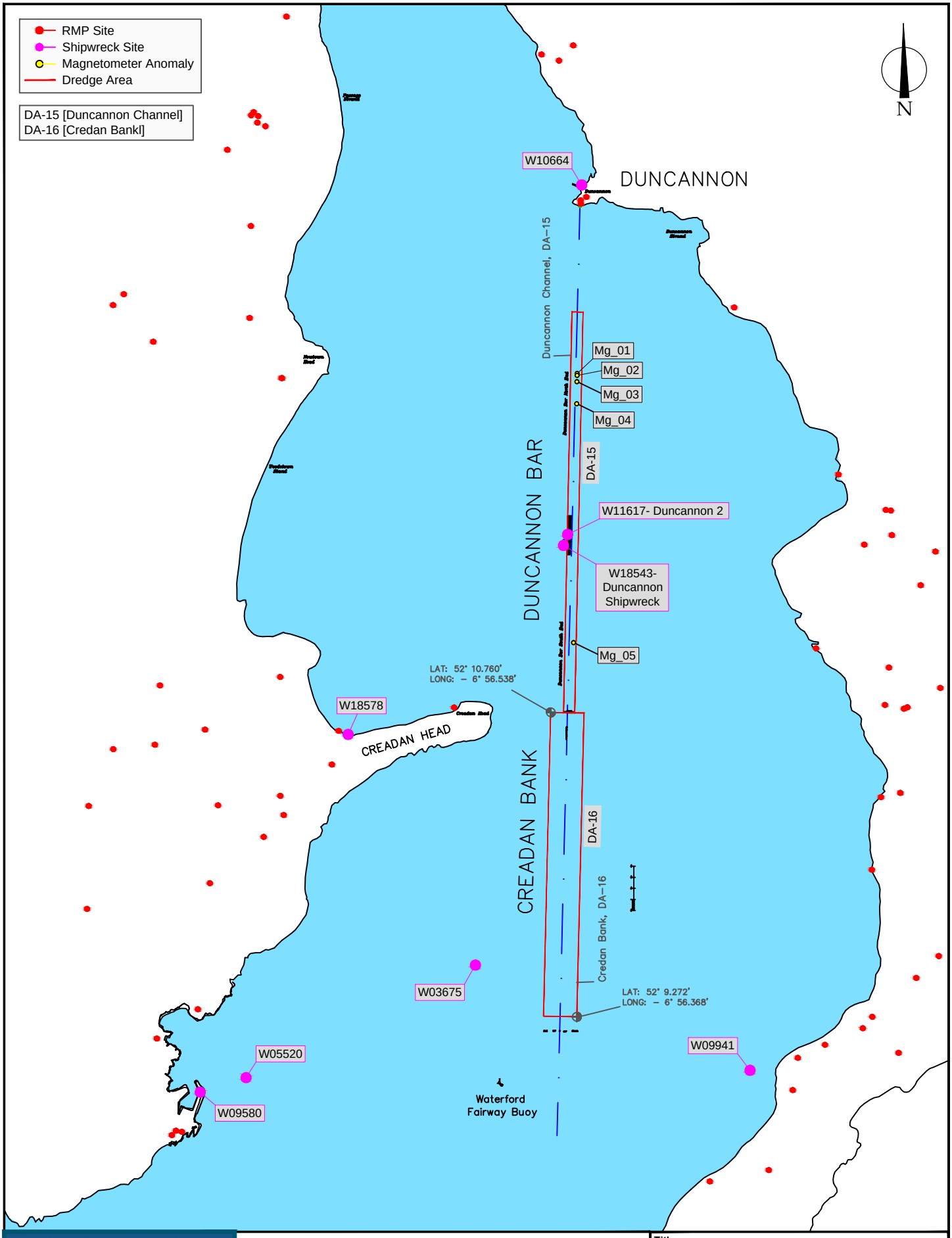
Job/Exc No.	Compiled by	CAD reference	Client
ADCO20/037	R.Bangerter	Waterford_Dredging	Malone O'Regan for Port of Waterford
Date	**Scale**	**Drawing No.**	**Project**
26.09.2023	1:5000	Figure 9	Port of Waterford, Navigation Maintenance Dredging Programme 2026-2033.

Title
Figure 9- Extract from OS First Edition (1842) map with location of Dredge Areas DA-13/DA-14 (Passage East) and nearby Cultural Heritage Assets superimposed.



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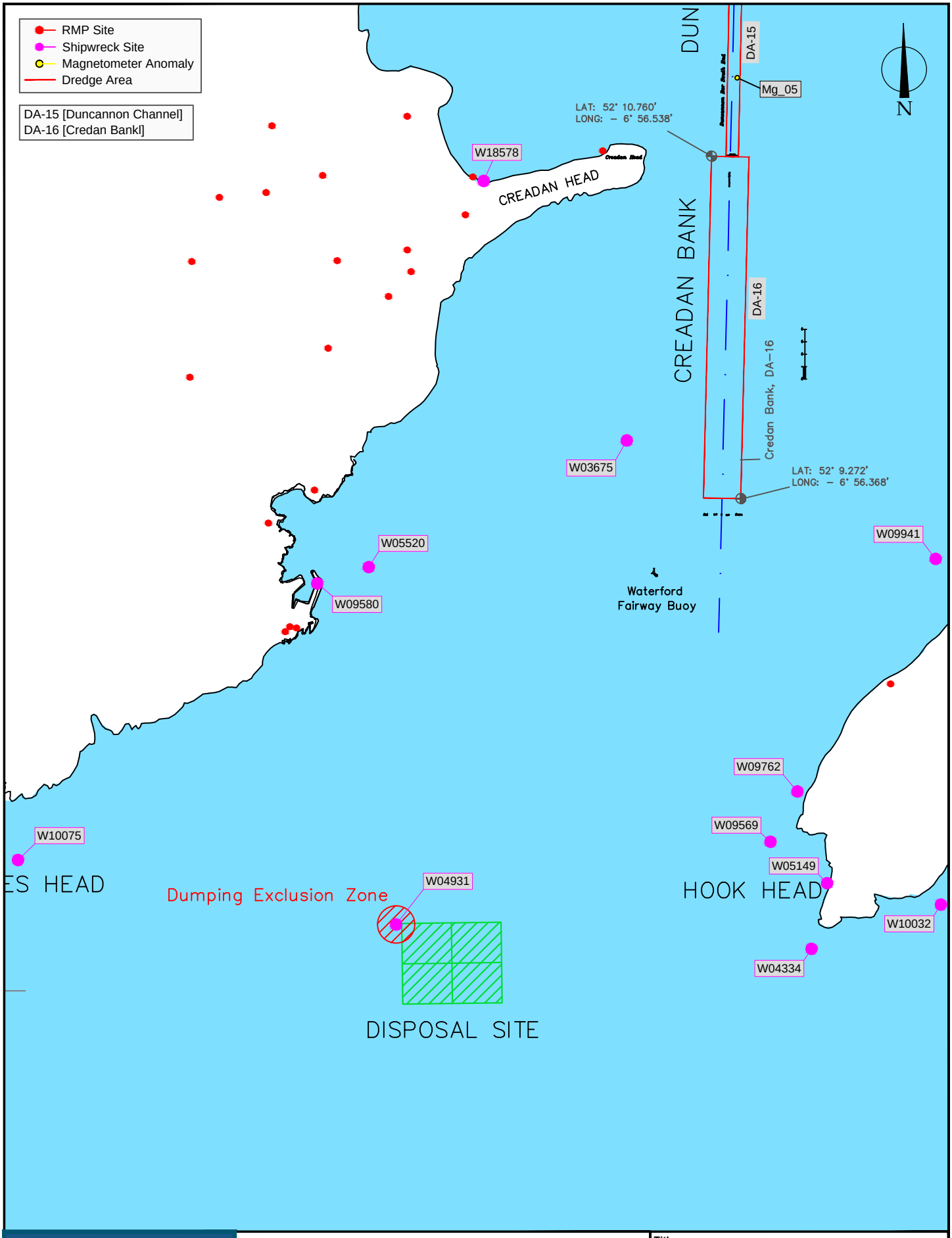
Client
Malone O'Regan for Port of Waterford

Notes
Source: Figure adapted from Project Drawing supplied by the client [Dredge Area Overview_R2- 636_Consultation_PreApp, September 2022, Anthony D. Bates Partnership LLP].

A4

Title
Figure 10- Location of proposed Dredge Areas DA-15 [Duncannon Channel] and DA-16 (Credan Bank), Waterford Estuary, with listed Shipwreck sites, 5no. magnetic anomalies [recorded 1999], and surrounding RMP sites superimposed.

Project	Job/Exc No.	Compiled by	CAD reference	Date	Scale	Drawing No.
Port of Waterford, Navigation Maintenance Dredging Programme 2026-2033.	ADCO20/037	R.Bangerter	Waterford_Dredging	29.09.23	1:45,000	Figure 10



Notes

Source: Figure adapted from Project Drawing supplied by the client [Dredge Area Overview_R2- 636_Consultation_PreApp, September 2022, Anthony D. Bates Partnership LLP].

A4

Title

Figure 11- Location of proposed Disposal Site [Lat/Long DM 52°7.27713N, 6°58.45148W; centrepoint coordinate].

Client	Project	Job/Exc No.	Compiled by	CAD reference	Date	Scale	Drawing No.
Malone O'Regan for Port of Waterford	Port of Waterford, Navigation Maintenance Dredging Programme 2026-2033.	ADCO20/037	R.Bangerter	Waterford_Dredging	29.09.23	1:40,000	Figure 11

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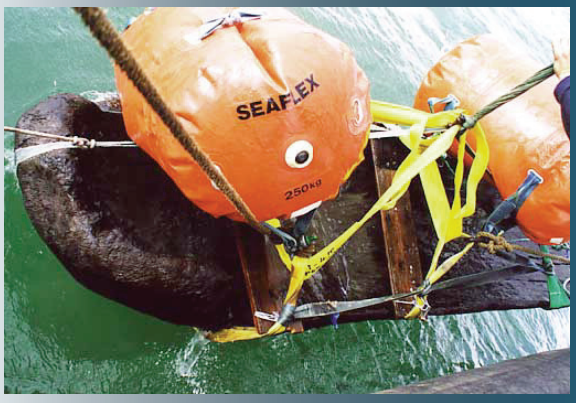

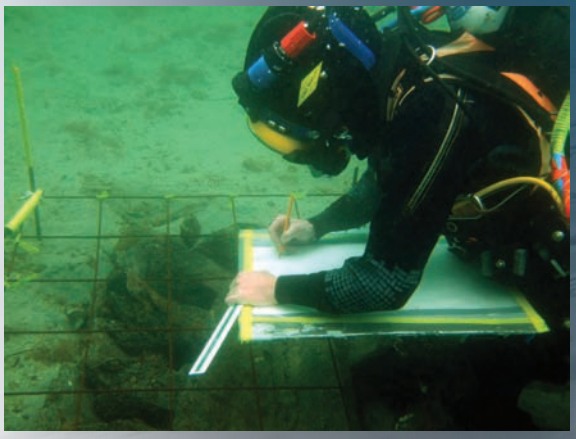

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