

METROLINK

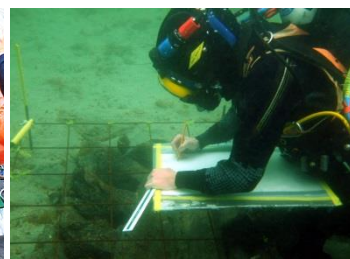
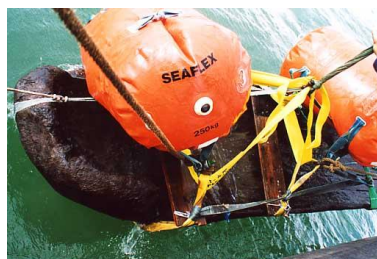
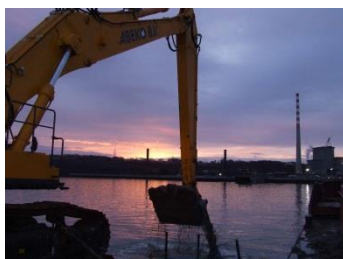
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A25.4

**Broadmeadow
Archaeological
Wade Survey**



**Archaeological Impact Assessment (AIA)
MetroLink Route Corridor
19D0107, 19R0255
Balheary Demesne
Waded Assessment and Metal-detection Survey,
Broadmeadow River
718609E, 748252N
The Archaeological Diving Company Ltd
Niall Brady, BA MA PhD FSA**





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16 June 2020

Project Manager and Site Director
Figures

Dr Niall Brady
Rex Bangerter

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Abbreviations

ACSU	Archaeological Consultancy Services Unit
ADCO	The Archaeological Diving Company Ltd
AIA	Archaeological Impact Assessment
DCHG	Department of Culture, Heritage, and the Gaeltacht
E	Easting
N	Northing
ITM	Irish Transverse Mercator
HWM	High Water Mark
LWM	Low Water Mark
NGR	National Grid Reference
NIAH	National Inventory of Architectural Heritage
OS	Ordnance Survey
RMP	Record of Monuments and Places
RPS	Record of Protected Structures
TII	Transport Infrastructure Ireland
JI	Jacobs IDOM JV
UAU	The Underwater Archaeology Unit

EXECUTIVE SUMMARY

Subject: MetroLink Waded Assessment and Metal Detection Survey
Location: Broadmeadow River, Balheary Demesne, Co. Dublin
ITM: 718609E 748252N
Status: Riverbank and riverbed
Licences: 19D0107, 19R0255

The Archaeological Diving Company Ltd (ADCO) was commissioned by ACSU for JI on behalf of TII to undertake an underwater archaeological impact assessment of a section of the Broadmeadow River in Balheary Demesne, Co, Dublin, to inform the MetroLink Environmental Impact Assessment Report.

The location is beside an area assessed previously by ADCO for old Metro North, that includes the presence of Lissenhall Bridge National Monument (RMP DU011-081----, RPS 341; NIAH 1135019). Balheary Bridge (RPS 340; NIAH 11335018), which crosses the Ward River, is located approximately 120m to the south of the Broadmeadow River.

The section of Broadmeadow River under assessment is the southern channel of the river that formerly swept north and south of an islet upstream of Lissenhall Bridge. The north channel is no longer active.

The assessment comprised waded inspection and metal-detection survey of the river bank and channel. Full access was possible. Features were recorded using a Total Station EDM.

The river crosses through a flat floodplain with rising ground to the north. The banks of the active channel fall steeply on both sides by approximately 2m to the riverbed. The riverbank has been reinforced on its south side with expanses of rock armour protection.

The insertion of a steel arterial water supply pipe that crosses above the river has a junction box on both the north and south sides, stepped back several metres from the river bank, which has also been reinforced on its south side.

The river channel is narrow (6m), widening as it approaches Lissenhall Bridge (14m). The channel is relatively flat in cross section and inclines gently from West to East.

Metal detection registered some targets in the channel and on the bank. Where noted, these were observed to be modern.

No archaeological material was recorded.

The proposed MetroLink project requires significant ground works at this location to facilitate the construction of the permanent viaduct crossing of the Broadmeadow and Ward Rivers, including the erection of temporary bridges and compounds. These works will directly and permanently impact the river floodplains and river banks. They will also impact the relict Broadmeadow River channel to the north.

This report recommends that all lands within the floodplains of the Balheary and Ward Rivers (which was the subject of a previous survey; ADCO 2009) that are to be directly impacted by the proposed project be subject to a programme of archaeological test excavations to determine the presence or absence of previously unrecorded sub-surface archaeological stratigraphy. Where archaeological stratigraphy is identified, full preservation by record (i.e. archaeological excavation) in advance of construction works commencing will be required in order to mitigate this permanent impact. Where lands cannot be accessed for archaeological test excavations, archaeological monitoring during construction is recommended. In the event that archaeological stratigraphy is identified during archaeological monitoring full preservation by record will be required prior to construction works being permitted to proceed.

The particulars of these mitigation measures will, in accordance with the Code of Practice for Archaeology, be set out in a MetroLink Cultural Heritage Strategy to be agreed between the office of the Minister of Culture, Heritage and Gaeltacht and TII.

ACKNOWLEDGEMENTS

ADCO wishes to thank Donald Murphy and Kerri Cleary of ACSU for facilitating access to the site, and Michael Healy (TII) who visited during the survey. Site work was conducted by Dr Niall Brady, Rex Bangerter and Derek Copeland. The survey data was post-processed by Copeland and the report figures were prepared by Bangerter. The report has been written by Brady.

1.0 INTRODUCTION

The Archaeological Diving Company Ltd (ADCO) was commissioned by ACSU for Jacobs IDOM JV (JI) on behalf of TII to undertake an underwater archaeological impact assessment and metal-detection survey of a section of the Broadmeadow River in Balheary Demesne townland, Co. Dublin, as part of the MetroLink Route Corridor project (Figure 1). This was the only section of either the Broadmeadow River or the adjacent Ward River to south within the proposed MetroLink impact zone that was not previously subject to a non-invasive archaeological impact assessment.

The project area is referred to as Licence Area 4 and it is proposed to route MetroLink across the Broadmeadow and Ward Rivers in this location (Figure 2). The design plan is to elevate MetroLink above the rivers supported by a sequence of transom piers placed on either side of the river channels.

The project area is centred on ITM 718609E, 748252N and is beside an area assessed previously by ADCO.¹ It is located immediately upstream of Lissenhall Bridge, a National Monument, a Recorded Monument and Place (RMP), a Protected Structure and is registered on the National Inventory of Architectural Heritage (RMP DU011-081----, RPS 341, NIAH 1135019; Figure 3).

The archaeological assessment was carried out in accordance with Section 3(5) Dive/Survey and Section 2(2) Detection Device licence (19D0107 and 19R0255). The licences were issued by the National Monuments Service of the Department of Culture, Heritage and Gaeltacht (CHG) on behalf of the Minister of CHG. Site work took place on 13 March 2020.

The project is covered by the Code of Practice for Archaeology agreed between the Minister for Arts, Heritage Regional, Rural and Gaeltacht Affairs (now Minister CHG) and TII (2017). Emer Dennehy is the nominated Project Archaeologist.

2.0 ENVIRONMENTAL AND HISTORICAL CONTEXT

The survey area is located just outside Swords, whose development during the medieval period owes much to being the archiepiscopal manor of the Archbishop of Dublin. The survey area lies some 1.3km north of the town and was on the main northern approaches to it. A bridge is

¹ Rex Bangerter, 2009. 'Broadmeadow River, Lissenhall Bridge, Balheary Demesne/Lissenhall Great, Swords, Co. Dublin 08D093, 08R311 and Balheary Bridge, Balheary Demesne, Swords, Co. Dublin 08D092, 08R312', unpublished report of the Archaeological Diving Company Ltd, 2009.

recorded crossing the Broadmeadow River on the Down Survey maps of 1656; on Herman Moll's map of 1714, and on John Rocque's map of 1760 (Figure 4). The River Ward ran to the south of the Broadmeadow, and shared the same floodplain at this point.

As recorded on Rocque's map, the Broadmeadow separated into two channels as it flowed around an islet that existed upstream of Lissenhall Bridge. The main channel was to the north, and a lesser channel to the south.

By the time of the Ordnance Survey's (OS) First Edition series (1837), the north channel was redundant and filled in, reclaiming the islet to the land and leaving the south channel as the active river (Figure 4). An artificial channel was cut into the islet from the south channel, indicating a possible race or culvert feature that was fed by water from the river on its upstream or west side, and emptied back into the river on its downstream or east side. It suggests the presence of a mill race and, by association, a mill structure, although this is not recorded on the map.

In later iterations of the OS mapping, the south channel is the only one shown associated with the Broadmeadow River, and the little race or culvert feature cut into the islet is not recorded (Figure 5).

Comment:

The existing environment indicates that the north bank of the present-day river was an islet around which the Broadmeadow River flowed and the principal channel of the river was to the north. The southern channel is what survives as the active river today. In addition, it appears that a small mill-race was cut into the north bank of the south channel during the nineteenth century and has since been abandoned.

The survey requirement is for a 92m-long stretch of the river, extending westwards from a point upstream of Lissenhall Bridge. This stretch includes the area in which the possible mill-race emptied back into the river in the nineteenth century.

3.0 METHODS

A three-person underwater archaeological team was deployed on site. Two personnel wore drysuits and conducted the survey work, while the third team member operated the Total Station EDM to record data acquired (Plates 1–3).

A survey grid was not required as the Total Station was positioned to capture any observations from its base station.

Site work comprised a walkover survey on the river banks followed by in-water waded assessment. The metal detector was deployed in conjunction with the bankside inspection and in-channel inspection.

The work was completed as scheduled in one working day, 13 March 2020.

Full access was possible, and no constraints were encountered.

The river was fast-flowing and visibility was reduced due to silt in suspension but it was still fully accessible. Water depth was on average 500mm, and 600mm in deeper portions.

Work commenced upstream and continued downstream. The area surveyed exceeded the required survey extent on both the upstream and the downstream sides (Figure 6).

4.0 RESULTS

The river crosses through a flat floodplain with rising ground to the north. To the south, the Ward River runs along the floodplain as a narrow straight channel and is crossed by Balheary Bridge, a Protected Structure (RPS 340, NIAH 11335018) (Plates 4–5).

Assessment commenced upstream of the required survey area and proceeded downstream (Plates 6–9).

It is a greenfield site that is a public park on the south side, and a grazing field on the north side. The only development feature recorded in the fields is a steel arterial water supply pipe that is raised above to cross the river at a height, between the downstream end of the survey area and Lissenhall Bridge (Plates 8, 10–11). The works associated with the pipe have had a direct impact on the associated ground surface (Plate 11).

The banks of the active channel fall steeply on both sides by approximately 2m to the riverbed. The slope is more acute on the south side. On the upstream end of the survey area, the north bank is overgrown with briars on the bank and low brush off the bank, making access impractical (Plate 12). The south bank, in contrast, is exposed and reveals a natural soil profile of a rich if A-horizon humic soil overlying a compact gravel till B- or C-horizon (Plate 13). The former is approximately 1m deep, and the underlying gravel extends in depth to the river bed. The south bank is exposed in this manner at the upstream bend that occurs along the surveyed area where it is being continually cut into by the river as the water flows passed the natural bend. An expanse of rock armour has been put in place to counter the erosion at this location. A second expanse of rock armour has been placed at the second bend downstream, where similar erosion occurs (Figure 7). The downstream rock armour expanse is more massive and

hides any exposure of natural river bank. It also serves to protect the arterial water supply pipe in this location.

There was no indication along the north bank for a cut or fill feature that might be associated with the mill race feature recorded on the OS First Edition map (Plate 15).

The river channel was surveyed over a 180m+ length (Figures 7–11). It is a narrow channel, measuring 6m wide until it widens to 14m as the channel approaches Lissenhall Bridge. The channel is relatively flat in cross-section, although the south side is scoured and somewhat deeper than the north side. The channel inclines almost imperceptibly from West to East. The inclination is not constant as the bed level is lower at the bends in the river and approaching Lissenhall Bridge. This is in keeping with those locations that experience faster moving water. Where water velocity is habitually less – in the straight section within the required survey area, and in the widened expanse immediately upstream of Lissenhall Bridge – there is a tendency for shoaling to occur, where stone falls out of suspension and is deposited on the gravel bed of the river. The riverbed surface has rounded cobble, between 30mm and 50mm in average diameter, with finer pebble over the shoaling.

The water supply pipe that crosses the river is supported by an in-water pier. Scour has developed around the base of the pier, leading to localised deepening of the channel. The scour pocket begins 500mm upstream of the pier where the water depth is 400mm against the pier. The depth and width of the scour quickly deepens and widens to 1m along the length of the pier, and this expands further downstream of the pier to 1400mm, which extends into the southern half of the channel. A back-eddy on the north side of the pier is creating its own scour that is 1200mm deep and 1m wide.

The metal detector did not record many targets either on the banks or in the channel. Where noted, it was possible to determine that the source target was modern, either debris (bottle tops and drinking cans) or fencing wire.

No features of archaeological interest were noted.

No objects were recovered or retained.

5.0 IMPACTS

The design plan is for there to be no impacts in the active river channel (Figure 2). MetroLink will be in a viaduct elevated above the Broadmeadow and Ward Rivers, supported on a series

of transom piers that will be constructed on the dry ground across the floodplain. The most northerly of these piers is to be constructed at the edge of the current floodplain, at a location that appears to be above the relict north channel of the Broadmeadow River as it flowed up to the eighteenth century. The construction works will also entail the erection of temporary bridges across both the Broadmeadow and Ward Rivers, the placement of a serviced construction compound and the diversion of existing utility infrastructure (both above ground and sub-surface).

This requirement for the construction of a viaduct is in response to a design change, rerouting the MetroLink alignment to the west of Lissenhall Bridge National Monument (RMP DU011-081----; RPS 341) and Balheary Bridge (RPS 340) and so avoiding a direct physical impact on both protected structures.

6.0 RECOMMENDATIONS

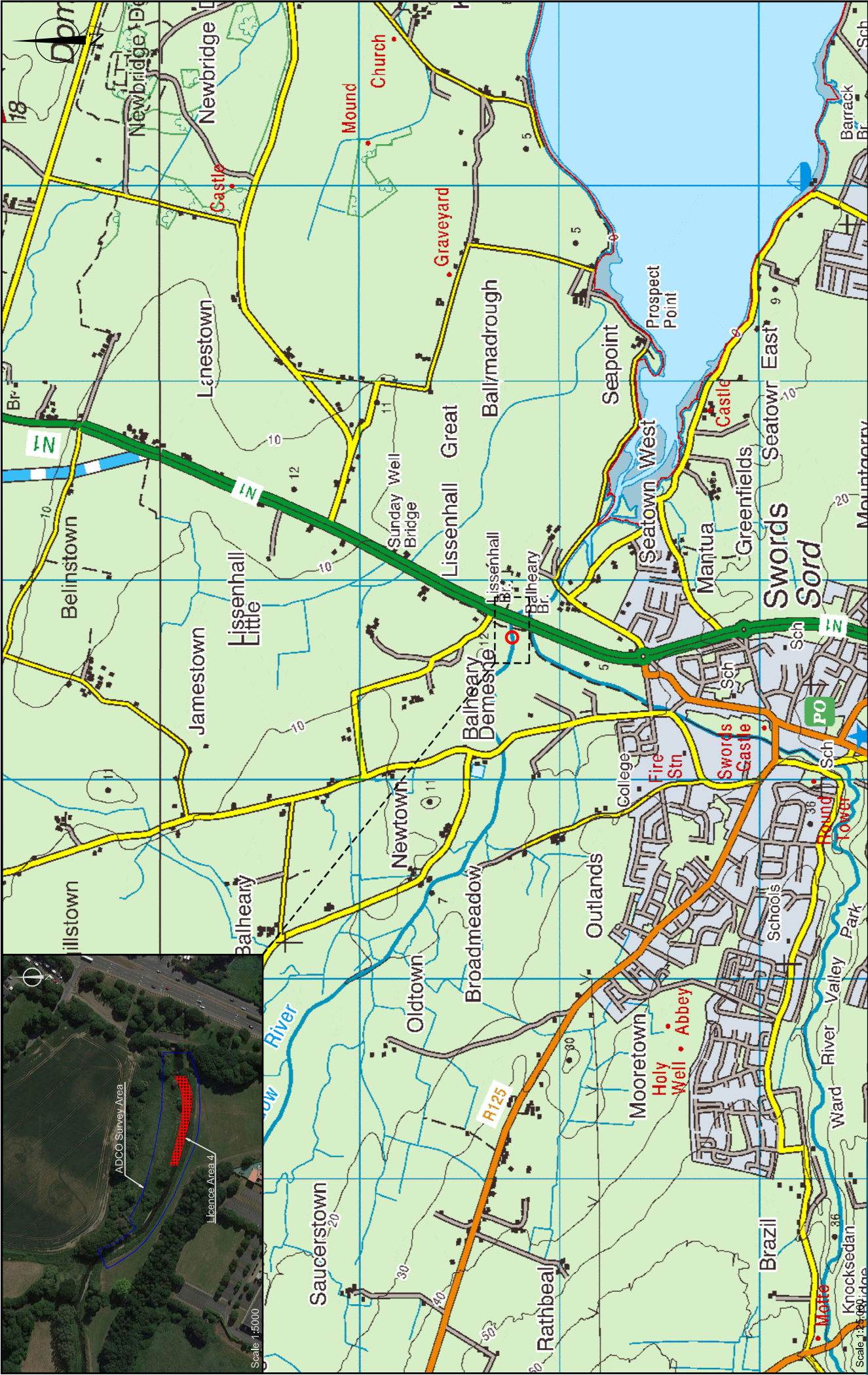
This report recommends that all lands within the floodplains of the Balheary and Ward Rivers (which was the subject of a previous survey; ADCO 2009) that are to be directly impacted by the proposed project be subject to a programme of archaeological test excavations to determine the presence or absence of previously unrecorded sub-surface archaeological stratigraphy. Where archaeological stratigraphy is identified, full preservation by record (i.e. archaeological excavation) in advance of construction works commencing will be required in order to mitigate this permanent impact. Where lands cannot be accessed for archaeological test excavations, archaeological monitoring during construction is recommended. In the event that archaeological stratigraphy is identified during archaeological monitoring full preservation by record will be required prior to construction works being permitted to proceed.

The particulars of these mitigation measures will, in accordance with the Code of Practice for Archaeology, be set out in a MetroLink Cultural Heritage Strategy to be agreed between the office of the Minister of Culture, Heritage and Gaeltacht and TII.

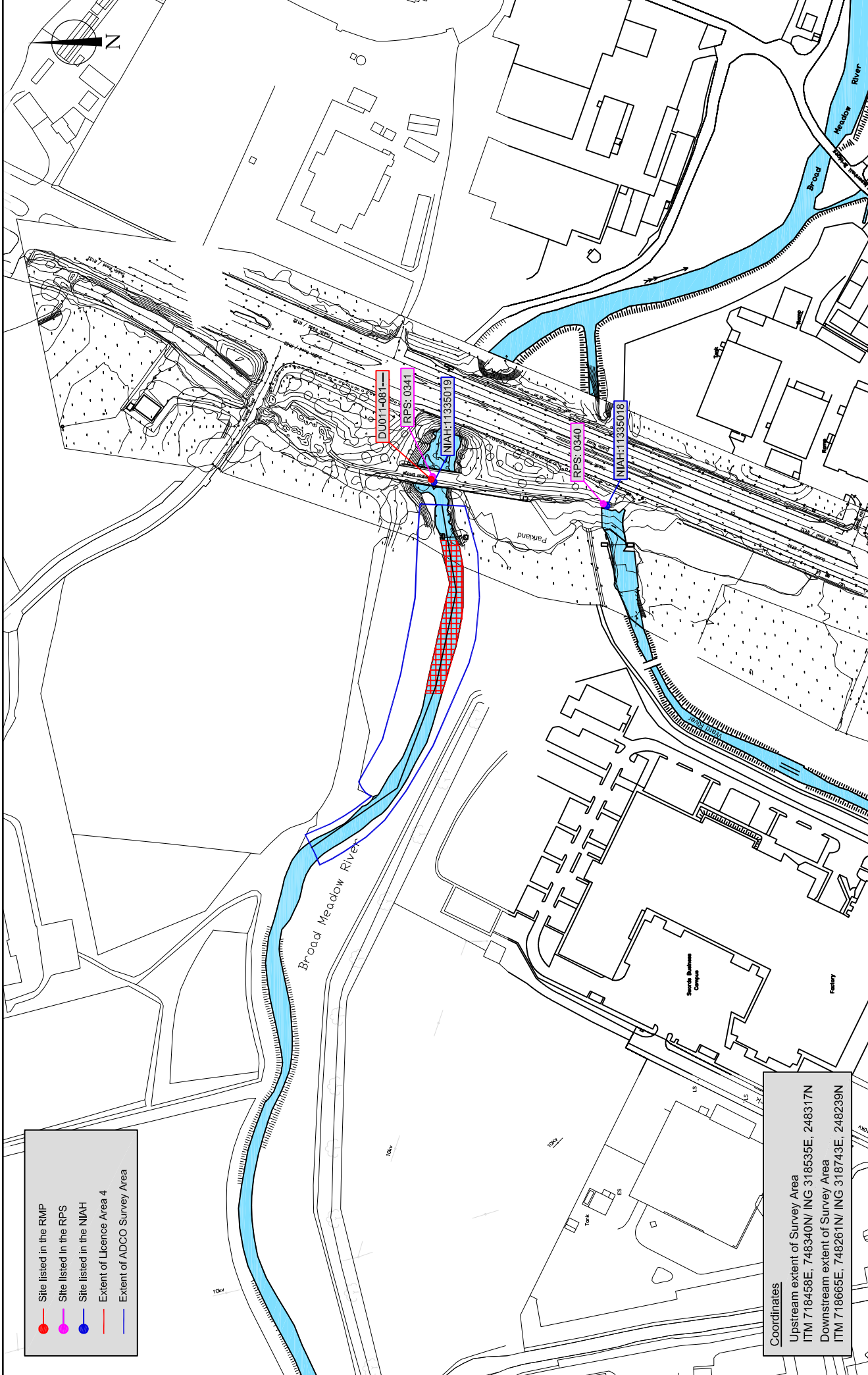
PLEASE NOTE: All of the above recommendations are based on the information supplied for the proposed MetroLink Preliminary Design which is subject to change.

7.0 BIBLIOGRAPHY

Bangerter, Rex, 'Broadmeadow River, Lissenhall Bridge, Balheary Demesne/Lissenhall Great, Swords, Co. Dublin 08D093, 08R311 and Baheary Bridge, Balheary Demesne, Swords, Co. Dublin 08D092, 08R312', unpublished report of the Archaeological Diving Company Ltd, 2009.



Notes: Source: Main- OS Discovery Series (1:50,000) Map. Thumbnail- Google Satellite Image 2018.	A4 Job/Exc. No. 19D0107 Date 18.03.20	Compiled by R. Bangster CAD reference Metrolink_2019 Drawing No. Figure 1	Client ACSU/ Transport Infrastructure Ireland (TII) Project UAIA, Broadmeadow River, TII Metrolink	Title Figure 1- Extract from OS Map (Main) and Satellite Image (Thumbnail) showing location of Licence Area 4 and corresponding ADCO Survey Area.

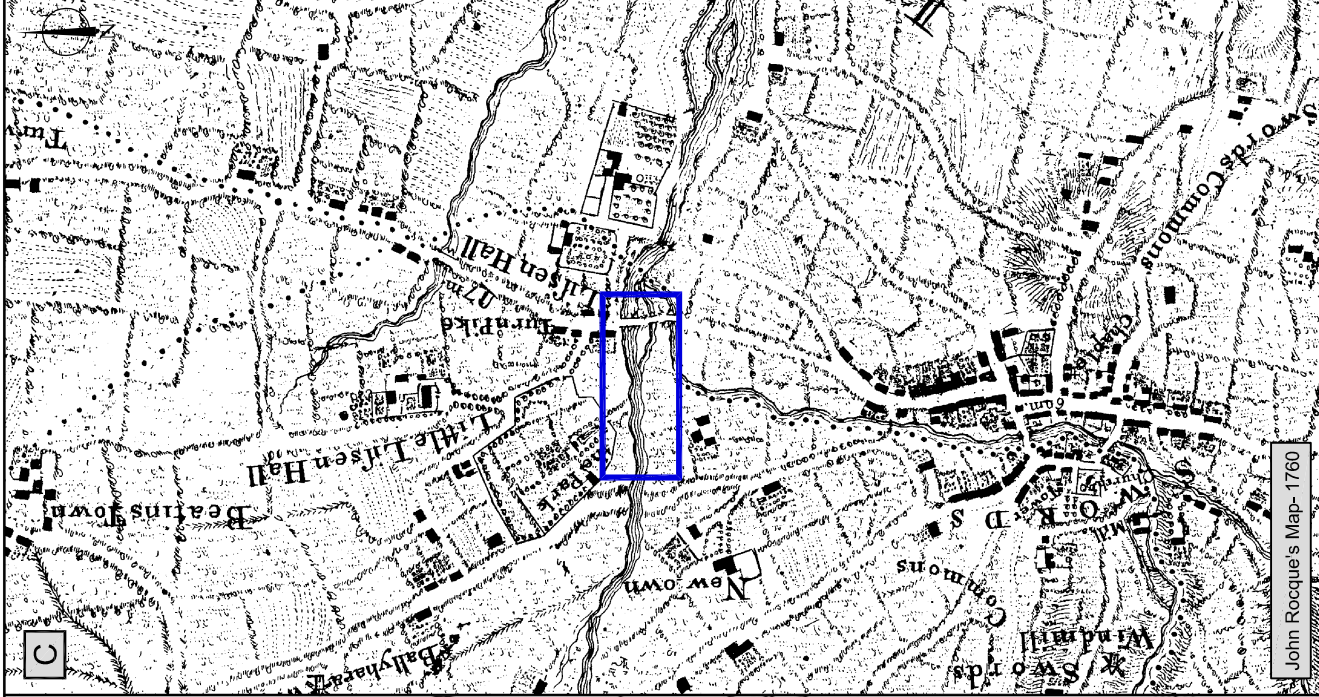
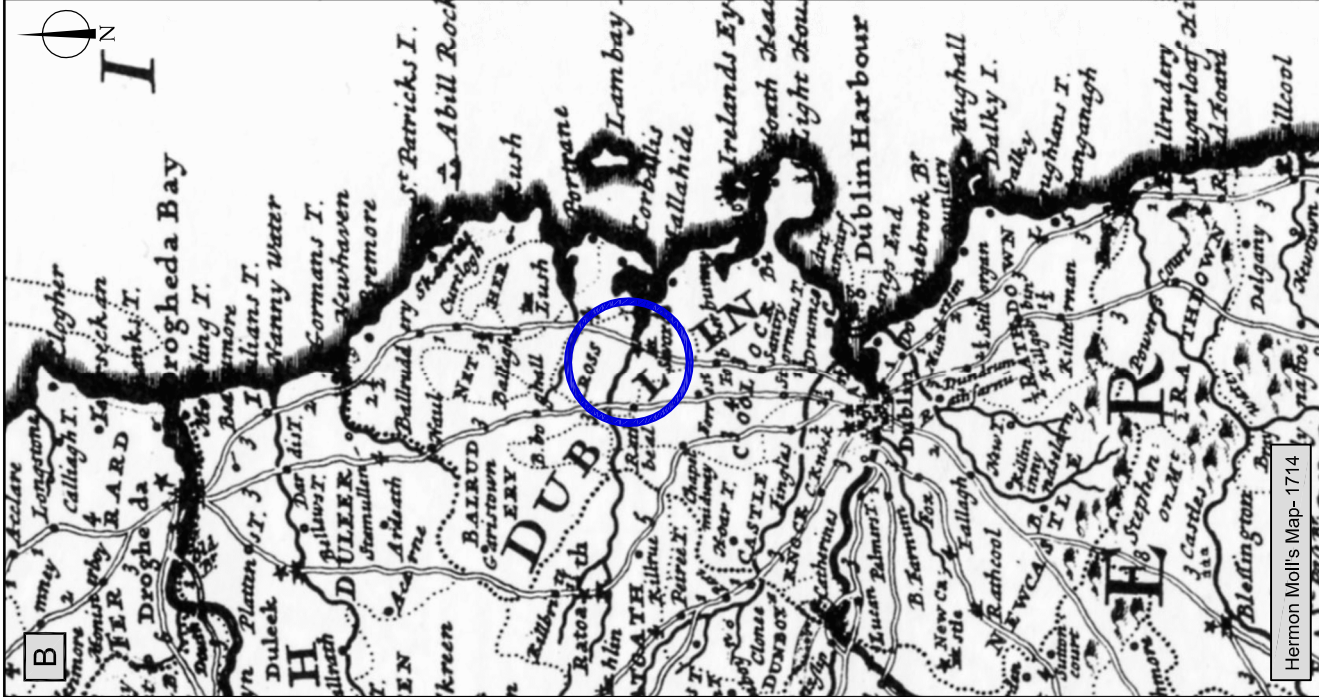


- Site listed in the RMP
- Site listed in the RPS
- Site listed in the NIAH
- Extent of Licence Area 4
- Extent of ADCO Survey Area

Coordinates
 Upstream extent of Survey Area
 ITM 718458E, 748340N/ ING 318535E, 248317N
 Downstream extent of Survey Area
 ITM 718665E, 748261N/ ING 318743E, 248239N

Notes Source: OS Background Mapping. ADCO Survey Area: 237m E-W x 40m N-S (max.). Licence Area 4: 92m E-W x 12m N-S (max.).		A4	Job/Exc No. 19D0107	Date 18.03.20	Client ACSU/ Transport Infrastructure Ireland (TII)	Project UAlA, Broadmeadow River, TII Metrolink
		Compiled by R. Bangertner	Scale 1:3000	CAD reference Metrolink_2019	Drawing No. Figure 3	Title Figure 3- OS Background Mapping with extent of Licence Area 4 and ADCO Survey Area superimposed.





Notes
 Source: (A) Trinity College Dublin Map Library.
 (B) Trinity College Dublin Map Library.
 (C) John Rocque's Dublin County Maps 1760.

A4	Job/Exc No. 19D01017	Compiled by R. Bangster	CAD reference Metrolink_2019	Client ACSU/ Transport Infrastructure Ireland (TII)	Title Figure 4- Historic Map extracts showing location of Lisshall Bridge and the Broadmeadow River.
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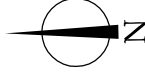


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718692,748317

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Ordnance Survey Ireland

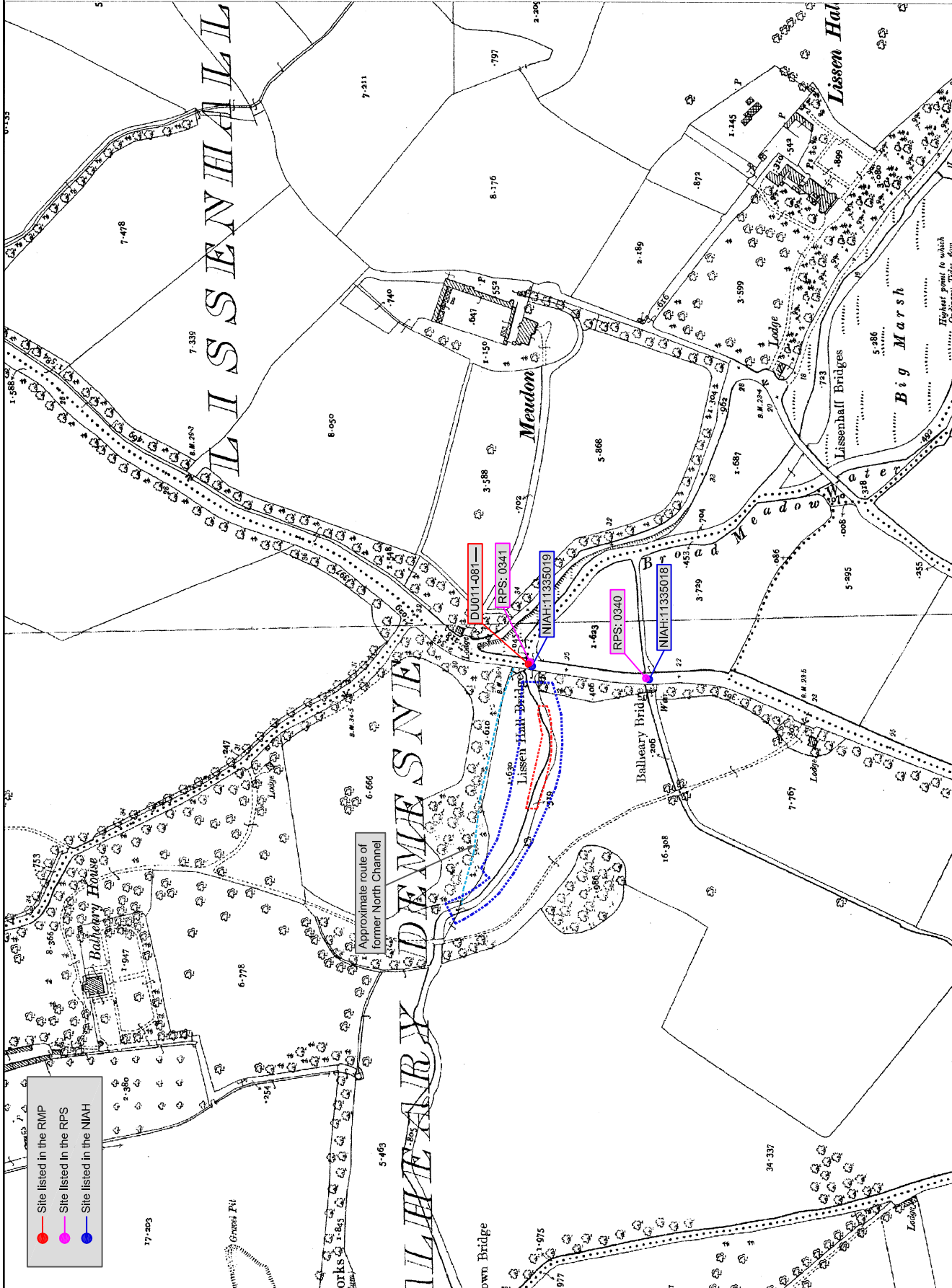
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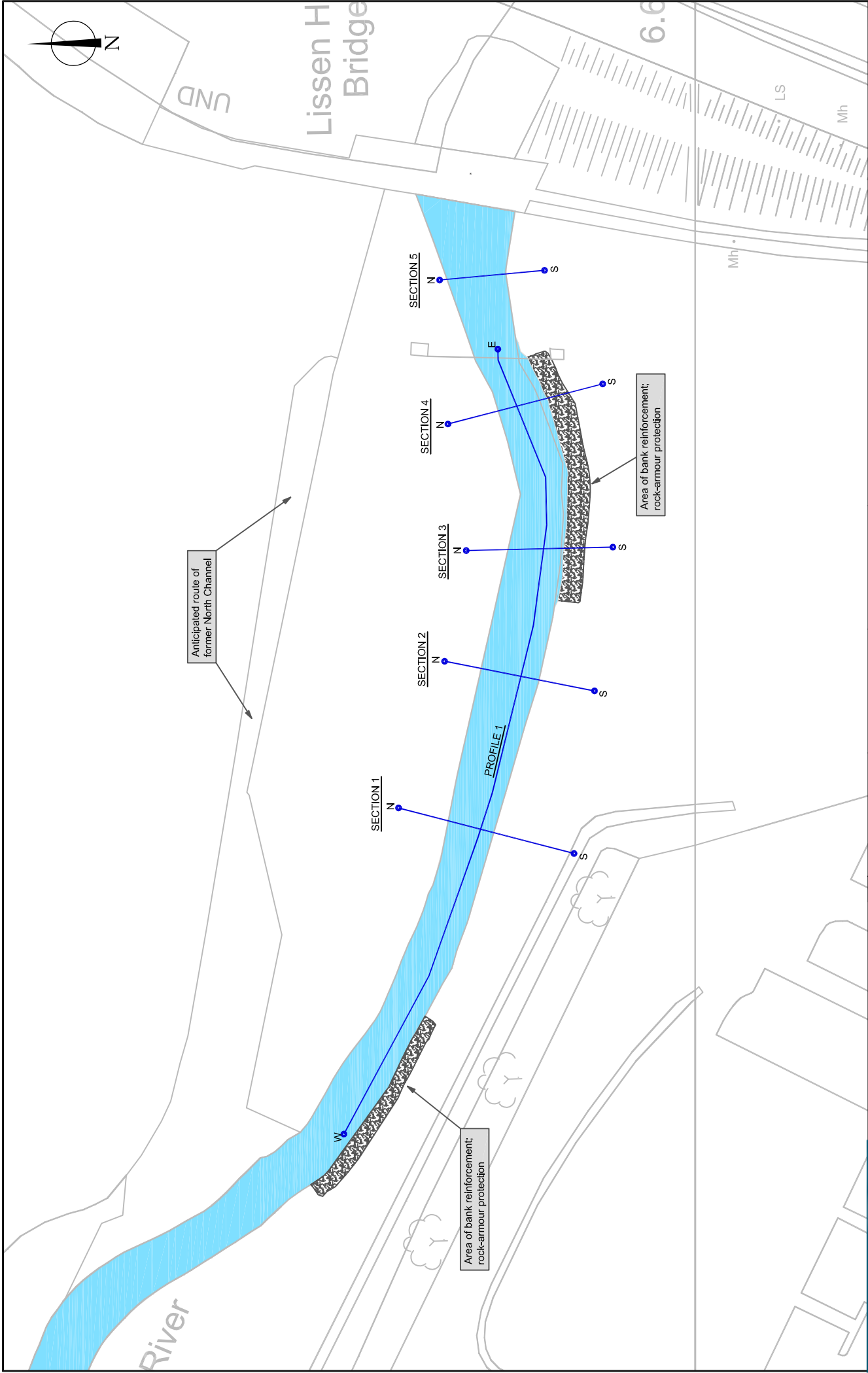
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The representation on this map of a road, track or footpath is not evidence of the existence of a right of way.

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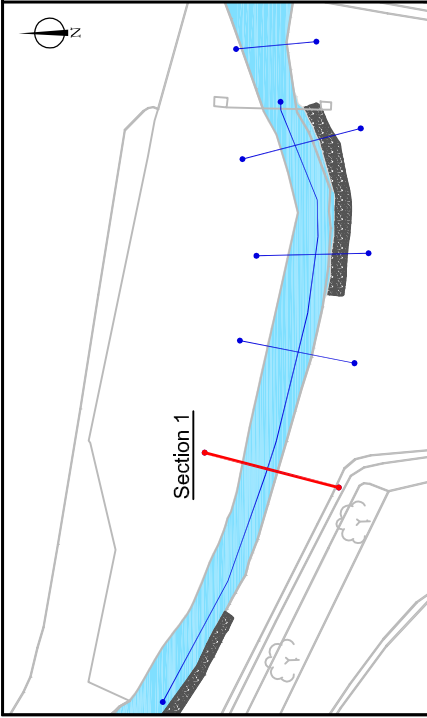
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	Date	18.03.20	Scale	1:5000	Drawing No.	Figure 6	Project	UAMA, Broadmeadow River, TII Metrolink	
Notes Source: OSi Historic Map Archive Licence Area 4 ADCO Survey Area Approximate route of former North Channel									



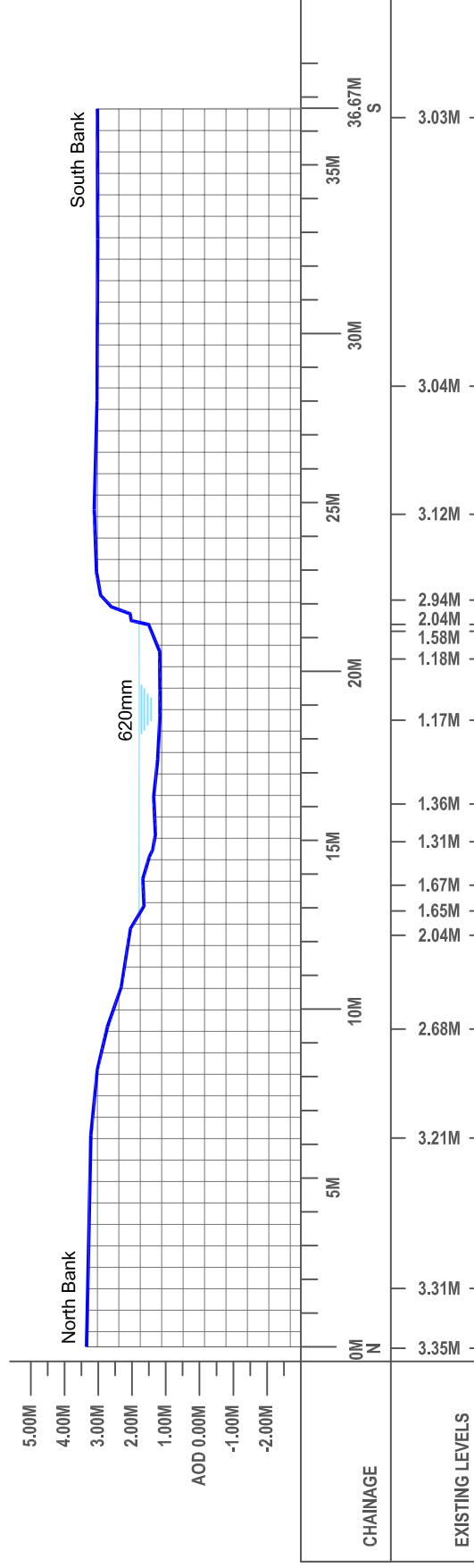


A4	Job/Exc. No. 19D0107	Notes Source: OS Background mapping with ADCO survey data.	Compiled by D. Copeland/ R. Bangertner	CAD reference Metrolink_2019	Client ACSU/ Transport Infrastructure Ireland (TII)	Title Figure 7- Plan showing location of Cross-sections 1-5 and River Profile 1, taken along the section of Broadmeadow River under assessment.	
						Scale 1:1000	Project UAIA, Broadmeadow River, TII Metrolink
	Date 19.03.20		Drawing No. Figure 7				





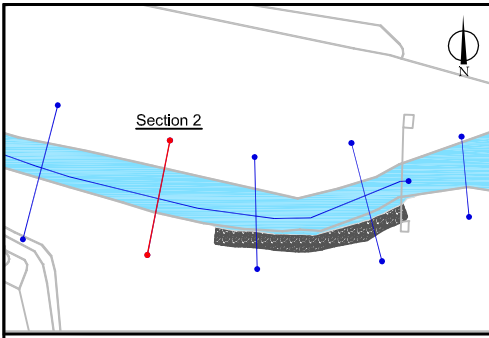
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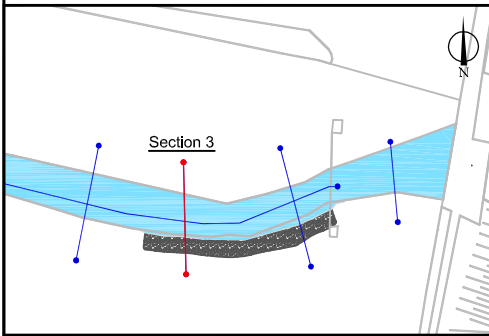
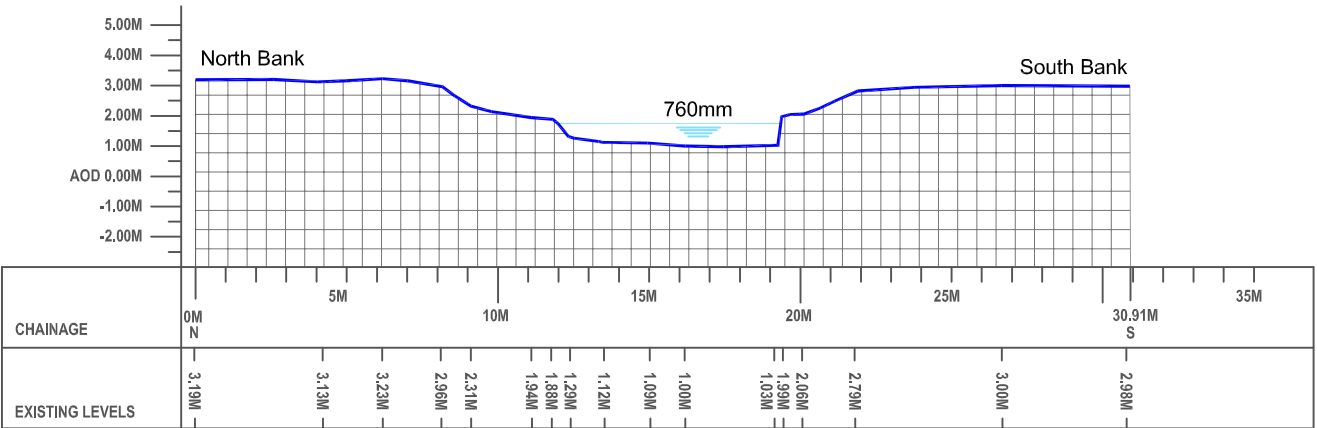
Notes
Source: ADCO onsite survey.



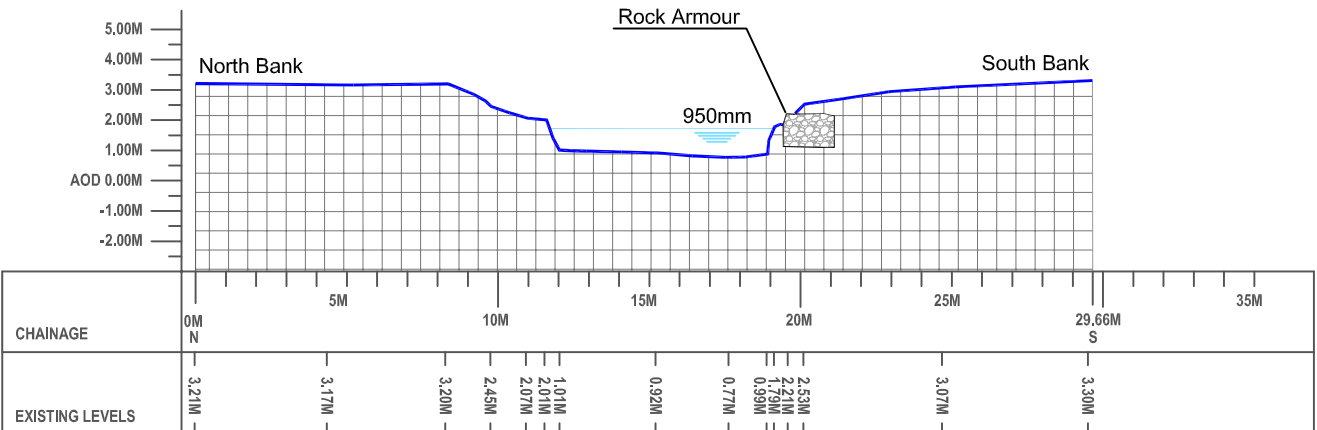
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CROSS-SECTION 2



CROSS-SECTION 3



Notes
Source: ADCO onsite survey.

Title
Figure 9- Cross-sections 2-3, Broadmeadow River.

Client
ACSU/ Transport Infrastructure Ireland (TII)

A4

Project
UAIA, Broadmeadow River, TII MetroLink

Job/Exc No.
19D0107

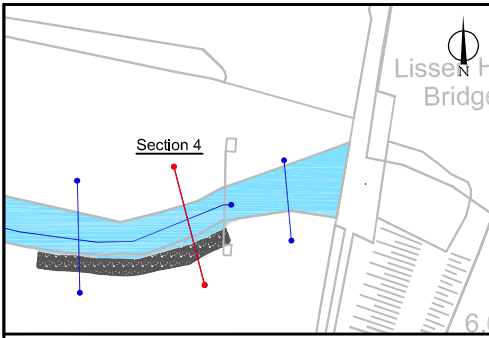
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R.Bangarter

CAD reference
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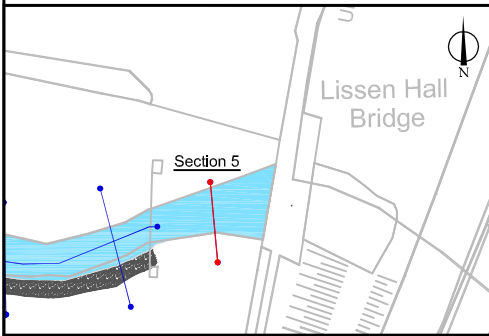
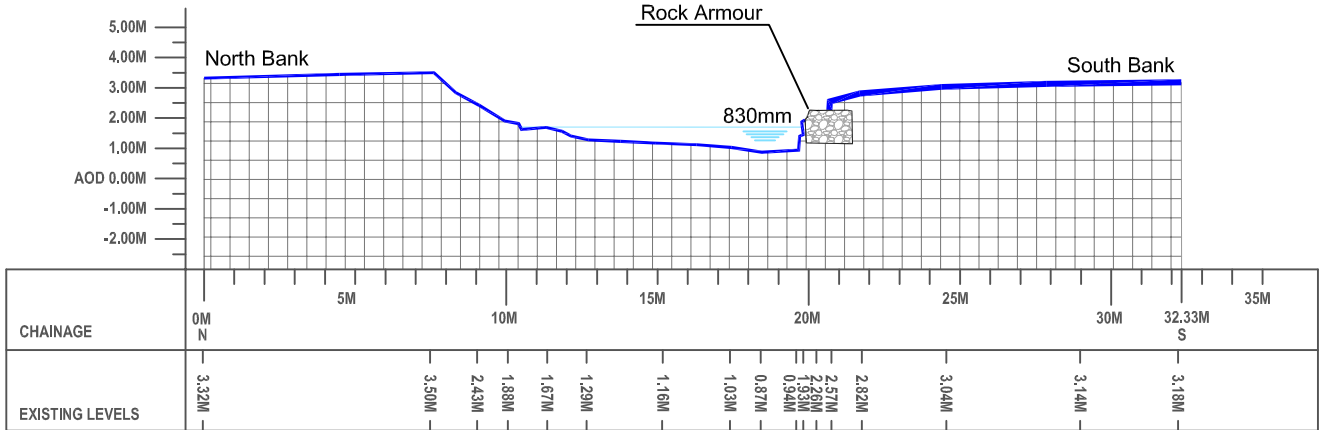
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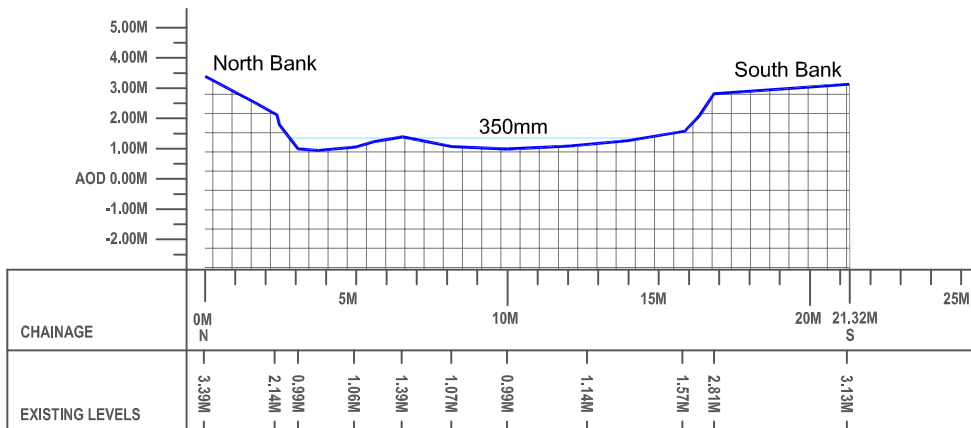
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Figure 9



CROSS-SECTION 4



CROSS-SECTION 5



Notes
Source: ADCO onsite survey.

Title
Figure 10- Cross-sections 4-5, Broadmeadow River.

Client
ACSU/ Transport Infrastructure Ireland (TII)

A4

Project
UAIA, Broadmeadow River, TII Metrolink

Job/Exc No.
19D0107

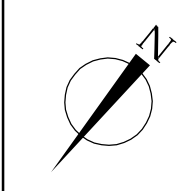
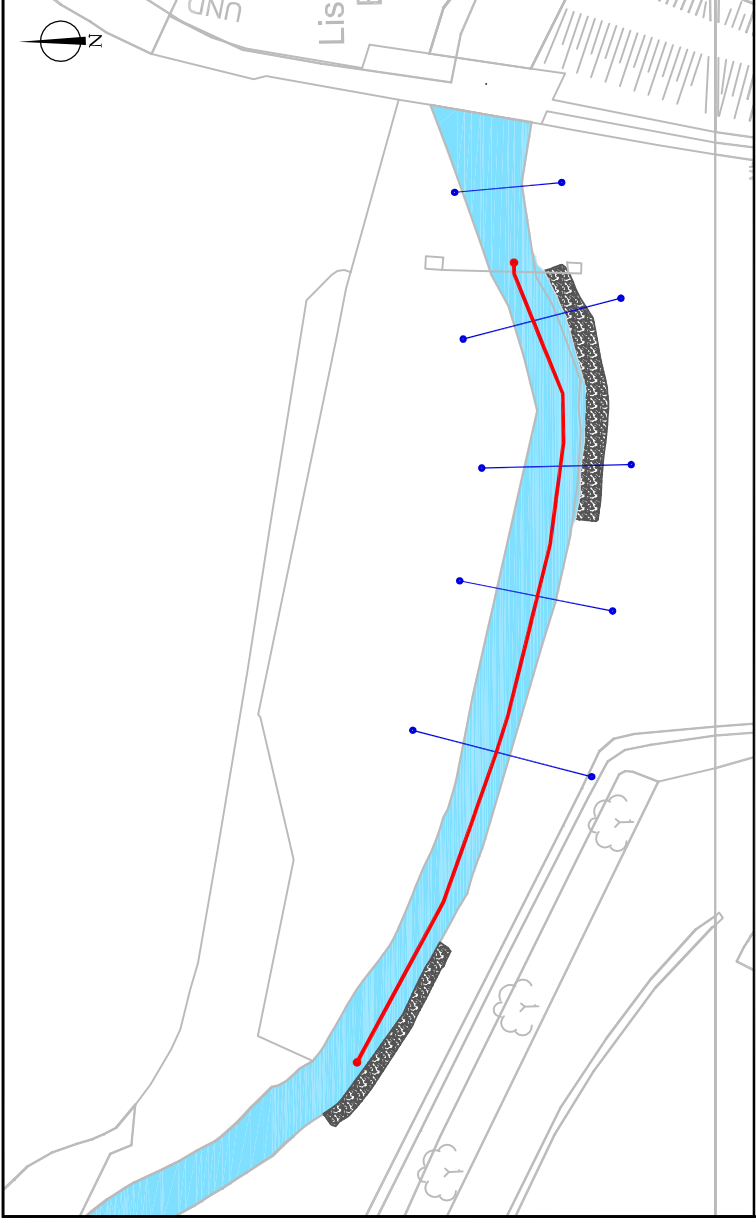
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R.Bangertner

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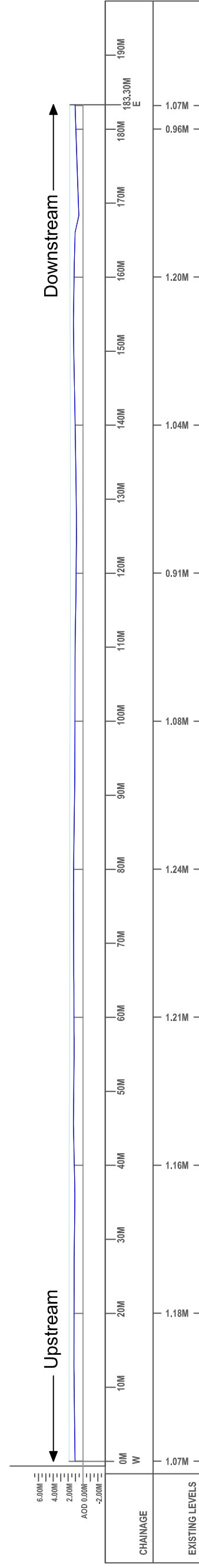
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Figure 10



RIVERBED PROFILE 1



Notes
Source: ADCO onsite survey.

A3 Job/Exc No.
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Date
19.03.20

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D.Copeland/
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Scale
1:600/ 1:1500

CAD reference
Metrolink_2019
Drawing No.
Figure 11

Client
ACSU/ Transport Infrastructure Ireland (TII)
Project
UAIA, Broadmeadow River, TII Metrolink

Title
Figure 11- Riverbed Profile, Broadmeadow River.



Plate 1: Base station set-up with Total Station EDM.



Plate 2: In-water survey recording under way, holding survey prism to record data points.



Plate 3: Metal-detection under way.



Plate 4: The Ward River, looking upstream and Southwest.



Plate 5: Balheary Bridge (RPS 340; NIAH 11335018) from the East.



Plate 6: The Broadmeadow River, view looking downstream (East) from the start of ADCO's survey area.



Plate 7: The Broadmeadow River, view looking downstream (East) from the start of the required survey area.



Plate 8: The Broadmeadow River looking upstream (West) from below the required survey area limit.



Plate 9: The Broadmeadow River looking downstream (East) at Lissenhall Bridge (RMP DU011-081-, RPS 340, NIAH 1135019).



Plate 10: The services pipe that crosses the Broadmeadow River at the downstream end of the survey area. View from Lissenhall Bridge.



Plate 11: Service boxes to facilitate the water pipe, off the south bank.



Plate 12: North bank, upstream of the required survey area, where brush and briar conceal the natural profile.



Plate 13: South bank at the upstream end of the required survey area, showing a humic topsoil over gravel till.



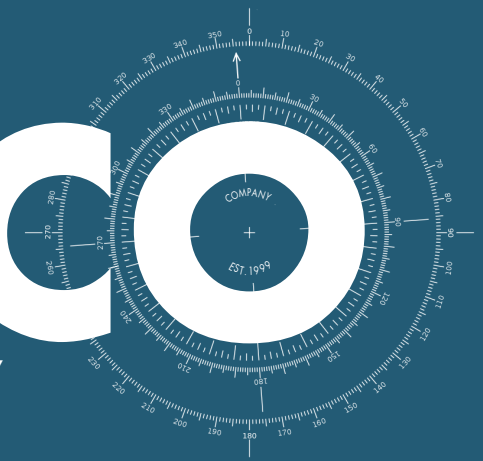
Plate 14: Upstream limit of the second expanse of rock armour protection to the south bank.



Plate 15: View looking downstream from within the required survey area showing river channel and the north bank on the left and south bank on the right.

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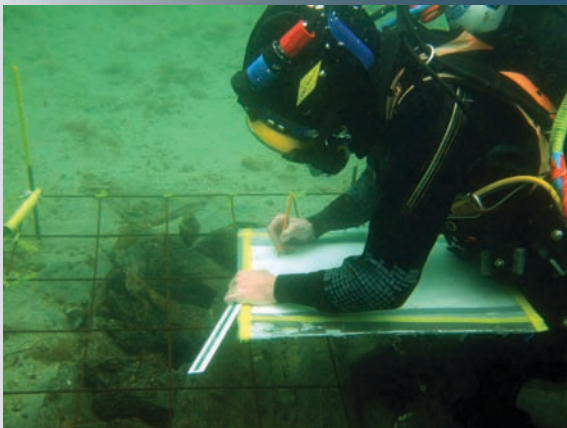
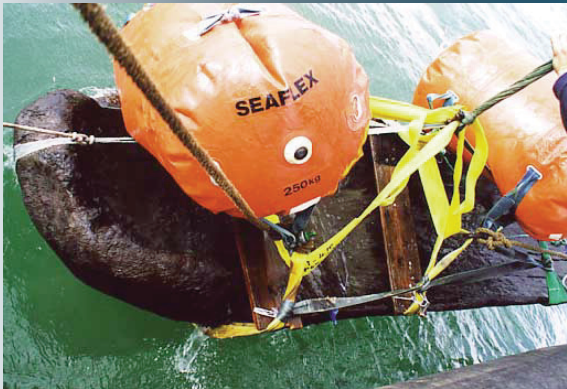


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