

Attachment E.1(iii): Site description of two potential sea disposal sites off Hook Head Report, Aquafact Ltd, November 1998

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AQUA-FACT

Site description of two potential sea disposal sites off Hook Head, Waterford Harbour

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**Site description of two potential sea
disposal sites off Hook Head,
Waterford Harbour**

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Report Title: Site description of two potential sea disposal sites off Hook Head, Waterford Harbour

Job Number: JN262

Date of Issue: 16-11-98

Author: Mark Costelloe

REPORT APPROVAL SHEET

No:

Date: 20-11-98

Nature of Amendment: 1st Edit

Mark Costelloe

Signed:

No:

Date: 20.11.98

Nature of Amendment: 2nd Edit & Final Inspection ..

John Costelloe

Signed:

No:

Date: 7-12-98

Nature of Amendment:

Final Copy

Signed:

John Costelloe

No:

Date:

Nature of Amendment:

Signed:

Has the Final Copy been saved to Disk? *yes*

Details: *2.3.99, Zip disc. No. 2.*

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1. Introduction

Aqua-Fact International Services Limited was commissioned to describe the benthic environment of two potential disposal sites in the Suir Estuary, Co. Waterford and assess the potential impacts on the benthos of disposing dredged material at these sites. The potential site locations are situated to the south and east of Hook Head as outlined in Figure 1. Information on the benthos was based on a review of existing information from the area and field surveys which included photographic dive surveys and remote sampling to collect faunal and floral samples.

2. Study Area

Hook Head is a long low headland running south into the sea 25 km south east of Waterford City and is a proposed 'Natural Heritage Area' (Site code: 00764). It forms the eastern side of Waterford Harbour which is the mouth of the Rivers Suir, Nore and Barrow, and is a major seaport. The fishing port of Dunmore East is 7 km to the west across the harbour. The area is a tourist resort.

The Head is in a junction of the Devonian Old Red Sandstone and the overlying Carboniferous Limestone. The limestone forms the low cliffs and has an abundance of fossils and interesting geological structures. The gently dipping bedrock forms wave-cut platforms and shallow rocky shores which hold varied marine life forms. The land on top of the cliff is improved grasslands with intensive grazing regimes, often with a marginal strip of unimproved land at the cliff top.

The main habitat is rocky shorelines and typical Atlantic vegetated sea cliffs with vegetation formed predominantly by thrift (*Armeria maritima*), sea lavender (*Limonium binervosum*), Plantain (*Plantago maritima*), buck's horn plantain (*Plantago coronopus*), sea mayweed (*Matricaria maritima*).

Hook Head has ornithological interest for breeding Choughs (*Pyrhocorax pyrrhocorax*), ravens (*Corvus corax*) and peregrines (*Falco peregrinus*), and as a landfall for migrants.

There is some pressure to develop tourist facilities along the head but these usually concentrate at the beaches which are outside the site. Effluent from intensive farming is a threat for the natural vegetation.

Hook Head is of international importance from a geological point of view. It is a very good example of the Atlantic vegetated sea cliff. It has a high amenity value. The 'NHA' site may be extended into the marine habitat in the future.

3. Survey Results

3.1 Site 1.

Site 1 is located to the west of Hook Head (Figure 1) in approximately 6 m of water at low water springs. The bottom composition ranged from rocky ledges, rocky/cobble to a coarse sand (Photos 1-5). The hard bottom areas supported a variety of red algae the most prominent being *Calliblepharis ciliata* and *Sphaerococcus coronopifolius*. Epifauna observed during the dive were typical of hard bottoms and included the starfish *Asterias rubens* (Photo 9) and *Marthasterias glacialis* (Photo 6) the ascidians *Botrylloides leachi*, *Dendrodoa grossularia* and *Asciadiella aspersa*, crabs *Liocarcinus puber*, *Corystes cassivelaunus* and *Cancer pagurus* (Photo 5&8), sea urchin *Echinus esculentus* (Photo 6) and a variety of sponges, hydroids and anemones. The common prawn (*Palaemon serratus*) was common under ridges and boulders (Photo 7). Fish species observed included wrasse (*Labrus bergylta*) (Photo 14), blenny (*Blimus* sp.) and goby's (*Pomatoschistus* sp.).

The fauna were less numerous in the gravel/sandy areas with occasional starfish (*Asterias rubens*) and hermit crabs (*Pagurus bernhardus*) and edible crabs (*Cancer pagurus*) recorded on the sediment surface (Photo 5). Infauna were typical of sandy bottoms and included the worms *Lumbrineria fragilis*, *Notomastus latericeus*, *Lanice conchilega* and *Glycera* sp., molluscs, *Clausinella fasciata*, *Ensis* sp. and *Macoma balthica*.

3.2. Site 2

Site 2 is located to the south of Hook Head (Figure 1) in approximately 12 m of water at low water springs. Large boulders and flagstones were grouped to form gullies up to 3 m in depth. The bottom between the gullies was composed of coarse sand/shell and small boulders (Photo 6) which became more extensive on moving away from Hook Head. Extensive kelp forests covered the top of these gullies (Photo 10) which graded into a covering of red algae with depth. Crevices in the gullies and under boulders formed numerous sub-habitats (Photos 11-14). The epifaunal species composition was similar to that recorded at site 1 with the inclusion of a number of additional sponges and hydroids such as *Alcyonium digitatum* (Photo 12) and

echinoderms *Antedon bifida* and *Ophiothrix fragilis* (Photo 11). Fish species were also more numerous with conger eels (*Conger conger*), pollack (*Pollachius pollachius*), wrasse (*Labrus bergylta* and *L. mixtus*) regularly seen (Photo 14). Lobsters (*Homarus gammarus*) were observed under large boulders and in crevices throughout the area (Photo 13).

4. Conclusions

Given that the composition of the dredged material will be predominantly fine sand/silt clay, disposal at either of the proposed sites would have severe environmental impacts on the bottom fauna and flora in the immediate area of the potential disposal sites and also wider impacts on the benthos of the general area of Hook Head. The majority of the material will fall within the site boundaries and smother the fauna and flora therein while a plume of the finer material will settle over a wider area. Tidal currents in the general area of Hook Head are relatively strong (spring ebbing tides can be up to 1.5 Kts) and it is anticipated that a significant portion of the material deposited at the sites will be re-suspended and settle over a larger area (a detailed hydrographic/sediment dispersal model will need to be developed to predict the fate of this material).

Figure 2 outlines dive and angling sites from the vicinity of Waterford Estuary. Hook Head is a high amenity area in terms of S.C.U.B.A. diving due to its ease of access and to the prominent fauna and flora found there. Doonoge Point, located just south of site 1 is listed in the Guide To Irish Dive Sites by The Underwater Council together with a number of additional sites along Hook Head. The value of these sites was highlighted by the Waterford Harbour Sub-Aqua Club in a letter published in a recent Environmental Impact Statement for a proposal to dredge marine aggregates from a site south of Waterford Harbour (Aqua-Fact, 1998). Silting of these areas will have an immediate effect on the quality of diving.

Angling will also be affected as fish are attracted by the availability of food in a rich benthic environment. Lobsters in the vicinity of the site will be affected directly by smothering or indirectly by filling of their habitats with silt. A lobster re-seeding programme is currently ongoing in the Waterford Harbour which overlaps the location of site 2 (Figure 3).

The location of previous dumpsites are presented in Figure 4. The most recent of these sites (1996) 4 was located in the mouth of the estuary, the bottom consisting of gravel of various diameters (see Aqua-Fact Report, 7th August 1996). The effects

of dumping on this location can clearly be seen in a later Aqua-Fact report (15th November, 1996) where the bottom is covered with a fine muddy sediment. All fauna covered by this material would have died. Given that a follow up survey was not carried out, it is not known the current condition of the site.

It is recommended that a new site be identified outside the mouth of the Harbour i.e. a line from Hook Head to Swines Head. However, this cannot lie within the known herring spawning grounds and a detailed survey of the bottom substrate and faunal composition will be needed to identify this site.

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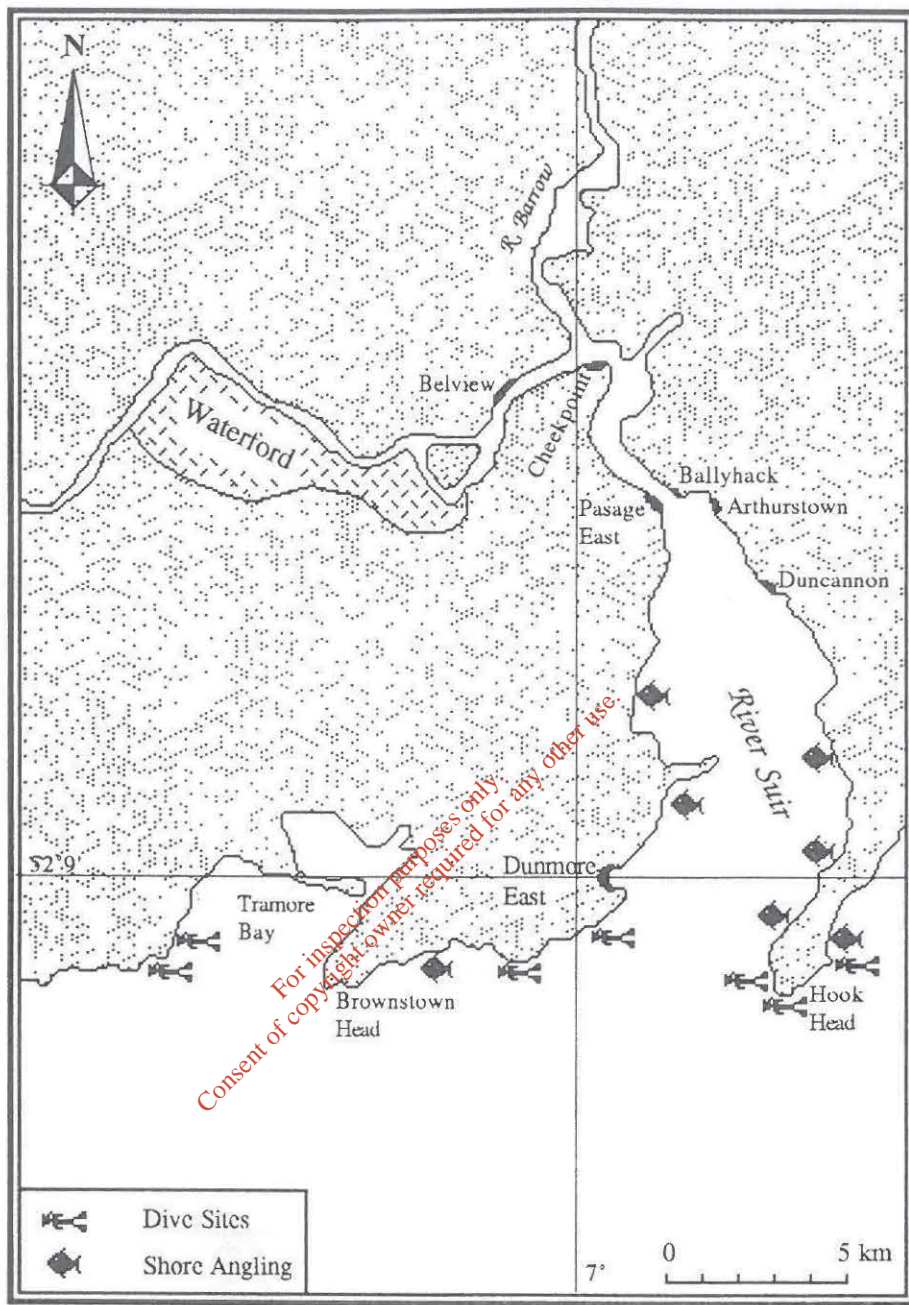


Figure 2. Location of dive sites and shore angling in the vicinity of Hook Head, Waterford Harbour.

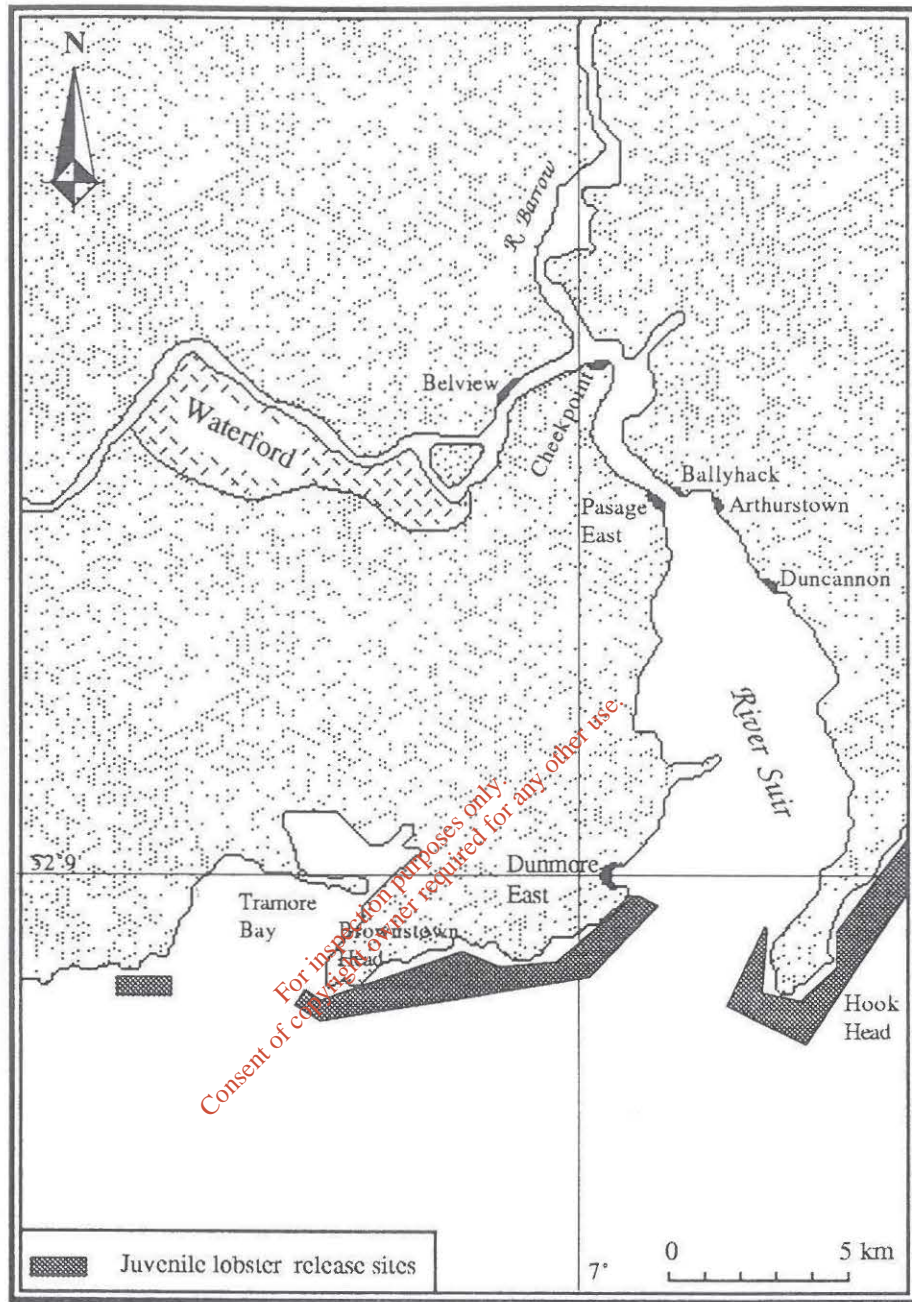


Figure 3. Location of juvenile lobster release sites, Waterford and Wexford.

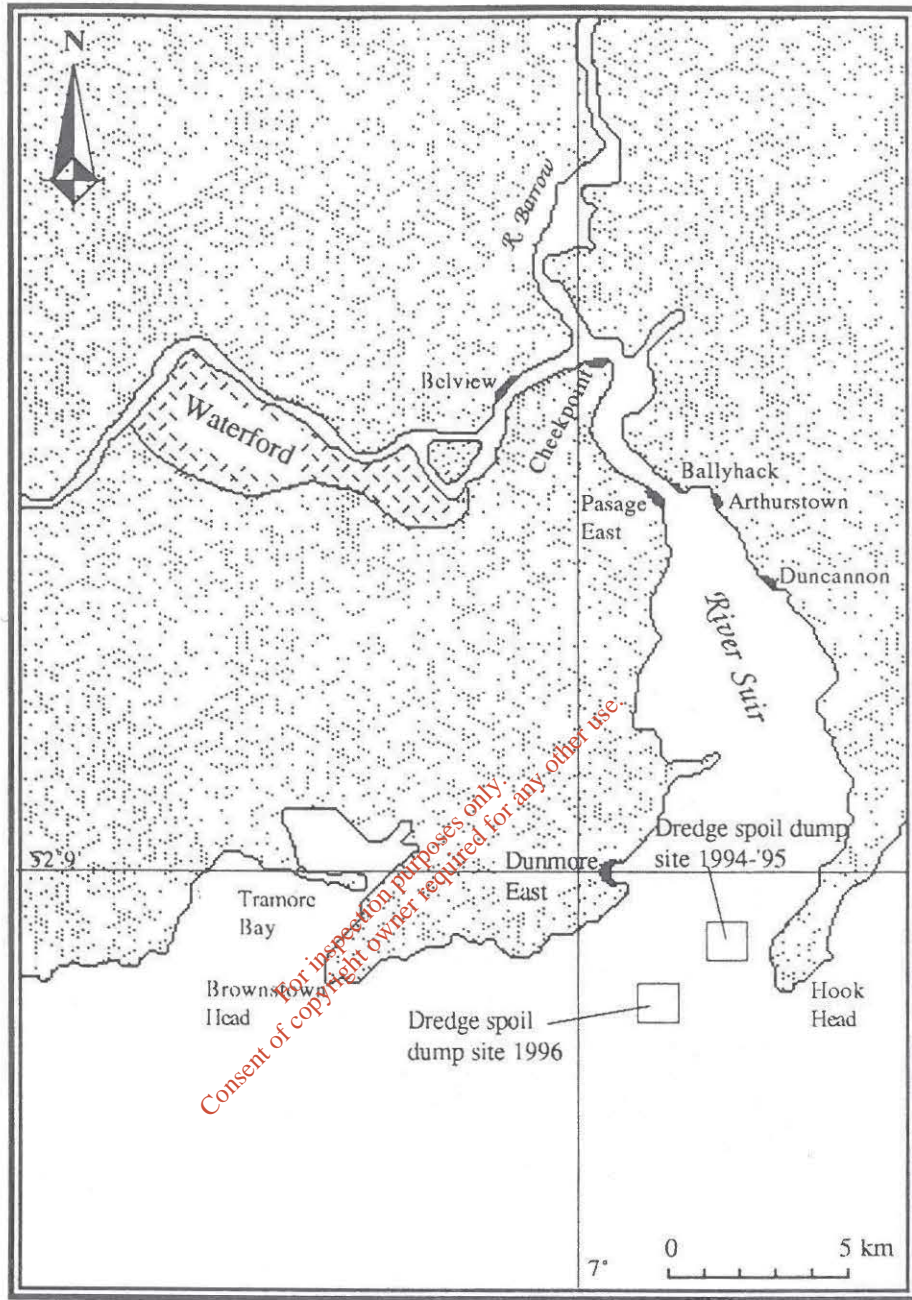


Figure 4. Location of the Previous Waterford Harbour dredge spoil dump sites.

Attachment E.1(iv): Surveys of the Dredge Spoil Dump Site, Aquafact Ltd, 1996

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**Photographic And Visual Survey Of The Seabed
In The Areas Of And Around A Dumpsite
In Waterford Harbour.**

15th November, 1996.



AQUA-FACT INTERNATIONAL SERVICES LTD.

**Photographic And Visual Survey Of The Seabed
In The Areas Of And Around A Dumpsite
In Waterford Harbour.**

15th November, 1996.

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**Aqua-Fact International Services Ltd.,
Kilkerrin Park,
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Report Title: Photographic And Visual Survey Of The Seabed In The Areas Of And
Around A Dumpsite In Waterford Harbour. 15th November,
1996.

Job Number: JN 170

Date: 27/11/96

Author: Mark/John Costelloe

REPORT APPROVAL SHEET

No; 1

Date; 27/11/96

Nature of Amendment;

1st Draft

Signed:

John Costelloe

No;

Date;

Nature of Amendment;

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No;

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Nature of Amendment;

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1. INTRODUCTION

Aqua-Fact International Services Ltd., were commissioned by the Department of the Marine to carry out a dive photographic survey prior to, and after the dumping of fine materials in Waterford Harbour. The initial survey was carried out on the 7th of August, 1996 to determine the seabed conditions prior to dumping and the results can be found in the report "Photographic and visual survey of the seabed in the areas of and around the proposed dumpsite in Waterford Harbour. (8th August, 1996."

Results from this survey indicated that, for the most part the dumpsite lies in an area experiencing strong tidal currents. The bottom was highly mobile with little or no fine material present. There was a paucity of fauna with mobile species (e.g. crabs) dominating.

The following report records seabed conditions after the dumping operation. Photographs were taken of the sediment surface during a number of transects within and outside the dumpsite and visual observations were made of the biological characteristics of these locations. The co-ordinates of the proposed dumpsite as outlined by the Department of the Marine are as follows (see Figure 1):

52° 07,45' N	06° 58,80' W
52° 07,45' N	06° 58,10' W
52° 07,10' N	06° 58,10' W
52° 07,10' N	06° 58,80' W



2. MATERIALS AND METHODS

Dive surveys were carried out at the dumpsite in Waterford Harbour on the 15th of November, 1996. At the time of diving sea conditions were calm with a light northerly wind blowing.

Seven dive transects were undertaken, two towards the southern end of the dumpsite, one in the centre of the dumpsite, three at the northern end of the dumpsite and a further transect north of the dumpsite heading into the harbour (see Figure 1.). Position fixes were taken with a GPS system.

Photographs and general observations were made along each of these transects although visibility on the bottom was bad. Photographs were taken with a Nikonos V fitted with a 15mm lens and Isonitecnic Flash System. Images were recorded on 100 ASA print film.

3. RESULTS

Photographs 1&2 record bottom conditions along the transects taken by the diver inside the north-eastern corner of the dumpsite (see Figure 1). The bottom is covered by a fine muddy sediment with no elements of the original seafloor apparent. No fauna were seen. Photo's 3-10 record conditions along the transect to the north-east of the site. The original coarse sand bottom was observed with a light layer of fine material covering it. Occasional blocks of dredged material were located (Photo's 4, 5, 8 & 10). Hermit crabs, *Pagurus bernhardus*, were common (Photo 3).

Photo's 11-14 show the depth of material deposited in the southern part of the site. The diver dug down approximately two feet to uncover rocks from the original bottom. The covering material is similar in composition as that recorded in the first transects. Again no fauna were observed.

Photo's 15-18 record conditions seen during the transects in the western side of the site. There was a light covering of fine material covering the coarse gravel bottom. Starfish, *Asteries rubens* (Photo's 17 & 18), were common.

Bottom conditions prevailing to the extreme north of the dumpsite are seen in photo's 19-22. There was a extremely light, flocculent layer of fine material covering a



coarse gravel bottom. This fine material was easily displaced and in places was moving with the bottom current. No fauna were observed.

4. OVERVIEW

The bottom in and around the dumpsite has clearly been impacted, the bulk of the dumped material being deposited on the eastern side of the site. This material is seen to consist primarily of a fine muddy sediment which overlays the original gravel/sand bottom. Any fauna covered by this material would presumably have died. Given that this area is a high energy site, this sediment is continually being sorted by the action of tidal currents and is being dispersed over a large area, the finer element being dispersed the furthest as observed in the northern transect located away from the site. It is probable that the bottom will eventually return to its original composition with the fine material being either dispersed in the open sea or settle in a depositional area near the shore.

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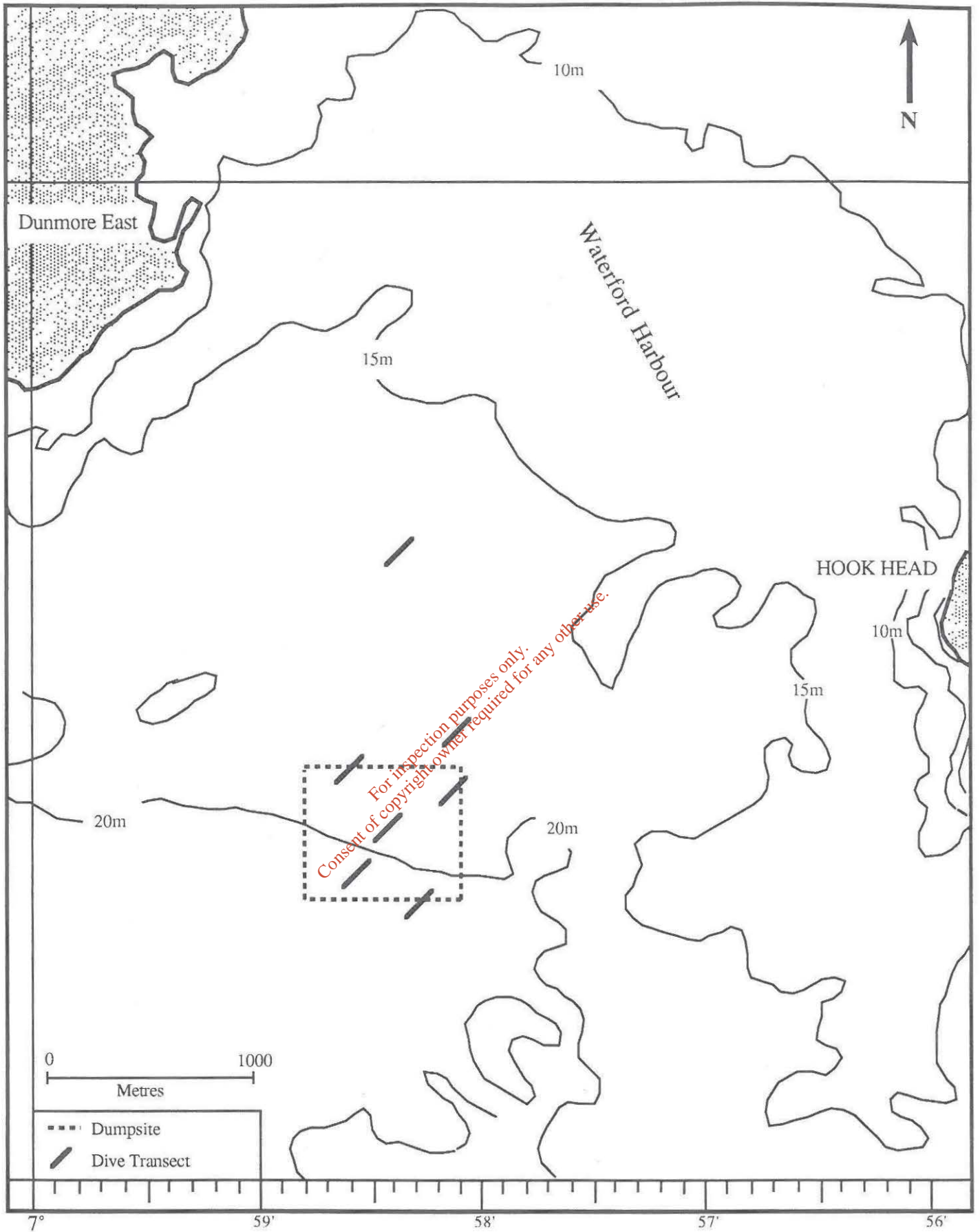


Figure 1. Location of the dive transects in the vicinity of the dumpsite in Waterford Harbour, 15th November 1996.

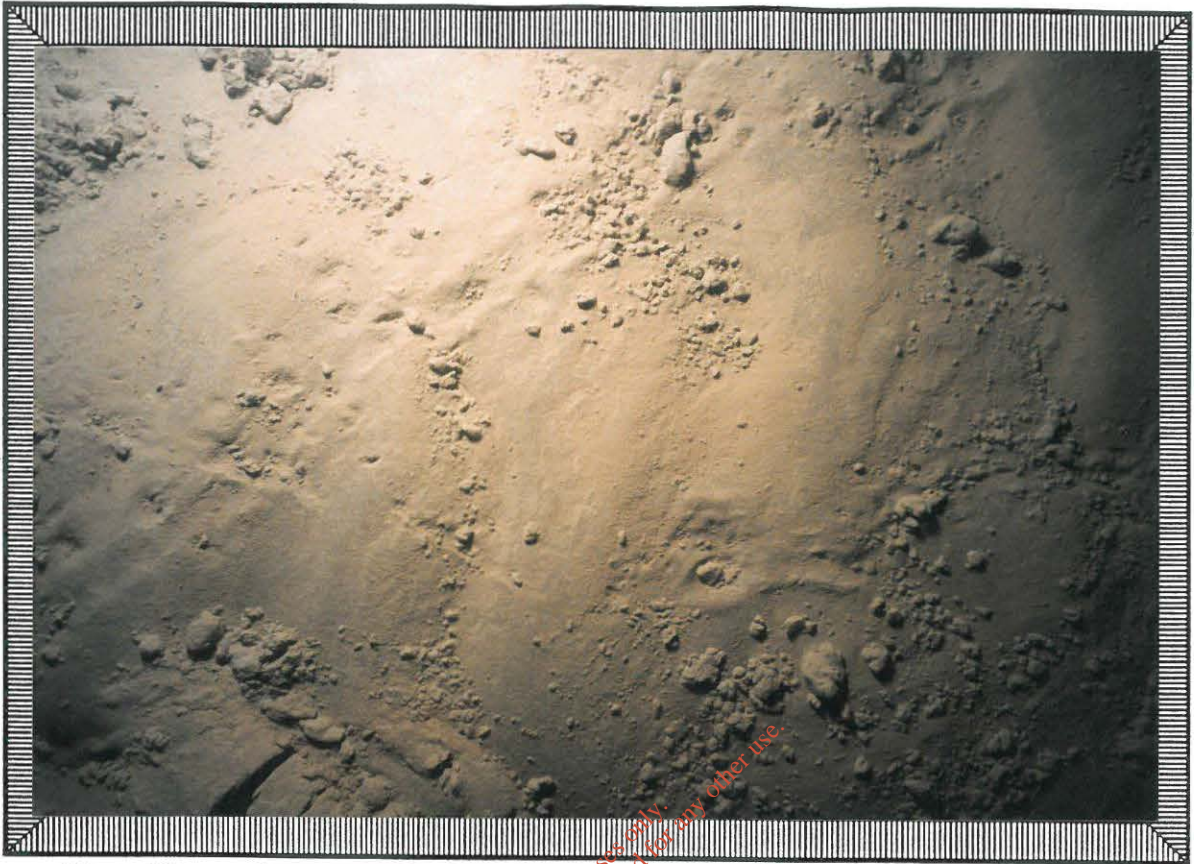


Photo No.:— 1



Photo No.:— 2

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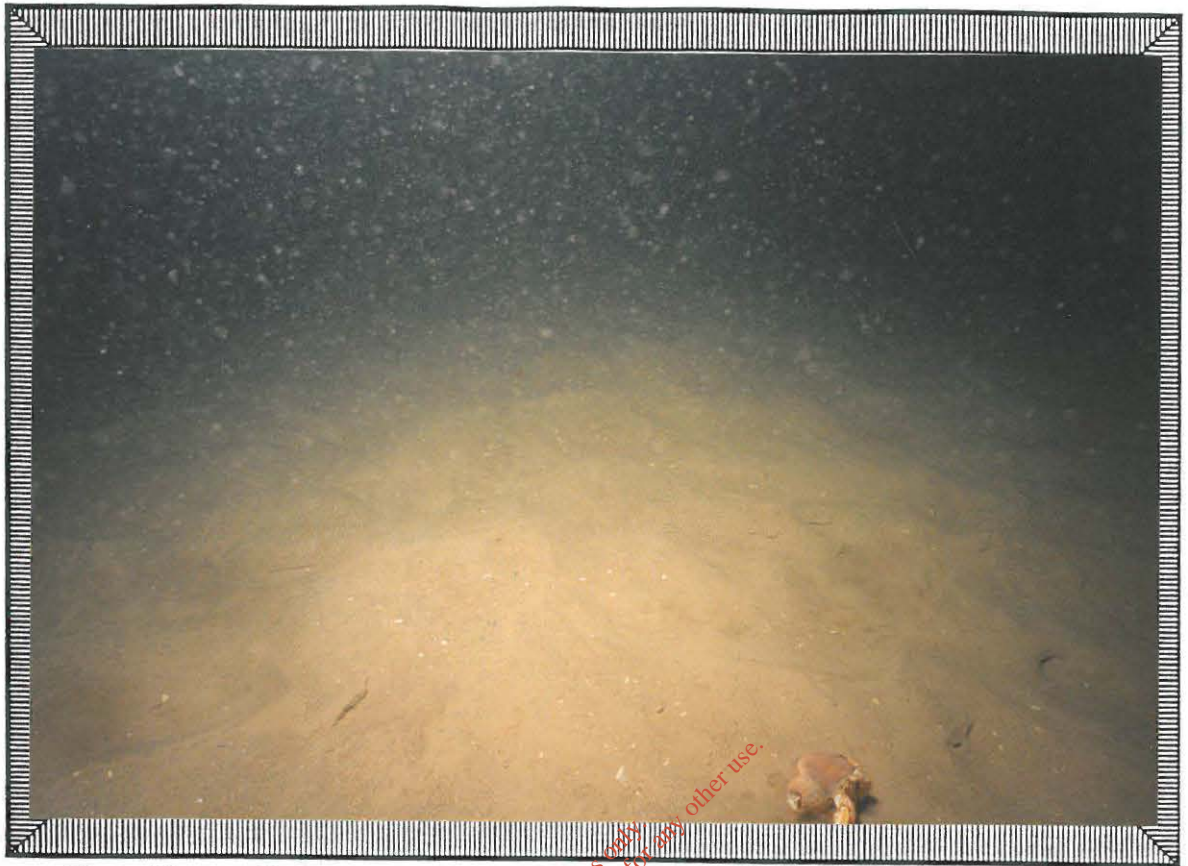


Photo No.:— 3

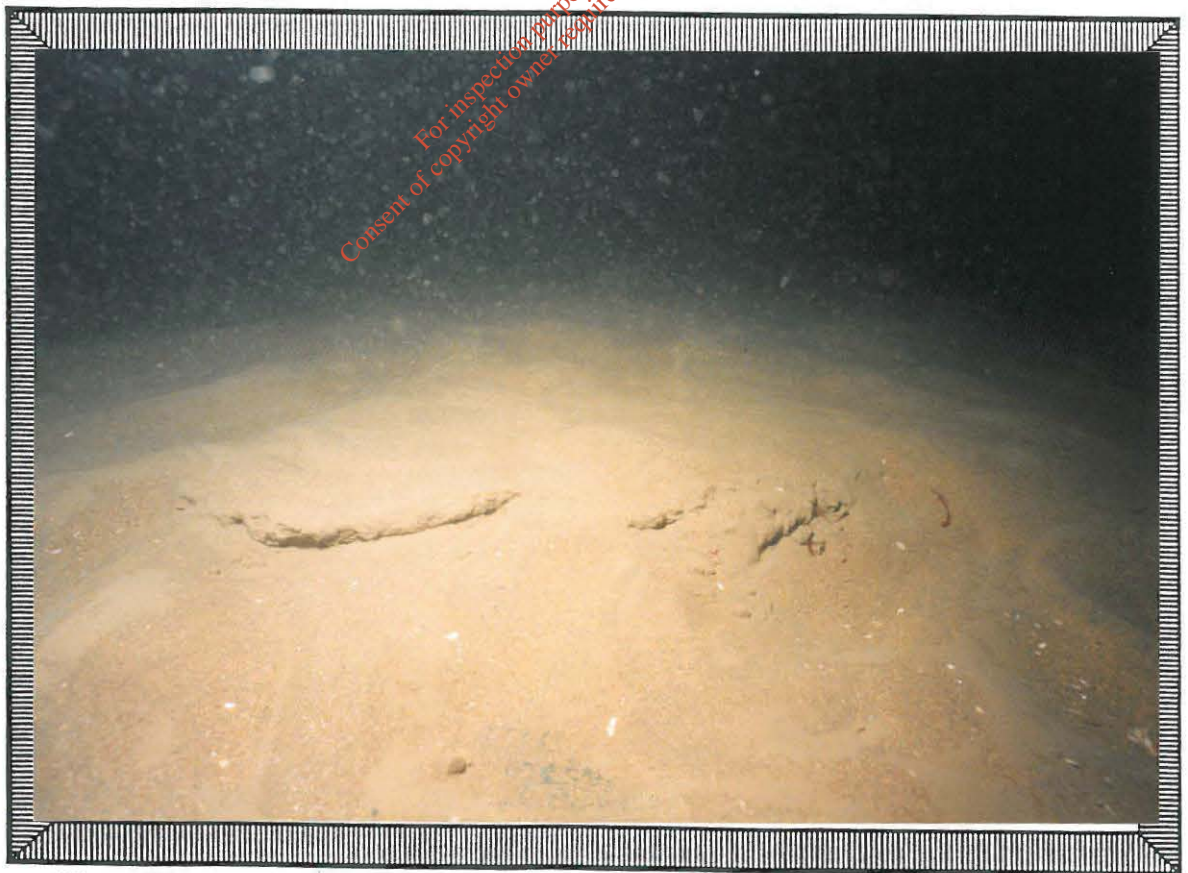


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Photo No.:— 5



Photo No.:— 6

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Photo No.:— 7



Photo No.:— 8

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Photo No.:— 9



Photo No.:— 10

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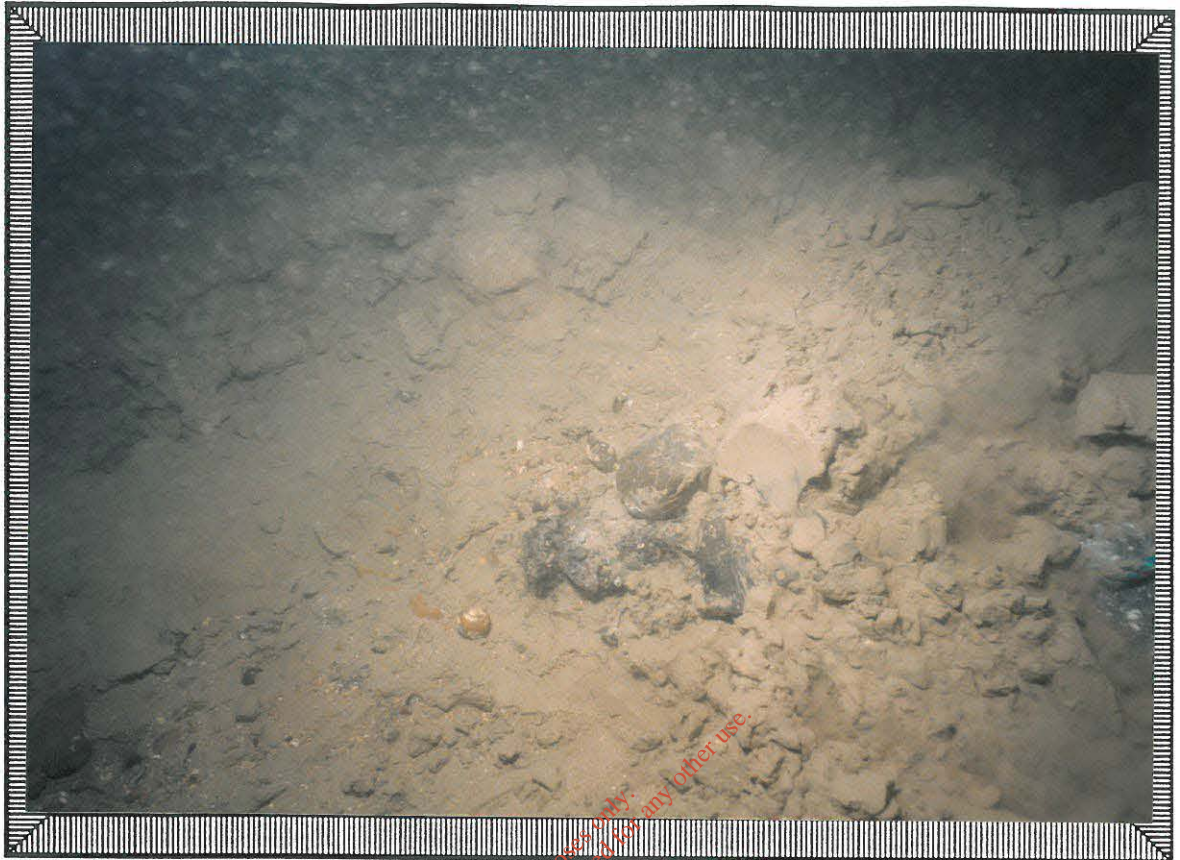


Photo No.:— 11



Photo No.:— 12

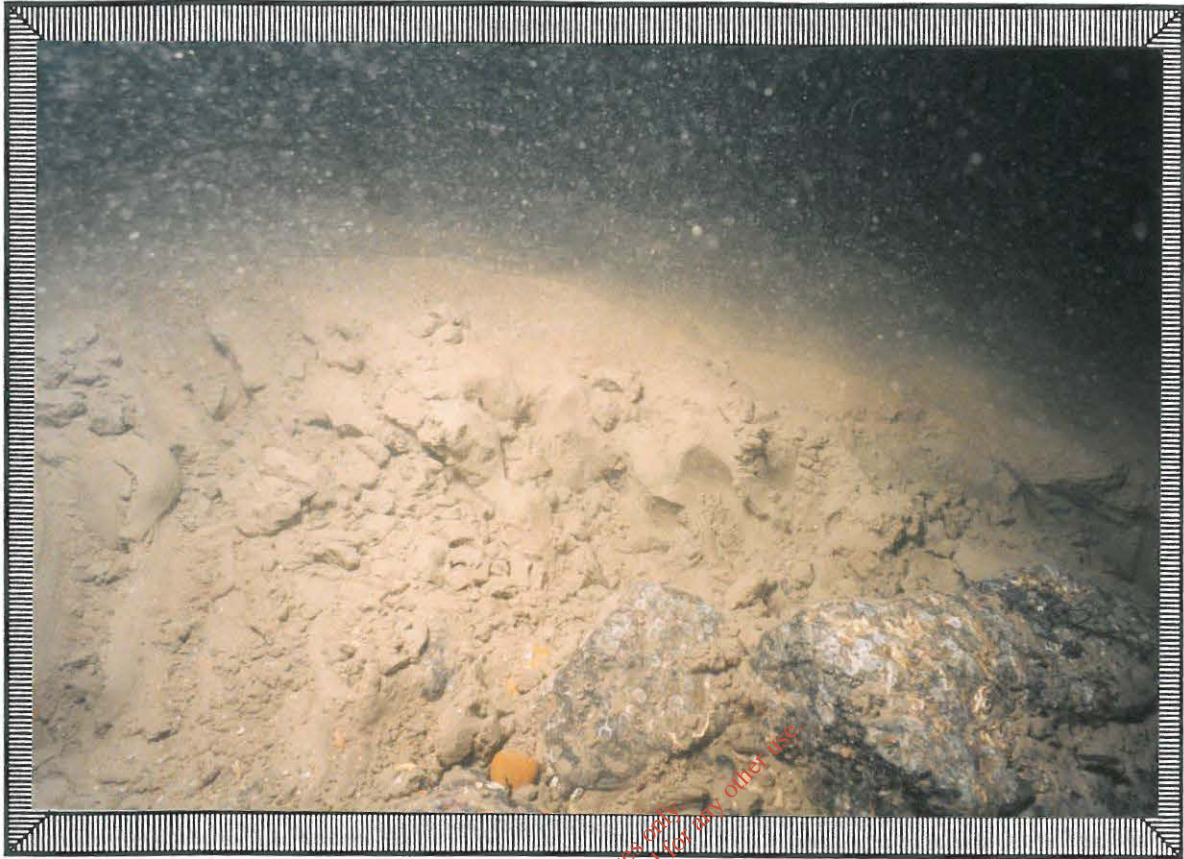


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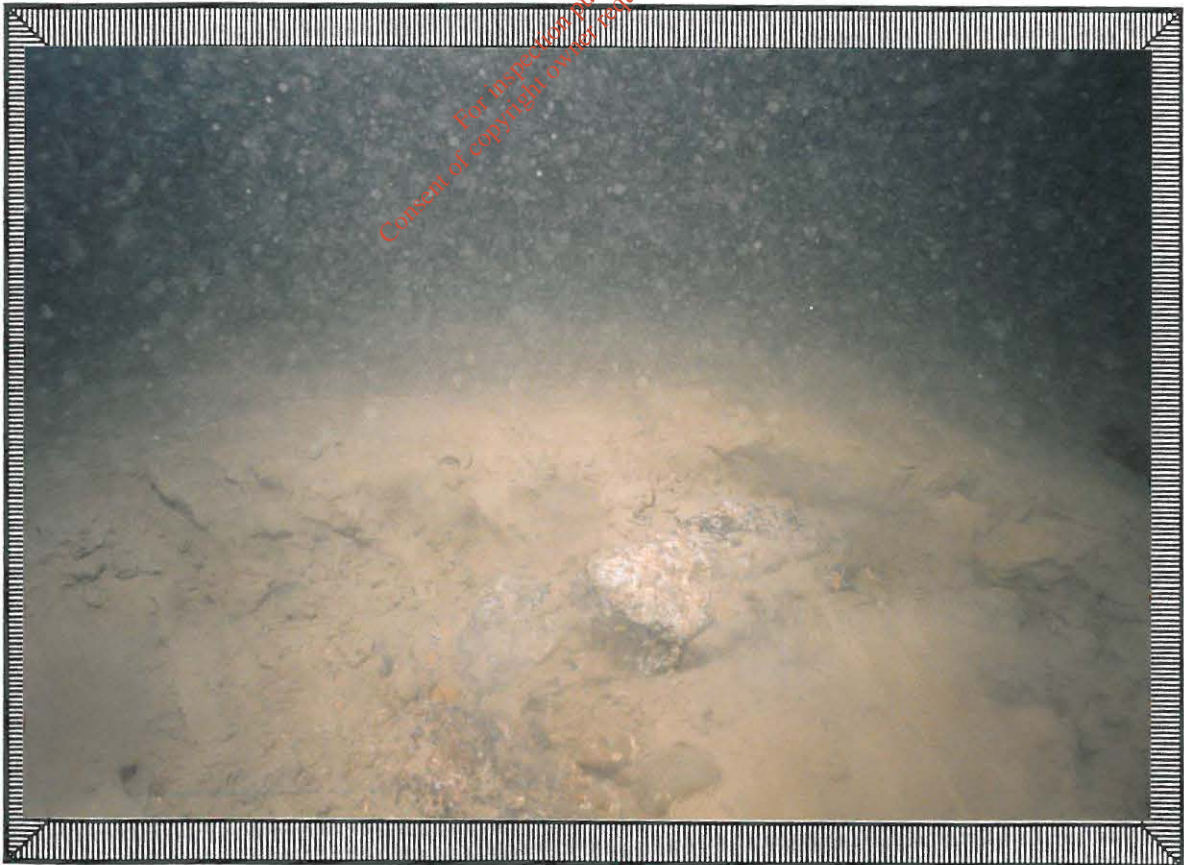


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Photo No.:— 15

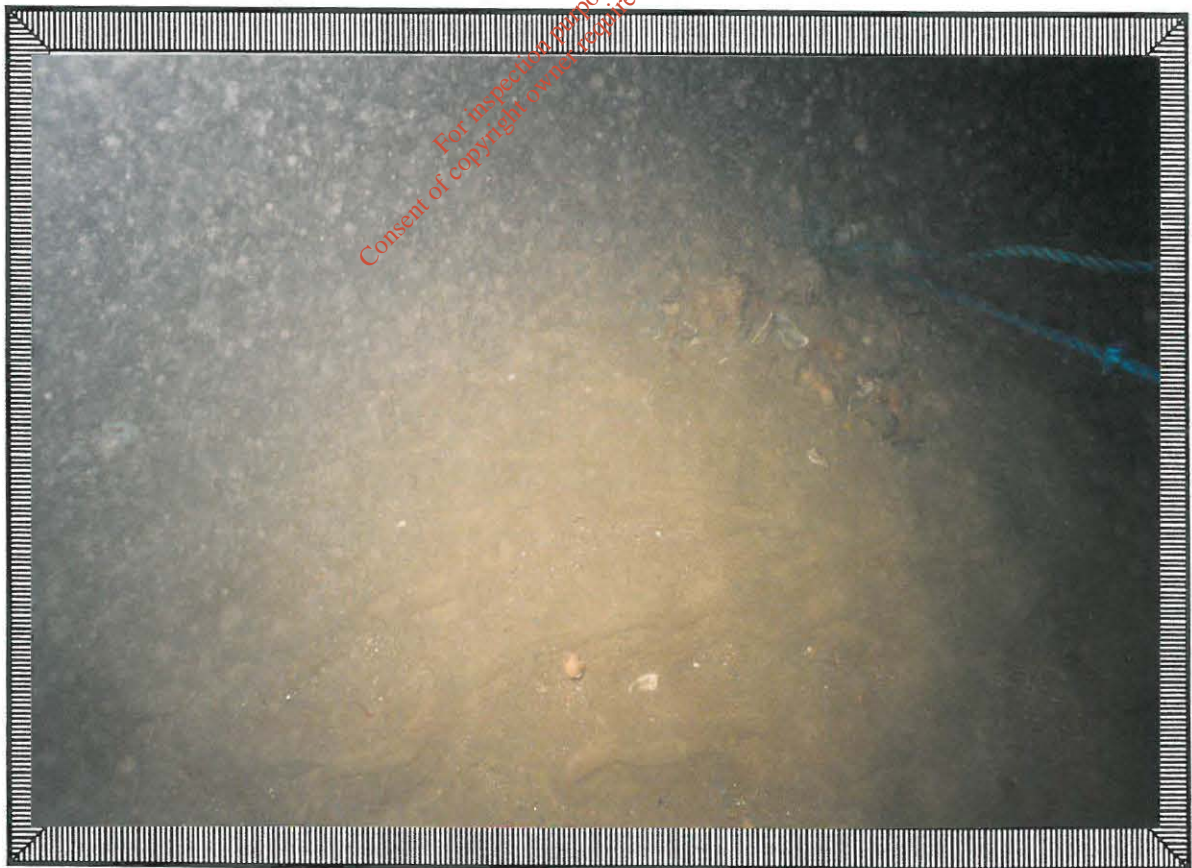


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Photo No.:— 17



Photo No.:— 18

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Photo No.:— 19



Photo No.:— 20



Photo No.:— 21

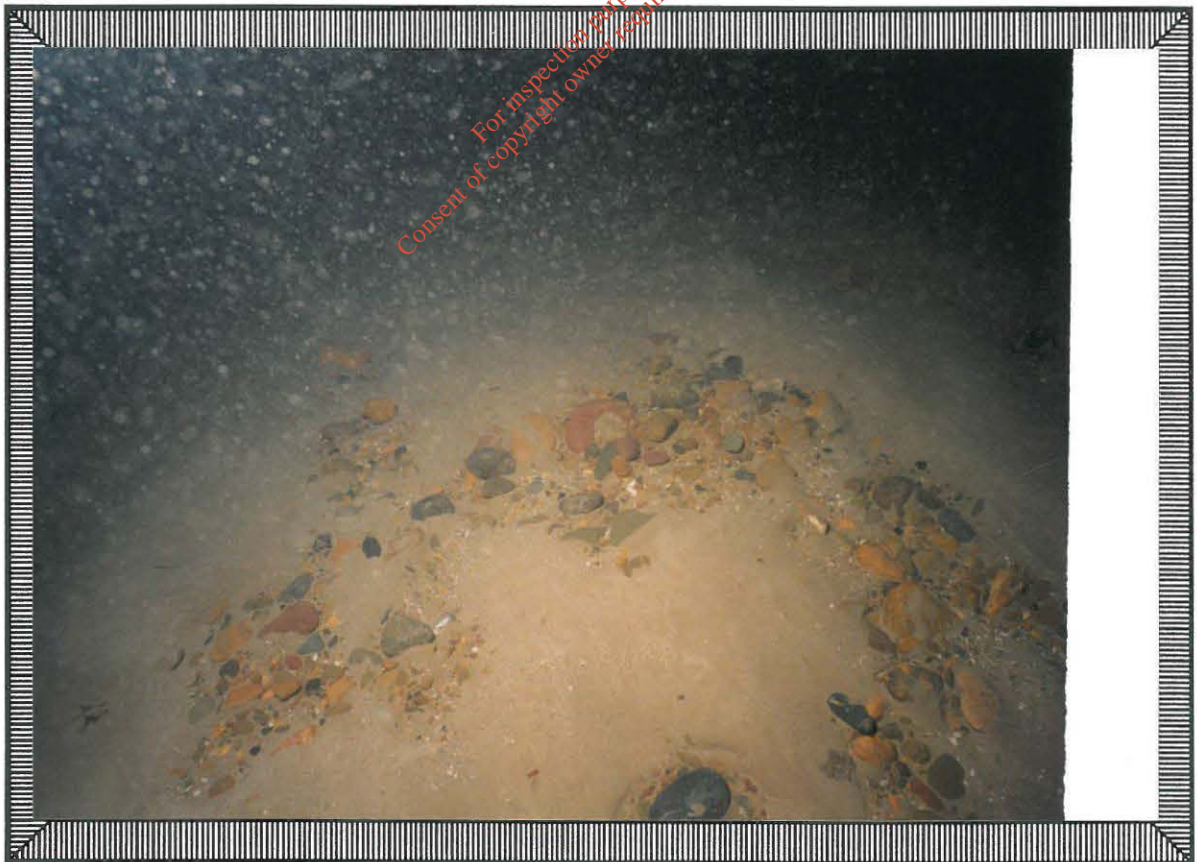


Photo No.:— 22