Appendix 1- Equipment Sheets for Dredgers

Equipment sheets for the following Trailer Suction Hopper Dredgers are provided in this appendix:

- Freeway
- Shoalway
- Waterway

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:43

Boskalis
Dredging & Marine Experts

EQUIPMENT SHEET

FREEWAY
TRAILING SUCTION HOPPER DREDGER

For inspection purposes only.
Consent of copyright owner required for any other use.

CONSTRUCTION/CLASSIFICATION

Built by	Shipkits B.V.
Year of construction	2014
Classification	I ✠ HULL ✠ MACH ✠ Hopperdredger. Unrestricted Navigation. Dredging within 15 miles from shore or within 20 miles from port; or dredging over 15 miles from shore with a significant wave height restriction to 2.5 m. ✠ AUT-UMS

MAIN DATA

Gross tonnage	4,320
Length overall	92.10 m
L.p.p.	84.87 m
Breadth	19,00 m
Moulded depth	7.25 m
Max. draught Int. load line	5,93 m/ DWT 5392
Max. draught dredging	6,82 m/ DWT 6750
Hopper capacity	4,500 m^3
Suction pipe diameter	900 mm
Max. dredging depth	30 m
Sailing speed loaded	11 kn
Total installed power	9,472 kW
Sand pump output	1,825 kW
Jet pump output	2*746 kW
Pump ashore output	3,650 kW
Propulsion power sailing	2*1,491 kW
Bow thruster	500 kW

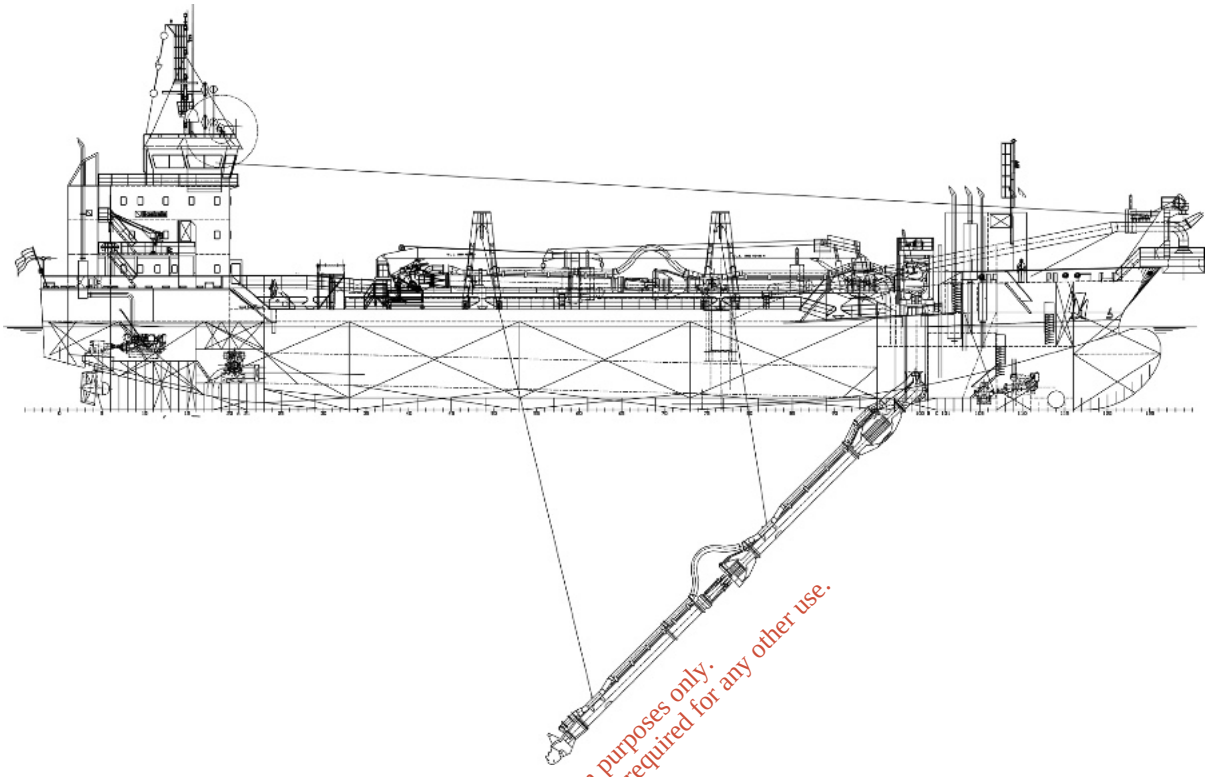
FEATURES

- Degassing system installed.
- Open bottom doors remain above the flat bottom of the vessel enabling very shallow dumping.
- Highly manoeuvrable using rudder propellers.
- Fully computerised engine room with certificate for unattended operation.
- Automatic discharge valve can be fitted into the overflow.
- Discharging through bottom doors, shore discharge and rainbow nozzle
- Fully compliant with the latest international requirements such as modern engines with low emissions.
- State of the art technology to minimize environmental impacts.

EPA Export 28-04-2021:02:37:43

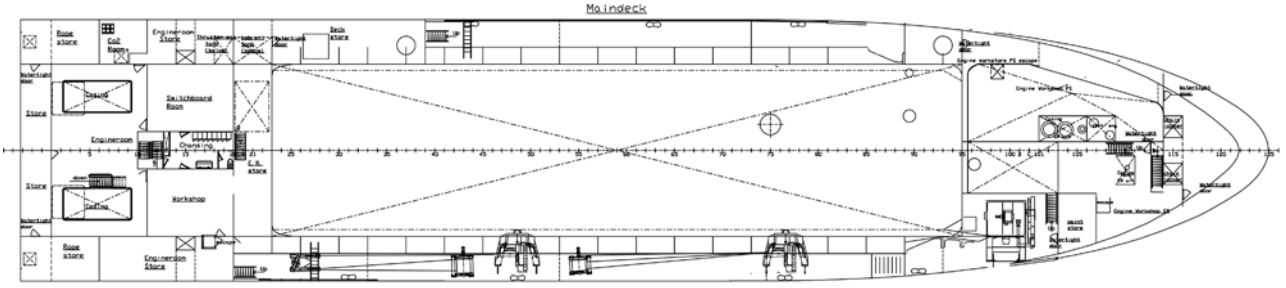
Boskalis
Dredging & Marine Experts

FREEWAY
TRAILING SUCTION HOPPER DREDGER



For inspection purposes only.
Consent of copyright owner required for any other use.

SIDE VIEW



TOP VIEW DECK LEVEL

Royal Boskalis Westminster N.V.
PO Box 43
3350 AA Papendrecht
The Netherlands

T +31 78 69 69 000
F +31 78 69 69 555

royal@boskalis.com
www.boskalis.com

The information contained in this data sheet is for guidance purposes only and may be subject to changes. © Boskalis. All rights reserved.

EPA Export 28-04-2021:02:37:43

Boskalis
Dredging & Marine Experts

EQUIPMENT SHEET

SHOALWAY
TRAILING SUCTION HOPPER DREDGER

For inspection purposes only.
Content of copyright owner required for any other use.

CONSTRUCTION/CLASSIFICATION

Built by	Intervak scheepswerf & constructie b.v. Harlingen
Year of construction	2010
Classification	I ✠ HULL ✠ MACH ✠ Hopperdredger. Unrestricted Navigation. Dredging within 15 miles from shore or within 20 miles from port; or dredging over 15 miles from shore with a significant wave height restriction to 2.5 m. ✠ AUT-UMS

FEATURES

- Shallow draft.
- Degassing system installed.
- Open bottom doors remain above the flat bottom of the vessel enabling very shallow dumping.
- Highly manoeuvrable using rudder propellers.
- Fully computerised engine room with certificate for unattended operation.
- Automatic discharge valve can be fitted into the overflow.
- Dumping through bottom doors, shore discharge and bow bulb.
- Fully compliant with the latest international requirements such as modern engines with low emissions.
- Oil pollution prevention equipment, and approved anti fouling paint.
- State of the art technology to minimise environmental impacts.

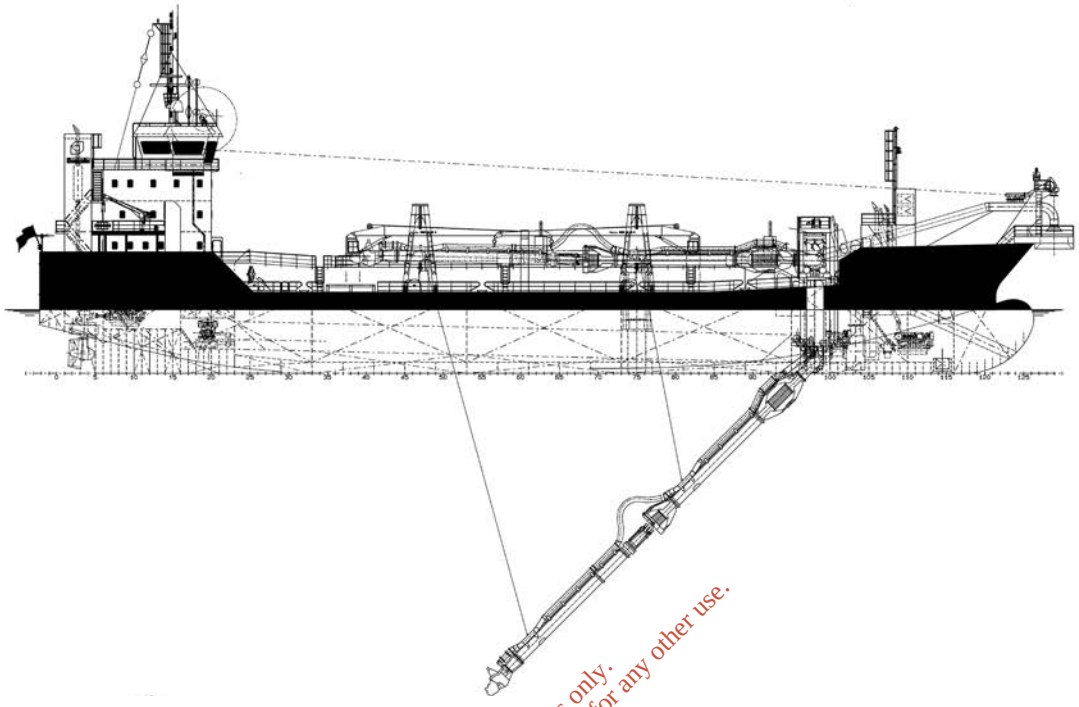
MAIN DATA

Gross tonnage	4,088
Length overall	90.00 m
L.p.p.	83.09 m
Breadth	19,00 m
Moulded depth	7.25 m
Max. draught Int. load line	5,93 m/ DWT 5392
Max. draught dredging	6,82 m/ DWT 6750
Hopper capacity	4,500 m^3
Suction pipe diameter	900 mm
Max. dredging depth	30 m
Sailing speed loaded	11 kn
Total installed power	6,666 kW
Sand pump output	1,680 kW
Jet pump output	2*746 kW
Pump ashore output	1,680 kW
Propulsion power sailing	2*1,491 kW
Bow thruster	500 kW

EPA Export 28-04-2021:02:37:43

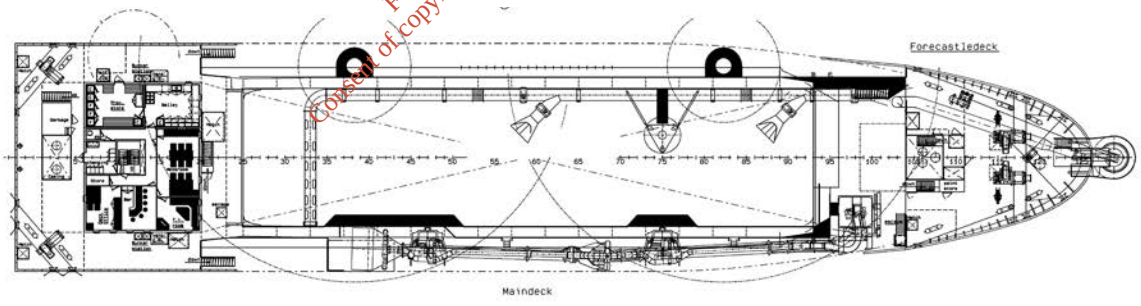
Boskalis
Dredging & Marine Experts

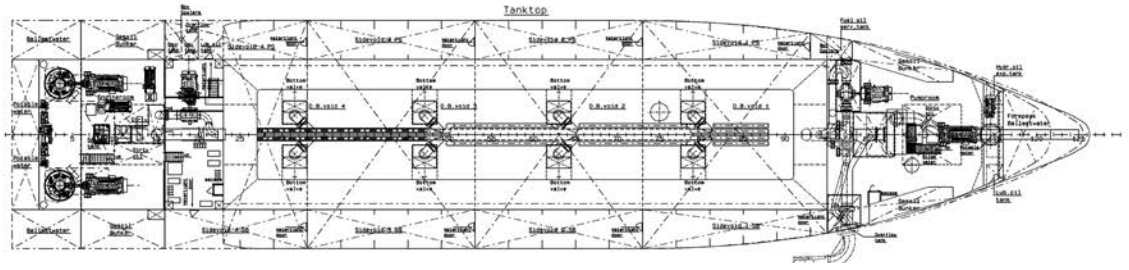
SHOALWAY
TRAILING SUCTION HOPPER DREDGER



Copyright owner required for any other use.
For inspection purposes only.

SIDE VIEW





TOP VIEW DECK LEVEL

Royal Boskalis Westminster N.V.
PO Box 43
3350 AA Papendrecht
The Netherlands

T +31 78 69 69 000
F +31 78 69 69 555

royal@boskalis.com
www.boskalis.com

The information contained in this data sheet is for guidance purposes only and may be subject to changes. © Boskalis. All rights reserved.

EPA Export 28-04-2021:02:37:43

Boskalis
Dredging & Marine Experts

EQUIPMENT SHEET

WATERWAY
TRAILING SUCTION HOPPER DREDGER

For inspection purposes only.
Consent of copyright owner required for any other use.

CONSTRUCTION/CLASSIFICATION

Built by	Merwede Shipyard
Year of construction	2001
Classification	I ✠ HULL ✠ MACH ✠ AUT-UMS Hopper dredger. Dredging within 15 miles from shore or within 20 miles from port. Dredging over 15 miles from shore with H.S. <= 2.5 m. Unrestricted navigation.

FEATURES

Shallow draught and large loading capacity.

Awarded "Ship of the year 2002": the most technically-innovative vessel built.

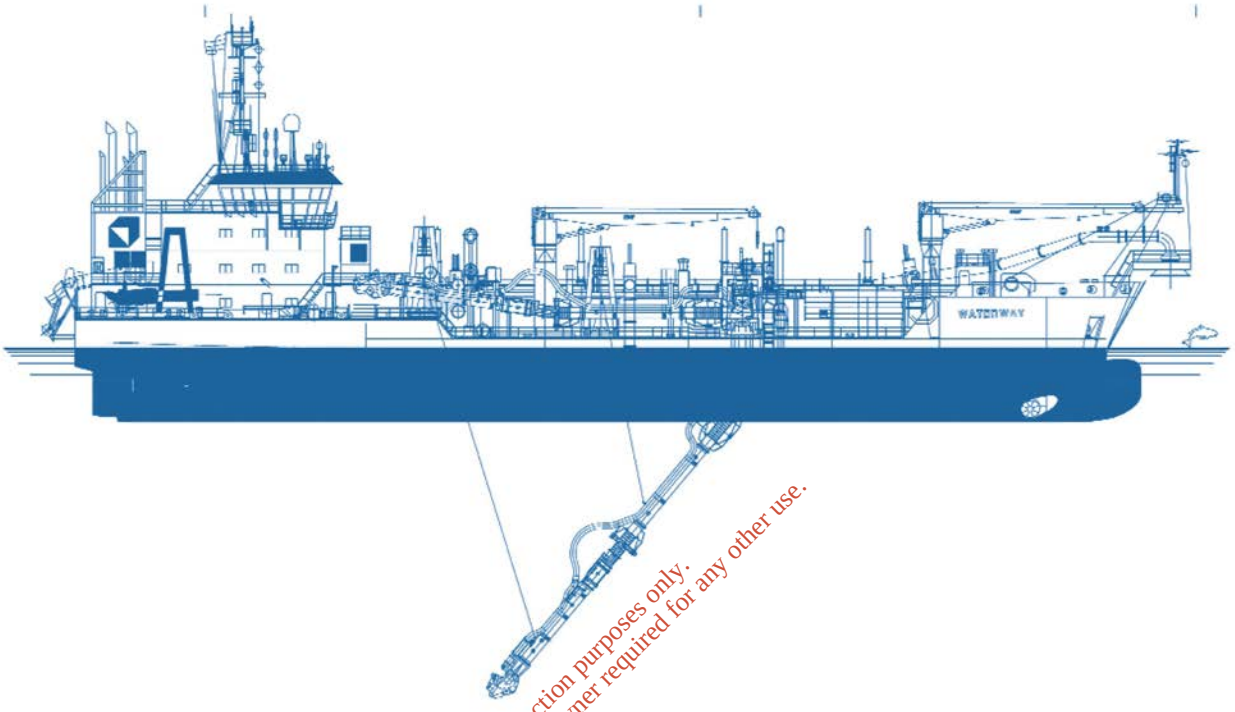
MAIN DATA

Gross tonnage	5,393
Length overall	97.70 m
Breadth	23.00 m
Moulded depth	7.00 m
Max. draught empty	4.04 m
Max. draught Int. load line	5.72 m
Max. draught dredging load line	6.58 m
Carrying capacity (D.W.)	7,192 t
Hopper capacity	4,906 m^3
Suction pipe diameter	1 x 0.90 m
Max. dredging depth	28.00 m
Discharge systems	4 bottom doors/pump ashore/ rainbow installation
Sailing speed loaded	12.5 kn
Total installed power	6,365 kW
Sand pump output	1,500 kW
Jet pump output	1,500 kW
Pump ashore output	2,760 kW
Propulsion power sailing	4,000 kW
Bow thruster	500 kW

EPA Export 28-04-2021:02:37:43

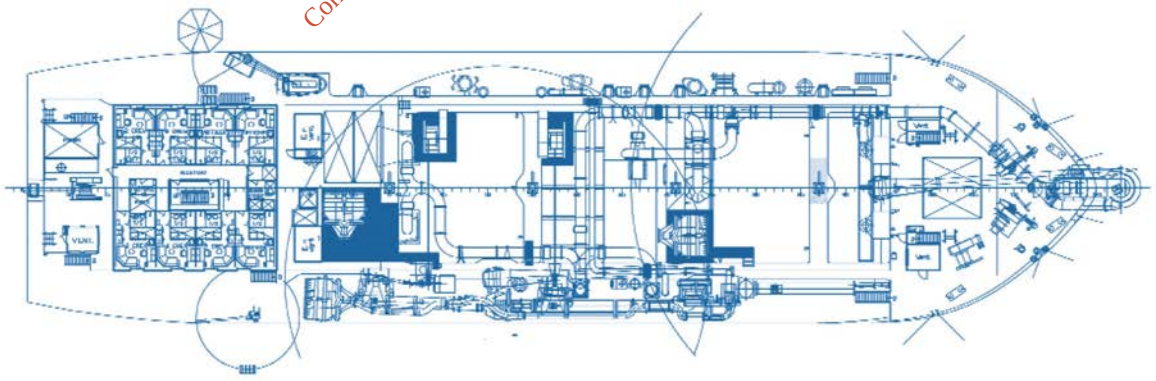
Boskalis
Dredging & Marine Experts

WATERWAY
TRAILING SUCTION HOPPER DREDGER



For inspection purposes only.
Consent of copyright owner required for any other use.

SIDE VIEW



TOP VIEW DECK LEVEL

Royal Boskalis Westminster N.V.
PO Box 43
3350 AA Papendrecht
The Netherlands

T +31 78 69 69 000
F +31 78 69 69 555

royal@boskalis.com
www.boskalis.com

The information contained in this data sheet is for guidance purposes only and may be subject to changes. © Boskalis. All rights reserved.

EPA Export 28-04-2021:02:37:43

Appendix 2 - Loading Area Drawings

The following 5 Drawings are presented in this Appendix in the following order:

Area dredged by the *Freeway* TSHD and *Shoalway* TSHD (January – March 2020)

- **Drawing 180032-9002 Site Location (Season 3)**
- **Drawing 180032-9003 Dredging Layout Inner Channel (Season 3)**
- **Drawing 180032-9004 Dredging Layout Outer Channel (Season 3)**

Area dredged by the *Waterway* TSHD (October – December 2020)

- **Drawing 180032-9005 Site Location (Season 4)**
- **Drawing 180032-9006 Dredging Layout Inner Channel (Season 4)**

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:43

© COPYRIGHT OF THIS DRAWING IS RESERVED BY DBFL CONSULTING ENGINEERS. NO PART SHALL BE REPRODUCED OR TRANSMITTED WITHOUT THEIR WRITTEN PERMISSION.

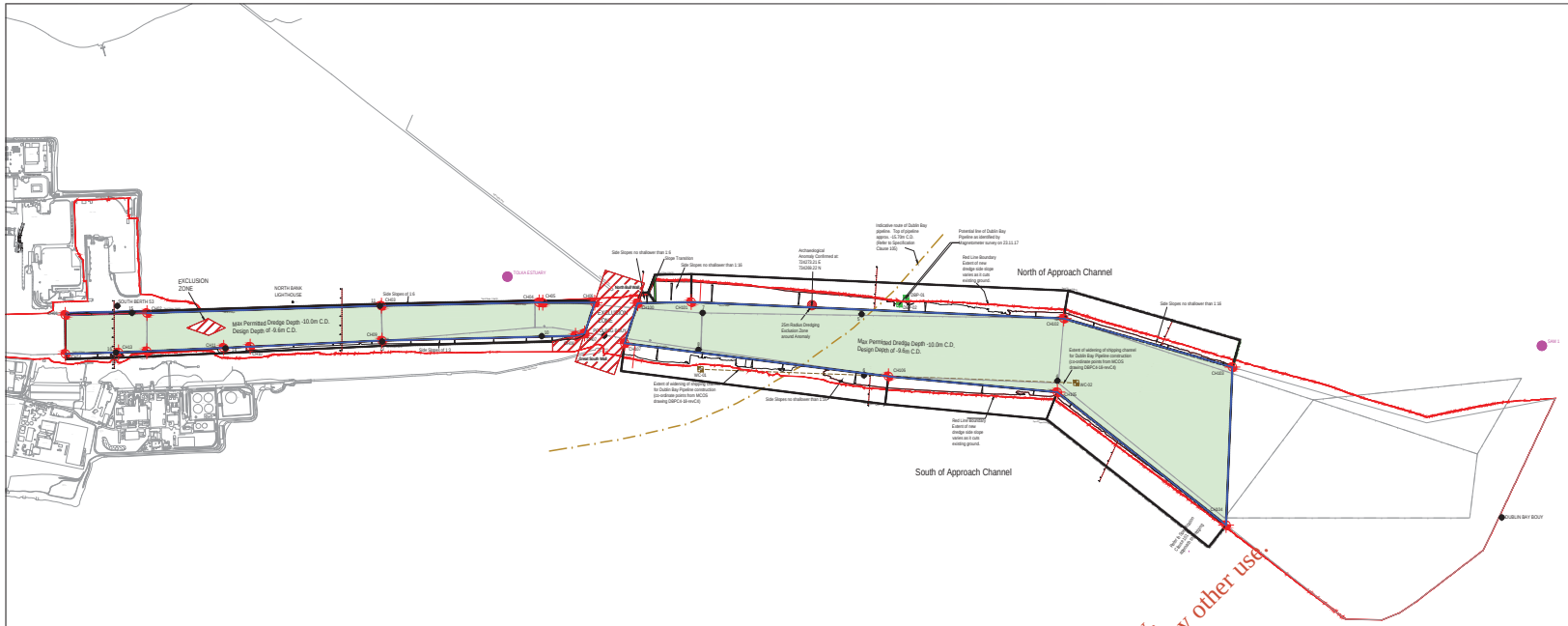
ON ORIGINAL

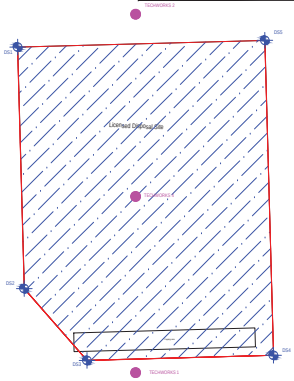
0 50 100 150 200 250 300mm

NOTES:

GENERAL NOTES:
1. THE CONTRACTOR SHALL VERIFY DIMENSIONS AGAINST SUCH OTHER DRAWINGS OR SITE CONDITIONS AS PERTAIN TO THIS PART OF THE WORKS.
2. EXISTING SERVICES. ANY INFORMATION CONCERNING THE LOCATION OF EXISTING SERVICES INDICATED ON THIS DRAWING IS INTENDED FOR GUIDANCE ONLY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE AND CLEAR THE EXACT HORIZONTAL AND VERTICAL ELEMENT OF ALL CABLES, PIPES ETC. (BOTH UNDERGROUND AND OVERHEAD) BEFORE WORK COMMENCES.
3. DATUM : CHART DATUM (DUBLIN PORT)

EXTENT OF EXISTING CHANNEL
DUMPING AT SEA LOCATION
EXTENT OF CHANNEL DREDGING
CHANNEL DREDGING EXTENTS
EXISTING NAVIGATION BUOY
WATER QUALITY AND MARINE MAMMAL BUOYS
DUMP SITE COORDINATES
WORKS BOUNDARY THIS PHASE
NEW APPROACH CHANNEL LINES
SLOPE LIMIT
SLOPE DESIGN LINE





For inspection purposes only.
Consent of copyright owner required for any other use.

CHANNEL DREDGING SETTING OUT POINTS RELATIVE TO ITM

NAME	EASTING	NORTHING
CH01	720175.3	734215.9
CH02	720624.1	734226.2
CH03	721910.9	734266.5
CH04	722776.3	734284.4
CH05	722796.0	734283.1
CH06	723081.3	734283.0
CH07	723025.8	734114.0
CH08	722976.0	734101.4
CH09	721913.7	734075.7
CH10	721190.3	734042.0
CH11	721044.9	734035.3
CH12	720623.3	720623.3
CH13	720468.0	734010.3
CH14	720176.6	734002.0

INNER CHANNEL

Dump Site Coordinates

	ITM		WGS84	
Name	Easting (m)	Northing (m)	Latitude (N)	Longitude (W)
DS1	729872.714	733357.151	53.3345°	6.05°
DS2	729907.592	732077.729	53.3238°	6.05°
DS3	730240.217	731697.109	53.3196°	6.0452°
DS5	731182.335	733393.134	53.3196°	6.0303°
DS4	731228.406	731724.296	53.3345°	6.0303°

Water Quality and Marine Mammal Buoys

	Irish Grid		ITM			
Buoy Name	Easting	Northing	Easting	Northing	Latitude (N)	Longitude (W)
Tecworks 1	330575.39	231606.77	730497.8	731632.49	53°11'0.131339916'	6°02.48005825
Tecworks 2	330575.39	233505.04	730497.82	733521.35	53°21.15463702'	6°02.43144626'
Tecworks 3	325702.07	228473.32	725625.54	728500.75	53° 8' 51.142333	6° 06.9394833'
Tecworks 4	330575.39	232539.37	730497.81	732565.89	53°11.63434909'	6°02.45700431'
SAM1	328356.41	234020.68	728279.37	734048.89	53°24.465	6°04.418
Tolka Estuary	322679.65	234389.8	722603.83	734425.97	53°24.75	6°09.52

REFERENCE	LATITUDE (N)	LONGITUDE (W)	ITM	
			EASTING	NORTHING
SOUTH BERTH 53	53°20'41.5888	6°11'27.2006	720461.2	734265.7
POOLBEG BOUY	53°20'34.1005	6°9'3.0095	723133.9	734102.6
BOUY 9	53°20'40.4844	6°9'22.0148	722777.3	734290.8
BOUY 8	53°20'31.1799	6°8'35.1777	723651.0	734025.7
BOUY 7	53°20'37.6863	6°8'33.6783	723673.5	734227.5
BOUY 6	53°20'25.8544	6°7'46.3337	724558.7	733884.7
BOUY 5	53°20'36.7203	6°7'46.5501	724545.9	734220.4
BOUY 4	53°20'23.9872	6°6'48.9929	725620.8	733854.9
BOUY 3	53°20'35.2355	6°6'46.3768	725660.0	734203.8
BOUY 16	53°20'33.3231	6°11'27.9561	720453.7	734009.9
BOUY 15	53°20'40.3596	6°11'27.6582	720541.5	734227.5
BOUY 14	53°20'33.5797	6°10'55.4504	721054.7	734033.1
BOUY 12	53°20'34.0692	6°10'8.9526	721914.3	734070.2
BOUY 11	53°20'40.4107	6°10'9.3351	721902.2	734266.0
BOUY 10	53°20'34.3038	6°9'21.5786	722790.3	734100.0

EXISTING NAVIGATION BOUY LOCATIONS

REV.	DATE	DESCRIPTION	BY	CHKD
		TENDER		
DESIGNED		PREPARED		
DATE:	April 2018	CHECKED		

DBFL Consulting Engineers
Dublin: Ormond House, Upper Ormond Quay, Dublin 7, Ireland. Phone: +353 1 400 4000 Fax: +353 1 400 4050
Cork: Unit 2, The Chandlery, 1-2 Corn Exchange Street, Waterford, Ireland. Phone: +353 51 309 500 Fax: +353 51 844 913
DBFL Consulting Engineers www.dbfl.ie info@dbfl.ie

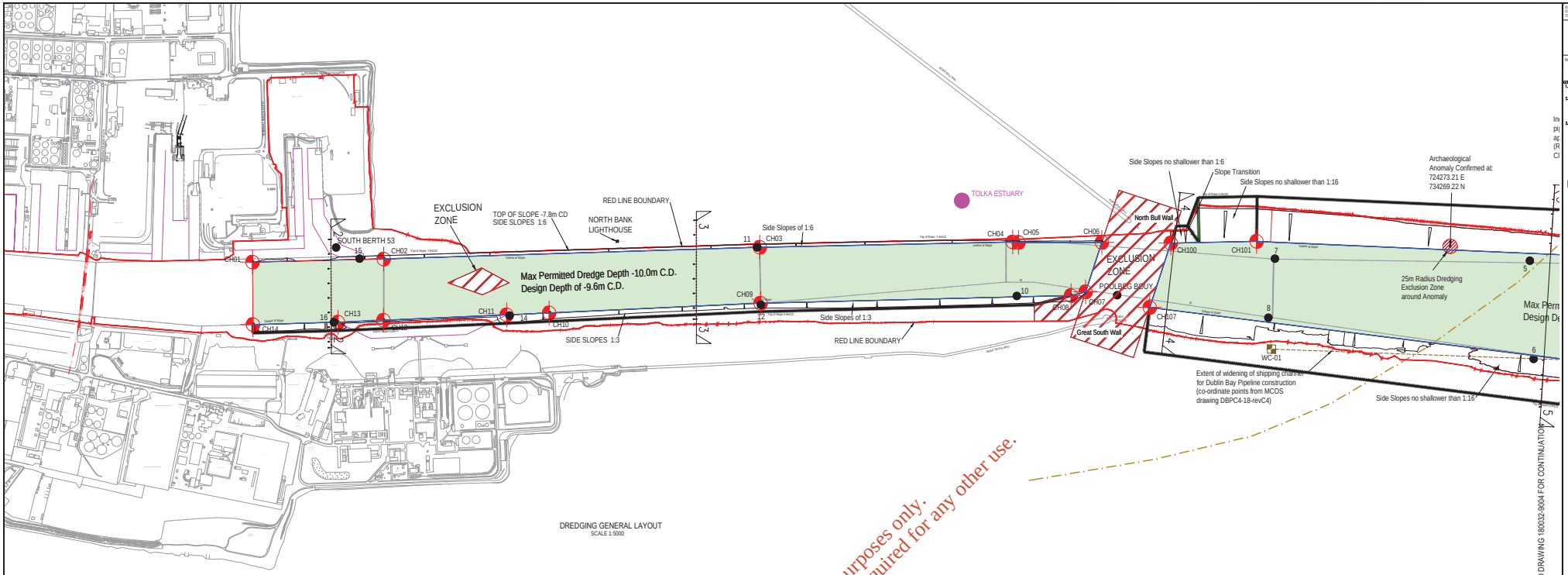
PROJECT
DUBLIN PORT CAPITAL DREDGING

DWG. TITLE
SITE LOCATION (SEASON 3)

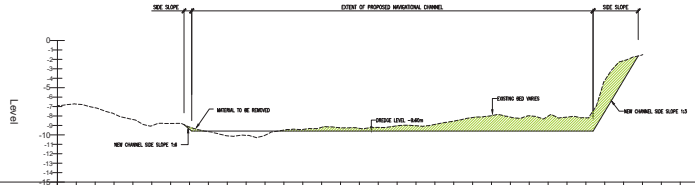
CLIENT
DUBLIN PORT COMPANY

SCALE	1:10000 @A0	FILE REF	180032-9002
DWG. NO.	180032-9002		-

EPA Export 28-04-2021:02:37:43

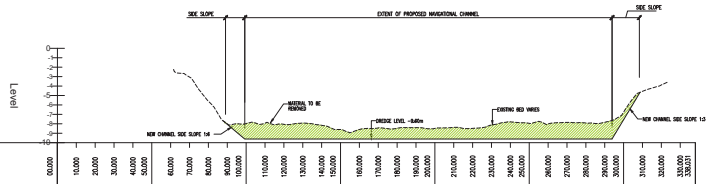


DREDGING GENERAL LAYOUT
SCALE 1:5000



Chainage	00.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	210.000	220.000	230.000	240.000	250.000	260.000	270.000	280.000	290.000	300.000	310.000	320.000	330.000	340.000	350.000	360.000	370.129
Existing Levels	-6.860	-6.724	-7.126	-7.775	-8.374	-9.039	-8.790	-9.176	-9.658	-10.008	-10.046	-10.039	-9.489	-9.427	-9.293	-9.251	-9.310	-9.254	-9.039	-9.032	-8.888	-8.546	-8.160	-7.969	-8.117	-7.986	-8.010	-8.131	-8.199	-8.230	-8.147	-7.522						

SECTION 2 – LONGSECTION
SCALE: H 1:1000,V 1:200. DATUM: –15.000



Chainage	00.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	210.000	220.000	230.000	240.000	250.000	260.000	270.000	280.000	290.000	300.000	310.000	320.000	330.000	338.231
Existing Levels					-2.243	-2.243	-2.243	-3.051	-5.599	-8.000	-7.978	-7.924	-8.057	-7.930	-8.157	-8.615	-8.806	-8.445	-8.473	-8.453	-8.486	-8.380	-8.480	-8.128	-7.797	-7.950	-8.021	-7.848	-7.922	-7.843	-8.772	-4.536	-3.861				

SECTION 3 – LONGSECTION
SCALE: H 1:1000,V 1:200. DATUM: –10.000

CHANNEL DREDGING SETTING OUT POINTS RELATIVE TO ITM

NAME	EASTING	NORTHING
CH01	720175.3	734215.9
CH02	720624.1	734226.2
CH03	721910.9	734266.5
CH04	722776.3	734284.4
CH05	722796.0	734283.1
CH06	723081.3	734283.0
CH07	723025.8	734114.0
CH08	722976.0	734101.4
CH09	721913.7	734075.7
CH10	721190.3	734042.0
CH11	721044.9	734035.3
CH12	720623.3	720623.3
CH13	720468.0	734010.3
CH14	720176.6	734002.0

INNER CHANNEL

REFERENCE	LATITUDE (N)	LONGITUDE (W)	ITM	
			EASTING	NORTHING
SOUTH BERTH 53	53°20'41.5888	6°11'27.2006	720461.2	734265.7
POOLBEG BOUY	53°20'34.1005	6°9'3.0095	723133.9	734102.6
BOUY 9	53°20'40.4844	6°9'22.0148	722777.3	734290.8
BOUY 8	53°20'31.1799	6°8'35.1777	723651.0	734025.7
BOUY 7	53°20'37.6863	6°8'33.6783	723673.5	734227.5
BOUY 6	53°20'25.8544	6°7'46.3337	724558.7	733884.7
BOUY 5	53°20'36.7203	6°7'46.5501	724545.9	734220.4
BOUY 4	53°20'23.9872	6°6'48.9929	725620.8	733854.9
BOUY 3	53°20'35.2355	6°6'46.3768	725660.0	734203.8
BOUY 16	53°20'33.3231	6°11'27.9561	720453.7	734009.9
BOUY 15	53°20'40.3596	6°11'27.6582	720541.5	734227.5
BOUY 14	53°20'33.5797	6°10'55.4504	721054.7	734033.1
BOUY 12	53°20'34.0692	6°10'8.9526	721914.3	734070.2
BOUY 11	53°20'40.4107	6°10'9.3351	721902.2	734266.0
BOUY 10	53°20'34.3038	6°9'21.5786	722790.3	734100.0

EXISTING NAVIGATION BOUY LOCATIONS

For inspection purposes only.
Consent of copyright owner required for any other use.

© COPYRIGHT OF THIS DRAWING IS RESERVED BY DBFL CONSULTING ENGINEERS. NO PART SHALL BE REPRODUCED OR TRANSMITTED WITHOUT THEIR WRITTEN PERMISSION.

ON ORIGINAL
0 10 20 30 40 50mm

NOTES:

GENERAL NOTES:
1. THE CONTRACTOR SHALL VERIFY DIMENSIONS AGAINST SUCH OTHER DRAWINGS OR SITE CONDITIONS AS PERTAIN TO THIS PART OF THE WORK.
2. EXISTING SERVICES. ANY INFORMATION CONCERNING THE LOCATION OF EXISTING SERVICES INDICATED ON THIS DRAWING IS BELIEVED TO BE CORRECT BUT IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE AND CHECK THE EXACT HORIZONTAL AND VERTICAL ELEMENTS OF ALL CABLES, PIPES ETC. (BOTH UNDERGROUND AND OVERHEAD) BEFORE WORK COMMENCES.
3. DATUM : CHART DATUM (DUBLIN PORT)

EXTENT OF CHANNEL DREDGING
CHANNEL DREDGING EXTENTS
EXISTING NAVIGATION BOUY
WORKS BOUNDARY THIS PHASE
NEW APPROACH CHANNEL LINES
SLOPE LIMIT
SLOPE DESIGN LINE

REV.	DATE	DESCRIPTION	BY	CHKD

TENDER

DESIGNED | PREPARED
DATE: April 2009 | CHECKED

DBFL Consulting Engineers
Dublin: Ormond House, Upper Ormond Quay, Dublin 7, Ireland. Phone: +353 1 402 4000 Fax: +353 1 402 4050
Waterford: Unit 2, The Chandlery, 1-2 Conrad Street, Waterford, Ireland. Phone: +353 51 309 500 Fax: +353 51 844 912
DBFL Consulting Engineers www.dbfl.ie info@dbfl.ie

PROJECT
DUBLIN PORT CAPITAL DREDGING

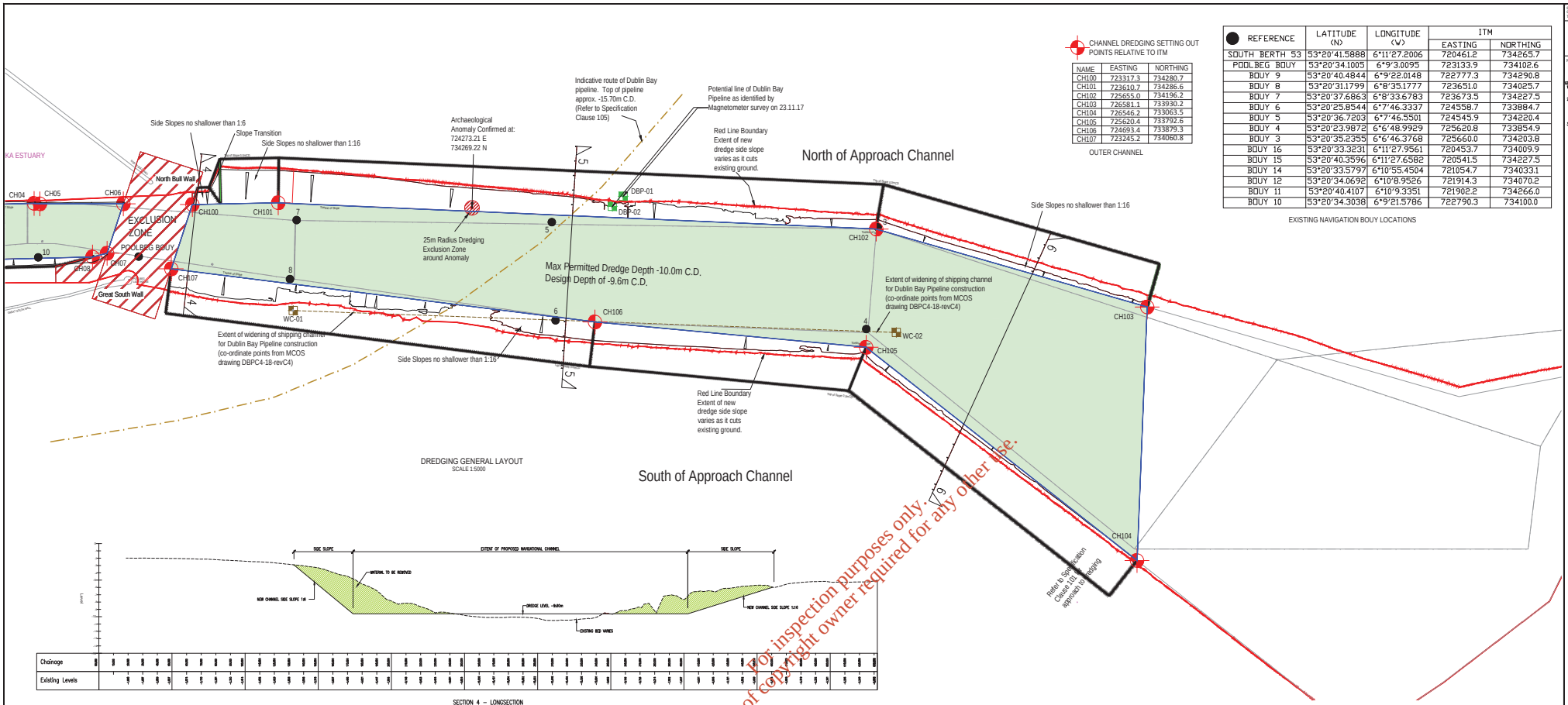
DRG. TITLE
DREDGING LAYOUT INNER CHANNEL (SEASON 3)

CLIENT
DUBLIN PORT COMPANY

SCALE	AS SHOWN @A0	FILE REF	180032-9003

DRG. NO. 180032-9003 -

EPA Export 28-04-2021:02:37:43



For inspection purposes only.
Consent of copyright owner required for any other use.

© COPYRIGHT OF THIS DRAWING IS RESERVED BY DBFL CONSULTING ENGINEERS. NO PART SHALL BE REPRODUCED OR TRANSMITTED WITHOUT THEIR WRITTEN PERMISSION.

ON ORIGINAL

NOTES:

GENERAL NOTES:
1. THE CONTRACTOR SHALL VERIFY DIMENSIONS AGAINST SUCH OTHER DRAWINGS OR SITE CONDITIONS AS PERTAIN TO THIS PART OF THE WORK.
2. EXISTING SERVICES. ANY INFORMATION CONCERNING THE LOCATION OF EXISTING SERVICES PROVIDED ON THIS DRAWING IS INTENDED AS A GUIDE ONLY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE AND SURVEY THE EXACT HORIZONTAL AND VERTICAL ELEMENTS OF ALL CABLES, PIPES ETC. (BOTH UNDERGROUND AND OVERHEAD) BEFORE WORK COMMENCES.
3. DATUM : CHART DATUM (DUBLIN PORT)

EXTENT OF CHANNEL DREDGING
CHANNEL DREDGING EXTENTS
EXISTING NAVIGATION BOUY
WORKS BOUNDARY THIS PHASE
NEW APPROACH CHANNEL LINES
SLOPE LIMIT
SLOPE DESIGN LINE

REV. DATE DESCRIPTION BY CHKD
TENDER
DESIGNED PREPARED
DATE: April 2008 CHECKED

DBFL Consulting Engineers
dublin office Ormond House, Upper Ormond Quay, Dublin 7, Ireland. phone: +353 1 400 4000 fax: +353 1 400 4050
waterford office Unit3, The Chantlley, I-10 Cornell Street, Waterford, Ireland. phone: +353 51 309 500 fax: +353 51 844 912
www.dbfl.ie info@dbfl.ie

PROJECT
DUBLIN PORT CAPITAL DREDGING

DRAG. TITLE
DREDGING LAYOUT OUTER CHANNEL (SEASON 3)

CLIENT
DUBLIN PORT COMPANY

SCALE AS SHOWN @A0 FILE REF 180032-9004
DRG. NO. 180032-9004 -

EPA Export 28-04-2021:02:37:43

© COPYRIGHT OF THIS DRAWING IS RESERVED BY DBFL CONSULTING ENGINEERS. NO PART SHALL BE REPRODUCED OR TRANSMITTED WITHOUT THEIR WRITTEN PERMISSION.

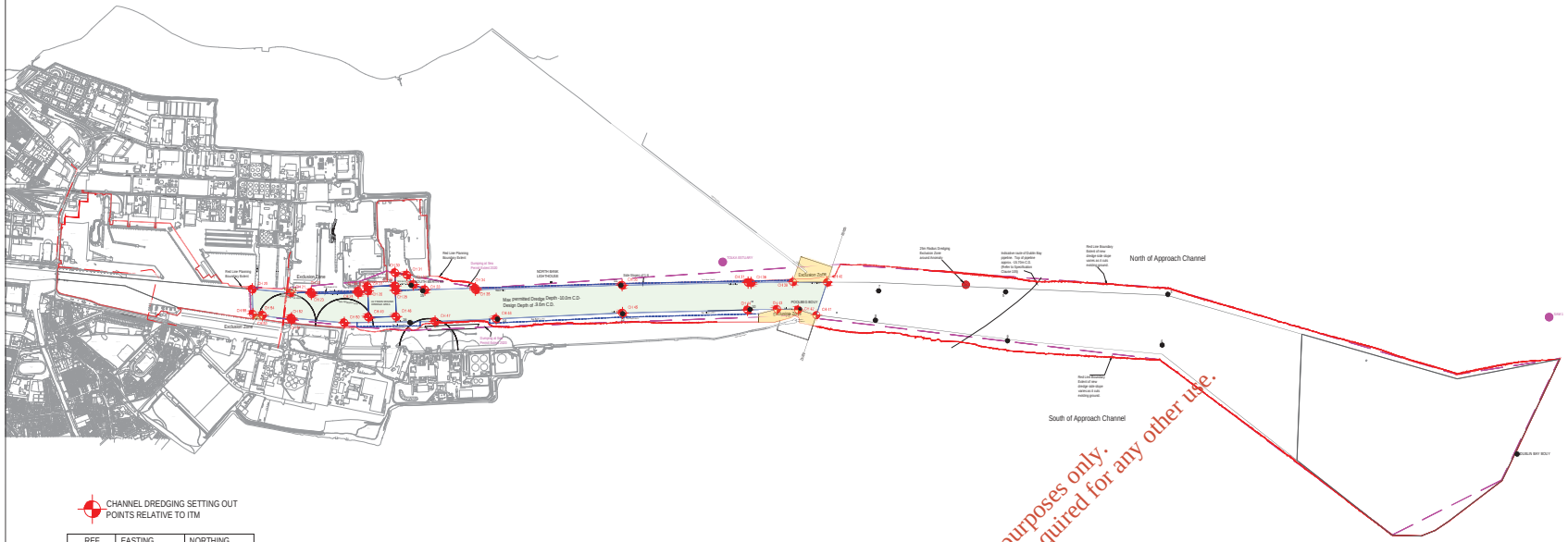
ON ORIGINAL

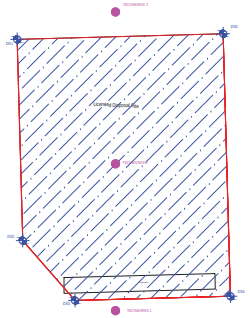
0 50 100 200 300 400 500mm

NOTES:

GENERAL NOTES:
1. THE CONTRACTOR SHALL VERIFY DIMENSIONS AGAINST EACH OTHER DRAWING OR SITE CONDITIONS AS PERTAIN TO THIS PART OF THE WORKS.
2. EXISTING SERVICES. ANY INFORMATION CONCERNING THE LOCATION OF EXISTING SERVICES INDICATED ON THIS DRAWING IS BASED ON THE BEST AVAILABLE INFORMATION. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE AND VERIFY THE EXACT HORIZONTAL AND VERTICAL ALIGNMENT OF ALL CABLES, PIPES ETC. (BOTH UNDERGROUND AND OVERHEAD) BEFORE WORK COMMENCES.
3. DATUM : CHART DATUM (DUBLIN PORT)

EXTENT OF EXISTING CHANNEL
DUMPING AT SEA LOCATION
EXTENT OF CHANNEL DREDGING
EXCLUSION ZONE
CHANNEL DREDGING EXTENTS
EXISTING NAVIGATION BUOY
WATER QUALITY AND MARINE MAMMAL BUOYS
DUMP SITE COORDINATES
WORKS BOUNDARY THIS PHASE
NEW APPROACH CHANNEL LINES
SLOPE DESIGN LINE





CHANNEL DREDGING SETTING OUT POINTS RELATIVE TO ITM

REF.	EASTING	NORTHING
CH 20	719370.228	734238.844
CH 21	719630.636	734215.516
CH 22	719775.689	734217.510
CH 23	719775.903	734206.998
CH 24	720097.972	734214.086
CH 25	720097.725	734224.885
CH 26	720164.127	734226.406
CH 27	720163.202	734257.234
CH 28	720353.798	734230.749
CH 29	720353.066	734261.923
CH 30	720351.000	734352.180
CH 31	720432.568	734337.113
CH 32	720476.792	734271.476
CH 33	720556.334	734235.808
CH 34	720903.164	734246.105
CH 35	720903.498	734235.308
CH 36	721910.879	734266.455
CH 37	722776.252	734284.413
CH 38	722796.040	734283.129
CH 39	723083.377	734289.521
CH 40	723319.387	734287.155
CH 41	723245.185	734060.848
CH 42	723120.654	734096.800
CH 43	722975.963	734101.351
CH 44	722772.401	734096.347
CH 45	721913.659	734075.238
CH 46	721045.820	734035.300
CH 47	720626.243	734017.155
CH 48	720358.273	734050.804
CH 49	720168.247	734046.453
CH 50	720002.451	734008.203
CH 51	719638.547	734030.034
CH 52	719639.943	734039.907
CH 53	719440.829	734057.448
CH 54	719441.281	734061.976
CH 55	719374.500	734068.744

Water Quality and Marine Mammal Buoys

	Irish Grid		ITM			
Buoy Name	Easting	Northing	Easting	Northing	Latitude (N)	Longitude (W)
Techworks 1	330575.34	231605.77	730497.8	731632.49	53° 19.131339'W	6°02.48005825
Techworks 2	330575.34	233505.04	730497.82	733531.35	53°20.15463702'	6°02.4314626'
Techworks 3	325702.07	228473.32	725625.54	728500.75	53° 17.5142333	6° 06.9394833'
Techworks 4	330575.34	232539.37	730497.81	732565.89	53°19.63434969'	6°02.4570643'
SAM1	326356.41	234020.68	726279.37	734046.89	53°20.465	6°04.418
Tolka Estuary	322679.65	234388.8	722603.83	734425.97	53°20.75	6°09.52

Dump Site Coordinates

	ITM		WGS84	
Name	Easting (m)	Northing (m)	Latitude (N)	Longitude (W)
DS1	729812.714	733357.151	53.3345°	6.05°
DS2	729967.592	732077.729	53.3230°	6.05°
DS3	730240.217	731697.109	53.3196°	6.0452°
DS5	731182.335	733393.134	53.3196°	6.0303°
DS4	731228.406	731724.296	53.3345°	6.0303°

REFERENCE	LATITUDE (N)	LONGITUDE (W)	ITM	
			EASTING	NORTHING
SOUTH BERTH 53	53°20'41.5888	6°11'27.2006	720461.2	734265.7
POOLBEG BOUY	53°20'34.1005	6°9'3.0095	723133.9	734102.6
BOUY 9	53°20'40.4844	6°9'22.0148	722777.3	734290.8
BOUY 8	53°20'31.1799	6°8'35.1777	723651.0	734025.7
BOUY 7	53°20'37.6863	6°8'33.6783	723673.5	734227.5
BOUY 6	53°20'25.8544	6°7'46.3337	724558.7	733884.7
BOUY 5	53°20'36.7203	6°7'46.5501	724545.9	734220.4
BOUY 4	53°20'23.9872	6°6'48.9929	725620.8	733854.9
BOUY 3	53°20'35.2355	6°6'46.3768	725660.0	734203.8
BOUY 16	53°20'33.3231	6°11'27.9561	720453.7	734009.9
BOUY 15	53°20'40.3596	6°11'27.6582	720541.5	734227.5
BOUY 14	53°20'33.5797	6°10'55.4504	721054.7	734033.1
BOUY 12	53°20'34.0692	6°10'8.9526	721914.3	734070.2
BOUY 11	53°20'40.4107	6°10'9.3351	721902.2	734266.0
BOUY 10	53°20'34.3038	6°9'21.5786	722790.3	734100.0

EXISTING NAVIGATION BOUY LOCATIONS

For inspection purposes only.
Consent of copyright owner required for any other use.

REV.	DATE	DESCRIPTION	BY	CHKD
		TENDER		

DESIGNED | PREPARED
DATE: April 2020 | CHECKED

DBFL Consulting Engineers
Unit 3 Block 3 Iveagh House, Upper Dorset Quay, Dublin 7, Ireland.
Phone +353 1 400 4000
Fax +353 1 400 4050
Summerhill House, Summerhill Road, Waterford, Ireland.
Phone +353 51 309 500
Fax +353 51 304 813
Email info@dbfl.ie Web www.dbfl.ie

PROJECT
DUBLIN PORT CAPITAL DREDGING

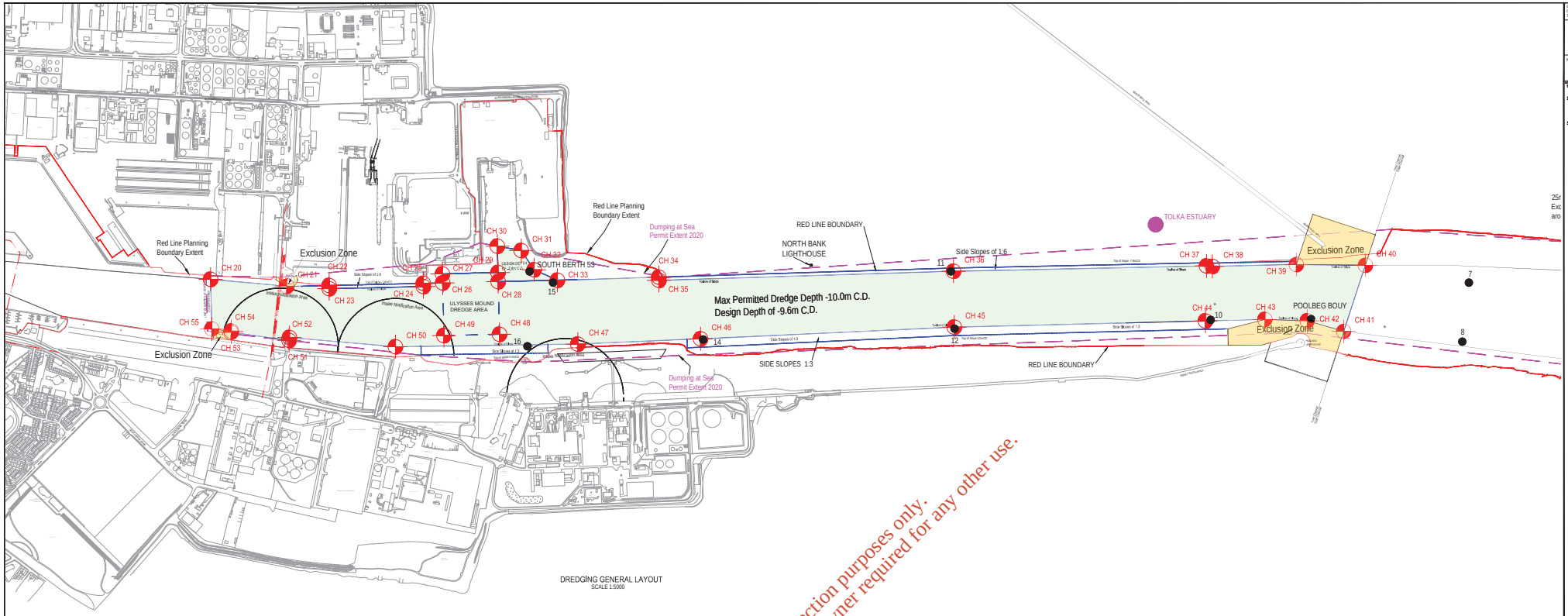
DWG. TITLE
SITE LOCATION (SEASON 4)

CLIENT
DUBLIN PORT COMPANY

SCALE: 1:12000 @A0 | FILE REF: 180032-9005

DWG. NO.: 180032-9005 | T0

EPA Export 28-04-2021:02:37:43



DREDGING GENERAL LAYOUT
SCALE 1:5000

For inspection purposes only.
Consent of copyright owner required for any other use.

CHANNEL DREDGING SETTING OUT POINTS RELATIVE TO ITM

REF.	EASTING	NORTHING
CH 20	719370.228	734238.844
CH 21	719630.636	734215.516
CH 22	719775.689	734217.510
CH 23	719775.903	734206.998
CH 24	720097.972	734214.086
CH 25	720097.725	734224.885
CH 26	720164.127	734226.406
CH 27	720163.202	734257.234
CH 28	720353.798	734230.749
CH 29	720353.066	734261.923
CH 30	720351.000	734352.180
CH 31	720432.568	734337.113
CH 32	720476.792	734271.476
CH 33	720556.334	734235.808
CH 34	720903.164	734246.105
CH 35	720903.498	734235.308
CH 36	721910.879	734266.455
CH 37	722776.252	734284.413
CH 38	722796.040	734283.129
CH 39	723083.377	734289.521
CH 40	723319.387	734287.155
CH 41	723245.185	734060.848
CH 42	723120.654	734096.800
CH 43	722975.963	734101.351
CH 44	722772.401	734096.347
CH 45	721913.659	734075.238
CH 46	721045.820	734035.300
CH 47	720626.243	734017.155
CH 48	720358.273	734050.804
CH 49	720168.247	734046.453
CH 50	720002.451	734008.203
CH 51	719638.547	734030.034
CH 52	719639.943	734039.907
CH 53	719440.829	734057.448
CH 54	719441.281	734061.976
CH 55	719374.500	734068.744

REFERENCE	LATITUDE (N)	LONGITUDE (W)	ITM	
			EASTING	NORTHING
SOUTH BERTH 53	53°20'41.5888	6°11'27.2006	720461.2	734265.7
POOLBEG BOUY	53°20'34.1005	6°9'3.0095	723133.9	734102.6
BOUY 9	53°20'40.4844	6°9'22.0148	722777.3	734290.8
BOUY 8	53°20'31.1799	6°8'35.1777	723651.0	734025.7
BOUY 7	53°20'37.6863	6°8'33.6783	723673.5	734227.5
BOUY 6	53°20'25.8544	6°7'46.3337	724558.7	733884.7
BOUY 5	53°20'36.7203	6°7'46.5501	724545.9	734220.4
BOUY 4	53°20'23.9872	6°6'48.9929	725620.8	733854.9
BOUY 3	53°20'35.2355	6°6'46.3768	725660.0	734203.8
BOUY 16	53°20'33.3231	6°11'27.9561	720453.7	734009.9
BOUY 15	53°20'40.3596	6°11'27.6582	720541.5	734227.5
BOUY 14	53°20'33.5797	6°10'55.4504	721054.7	734033.1
BOUY 12	53°20'34.0692	6°10'8.9526	721914.3	734070.2
BOUY 11	53°20'40.4107	6°10'9.3351	721902.2	734266.0
BOUY 10	53°20'34.3038	6°9'21.5786	722790.3	734100.0

EXISTING NAVIGATION BOUY LOCATIONS

© COPYRIGHT OF THIS DRAWING IS RESERVED BY DBFL CONSULTING ENGINEERS. NO PART SHALL BE REPRODUCED OR TRANSMITTED WITHOUT THEIR WRITTEN PERMISSION.

ON ORIGINAL

NOTES:

GENERAL NOTES:
1. THE CONTRACTOR SHALL VERIFY DIMENSIONS AGAINST EACH OTHER AND ON SITE CONDITIONS AS PERTAIN TO THIS PART OF THE WORKS.
2. EXISTING SERVICES. ANY INFORMATION CONCERNING THE LOCATION OF EXISTING SERVICES INDICATED ON THIS DRAWING IS INTENDED FOR GUIDANCE ONLY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE AND VERIFY THE EXACT HORIZONTAL AND VERTICAL ALIGNMENT OF ALL CABLES, PIPES ETC. (BOTH UNDERGROUND AND OVERHEAD) BEFORE WORK COMMENCES.
3. DATUM : CHART DATUM (DUBLIN PORT)

EXTENT OF CHANNEL DREDGING
EXCLUSION ZONE
CHANNEL DREDGING EXTENTS
EXISTING NAVIGATION BOUY
WORKS BOUNDARY THIS PHASE
NEW APPROACH CHANNEL LINES
SLOPE DESIGN LINE

REV.	DATE	DESCRIPTION	BY	CHKD
		TENDER		

DESIGNED | PREPARED
DATE: April 2020 | CHECKED

DBFL Consulting Engineers
Dublin (HQ) Ground Floor, Lower Ormond Quay, Dublin 1 Ireland.
Phone +353 1 400 4000
Fax +353 1 400 4050
Waterford Office, 2nd Floor, The Chandlery, 25 Quay Street, Waterford Ireland.
Phone +353 51 309 500
Fax +353 51 304 813
Email info@dbfl.ie Web www.dbfl.ie

PROJECT
DUBLIN PORT CAPITAL DREDGING

DRG. TITLE
DREDGING LAYOUT INNER CHANNEL (SEASON 4)

CLIENT
DUBLIN PORT COMPANY

SCALE 1:5000 @A0 | FILE REF. 180032-9005
DRG. NO. 180032-9006 | T0

EPA Export 28-04-2021:02:37:43

Appendix 3 - Sample Daily Logs and Track Plots

The following information is presented in this Appendix:

- Daily Logs for Trips 207 to 211.
- Track plots for the loading and dumping of Trips 207, 208, 209, 210 and 211.

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:43

Day report trailer dredger

Equipment **FREEWAY (10322)**
Project **Dublin Capital Dredging 2019-2020 Season - 372 (10235)**
Activity **– All –**

Day: 09/01/2020 **Page: 1**

	Totals										
TRIP		**207**		**208**		**209**		**210**		**211**	
Project code		372-10235		372-10235		372-10235		372-10235		372-10235	
Project description		Dublin Capital Dredgin		Dublin Capital Dredgin		Dublin Capital Dredgin		Dublin Capital Dredgin		Dublin Capital Dredgin	
Activity number		200		200		200		200		200	
Activity description		Outer Channel (overflo		Outer Channel (overflo		Outer Channel (overflo		Outer Channel (overflo		Outer Channel (overflo	
Dredge area						Outer		Outer			
Discharge area		Ebb stream dump		Flood stream dump		Ebb stream dump		Flood stream dump		Ebb stream dump	
Unit		M3		M3		M3		M3		M3	
Hopper volume (M3)		4,115		4,110		4,127		4,167		4,181	
Rho grain (kg/m3)											
Rho water (kg/m3)											
Remark											
CYCLE TIMES **Total**	**1,412**	Start	Min.	Start	Min.	Start	Min.	Start	Min.	Start	Min.
Sailing empty	92			02:13	28	06:55	25	13:38	20	19:40	19
Loading	888	00:00	33	02:41	180	07:48	230	13:58	228	19:59	217
Turning	288	00:33	67	05:41	41	11:38	79	17:46	77	23:36	24
Sailing loaded	85	01:40	22	06:22	20	12:57	21	19:03	22		
Dumping	59	02:02	11	06:42	13	13:18	20	19:25	15		
Time totals			Min.		Min.		Min.		Min.		Min.
Nett cycle time	1,412		133		282		375		362		260
Gross cycle time	1,440		133		282		403		362		260
PRODUCTION		Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit
Rest load before dredging		0	M3	0	M3	0	M3	0	M3	0	M3
Sounded solids in load		2,430	M3	2,368	M3	2,568	M3	2,380	M3	0	M3
Suspended in load		0	M3	0	M3	0	M3	0	M3	0	M3
Rest load after discharging		0	M3	0	M3	0	M3	0	M3	0	M3
Rest load end of cycle		0	M3	0	M3	0	M3	0	M3	0	M3
Hopper volume		4,115	M3	4,110	M3	4,127	M3	4,167	M3	0	M3
CALCULATED QUANTITIES		Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit	Amount	Unit
Total loaded	9,746	2,430	M3	2,368	M3	2,568	M3	2,380	M3	0	M3
Nett loaded	9,746	2,430	M3	2,368	M3	2,568	M3	2,380	M3	0	M3
Total discharged by pump	0	0	M3	0	M3	0	M3	0	M3	0	M3
Total dumped	9,746	2,430	M3	2,368	M3	2,568	M3	2,380	M3	0	M3
Load production		11	M3/MIN	13	M3/MIN	11	M3/MIN	10	M3/MIN	0	M3/MIN
Discharge production		0	M3/HR	0	M3/HR	0	M3/HR	0	M3/HR	0	M3/HR
Dump production		221	M3/MIN	182	M3/MIN	128	M3/MIN	159	M3/MIN	0	M3/MIN
Tonnes dry solids	11,033	2,921	TDS	2,688	TDS	2,689	TDS	2,735	TDS	0	TDS
Cycle production		428	M3/HR	504	M3/HR	411	M3/HR	394	M3/HR	0	M3/HR

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:43

Day report trailer dredger

Equipment **FREEWAY (10322)**
Project **Dublin Capital Dredging 2019-2020 Season - 372 (10235)**
Activity **– All –**

Day: 09/01/2020 **Page: 2**

Trip	Time	Code	Remark
207	02:02	Dumping	Ebb stream dump
208	06:42	Dumping	Flood stream dump
209	07:48	Loading	Outer
209	13:18	Dumping	Ebb stream dump
210	13:58	Loading	Outer
210	19:25	Dumping	Flood stream dump

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:43

Dublin capital dredging

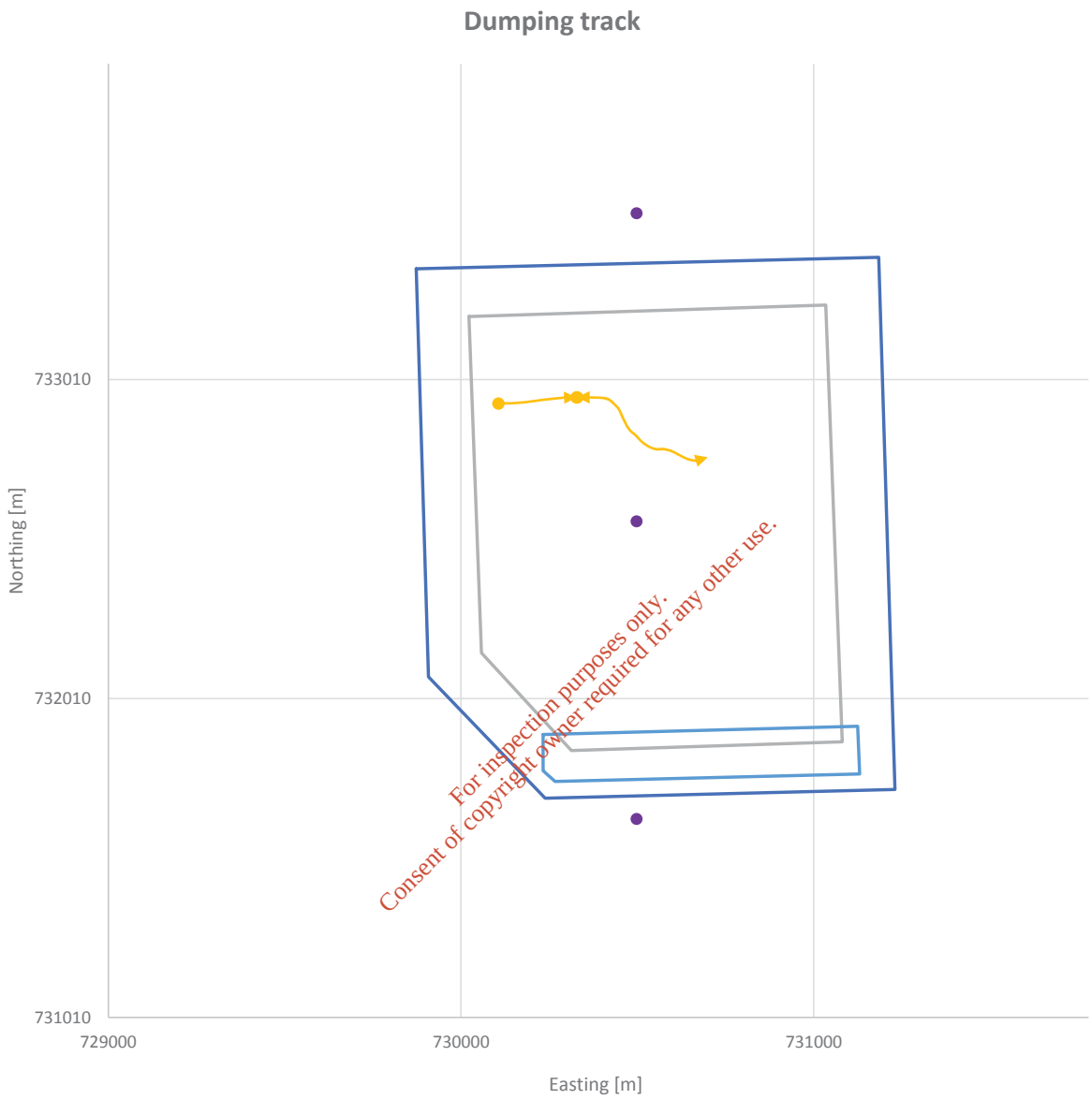
Freeway

Trip nr	207

Date	09/01/2020
Start Time	02:02
End Time	02:13

	Easting	Northing
Start Pos	730106.26	732934.66
End Pos	730710.29	732770.85

Dumping



For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:43

Dublin capital dredging

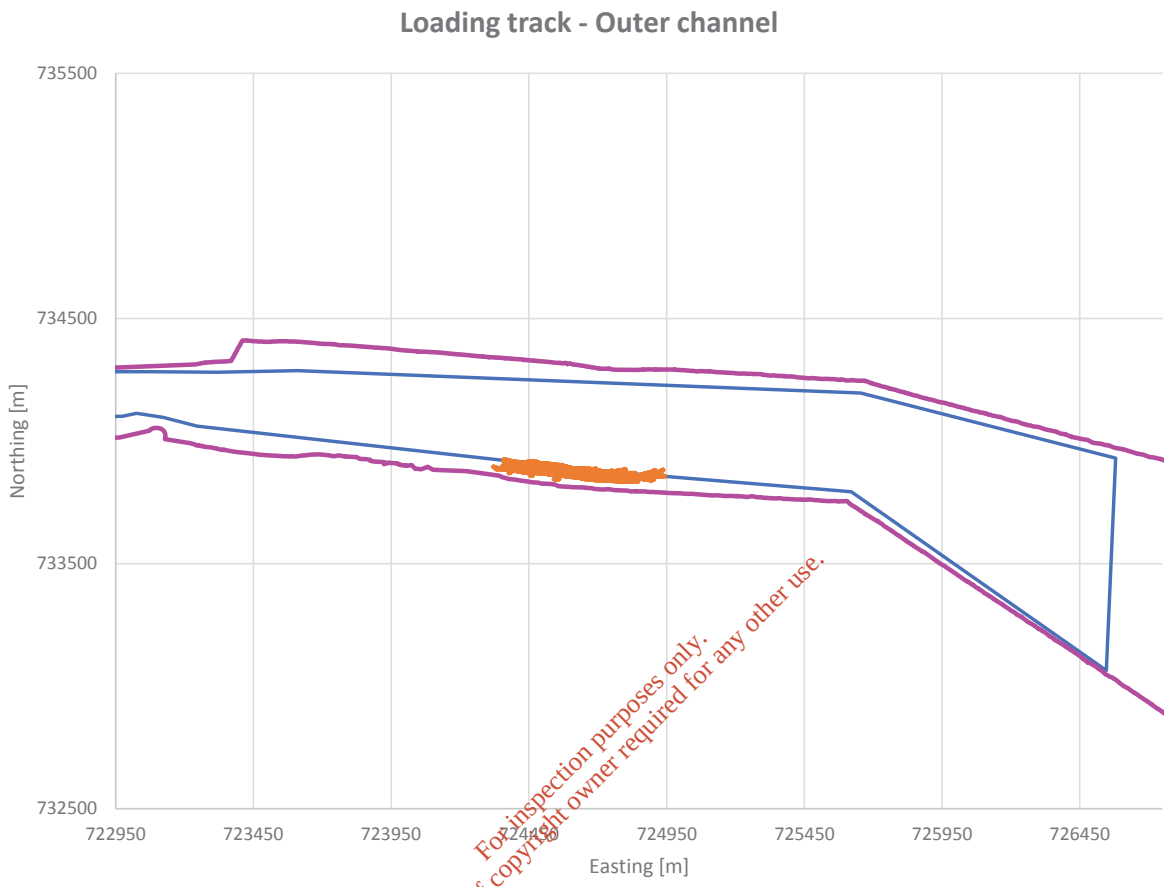
Freeway

Trip nr	207

Date	09/01/2020
Start Time	20:50
End Time	01:40

	Easting	Northing
Start Pos	725178.46	733815.07
End Pos	724791.37	733859.22

Loading



For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:43

Dublin capital dredging

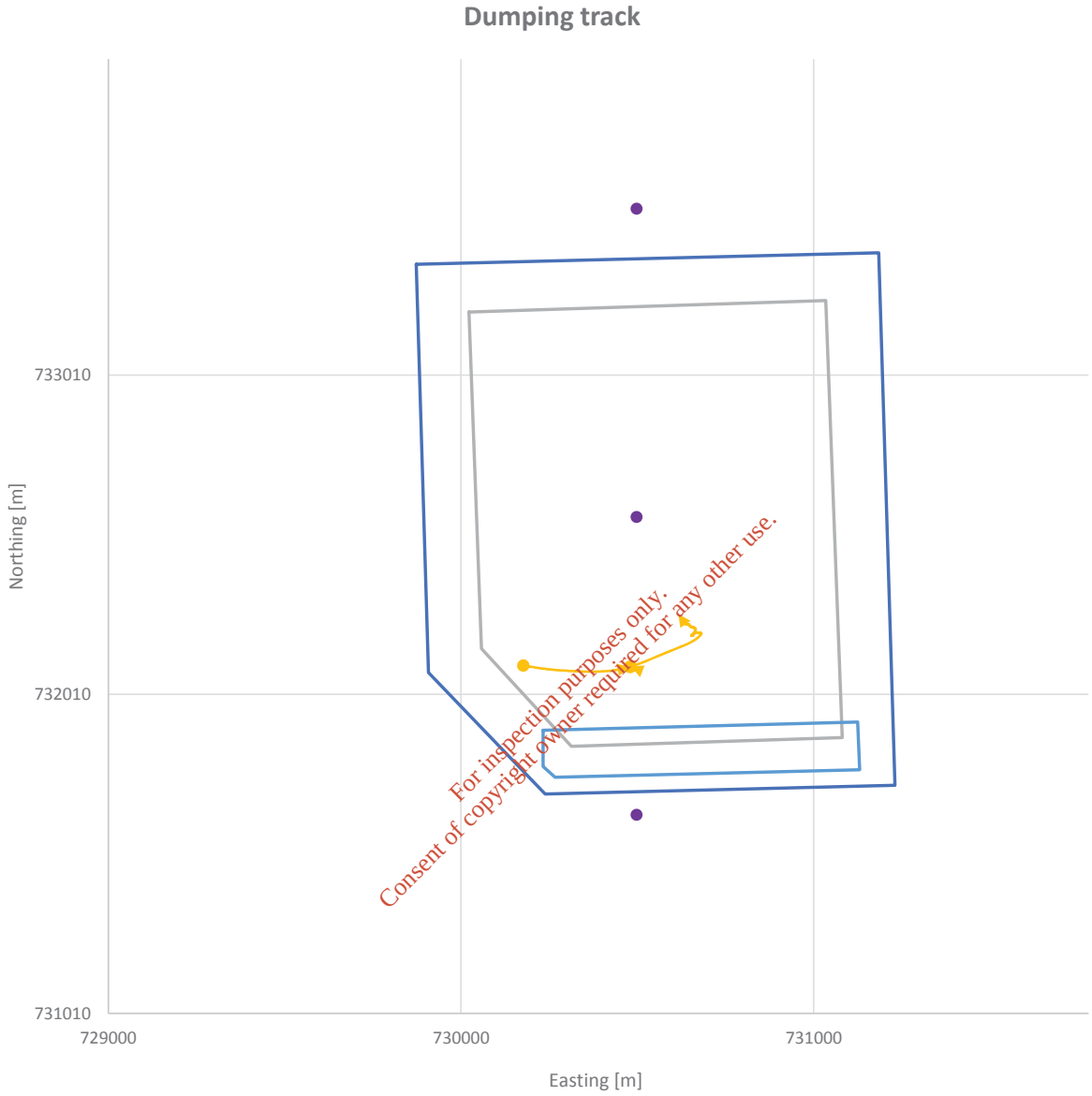
Freeway

Trip nr	208

Date	09/01/2020
Start Time	06:42
End Time	06:55

	Easting	Northing
Start Pos	730172.07	732101.34
End Pos	730616.46	732261.72

Dumping



For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:43

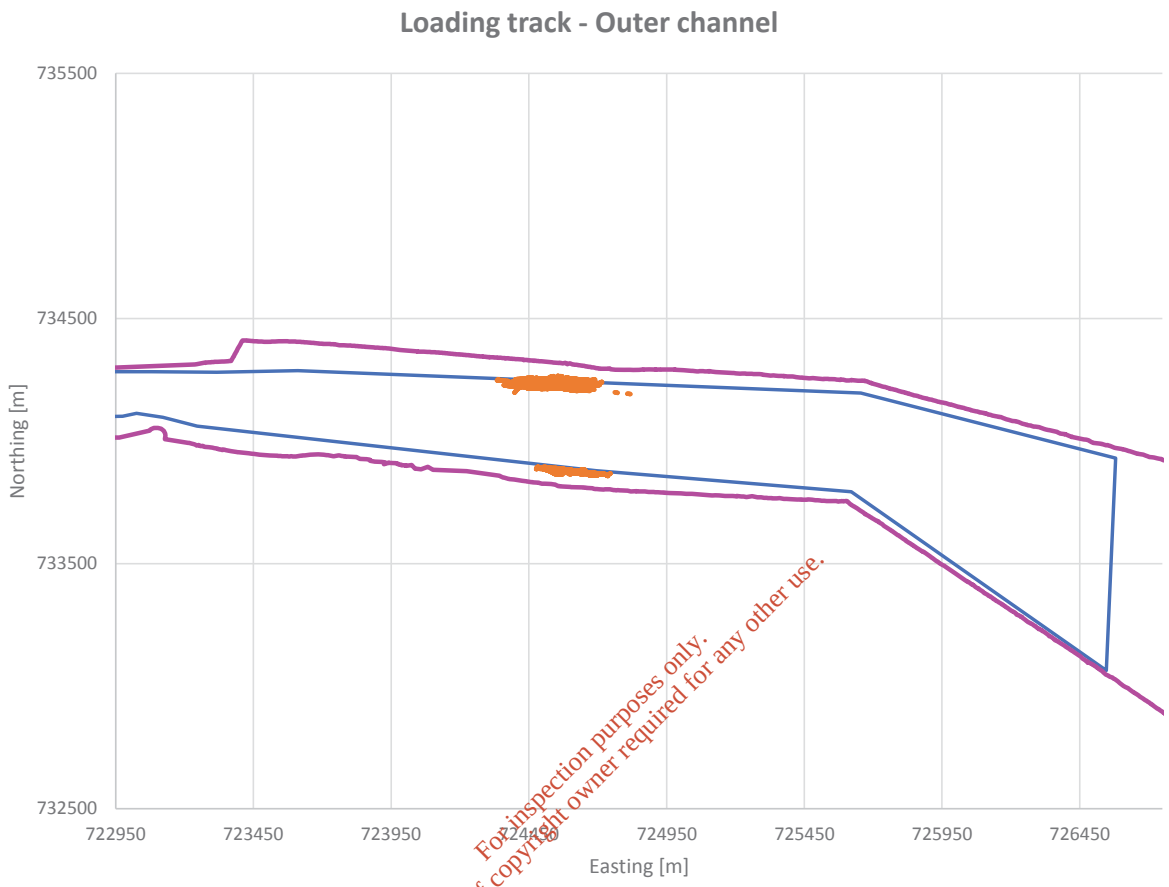
Dublin capital dredging

Freeway	
Trip nr	208

Date	09/01/2020
Start Time	02:41
End Time	06:22

	Easting	Northing
Start Pos	724501.52	733932.38
End Pos	724818.08	734192.13

Loading



For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:43

Dublin capital dredging

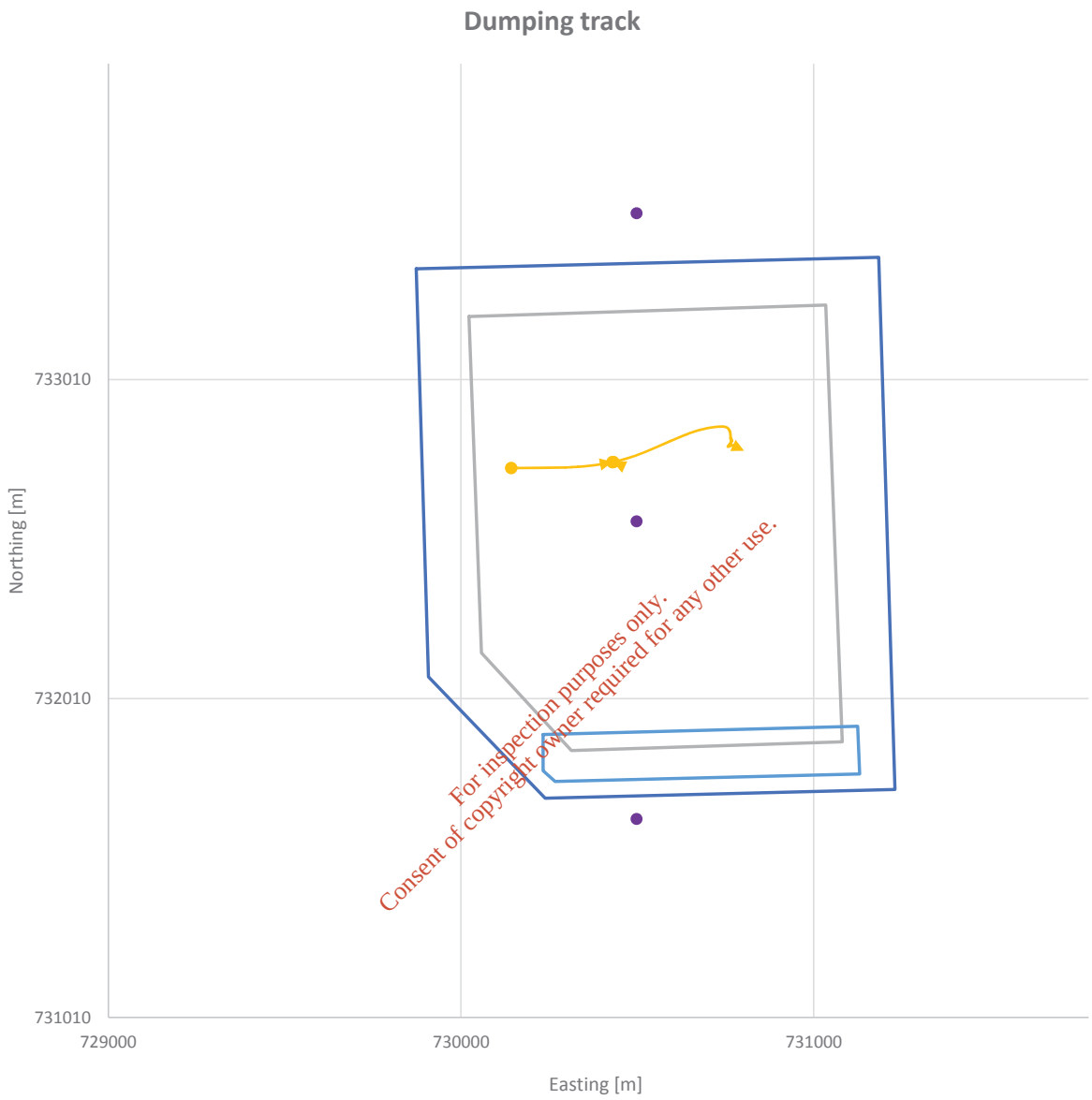
Freeway

Trip nr	209

Date	09/01/2020
Start Time	13:18
End Time	13:38

	Easting	Northing
Start Pos	730142.41	732732.64
End Pos	730812.43	732798.97

Dumping



For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:43

Dublin capital dredging

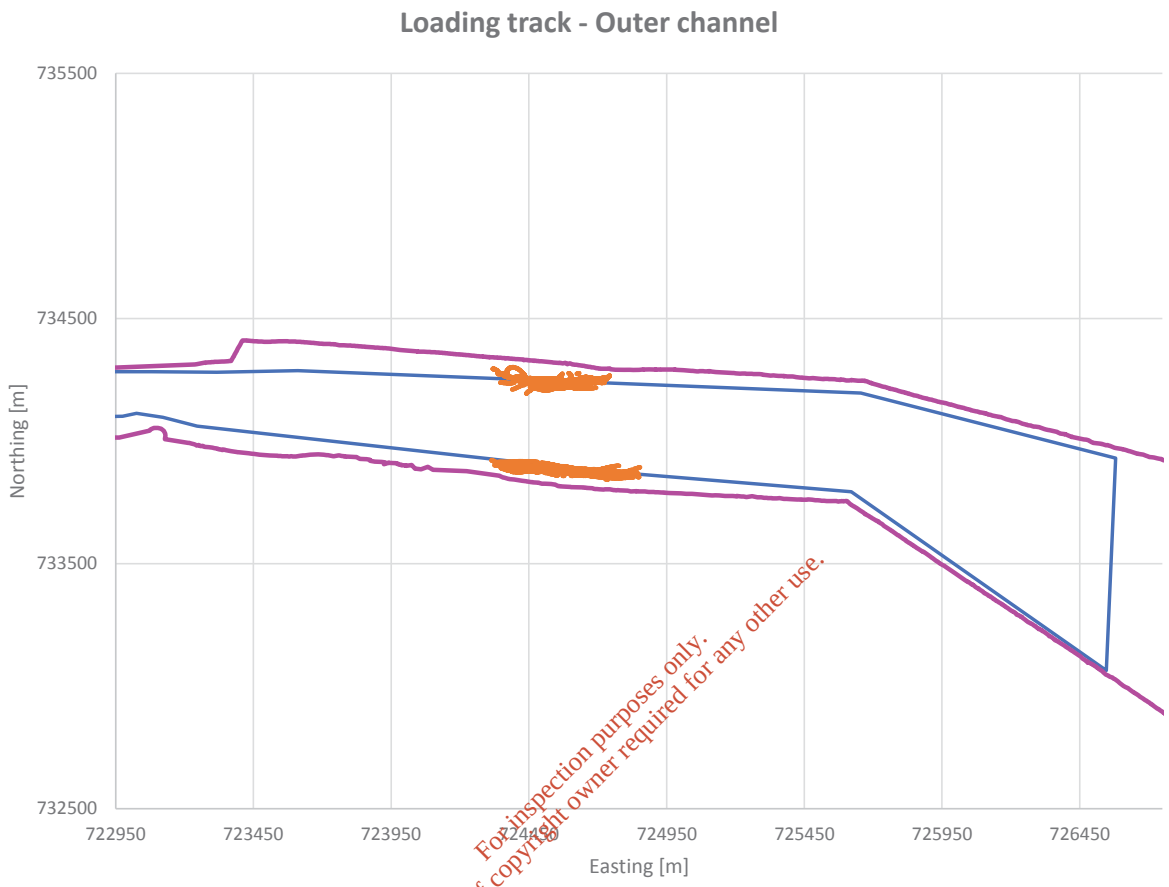
Freeway

Trip nr	209

Date	09/01/2020
Start Time	07:48
End Time	12:57

	Easting	Northing
Start Pos	724171.17	734202.94
End Pos	724845.31	733855.61

Loading



For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:43

Dublin capital dredging

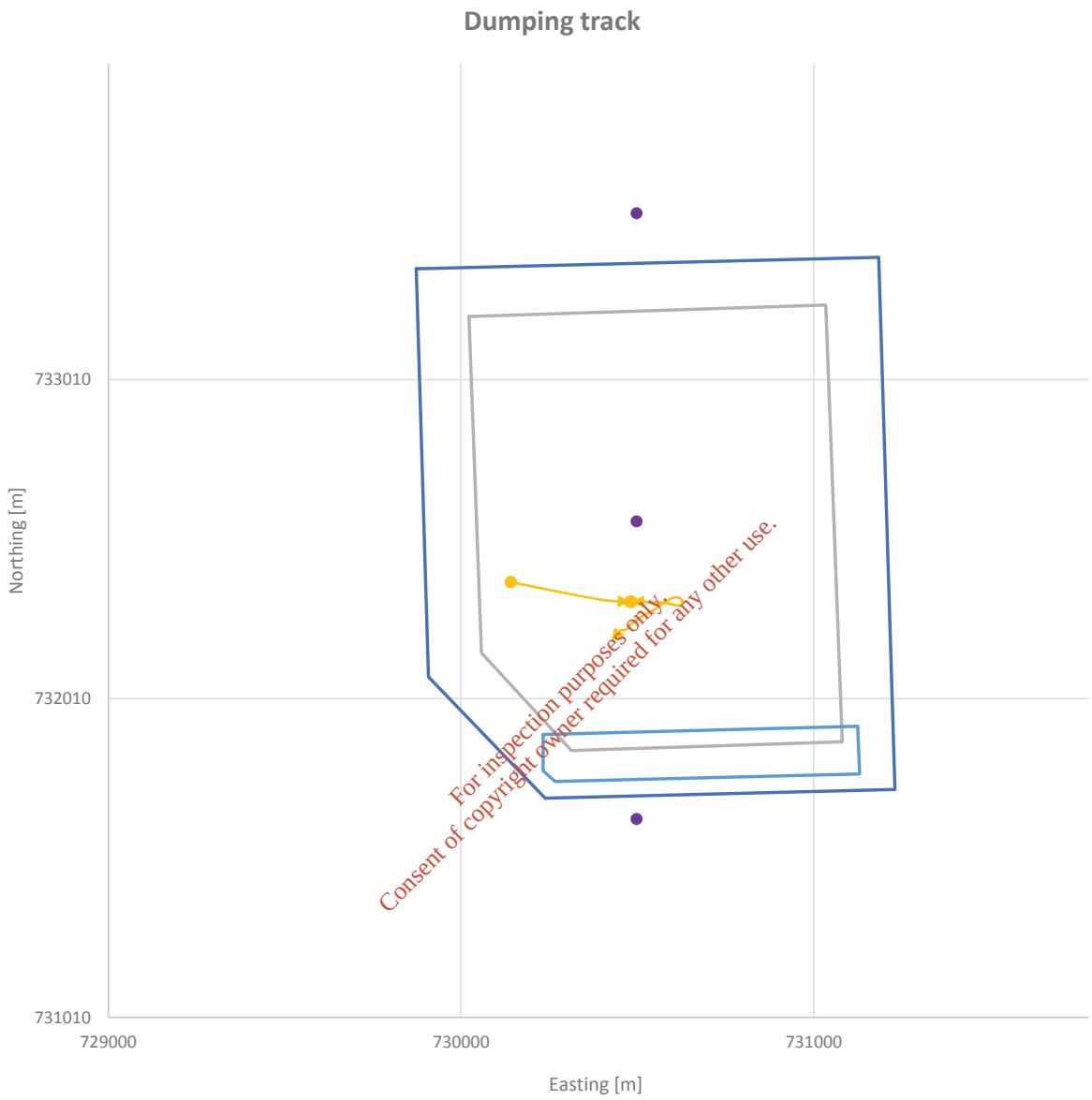
Freeway

Trip nr	210

Date	09/01/2020
Start Time	19:25
End Time	19:40

	Easting	Northing
Start Pos	730141.50	732375.22
End Pos	730426.72	732188.70

Dumping



For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:43

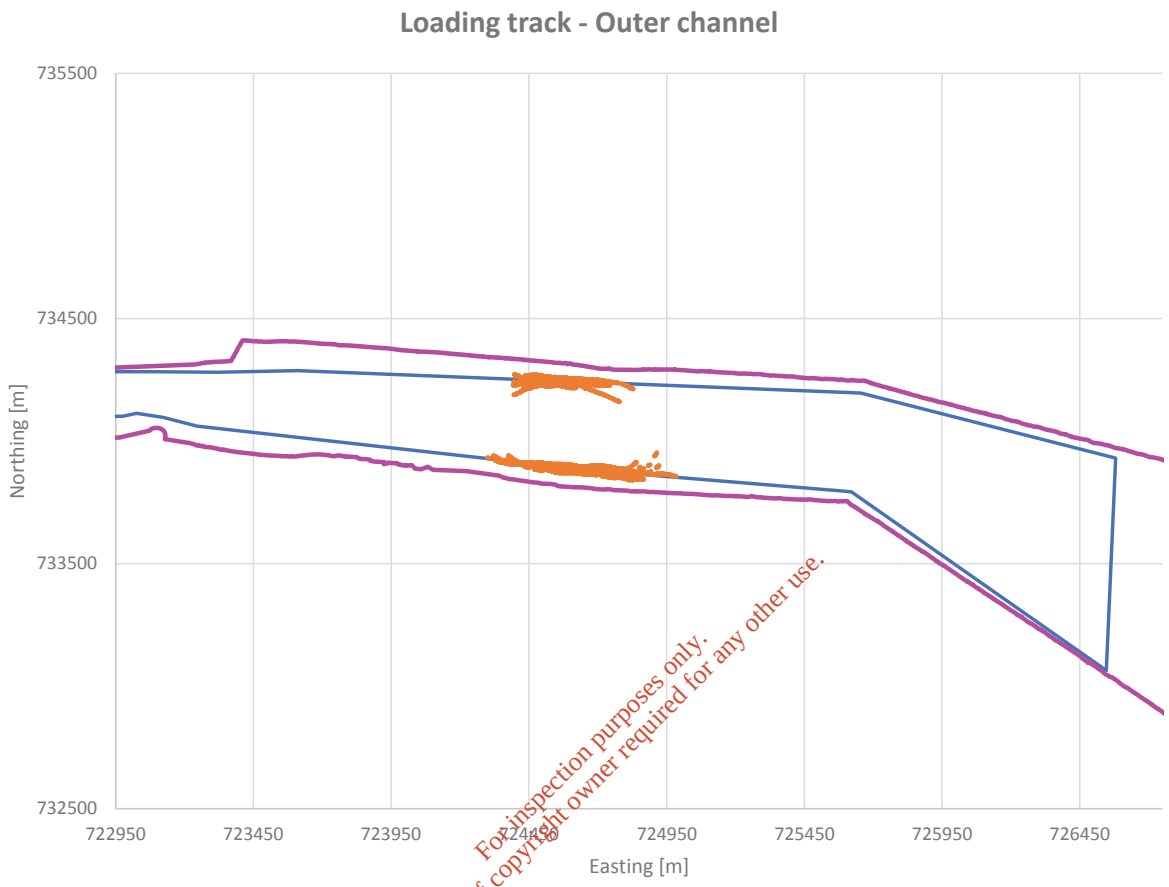
Dublin capital dredging

Freeway	
Trip nr	210

Date	09/01/2020
Start Time	13:58
End Time	19:03

	Easting	Northing
Start Pos	725077.77	733845.05
End Pos	724435.50	734242.34

Loading



For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:43

Dublin capital dredging

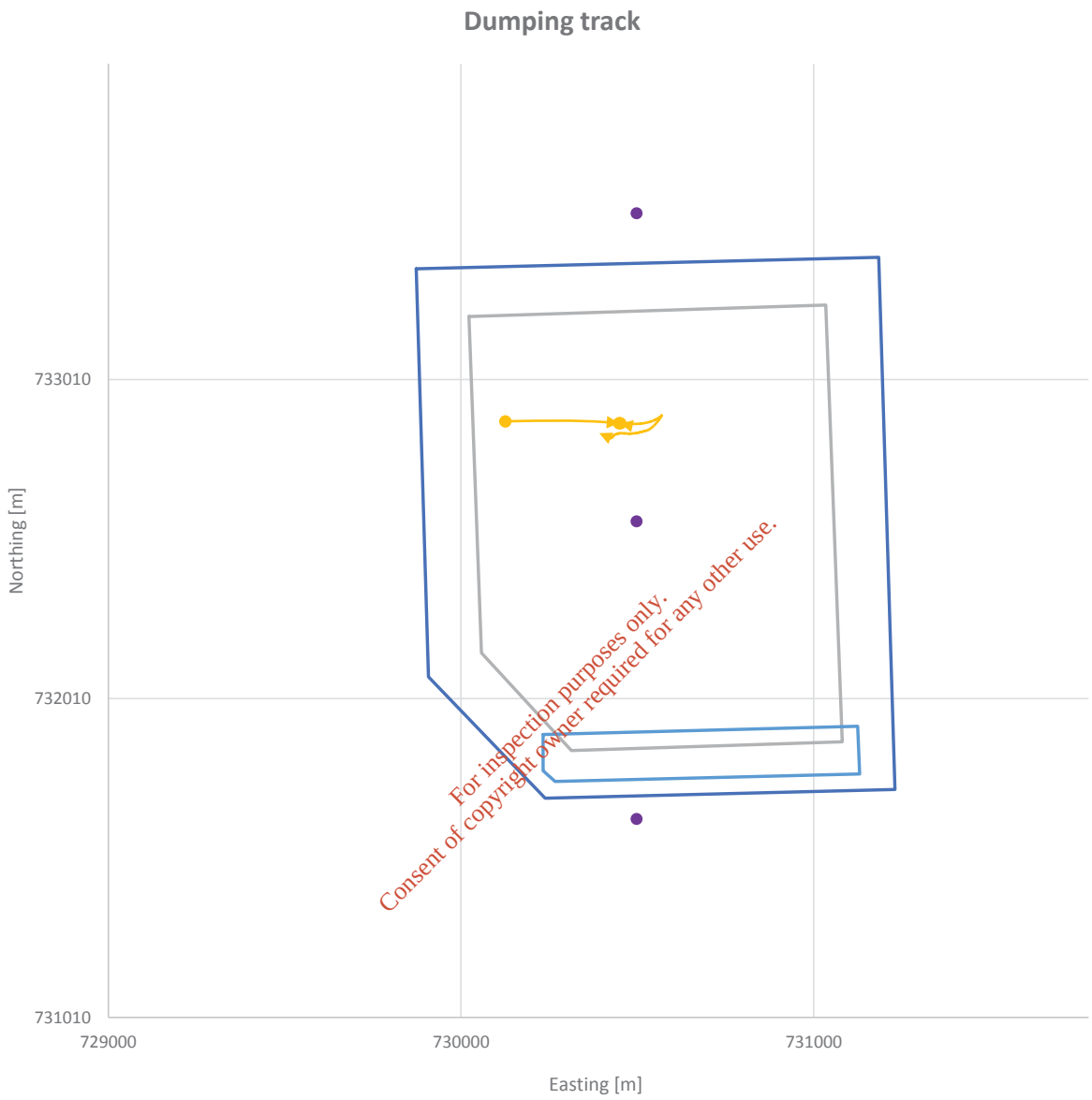
Freeway

Trip nr	211

Date	10/01/2020
Start Time	01:07
End Time	01:19

	Easting	Northing
Start Pos	730125.86	732878.69
End Pos	730397.99	732845.76

Dumping



For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:44

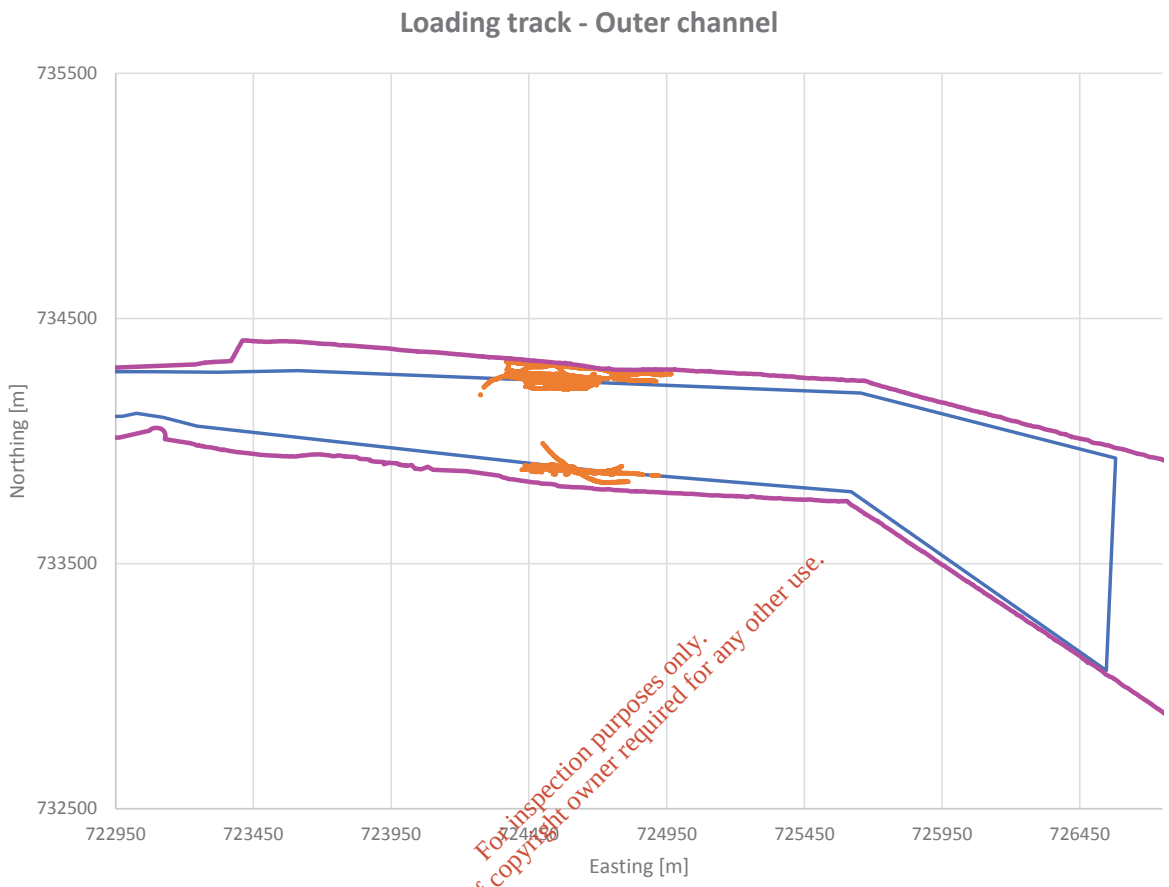
Dublin capital dredging

Freeway	
Trip nr	211

Date	10/01/2020
Start Time	19:59
End Time	04:51

	Easting	Northing
Start Pos	725048.40	733865.54
End Pos	724411.26	734203.08

Loading



For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:44

Appendix 4 - Sediment Chemistry Results

The following information is presented in this Appendix:

- Hydrodata Report on Sediment Chemistry Testing in 2020
- Socotec Laboratory Report on results of Sediment Chemistry Testing
- Sediment Chemistry Results presented in Marine Institute Format

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:44

Dublin Port
Sediment sampling (contamination) Report
April 2020

For inspection purposes only.
Consent of copyright owner required for any other use.

NOTES

Survey date	The 15th and 16th of April
Report date	15/05/2020
Location	Dublin Port
Coordinate system	Geographic WGS84 and ITM
Report Revision	Draft
Prepared by	DL
Check by	CM/BS

Document control

Date	Prepared by	Comment
15/05/2020	DL	Draft
17/05/2020	CM and BS	Final review and edits

Hydromaster Ltd.
7 Howley Court,
Dublin Road
Oranmore
Co. Galway, Ireland

Tel: +353-86-0891047
E-mail: bsmith@hydromaster.ie

EPA Export 28-04-2021:02:37:44

Contents

1. Introduction 3
2. Sediment sampling methodology 5
2.1. Visual sediment characteristics 5
2.2. Analytical laboratory sampling 6
3. Results 6
3.1. Laboratory results 7
3.2. EPA documentation 7
4. Conclusion 7
5. Appendices 7
5.1. Appendix A – Sampling Details 7
- Appendix A1 Sample location time and date 7
- Appendix A2 Sediment descriptions 7
5.2. Appendix B – Laboratory results 7
- Appendix B1 Laboratory results 7
- Appendix B2 EPA result sheet 7
5.3. Appendix C – Charts of Grab samples location 7

For inspection purposes only.
Consent of copyright owner required for any other use.

Figures

Figure 1: Dublin port sediment sampling locations (2020 licensed area). 3
Figure 2: Dublin port sediment sampling locations (2016 licensed area). 3
Figure 3: Van veen grab utilised for sediment sample collection 5

EPA Export 28-04-2021:02:37:44

1. Introduction

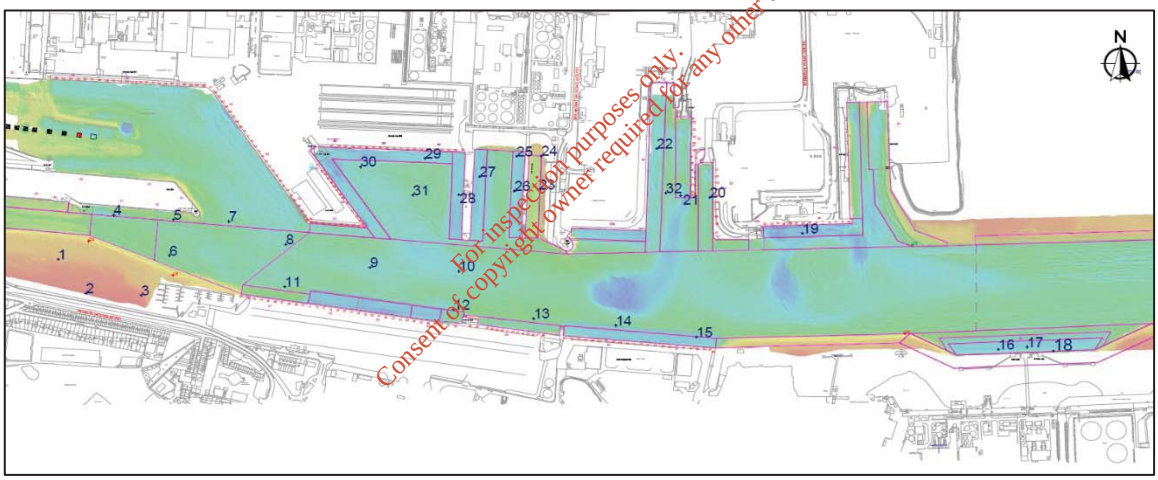
Dublin Port Company (DPC) are conducting a comprehensive sampling and analysis plan of marine sediment designed to cover the planned maintenance dredging of the berths and navigation channel as well as covering locations for the capital works (berth widening and a turning circle).

The primary area of concern highlighted by the Environmental Protection Agency (EPA) is the possibility of contaminants found within the sediment. Therefore a total of thirty-one sampling locations were chosen as well as five historically sampled locations for the collection and analysis of sediment samples for contamination.

Hydromaster were contracted to collect these sediment samples and conduct the required analysis.

Hydromaster undertook sediment collection across two days in April (the 15th and 16th), within the Dublin port area. The survey was carried out over two days due to restrictions of access to berths and tidal height.

The sampling locations are spread out across Dublin Port and the channel. The sample locations are shown below in Figure 1 and Figure 2.



For inspection purposes only.
Consent of copyright owner required for any other use.

Figure 1: Dublin port sediment sampling locations (2020 licenced area).

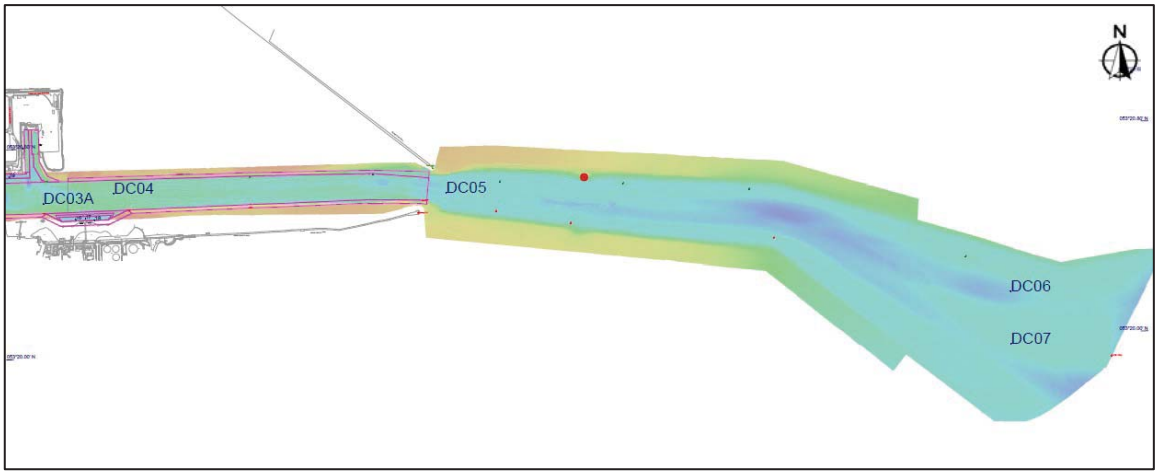


Figure 2: Dublin port sediment sampling locations (2016 licenced area).

EPA Export 28-04-2021:02:37:44

The locations of the samples at some locations had to be moved slightly due to either access restrictions, or the inability for the grab to collect a valid sample (large rocks or hard bottom). In these instances, the sample was collected from within a 10m radius of the original location.

Details of the sample locations are provided in Table 1 in appendix A.

Detailed location charts (PDF format) are provided in appendix C.

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:44

2.ĀSediment sampling methodology

The sampling vessel is equipped with a highly accurate Hemisphere mounted GPS VS330, allowing a location fix of up to 10 mm. This was used when approaching the sampling location to ensure that the sample was collected from the designated position.

At each location, all of the equipment was cleaned thoroughly prior to deployment. Additionally a new set of disposable gloves were used by the individual collecting the sample to remove the possibility of contamination from the sampler and between samples.

Once in position, sediment samples were collected by Hydromaster scientists utilising a Van Veen benthic grab of 0.1m^2 (Figure 3).

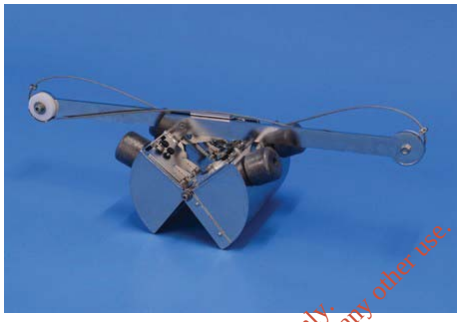


Figure 3: Van veen grab utilised for sediment sample collection

For inspection purposes only.
Consent of copyright owner required for any other use.

Once the grab was brought back onto the sampling vessel, the sample was deposited into the stainless-steel collection bucket. Samples found to be less than 2l were rejected.

If any samples were rejected or unusable all of the equipment was cleaned thoroughly before the equipment was redeployed and a new sample was collected. This ensured no cross contamination between samples

Successful grab samples were placed into the collection bucket and a visual inspection was carried out. Once the sample had been documented, laboratory sub samples were collected from the surface layer and placed into the laboratory provided sample containers. These processes are detailed in the following sections.

Once the documentation and sampling had been carried out, all the sampling equipment was cleaned thoroughly with seawater to minimise sample cross contamination.

2.1.ĀVisual sediment characteristics

Once the sediment sample was placed into the stainless-steel collection bucket, photographs were taken, and a descriptive log of sediment characteristics was recorded. The sediment characteristics log included the following details:

- Sediment classification (very coarse, fine silt, muddy etc.);
- Layering (if present, including colour of surface/subsurface layers and presence of anoxic layer);

EPA Export 28-04-2021:02:37:44

- Odour (presence of H_2S);
- Visible fauna;
- Bioturbation (presence/absence); and
- Anthropogenic debris (e.g. pollution, plastic waste etc.).

This qualitative sediment analysis was performed on sediment obtained from the first successful grab taken at each location. The photographs and characteristics collected from this process can be viewed in Appendix A.

2.2. Analytical laboratory sampling

Once the sediment sample had been photographed and documented, sub samples were collected from the surface layer using a stainless-steel scoop and placed into the laboratory provided containers. The details of the containers collected at each site are provided in Appendix X.

All sediment samples to be sent to the analytical laboratory were labelled with the project number, site number, date and time of sampling and placed into cold storage immediately. Samples were transported to the laboratory immediately after demobilisation along with full Chain of Custody (CoC) documentation. The laboratory used for analysis of these samples was Socotec, based in the UK.

For inspection purposes only.
Consent of copyright owner required for any other use.

The sediment samples collected from all of the locations were subjected to the following laboratory analyses:

- Grain Size Analysis (<2mm and <63µm);
- Organic Carbon content;
- Total Extractable Hydrocarbons (TEH);
- Heavy Metals (Cd, Hg, As, Cr, Cu, Pb, Ni, Zn);
- ΣPAH16;
- ΣPCB7;
- HCB;
- g-HCH;
- p,p' DDT;
- p,p' DDD;
- p,p' DDE;
- TBT;
- DBT.

For QAQC purposes, the laboratory conducted a QC blank and a reference material analysis for all chemical analysis. These results are provided with the laboratory results in Appendix B.

3. Results

Samples were successfully collected, and sub sampled from all but one location (30). At this location, only large rocks were able to be obtained. These were provided to the lab for visual inspection, but no physio-chemical analysis was able to be carried out. Additionally at location 21 only one large rock was able to be collected after multiple grab attempts on location. Therefore the vessel was

EPA Export 28-04-2021:02:37:44

moved to location 32 and a sample was successfully collected. This may be used as a proxy for location 21.

3.1. Laboratory results

The results provided by the laboratory are provided in Appendix B.

3.2. EPA documentation

The results from the laboratory and the survey details were inputted into the EPA survey document. This completed document is provided in Appendix B.

4. Conclusion

Sediment samples were able to be collected from all but one location (30). All samples were stored and delivered successfully to the laboratory for analysis. Accurate analysis was possible on all samples provided to the laboratory.

5. Appendices

5.1. Appendix A – Sampling Details

- Appendix A1 Sample location time and date
- Appendix A2 Sediment descriptions

5.2. Appendix B – Laboratory results

- Appendix B1 Laboratory results
- Appendix B2 EPA result sheet

5.3. Appendix C – Charts of Grab samples location

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:44

Appendix A1 – Sampling locations and sample descriptions

Table 1: Sampling locations

Location Name	Latitude	Longitude	Date sampled	Time sample taken
new 1	53.34479	-6.22156	16/04/2020	13:30
new 2	53.34395	-6.22057	15/04/2020	19:40
new 3	53.34391	-6.2186	15/04/2020	19:30
new 4	53.34573	-6.2194	15/04/2020	17:04
new 5	53.34561	-6.21733	15/04/2020	16:47
new 6	53.34478	-6.21758	16/04/2020	13:20
new 7	53.34554	-6.21537	16/04/2020	14:04
new 8	53.34497	-6.21332	16/04/2020	14:12
new 9	53.34441	-6.21042	16/04/2020	14:47
new 10	53.34426	-6.20714	16/04/2020	15:03
new 11	53.34414	-6.21353	16/04/2020	14:32
new 12	53.34343	-6.20728	15/04/2020	16:35
new 13	53.34315	-6.20445	15/04/2020	16:24
new 14	53.34294	-6.20152	15/04/2020	16:11
new 15	53.34262	-6.19859	15/04/2020	15:58
new 16	53.34217	-6.18777	16/04/2020	15:32
new 17	53.34223	-6.18673	16/04/2020	15:43
new 18	53.34211	-6.1858	16/04/2020	15:51
new 19	53.34496	-6.19461	15/04/2020	15:03
new 20	53.34585	-6.19806	15/04/2020	13:18
new 21	53.34593	-6.19903	15/04/2020	15:46
new 22	53.34697	-6.19988	15/04/2020	18:40
new 23	53.34612	-6.20411	15/04/2020	14:15
new 24	53.34693	-6.20394	15/04/2020	14:26
new 25	53.34689	-6.20492	15/04/2020	13:47
new 26	53.34609	-6.20505	15/04/2020	13:31
new 27	53.34642	-6.20626	15/04/2020	13:57
new 28	53.34602	-6.20703	15/04/2020	18:52
new 29	53.34692	-6.20827	15/04/2020	19:03
new 30	53.34695	-6.21063	15/04/2020	19:22
new 31	53.34601	-6.20865	16/04/2020	15:16
new 32	53.34596	-6.19958	15/04/2020	14:39
DC03A	53.3432	-6.19116	16/04/2020	11:23
DC04	53.34369	-6.18346	16/04/2020	11:14
DC05	53.34332	-6.14829	16/04/2020	10:54
DC06	53.33608	-6.08881	16/04/2020	09:46
DC07	53.33274	-6.08881	16/04/2020	10:10

Consent of copyright owner required for any other use.
For inspection purposes only.

EPA Export 28-04-2021:02:37:44

Appendix A2 – Sample descriptions

Table 2: Sample descriptions

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 1		Grey sandy silty CLAY	Yes, light fine sediment on top of dark	Slight H_2S	No	No	No	3	2
new 2		Grey slightly sandy silty CLAY	Yes, light fine sediment on top of dark	Slight H_2S	No	No	No	3	2

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:44

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 3		Grey sandy SILT	Yes, light fine sediment on top of dark	Slight H_2S	No	No	No	3	2
new 4		Grey slightly sandy silty CLAY	No	Slight H_2S	No	No	No	3	2

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:44

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 5		Grey sandy SILT	No	No	No	No	No	3	2
new 6		Grey slightly sandy silty CLAY	No	No	No	No	No	3	2

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:44

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 7		Grey sandy clayey SILT	No	No	No	No	No	3	2
new 8		Grey slightly sandy slightly gravelly silty CLAY	No	No	No	No	No	3	2

Consent of copyright owner required for any other use.
For inspection purposes only.

EPA Export 28-04-2021:02:37:44

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 9		Very large rocks with Grey sandy silty CLAY	No	No	Large velvet swimming crab	No	small pottery and brick fragments	3	2
new 10		Grey slightly sandy silty CLAY	No	No	No	No	No	3	2

Consent of copyright owner required for any other use.
For inspection purposes only.

EPA Export 28-04-2021:02:37:44

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 11		Grey slightly sandy silty CLAY	Yes, light fine sediment on top of dark	Slight H_2S	No	No	No	3	2
new 12		Grey slightly sandy silty CLAY	Yes, light fine sediment on top of dark	Slight H_2S	small number of ragworms	minor	No	3	2

Consent of copyright owner required for any other use.
For inspection purposes only.

EPA Export 28-04-2021:02:37:44

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 13		Grey slightly sandy silty CLAY	Yes, light fine sediment on top of dark	Slight H_2S	No	No	No	3	2
new 14		Grey sandy SILT	Yes, light fine sediment on top of dark	Slight H_2S	No	No	No	3	2

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:44

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 15		Grey sandy silty CLAY	Yes, light fine sediment on top of dark	Slight H_2S	No	No	Plastic bottle in sediment	3	2
new 16		Grey sandy SILT	Yes, light fine sediment on top of dark	Slight H_2S	large number of ragworms	some burrows observed	Oil sheen on surface	3	2

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:44

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 17		Grey sandy SILT	Yes, light fine sediment on top of dark	Slight H_2S	small number of ragworms	some burrows observed	No	3	2
new 18		Grey slightly sandy silty CLAY	No	No	No	No	No	3	2

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:44

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 19		Grey slightly gravelly silty SAND	No	No	Shells and fragements	No	No	3	2
new 20		Large rocks Grey slightly gravelly sandy SILT	No	No	No	No	small pottery and brick fragments	3	2

Consent of copyright owner required for any other use.
For inspection purposes only.

EPA Export 28-04-2021:02:37:44

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 21	No photo taken as only a single large rock was collected.	One large rock	No	No	No	No	No	-	-
new 22		Grey sandy SILT	Yes, light fine sediment on top of dark	Slight H_2S	small number of ragworms	some burrows observed	No	3	2

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:44

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 23		Grey slightly sandy silty CLAY	Yes, light fine sediment on top of dark	Slight H_2S	No	No	No	3	2
new 24		Grey sandy clayey SILT	Yes, light fine sediment on top of dark	Slight H_2S	Crab shell remains	No	No	3	2

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:44

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 25		Grey slightly sandy silty CLAY	Yes, light fine sediment on top of dark	Slight H_2S	No	No	No	3	2
new 26		Grey slightly sandy silty CLAY	Yes, light fine sediment on top of dark	Strong H_2S	No	No	No	3	2

Consent of copyright owner required for any other use.
For inspection purposes only.

EPA Export 28-04-2021:02:37:44

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 27		Grey sandy silty CLAY	Yes, light fine sediment on top of dark	Slight H_2S	No	No	No	3	2
new 28		Grey slightly sandy silty CLAY	Yes, light fine sediment on top of dark	Slight H_2S	No	No	No	3	2

Consent of copyright owner required for any other use.
For inspection purposes only.

EPA Export 28-04-2021:02:37:44

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 29		Grey sllightly sandy slightly gravelly silty CLAY	Yes, light fine sediment on top of dark	Slight H_2S	No	No	No	3	2
new 30		Large rocks no sediment	N/A	No	Barnacles present on some rocks	No	No	-	-

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:44

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
new 31		Small rocks Grey sandy clayey SILT	No	Slight H_2S	No	No	No	3	2
new 32		some rocksGrey slightly sandy slightly gravelly silty CLAY	No	No	No	No	No	3	2

Consent of copyright owner required for any other use. For inspection purposes only.

EPA Export 28-04-2021:02:37:44

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
DC03A		Grey slightly sandy silty CLAY	Yes, light fine sediment on top of dark	Slight H_2S	No	No	No	4	2
DC04		Grey sandy SILT	No	Slight H_2S	No	No	Small piece of plastic	4	2

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:44

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
DC05		Grey silty SAND	Yes, light fine sediment on top of dark	Slight H_2S	No	No	No	4	2
DC06		Grey slightly gravelly silty SAND	No	No	No	No	No	4	2

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:44

Location Name	Photo	Sediment classification	Layering	Odour	Visible fauna	Bioturbation	Anthropogenic debris	0.5l plastic tubs	120ml glass jars
DC07		Light brown SAND	No	No	Some shell fragments	No	No	4	2

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:44

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	**MAR00599**	
Issue Version	3	
Customer	Hydromaster Ltd, 7 Howley Court, Dublin Road, Oranmore, Co. Galway, Ireland H91 V1KD	
Customer Reference	Dublin Port	
Date Sampled	15-Apr-20	
Date Received	17-Apr-20	
Date Reported	26-May-20	
Condition of samples	Cold	Satisfactory

This is a revised report containing the actual CRM values in addition to the % Recovery

For inspection purposes only.
Consent of copyright owner required for any other use.

Authorised by: Marya Hubbard

Position: Laboratory Manager

Any additional opinions or interpretations found in this report, are outside the scope of UKAS accreditation.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:44

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

Client Reference:	SOCOTEC Ref:	Matrix	Visual Description
2	MAR00599.001	Sediment	Grey slightly sandy silty CLAY
3	MAR00599.002	Sediment	Grey sandy SILT
4	MAR00599.003	Sediment	Grey slightly sandy silty CLAY
5	MAR00599.004	Sediment	Grey sandy SILT
12	MAR00599.005	Sediment	Grey slightly sandy silty CLAY
13	MAR00599.006	Sediment	Grey slightly sandy silty CLAY
14	MAR00599.007	Sediment	Grey sandy SILT
15	MAR00599.008	Sediment	Grey sandy silty CLAY
19	MAR00599.009	Sediment	Grey slightly gravelly silty SAND
20	MAR00599.010	Sediment	Grey slightly gravelly sandy SILT
22	MAR00599.011	Sediment	Grey sandy SILT
23	MAR00599.012	Sediment	Grey slightly sandy silty CLAY
24	MAR00599.013	Sediment	Grey sandy clayey SILT
25	MAR00599.014	Sediment	Grey slightly sandy silty CLAY
26	MAR00599.015	Sediment	Grey slightly sandy silty CLAY
27	MAR00599.016	Sediment	Grey sandy silty CLAY
28	MAR00599.017	Sediment	Grey slightly sandy silty CLAY
29	MAR00599.018	Sediment	Grey slightly sandy slightly gravelly silty CLAY
32	MAR00599.019	Sediment	Grey slightly sandy slightly gravelly silty CLAY
1	MAR00599.020	Sediment	Grey sandy silty CLAY
6	MAR00599.021	Sediment	Grey slightly sandy silty CLAY
7	MAR00599.022	Sediment	Grey sandy clayey SILT
8	MAR00599.023	Sediment	Grey slightly sandy slightly gravelly silty CLAY
9	MAR00599.024	Sediment	Grey sandy silty CLAY
10	MAR00599.025	Sediment	Grey slightly sandy silty CLAY
11	MAR00599.026	Sediment	Grey slightly sandy silty CLAY
16	MAR00599.027	Sediment	Grey sandy SILT
17	MAR00599.028	Sediment	Grey sandy SILT
18	MAR00599.029	Sediment	Grey slightly sandy silty CLAY
31	MAR00599.030	Sediment	Grey sandy clayey SILT
DC03A	MAR00599.031	Sediment	Grey slightly sandy silty CLAY
DC04	MAR00599.032	Sediment	Grey sandy SILT
DC05	MAR00599.033	Sediment	Grey silty SAND
DC06	MAR00599.034	Sediment	Grey slightly gravelly silty SAND
DC07	MAR00599.035	Sediment	Light brown SAND

For inspection purposes only.
Consent of copyright owner required for any other use.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:44

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	%	%	%	%	%	mg/m3
		Method No	ASC/SOP/303	ASC/SOP/303	SUB_01*	SUB_01*	SUB_01*	SOCOTEC Doncaster*
		Limit of Detection	0.2	0.2	N/A	N/A	N/A	N/A
		Accreditation	UKAS	UKAS	N	N	N	N
Client Reference:	SOCOTEC Ref:	Matrix	Total Moisture @ 120°C	Total Solids	Gravel (>2mm)	Sand (63-2000 µm)	Silt (<63 µm)	Particle Density
2	MAR00599.001	Sediment	41.8	58.2	1.8	52.4	45.8	2.66
3	MAR00599.002	Sediment	58.2	41.8	0.0	27.0	73.0	2.63
4	MAR00599.003	Sediment	49.8	50.2	1.0	25.4	73.7	2.68
5	MAR00599.004	Sediment	49.5	50.5	3.1	37.7	59.2	2.70
12	MAR00599.005	Sediment	49.1	50.9	1.2	29.9	69.0	2.69
13	MAR00599.006	Sediment	57.2	42.8	0.1	26.5	73.4	2.66
14	MAR00599.007	Sediment	52.9	47.1	5.1	31.9	63.0	2.69
15	MAR00599.008	Sediment	56.1	43.9	0.0	26.1	73.9	2.63
19	MAR00599.009	Sediment	27.3	72.7	25.3	65.4	9.3	2.70
20	MAR00599.010	Sediment	43.0	57.0	9.8	31.0	59.2	2.61
22	MAR00599.011	Sediment	48.0	52.0	8.9	43.6	47.4	2.60
23	MAR00599.012	Sediment	63.6	36.4	0.0	16.2	83.8	2.67
24	MAR00599.013	Sediment	60.5	39.5	1.1	11.8	87.1	2.67
25	MAR00599.014	Sediment	61.5	38.5	0.3	17.5	82.2	2.64
26	MAR00599.015	Sediment	61.6	38.4	0.4	21.8	77.9	2.66
27	MAR00599.016	Sediment	64.8	35.2	0.1	17.5	82.4	2.62
28	MAR00599.017	Sediment	62.0	38.0	0.2	21.3	78.5	2.66
29	MAR00599.018	Sediment	61.1	38.9	0.1	22.8	77.1	2.69
32	MAR00599.019	Sediment	45.7	54.3	43.6	24.8	31.6	2.66
1	MAR00599.020	Sediment	69.2	30.8	0.0	18.3	81.7	2.53
6	MAR00599.021	Sediment	56.6	43.4	8.1	35.6	56.3	2.69
7	MAR00599.022	Sediment	40.2	59.8	21.2	50.4	28.3	2.68
8	MAR00599.023	Sediment	47.8	52.2	7.7	32.3	60.0	2.64
9	MAR00599.024	Sediment	20.1	79.9	81.8	8.9	9.2	2.67
10	MAR00599.025	Sediment	53.2	46.8	23.2	26.2	50.7	2.70
11	MAR00599.026	Sediment	62.8	37.2	0.0	24.0	76.0	2.66
16	MAR00599.027	Sediment	62.0	38.0	0.0	20.2	79.8	2.66
17	MAR00599.028	Sediment	70.4	29.6	0.0	18.1	81.9	2.63
18	MAR00599.029	Sediment	69.9	30.1	0.0	20.5	79.5	2.54
31	MAR00599.030	Sediment	47.8	52.2	3.9	28.5	67.6	2.70

For inspection purposes only.
Consent of copyright owner required for any other use.

* See Report Notes

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:44

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	%	% M/M
		Method No	SOCOTEC Env Chem*	SOCOTEC Env Chem*
		Limit of Detection	00/01/1900	0.02
		Accreditation	N	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Carbonate**	**TOC**
2	MAR00599.001	Sediment	1.68	1.08
3	MAR00599.002	Sediment	3.24	2.30
4	MAR00599.003	Sediment	3.28	2.38
5	MAR00599.004	Sediment	3.68	1.94
12	MAR00599.005	Sediment	3.96	1.46
13	MAR00599.006	Sediment	3.80	1.67
14	MAR00599.007	Sediment	4.92	1.33
15	MAR00599.008	Sediment	3.32	1.59
19	MAR00599.009	Sediment	6.76	0.81
20	MAR00599.010	Sediment	4.00	1.11
22	MAR00599.011	Sediment	4.16	1.06
23	MAR00599.012	Sediment	3.36	2.11
24	MAR00599.013	Sediment	3.96	1.97
25	MAR00599.014	Sediment	3.52	2.06
26	MAR00599.015	Sediment	3.72	1.92
27	MAR00599.016	Sediment	3.96	1.90
28	MAR00599.017	Sediment	3.36	1.85
29	MAR00599.018	Sediment	3.44	1.85
32	MAR00599.019	Sediment	6.04	0.79
1	MAR00599.020	Sediment	3.64	3.62
6	MAR00599.021	Sediment	3.84	1.49
7	MAR00599.022	Sediment	3.88	2.58
8	MAR00599.023	Sediment	4.24	1.69
9	MAR00599.024	Sediment	5.44	0.44
10	MAR00599.025	Sediment	6.08	1.11
11	MAR00599.026	Sediment	3.72	2.16
16	MAR00599.027	Sediment	3.36	1.89
17	MAR00599.028	Sediment	3.04	2.08
18	MAR00599.029	Sediment	3.36	2.06
31	MAR00599.030	Sediment	3.76	1.63

* See Report Notes

Consent of copyright owner required for any other use.
For inspection purposes only.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:44

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	%	%	%	%	%	mg/m3
		Method No	ASC/SOP/303	ASC/SOP/303	SUB_01*	SUB_01*	SUB_01*	SOCOTEC Doncaster*
		Limit of Detection	0.2	0.2	N/A	N/A	N/A	N/A
		Accreditation	UKAS	UKAS	N	N	N	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Total Moisture @ 120°C**	**Total Solids**	**Gravel (>2mm)**	**Sand (63-2000 µm)**	**Silt (<63 µm)**	**Particle Density**
DC03A	MAR00599.031	Sediment	62.4	37.6	0.0	32.4	67.6	2.65
DC04	MAR00599.032	Sediment	48.1	51.9	0.0	38.6	61.4	2.66
DC05	MAR00599.033	Sediment	42.3	57.7	0.5	91.9	7.6	2.63
DC06	MAR00599.034	Sediment	31.9	68.1	0.9	94.1	5.1	2.75
DC07	MAR00599.035	Sediment	27.3	72.7	0.2	97.0	2.9	2.64

* See Report Notes

For inspection purposes only.
Consent of copyright owner required for any other use.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:44

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	%	% M/M
		Method No	SOCOTEC Env Chem*	SOCOTEC Env Chem*
		Limit of Detection	00/01/1900	0.02
		Accreditation	N	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Carbonate**	**TOC**
DC03A	MAR00599.031	Sediment	3.20	1.35
DC04	MAR00599.032	Sediment	3.24	1.74
DC05	MAR00599.033	Sediment	2.32	0.24
DC06	MAR00599.034	Sediment	2.16	0.13
DC07	MAR00599.035	Sediment	1.84	0.11

* See Report Notes

For inspection purposes only.
Consent of copyright owner required for any other use.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:44

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*
		Limit of Detection	1	0.1	0.5	2	2	0.5	3
		Accreditation	UKAS	N	N	UKAS	UKAS	Nickel	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Arsenic**	**Cadmium**	**Chromium**	**Copper**	**Lead**	**Nickel**	**Zinc**
2	MAR00599.001	Sediment	23.7	0.9	95.6	39.2	50.4	17.3	118
3	MAR00599.002	Sediment	34.8	1.1	79.7	42.0	61.8	25.6	201
4	MAR00599.003	Sediment	36.3	1.3	77.2	38.1	71.2	33.1	183
5	MAR00599.004	Sediment	35.4	1.1	85.8	32.2	53.9	30.1	149
12	MAR00599.005	Sediment	32.7	1.0	81.1	34.6	35.0	34.1	124
13	MAR00599.006	Sediment	28.7	0.9	78.0	37.9	32.0	43.0	117
14	MAR00599.007	Sediment	24.9	1.3	81.8	22.3	26.4	32.3	103
15	MAR00599.008	Sediment	19.5	0.9	78.3	26.1	33.6	30.6	112
19	MAR00599.009	Sediment	14.6	0.6	91.6	19.9	15.2	24.7	95.0
20	MAR00599.010	Sediment	14.6	0.9	83.0	24.7	39.7	29.2	121
22	MAR00599.011	Sediment	13.8	1.1	86.5	42.5	24.4	27.0	99.0
23	MAR00599.012	Sediment	15.8	0.9	85.1	39.9	44.8	35.6	150
24	MAR00599.013	Sediment	12.7	1.0	78.8	47.8	57.2	36.0	176
25	MAR00599.014	Sediment	17.4	1.1	81.9	34.6	41.9	33.0	143
26	MAR00599.015	Sediment	21.4	0.9	78.8	30.0	36.8	32.8	129
27	MAR00599.016	Sediment	19.1	0.9	81.3	31.9	38.7	33.1	144
28	MAR00599.017	Sediment	19.9	0.9	77.9	32.5	40.6	32.1	141
29	MAR00599.018	Sediment	18.0	1.0	78.3	31.1	39.4	31.9	134
32	MAR00599.019	Sediment	10.7	0.8	88.9	46.3	18.6	28.4	92
		Certified Reference Material 2702 (% Recovery)	105	253	80	78	89	82	90
		Certified Reference Material 2702 (Result)	47.5	2	280	91	118	62	439
		Certified Reference Material 1646a (% Recovery)	-	-	-	-	-	-	-
		Certified Reference Material 1646a (Result)	-	-	-	-	-	-	-
		QA/QC In-House Refernece Material (% Recovery)	120	100	102	103	98	102	100
		QC Blank	<1	<0.1	<0.5	<2	<2	<0.5	<3

For inspection purposes only.
Consent of copyright owner required for any other use.

* See Report Notes
~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:44

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*
		Limit of Detection	10	0.5	0.01
		Accreditation	UKAS	N	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Aluminium**	**Lithium**	**Mercury**
2	MAR00599.001	Sediment	23900	23.9	0.02
3	MAR00599.002	Sediment	30100	32.7	0.04
4	MAR00599.003	Sediment	35800	39.8	0.07
5	MAR00599.004	Sediment	31000	34.2	0.07
12	MAR00599.005	Sediment	34000	35.9	0.02
13	MAR00599.006	Sediment	33000	35.8	0.01
14	MAR00599.007	Sediment	30700	32.4	0.01
15	MAR00599.008	Sediment	35300	37.8	0.06
19	MAR00599.009	Sediment	11700	14.1	<0.01
20	MAR00599.010	Sediment	28100	30.5	0.02
22	MAR00599.011	Sediment	26500	29.5	0.01
23	MAR00599.012	Sediment	40700	44.3	0.05
24	MAR00599.013	Sediment	43300	46.0	0.04
25	MAR00599.014	Sediment	38000	40.4	0.05
26	MAR00599.015	Sediment	41200	42.7	0.04
27	MAR00599.016	Sediment	40100	42.2	0.03
28	MAR00599.017	Sediment	38300	40.6	0.05
29	MAR00599.018	Sediment	36900	38.8	0.02
32	MAR00599.019	Sediment	19100	21.8	<0.01
		Certified Reference Material 2702 (% Recovery)	98	93	-
		Certified Reference Material 2702 (Result)	82400	73	-
		Certified Reference Material 1646a (% Recovery)	-	-	25
		Certified Reference Material 1646a (Result)	-	-	0.01
		QA/QC In-House Refernece Material (% Recovery)	106	97	102
		QC Blank	<10	<0.5	<0.01

* See Report Notes
~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

Consent of copyright owner required for any other use.
For inspection purposes only.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:44

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*
		Limit of Detection	1	0.1	0.5	2	2	0.5	3
		Accreditation	UKAS	N	N	UKAS	UKAS	N	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Arsenic**	**Cadmium**	**Chromium**	**Copper**	**Lead**	**Nickel**	**Zinc**
1	MAR00599.020	Sediment	16.4	1.2	79.7	45.1	70.0	33.1	252
6	MAR00599.021	Sediment	12.8	0.9	98.0	27.5	48.9	25.4	136
7	MAR00599.022	Sediment	13.1	0.7	111	23.6	110	20.0	117
8	MAR00599.023	Sediment	17.1	1.2	101	28.9	78.0	27.0	145
9	MAR00599.024	Sediment	16.2	1.2	103	15.7	10.6	33.2	62.0
10	MAR00599.025	Sediment	14.9	0.9	82.3	22.8	29.8	24.3	116
11	MAR00599.026	Sediment	18.0	1.1	90.0	62.3	51.8	29.2	151
16	MAR00599.027	Sediment	15.6	0.8	81.4	34.1	39.5	28.0	127
17	MAR00599.028	Sediment	14.3	0.9	94.8	34.0	43.6	29.1	154
18	MAR00599.029	Sediment	11.3	0.9	80.8	29.0	41.6	28.6	133
31	MAR00599.030	Sediment	10.9	0.9	85.7	29.3	48.5	26.5	137
DC03A	MAR00599.031	Sediment	9.7	0.7	78.9	24.4	31.4	24.3	105
DC04	MAR00599.032	Sediment	10.8	1.0	76.5	28.0	65.6	26.4	139
DC05	MAR00599.033	Sediment	6.1	0.2	82.9	6.8	11.7	10.3	36.0
DC06	MAR00599.034	Sediment	9.0	0.3	105	6.4	9.7	9.7	37.0
DC07	MAR00599.035	Sediment	10.8	0.3	106	6.1	9.9	8.5	30.0
Certified Reference Material 2702 (% Recovery)			90	218	86	80	94	87	93
Certified Reference Material 2702 (Result)			40.9	2	303	95	125	66	450
Certified Reference Material 1646a (% Recovery)				-	-	-	-	-	-
Certified Reference Material 1646a (Result)			-	-	-	-	-	-	-
QA/QC In-House Refernece Material (% Recovery)			103	100	98	107	104	98	97
QC Blank			<1	<0.1	<0.5	<2	<2	<0.5	<3

For inspection purposes only.
Consent of copyright owner required for any other use.

* See Report Notes
~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:44

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*
		Limit of Detection	10	0.5	0.01
		Accreditation	UKAS	N	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Aluminium**	**Lithium**	**Mercury**
1	MAR00599.020	Sediment	38900	40.8	0.17
6	MAR00599.021	Sediment	32300	34.0	0.09
7	MAR00599.022	Sediment	26600	28.5	0.07
8	MAR00599.023	Sediment	35100	36.0	0.11
9	MAR00599.024	Sediment	18800	16.1	<0.01
10	MAR00599.025	Sediment	28200	29.3	0.01
11	MAR00599.026	Sediment	40800	42.1	0.06
16	MAR00599.027	Sediment	43000	44.5	0.04
17	MAR00599.028	Sediment	44400	46.5	0.08
18	MAR00599.029	Sediment	44200	45.6	0.06
31	MAR00599.030	Sediment	36000	36.8	0.11
DC03A	MAR00599.031	Sediment	36600	36.7	0.04
DC04	MAR00599.032	Sediment	36500	37.4	0.18
DC05	MAR00599.033	Sediment	20500	16.9	<0.01
DC06	MAR00599.034	Sediment	16000	13.6	<0.01
DC07	MAR00599.035	Sediment	13700	12.5	<0.01
		Certified Reference Material 2702 (% Recovery)	100	94	-
		Certified Reference Material 2702 (Result)	84400	73	-
		Certified Reference Material 1646a (% Recovery)		-	0.01
		Certified Reference Material 1646a (Result)	-	-	25
		QA/QC In-House Refernece Material (% Recovery)	108	99	101
		QC Blank	<10	<0.5	<0.01

For inspection purposes only.
Consent of copyright owner required for any other use.

* See Report Notes
~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:44

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	
		Method No	ASC/SOP/301	
		Limit of Detection	1	1
		Accreditation	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Dibutyltin (DBT)**	**Tributyltin (TBT)**
2	MAR00599.001	Sediment	16.1	16.2
3	MAR00599.002	Sediment	43.3	56.9
4	MAR00599.003	Sediment	12.4	22.4
5	MAR00599.004	Sediment	15.4	33.4
12	MAR00599.005	Sediment	11.0	10.9
13	MAR00599.006	Sediment	<5	14.4
14	MAR00599.007	Sediment	<5	<5
15	MAR00599.008	Sediment	<5	<5
19	MAR00599.009	Sediment	<5	<5
20	MAR00599.010	Sediment	20.0	13.0
22	MAR00599.011	Sediment	<5	<5
23	MAR00599.012	Sediment	<5	<5
24	MAR00599.013	Sediment	<5	<5
25	MAR00599.014	Sediment	<5	<5
26	MAR00599.015	Sediment	<5	<5
Certified Reference Material BCR-646 (% Recovery)			97	81
Certified Reference Material BCR-646			743	389
QC Blank			<1	<1

* See Report Notes

For inspection purposes only.
Consent of copyright owner required for any other use.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:44

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	
		Method No	ASC/SOP/301	
		Limit of Detection	1	1
		Accreditation	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Dibutyltin (DBT)**	**Tributyltin (TBT)**
27	MAR00599.016	Sediment	<5	<5
28	MAR00599.017	Sediment	<5	<5
29	MAR00599.018	Sediment	<5	<5
32	MAR00599.019	Sediment	<5	<5
1	MAR00599.020	Sediment	19.0	28.4
6	MAR00599.021	Sediment	<5	18.1
7	MAR00599.022	Sediment	<5	18.7
8	MAR00599.023	Sediment	16.4	63.6
9	MAR00599.024	Sediment	<5	<5
10	MAR00599.025	Sediment	<5	<5
11	MAR00599.026	Sediment	<5	23.4
16	MAR00599.027	Sediment	<5	<5
17	MAR00599.028	Sediment	<5	<5
18	MAR00599.029	Sediment	<5	<5
31	MAR00599.030	Sediment	12.7	34.7
DC03A	MAR00599.031	Sediment	<5	<5
DC04	MAR00599.032	Sediment	<5	<5
		Certified Reference Material BCR-646 (% Recovery)	84	72
		Certified Reference Material BCR-646	649	345
		QC Blank	<1	<1

* See Report Notes

For inspection purposes only.
Consent of copyright owner required for any other use.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:44

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	
		Method No	ASC/SOP/301	
		Limit of Detection	1	1
		Accreditation	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Dibutyltin (DBT)**	**Tributyltin (TBT)**
DC05	MAR00599.033	Sediment	<5	<5
DC06	MAR00599.034	Sediment	<5	<5
DC07	MAR00599.035	Sediment	<5	<5
Certified Reference Material BCR-646 (% Recovery)			103	81
Certified Reference Material BCR-646			797	390
QC Blank			<1	<1

* See Report Notes

For inspection purposes only.
Consent of copyright owner required for any other use.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:44

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**ACENAPTH**	**ACENAPHY**	**ANTHRACN**	**BAA**	**BAP**	**BBF**
2	MAR00599.001	Sediment	46.2	40.8	95.0	193	269	271
3	MAR00599.002	Sediment	43.9	91.7	123	308	432	380
4	MAR00599.003	Sediment	45.2	104	135	329	427	409
5	MAR00599.004	Sediment	89.3	432	531	1340	1580	1070
12	MAR00599.005	Sediment	30.6	51.9	70.5	176	226	222
13	MAR00599.006	Sediment	15.2	47.9	37.6	101	145	153
14	MAR00599.007	Sediment	20.3	59.4	45.2	116	167	148
15	MAR00599.008	Sediment	20.2	94.2	82.4	235	319	256
19	MAR00599.009	Sediment	2.69	3.01	6.21	17.2	22.6	24.9
20	MAR00599.010	Sediment	38.4	72.3	111	283	361	349
Certified Reference Material CRM180013 1941b (% Recovery)			70	100	68	64	56	90
Certified Reference Material CRM180013 1941b			27	58	125	214	200	408
QC Blank			<1	<1	<1	<1	<1	<1

For full analyte name see method summaries

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

For inspection purposes only.
Consent of copyright owner required for any other use.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:44

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**BENZGHIP**	**BKF**	**CHRYSENE**	**DBENZAH**	**FLUORANT**	**FLUORENE**
2	MAR00599.001	Sediment	184	103	217	42.3	353	65.0
3	MAR00599.002	Sediment	302	178	250	69.6	468	86.9
4	MAR00599.003	Sediment	294	207	265	68.0	533	99.7
5	MAR00599.004	Sediment	818	620	1240	203	1700	285
12	MAR00599.005	Sediment	163	93.3	183	32.8	275	59.6
13	MAR00599.006	Sediment	117	65.4	124	27.4	145	49.0
14	MAR00599.007	Sediment	123	75.3	139	26.5	160	50.4
15	MAR00599.008	Sediment	207	120	248	52.5	261	64.6
19	MAR00599.009	Sediment	15.6	10.8	22.0	3.73	23.5	4.40
20	MAR00599.010	Sediment	264	126	308	55.3	412	78.3
Certified Reference Material CRM180013 1941b (% Recovery)			69	90	88	110	79	52
Certified Reference Material CRM180013 1941b			212	203	256	58	514	44
QC Blank			<1	<1	<1	<1	<1	<1

For full analyte name see method summaries

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

For inspection purposes only.
Consent of copyright owner required for any other use.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:44

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/306
		Limit of Detection	1	1	1	1	100
		Accreditation	UKAS	UKAS	UKAS	UKAS	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**INDPYR**	**NAPTH**	**PHENANT**	**PYRENE**	**THC**
2	MAR00599.001	Sediment	184	44.5	248	436	277000
3	MAR00599.002	Sediment	302	80.8	222	698	1070000
4	MAR00599.003	Sediment	299	91.2	247	642	644000
5	MAR00599.004	Sediment	823	179	378	2800	1170000
12	MAR00599.005	Sediment	171	53.0	150	309	489000
13	MAR00599.006	Sediment	120	54.9	95.5	181	357000
14	MAR00599.007	Sediment	121	53.5	104	220	387000
15	MAR00599.008	Sediment	202	57.2	141	385	433000
19	MAR00599.009	Sediment	14.9	5.02	10.4	33.1	81800
20	MAR00599.010	Sediment	257	77.4	230	460	819000
		Certified Reference Material CRM180013 1941b (% Recovery)	67	60	75	69	94~
		Certified Reference Material CRM180013 1941b	228	59	305	401	
		QC Blank	<1	<1	<1	<1	<100

For full analyte name see method summaries

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

For inspection purposes only.
Consent of copyright owner required for any other use.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:44

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**ACENAPTH**	**ACENAPHY**	**ANTHRACN**	**BAA**	**BAP**	**BBF**
22	MAR00599.011	Sediment	45.2	36.7	100	298	292	269
23	MAR00599.012	Sediment	18.0	35.6	53.7	145	202	189
24	MAR00599.013	Sediment	16.0	49.2	66.9	162	266	243
25	MAR00599.014	Sediment	9.36	28.2	35.0	94.4	137	122
26	MAR00599.015	Sediment	15.0	31.9	43.9	112	155	146
27	MAR00599.016	Sediment	12.2	29.9	44.0	126	162	158
28	MAR00599.017	Sediment	12.4	32.7	48.5	123	175	170
29	MAR00599.018	Sediment	13.5	49.0	66.8	141	205	205
32	MAR00599.019	Sediment	9.23	14.2	21.7	115	229	253
1	MAR00599.020	Sediment	32.4	77.7	120	334	448	403
6	MAR00599.021	Sediment	15.2	51.9	76.7	198	278	241
7	MAR00599.022	Sediment	19.6	40.7	81.3	173	252	212
8	MAR00599.023	Sediment	17.1	86.4	107	265	404	317
9	MAR00599.024	Sediment	9.11	41.3	60.4	103	213	174
10	MAR00599.025	Sediment	14.0	38.5	52.2	115	183	168
11	MAR00599.026	Sediment	24.0	63.8	88.3	215	288	252
16	MAR00599.027	Sediment	12.4	39.6	45.6	139	197	167
17	MAR00599.028	Sediment	18.4	121	100	276	387	304
18	MAR00599.029	Sediment	20.9	41.9	48.7	137	215	196
Certified Reference Material CRM180013 1941b (% Recovery)			70	100	65	66	60	90
Certified Reference Material CRM180013 1941b			27	53	120	221	215	408
QC Blank			<1	<1	<1	<1	<1	<1

For inspection purposes only.
Consent of copyright owner required for any other use.

For full analyte name see method summaries

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:44

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**BENZGHIP**	**BKF**	**CHRYSENE**	**DBENZAH**	**FLUORANT**	**FLUORENE**
22	MAR00599.011	Sediment	174	138	314	45.3	593	51.7
23	MAR00599.012	Sediment	159	94.8	170	34.1	229	36.7
24	MAR00599.013	Sediment	197	134	181	44.5	219	45.6
25	MAR00599.014	Sediment	115	70.5	115	23.2	153	25.9
26	MAR00599.015	Sediment	128	71.9	133	27.9	165	30.9
27	MAR00599.016	Sediment	129	82.2	143	25.7	179	32.0
28	MAR00599.017	Sediment	144	84.4	145	27.9	180	35.7
29	MAR00599.018	Sediment	163	91.7	164	35.1	190	39.9
32	MAR00599.019	Sediment	212	108	186	50.4	185	17.9
1	MAR00599.020	Sediment	333	201	368	70.6	519	69.1
6	MAR00599.021	Sediment	196	127	207	44.8	301	43.0
7	MAR00599.022	Sediment	166	126	185	33.1	259	40.8
8	MAR00599.023	Sediment	271	160	245	56.8	283	57.7
9	MAR00599.024	Sediment	138	72.0	113	28.1	118	30.5
10	MAR00599.025	Sediment	136	76.9	123	31.6	146	40.1
11	MAR00599.026	Sediment	212	113	232	48.7	327	63.3
16	MAR00599.027	Sediment	150	102	195	34.0	211	35.9
17	MAR00599.028	Sediment	261	176	291	63.9	296	68.7
18	MAR00599.029	Sediment	158	108	168	37.0	195	41.0
Certified Reference Material CRM180013 1941b (% Recovery)			67	85	87	99	79	54
Certified Reference Material CRM180013 1941b			206	191	253	52	514	46
QC Blank			<1	<1	<1	<1	<1	<1

For inspection purposes only.
Consent of copyright owner required for any other use.

For full analyte name see method summaries

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:44

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/306
		Limit of Detection	1	1	1	1	100
		Accreditation	UKAS	UKAS	UKAS	UKAS	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**INDPYR**	**NAPTH**	**PHENANT**	**PYRENE**	**THC**
22	MAR00599.011	Sediment	182	86.5	355	546	366000
23	MAR00599.012	Sediment	148	47.3	139	295	292000
24	MAR00599.013	Sediment	197	55.5	135	333	498000
25	MAR00599.014	Sediment	110	36.6	82.4	175	520000
26	MAR00599.015	Sediment	128	45.7	107	199	337000
27	MAR00599.016	Sediment	132	50.7	110	222	385000
28	MAR00599.017	Sediment	144	58.6	117	215	351000
29	MAR00599.018	Sediment	160	58.5	123	240	403000
32	MAR00599.019	Sediment	218	22.3	71.2	193	281000
1	MAR00599.020	Sediment	323	71.6	270	603	385000
6	MAR00599.021	Sediment	203	40.7	155	354	598000
7	MAR00599.022	Sediment	169	36.1	131	378	312000
8	MAR00599.023	Sediment	283	59.2	139	510	372000
9	MAR00599.024	Sediment	141	28.0	74.5	255	267000
10	MAR00599.025	Sediment	132	36.5	88.4	232	342000
11	MAR00599.026	Sediment	215	63.9	160	421	367000
16	MAR00599.027	Sediment	158	43.2	118	258	437000
17	MAR00599.028	Sediment	271	67.6	154	459	443000
18	MAR00599.029	Sediment	171	62.7	154	249	526000
Certified Reference Material CRM180013 1941b (% Recovery)			69	62	76	72	102~
Certified Reference Material CRM180013 1941b			235	526	309	418	
QC Blank			<1	<1	<1	<1	<100

For inspection purposes only.
Consent of copyright owner required for any other use.

For full analyte name see method summaries

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:44

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**ACENAPTH**	**ACENAPHY**	**ANTHRACN**	**BAA**	**BAP**	**BBF**
31	MAR00599.030	Sediment	21.4	78.3	100	230	352	302
DC03A	MAR00599.031	Sediment	28.3	146	133	383	522	383
DC04	MAR00599.032	Sediment	46.8	83.9	167	395	472	449
DC05	MAR00599.033	Sediment	7.83	7.44	19.1	38.7	49.9	54.7
DC06	MAR00599.034	Sediment	1.63	2.86	6.11	9.36	17.0	18.6
DC07	MAR00599.035	Sediment	1.22	1.84	4.05	5.50	7.75	10.8
Certified Reference Material CRM180013 1941b (% Recovery)			70	96	68	65	60	90
Certified Reference Material CRM180013 1941b			27	51	125	218	215	408
QC Blank			<1	<1	<1	<1	<1	<1

For full analyte name see method summaries

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

For inspection purposes only.
Consent of copyright owner required for any other use.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:44

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**BENZGHIP**	**BKF**	**CHRYSENE**	**DBENZAH**	**FLUORANT**	**FLUORENE**
31	MAR00599.030	Sediment	251	159	236	56.8	294	57.9
DC03A	MAR00599.031	Sediment	322	180	395	76.6	398	86.1
DC04	MAR00599.032	Sediment	370	260	459	75.1	669	94.0
DC05	MAR00599.033	Sediment	36.6	20.0	49.9	8.70	67.0	11.5
DC06	MAR00599.034	Sediment	15.3	10.1	13.2	3.67	13.3	4.42
DC07	MAR00599.035	Sediment	7.67	6.45	6.87	1.78	8.37	2.95
		Certified Reference Material CRM180013 1941b (% Recovery)	73	94	90	100	84	49
		Certified Reference Material CRM180013 1941b	224	212	262	53	547	42
		QC Blank	<1	<1	<1	<1	<1	<1

For full analyte name see method summaries
~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.
As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

For inspection purposes only.
Consent of copyright owner required for any other use.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:44

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/306
		Limit of Detection	1	1	1	1	100
		Accreditation	UKAS	UKAS	UKAS	UKAS	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**INDPYR**	**NAPTH**	**PHENANT**	**PYRENE**	**THC**
31	MAR00599.030	Sediment	259	56.6	164	425	615000
DC03A	MAR00599.031	Sediment	336	61.2	199	660	517000
DC04	MAR00599.032	Sediment	383	133	247	787	961000
DC05	MAR00599.033	Sediment	38.1	14.4	43.8	104	124000
DC06	MAR00599.034	Sediment	16.2	8.89	13.0	16.5	35300
DC07	MAR00599.035	Sediment	8.33	3.76	6.92	11.1	18900
		Certified Reference Material CRM180013 1941b (% Recovery)	72	58	73	75	95~
		Certified Reference Material CRM180013 1941b	246	492	296	436	
		QC Blank	<1	<1	<1	<1	<100

For full analyte name see method summaries

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

For inspection purposes only.
Consent of copyright owner required for any other use.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:44

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.08	0.08	0.08	0.08	0.08	0.08	0.08
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB28**	**PCB52**	**PCB101**	**PCB118**	**PCB138**	**PCB153**	**PCB180**
2	MAR00599.001	Sediment	0.93	0.53	0.40	0.50	0.47	0.47	0.22
3	MAR00599.002	Sediment	1.44	0.95	1.00	1.14	1.27	1.24	0.53
4	MAR00599.003	Sediment	2.53	2.03	1.23	1.30	1.29	1.47	0.64
5	MAR00599.004	Sediment	1.89	1.39	1.19	1.40	1.64	1.79	0.81
12	MAR00599.005	Sediment	0.87	0.55	0.37	0.44	0.47	0.48	0.25
13	MAR00599.006	Sediment	0.60	0.39	0.26	0.34	0.34	0.38	0.19
14	MAR00599.007	Sediment	0.22	0.16	0.10	0.13	0.14	0.14	<0.08
15	MAR00599.008	Sediment	0.57	0.40	0.28	0.38	0.36	0.41	0.21
19	MAR00599.009	Sediment	0.17	0.11	<0.08	<0.08	<0.08	<0.08	<0.08
20	MAR00599.010	Sediment	1.55	1.10	0.99	1.17	0.93	1.08	0.47
22	MAR00599.011	Sediment	0.41	0.30	0.19	0.20	0.24	0.26	0.10
23	MAR00599.012	Sediment	1.21	0.80	0.52	0.73	0.66	0.71	0.41
24	MAR00599.013	Sediment	1.34	0.76	0.72	0.91	1.17	1.21	0.68
25	MAR00599.014	Sediment	1.08	0.65	0.48	0.69	0.60	0.74	0.38
26	MAR00599.015	Sediment	0.71	0.46	0.34	0.45	0.51	0.55	0.29
27	MAR00599.016	Sediment	0.73	0.44	0.36	0.46	0.47	0.51	0.24
28	MAR00599.017	Sediment	0.99	0.68	0.46	0.67	0.61	0.69	0.37
29	MAR00599.018	Sediment	0.94	0.59	0.39	0.49	0.52	0.58	0.31
32	MAR00599.019	Sediment	0.31	0.23	0.13	0.19	0.19	0.17	<0.08
Certified Reference Material SRM 1941b (% Recovery)			66	90	85	96	120	90	83
Certified Reference Material SRM 1941b (Result)			2.98	4.75	4.43	4.04	4.33	4.95	2.70
QC Blank			<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08

Consent of copyright owner required for any other use.
For inspection purposes only.

For full analyte name see method summaries

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:44

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Accreditation	UKAS	UKAS	UKAS	N	UKAS	UKAS	UKAS	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**AHCH**	**BHCH**	**GHCH**	**DIELDRIN**	**HCB**	**DDE**	**DDT**	**DDD**
2	MAR00599.001	Sediment	<0.1	<0.1	0.14	<0.1	0.12	0.31	0.12	0.67
3	MAR00599.002	Sediment	<0.1	<0.1	<0.1	0.48	0.26	0.62	0.25	1.73
4	MAR00599.003	Sediment	<0.1	<0.1	<0.1	0.84	<0.1	1.12	0.19	3.95
5	MAR00599.004	Sediment	<0.1	<0.1	0.11	0.46	0.19	0.80	0.15	2.68
12	MAR00599.005	Sediment	<0.1	<0.1	<0.1	0.32	0.10	0.38	<0.1	1.15
13	MAR00599.006	Sediment	<0.1	<0.1	<0.1	0.29	0.10	0.53	0.11	1.55
14	MAR00599.007	Sediment	<0.1	<0.1	<0.1	0.12	<0.1	0.17	<0.1	0.69
15	MAR00599.008	Sediment	<0.1	<0.1	<0.1	0.36	0.10	0.55	<0.1	2.18
19	MAR00599.009	Sediment	<0.1	<0.1	<0.1	0.10	<0.1	0.08	<0.1	0.35
20	MAR00599.010	Sediment	<0.1	<0.1	<0.1	1.27	<0.1	1.03	0.12	3.21
22	MAR00599.011	Sediment	<0.1	<0.1	<0.1	0.29	<0.1	0.27	<0.1	0.96
23	MAR00599.012	Sediment	<0.1	<0.1	<0.1	0.71	0.15	0.65	0.38	2.73
24	MAR00599.013	Sediment	<0.1	<0.1	<0.1	0.47	0.10	0.72	0.20	2.64
25	MAR00599.014	Sediment	<0.1	<0.1	<0.1	0.71	0.11	0.62	0.31	3.00
26	MAR00599.015	Sediment	<0.1	<0.1	<0.1	0.41	0.11	0.49	<0.1	2.03
27	MAR00599.016	Sediment	<0.1	<0.1	<0.1	0.35	0.12	0.51	<0.1	2.02
28	MAR00599.017	Sediment	<0.1	<0.1	<0.1	0.42	0.14	0.53	0.15	3.07
29	MAR00599.018	Sediment	<0.1	<0.1	<0.1	0.52	0.14	0.50	<0.1	2.01
32	MAR00599.019	Sediment	<0.1	<0.1	<0.1	0.11	<0.1	0.20	<0.1	0.56
Certified Reference Material SRM 1941b (% Recovery)			83~	110~	83~	45~	99	74	101~	74
Certified Reference Material SRM 1941b (Result)							5.78	2.37		3.45
QC Blank			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

For full analyte name see method summaries

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

Consent of copyright owner required for any other use.
For inspection purposes only.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:44

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.08	0.08	0.08	0.08	0.08	0.08	0.08
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB28**	**PCB52**	**PCB101**	**PCB118**	**PCB138**	**PCB153**	**PCB180**
1	MAR00599.020	Sediment	1.89	1.46	0.95	1.10	1.18	1.37	0.65
6	MAR00599.021	Sediment	1.69	1.12	0.79	0.93	0.84	1.01	0.45
7	MAR00599.022	Sediment	1.57	1.58	1.56	1.80	1.42	1.33	0.45
8	MAR00599.023	Sediment	2.59	1.80	1.65	1.58	3.19	3.80	2.44
9	MAR00599.024	Sediment	1.44	0.81	0.56	0.53	0.86	1.14	1.46
10	MAR00599.025	Sediment	1.09	0.62	0.42	0.52	0.48	0.55	0.26
11	MAR00599.026	Sediment	1.25	0.85	0.59	0.65	0.69	0.79	0.38
16	MAR00599.027	Sediment	0.76	0.58	0.36	0.43	0.37	0.51	0.28
17	MAR00599.028	Sediment	0.67	0.55	0.35	0.43	0.45	0.49	0.26
18	MAR00599.029	Sediment	0.67	0.55	0.31	0.43	0.41	0.41	0.19
31	MAR00599.030	Sediment	3.73	2.24	1.53	1.69	1.74	1.93	0.95
DC03A	MAR00599.031	Sediment	0.34	0.28	0.16	0.22	0.17	0.22	0.08
DC04	MAR00599.032	Sediment	5.39	4.31	2.08	2.54	2.02	2.42	1.33
DC05	MAR00599.033	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
DC06	MAR00599.034	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
DC07	MAR00599.035	Sediment	0.10	0.18	0.15	0.11	<0.08	0.09	<0.08
		Certified Reference Material SRM 1941b (% Recovery)	71	87	88	103	109	96	83
		Certified Reference Material SRM 1941b	3.23	4.56	4.50	4.36	3.93	5.28	2.71
		QC Blank	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08

For inspection purposes only.
Consent of copyright owner required for any other use.

For full analyte name see method summaries

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:44

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Accreditation	UKAS	N	UKAS	N	UKAS	UKAS	UKAS	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**AHCH**	**BHCH**	**GHCH**	**DIELDRIN**	**HCB**	**DDE**	**DDT**	**DDD**
1	MAR00599.020	Sediment	<0.1	<0.1	0.18	1.74	0.28	0.93	0.21	5.04
6	MAR00599.021	Sediment	0.11	0.14	0.21	0.72	0.13	0.79	0.23	4.17
7	MAR00599.022	Sediment	<0.1	<0.1	<0.1	0.62	<0.1	0.52	<0.1	2.85
8	MAR00599.023	Sediment	<0.1	<0.1	<0.1	1.18	<0.1	1.30	0.11	7.16
9	MAR00599.024	Sediment	<0.1	<0.1	<0.1	0.51	<0.1	0.35	0.13	2.67
10	MAR00599.025	Sediment	<0.1	<0.1	<0.1	0.45	<0.1	0.47	<0.1	2.15
11	MAR00599.026	Sediment	<0.1	<0.1	<0.1	0.54	0.17	0.66	0.11	2.83
16	MAR00599.027	Sediment	<0.1	<0.1	<0.1	0.52	<0.1	0.87	0.31	5.47
17	MAR00599.028	Sediment	<0.1	<0.1	<0.1	0.87	0.10	0.77	0.25	4.42
18	MAR00599.029	Sediment	<0.1	<0.1	<0.1	0.66	0.13	0.51	0.29	2.13
31	MAR00599.030	Sediment	<0.1	<0.1	<0.1	1.31	<0.1	1.29	0.14	5.77
DC03A	MAR00599.031	Sediment	<0.1	<0.1	<0.1	0.29	<0.1	0.24	<0.1	1.06
DC04	MAR00599.032	Sediment	<0.1	<0.1	0.21	3.29	<0.1	3.16	0.15	10.2
DC05	MAR00599.033	Sediment	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
DC06	MAR00599.034	Sediment	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
DC07	MAR00599.035	Sediment	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Certified Reference Material SRM 1941b (% Recovery)			125~	160~	145~	170~	114	90	76~	185
Certified Reference Material SRM 1941b							6.65	2.89		8.63
QC Blank			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

For inspection purposes only.
Consent of copyright owner required for any other use.

For full analyte name see method summaries

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:45

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID MAR00599
Issue Version 3
Customer Reference Dublin Port

REPORT NOTES

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
SOCOTEC Env Chem*	MAR00599.001-035	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
SOCOTEC Doncaster*	MAR00599.001-035	Analysis was conducted by an internal SOCOTEC laboratory.
SUB_01*	MAR00599.001-035	Analysis was conducted by an approved subcontracted laboratory.
ASC/SOP/301	MAR00599.005-009, .011-019, .021, .022, .024-.029, .031, .032-.035	The matrix of this sample has been found to interfere with the result for this test. The sample has therefore been diluted, but in doing so, the detection limit for this test has been elevated.
ASC/SOP/302	MAR00599.001-035	The Primary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with Dieldrin and p,p'-Dichorodiphenyldichloroethane falling outside acceptable limits. The remaining data gives the Laboratory confidence that the test has performed satisfactorily and that the validity of the data may not have been significantly affected. However in line with our QMS policy we have removed accreditation, where applicable, from the affected analytes . These circumstances should be taken into consideration when utilising the data.
ASC/SOP/302	MAR00599.020-035	The Primary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with beta-Hexachlorocyclohexane falling outside acceptable limits. The remaining data gives the Laboratory confidence that the test has performed satisfactorily and that the validity of the data may not have been significantly affected. However in line with our QMS policy we have removed accreditation, where applicable, from the affected analytes . These circumstances should be taken into consideration when utilising the data.
ASC/SOP/303/304	MAR00599.001-035	Chrysene is known to coelute with Triphenylene and these peaks can not be resolved. It is believed Triphenylene is present in these samples therefore it is suggested that the Chrysene results should be taken as a Chrysene (inc. Triphenylene). This should be taken into consideration when utilising the data.

DEVIATING SAMPLE STATEMENT

Deviation Code	Deviation Definition	Sample ID	Deviation Details. The following information should be taken into consideration when using the data contained within this report
D1	Holding Time Exceeded	N/A	N/A
D2	Handling Time Exceeded	N/A	N/A
D3	Sample Contaminated through Damaged Packaging	N/A	N/A
D4	Sample Contaminated through Sampling	N/A	N/A
D5	Inappropriate Container/Packaging	N/A	N/A
D6	Damaged in Transit	N/A	N/A
D7	Insufficient Quantity of Sample	N/A	N/A
D8	Inappropriate Headspace	N/A	N/A
D9	Retained at Incorrect Temperature	N/A	N/A
D10	Lack of Date & Time of Sampling	N/A	N/A
D11	Insufficient Sample Details	N/A	N/A
D12	Sample integrity compromised or not suitable for analysis	N/A	N/A

For inspection purposes only.
Consent of copyright owner required for any other use.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:45

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

Method	Sample and Fraction Size	Method Summary
Total Solids	Wet Sediment	Calculation (100%-Moisture Content).Moisture content determined by drying a portion of the sample at 120°C to constant weight.
Particle Size Analysis	Wet Sediment	Wet and dry sieving followed by laser diffraction analysis.
Total Organic Carbon (TOC)	Air dried and ground	Carbonate removal and sulphurous acid/combustion at 1600°C/NDIR.
Carbonate	Air dried and ground	Quantitative digestion with Hydrochloric Acid back titration with 1M Sodium Hydroxide to pH 7
Metals	Air dried and ground	Hydrofluoric Acid extraction followed by ICP analysis.
Mercury	Air dried and ground	Nitric/Peroxide digest followed by ICPMS analysis
Organotins	Wet Sediment	Solvent extraction and derivatisation followed by GC-MS analysis.
Polyaromatic Hydrocarbons (PAH)	Wet Sediment	Solvent extraction and clean up followed by GC-MS analysis.
Total Hydrocarbon Content (THC)	Wet Sediment	Solvent extraction and clean up followed by GC-FID analysis.
Polychlorinated Biphenyls (PCBs)	Air dried and seived to <2mm	Solvent extraction and clean up followed by GC-MS-MS analysis.
Organochlorine Pesticides (OCPs)	Air dried and seived to <2mm	Solvent extraction and clean up followed by GC-MS-MS analysis.

Analyte Definitions

Analyte Abbreviation	Full Analyte name	Analyte Abbreviation	Full Analyte name	Analyte Abbreviation	Full Analyte name
ACENAPTH	Acenaphthene	CHRYSENE	Chrysene	THC	Total Hydrocarbon Content
ACENAPHY	Acenaphthylene	DBENZAH	Dibenzo[ah]anthracene	AHCH	alpha-Hexachlorocyclohexane
ANTHRACN	Anthracene	FLUORANT	Fluoranthene	BHCH	beta-Hexachlorocyclohexane
BAA	Benzo[a]anthracene	FLUORENE	Fluorene	GHCH	gamma-Hexachlorocyclohexane
BAP	Benzo[a]pyrene	INDPYR	Indeno[1,2,3-cd]pyrene	DIELDRIN	Dieldrin
BBF	Benzo[b]fluoranthene	NAPTH	Naphthalene	HCB	Hexachlorobenzene
BENZGHIP	Benzo[ghi]perylene	PHENANT	Phenanthrene	DDD	p,p'-Dichorodiphenyldichloroethane
BKF	Benzo[k]fluoranthene	PYRENE	Pyrene	DDE	p,p'-Dichorodiphenyldichloroethylene
				DDT	p,p'-Dichorodiphenyltrichloroethane

Consent of copyright owner required for any other use.
For inspection purposes only.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:45

EPA Export 28-04-2021:02:37:45

Instructions

As part of an application for a Dumping at Sea (DAS) Permit, sediment chemistry results must be submitted using this form. When completing this form, please ensure that you:

* Complete all worksheets in full - i.e. sheets "2. Project Info", "3. Results" and "4. QA".
* Report all results in the units specified (e.g. mg kg^{-1} versus $\mu g\ kg^{-1}$).
* Do not alter the format of this spreadsheet by changing units, by moving columns or by inserting new columns amongst the existing used columns.
* Insert additional rows as necessary at the end of the existing rows in sheet. "3 Results"
* Insert other determinants as necessary in the empty columns to the right in sheet. "3 Results".
* Any additional information should be included as inserted comments or in the Notes column in sheet. "3 Results".
* Provide a brief description of methodology used in sheet "2. Project Info".
* Enter the measured value (as well as the certified value) for Certified Reference material in sheet "4. QA"
* If in-house reference material is used, insert the measured value and the range normally achieved.
* Refer to the Dumping at Sea Application Form Guidance Note for further relevant information: http://www.epa.ie/downloads/forms/lic/das/name,30267,en.html

Key	
Location	Name of area e.g. Cork Harbour, Dublin Bay
CRMs	Certified reference materials used in analyses for metals, organics & TBT
Fraction analysed	Specify which fraction of sediment was analysed. < 2mm is requested, but some labs use < 63um
Analysing laboratory	Main laboratory where samples were sent to for analysis
Sub-contract lab	Sub-contracted laboratory where samples were sent by main laboratory
Sample ID code	Sample number assigned by sampler
Lab Report ID	Code assigned by analysing laboratory
Position (dd.ddd)	Give lat/long coordinates in decimal degrees (dd.dddd) of the position from where the sample was taken. List also the datum & projection.
Sampling depth (m)	The depth below the seabed surface at which the sample was collected.
<2mm	Grain size % < 2mm
<63um	Grain size % < 63mm
OC	Organic carbon (NOT organic matter)
Cd	Cadmium mg/kg
Hg	Mercury mg/kg
As	Arsenic **mg/kg**
Cr	Chromium mg/kg
Cu	Copper mg/kg
Pb	Lead mg/kg
Ni	Nickel mg/kg
Zn	Zinc mg/kg
TEH	Total extractable hydrocarbons g/kg
ΣPAH16	Sum of USEPA 16 PAH - acenaphthene, acenaphthylene, anthracene, benzo[a]anthracene, benzo[b]fluoranthene, benzo[k]flouranthene, benzo[a]pyrene, benzo[ghi]perylene, chrysene, dibenz(ah)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene and pyrene,
ΣPCB7	Sum of the seven ICES polychlorinated biphenyls: PCB 028, PCB 052, PCB 101, PCB 138, BCB 153, PCB 180, PCB 118.
HCB	Hexachlorobenzene
γ-HCH	γ-Hexachlorocyclohexane (Lindane)
p,p' DDT	pp DDT ug/kg
p,p' DDD	pp DDD ug/kg
p,p' DDE	pp DDE ug/kg
TBT	TBT (mg/kg)
DBT	DBT (mg/kg)

Consent of copyright owner required for any other use. For inspection purposes only.

1. General Information	Applicant (company name)	
	Location (port/harbour)	
	Dredge Quantity (tonnes)	
	Permit Application Reg. No. (to be assigned by EPA)	
2. Survey Information	Survey Company	Hydromaster
	Sampling Date	15th and 16th of April 2020
	Analysing Laboratory	Socotec
	Sub Contract Lab	
	Analysis Date	11th May 2020
3. Methods Information	Fraction analysed	
	Water content of sample (reported as %)	Calculation (100%-Moisture Content).Moisture content determined by drying a portion of the sample at 120°C to constant weight.
	Are results reported as wet weight or dry weight?	Dry Weight
	Granulometry method	Wet and dry sieving followed by laser diffraction analysis.
	TEH method	Solvent extraction and clean up followed by GC-FID analysis.
	Organic carbon (OC) method	Carbonate removal and sulphurous acid/combustion at 1600°C/NDIR.
	Metals (incl. mercury & arsenic) extraction type	Hydrofluoric Acid extraction.
	Methods of detection (metals, incl. mercury & arsenic)	ICP analysis.
	Organics extraction types	Solvent extraction and derivatisation followed by GC-MS analysis.

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:45

Methods of detection (PCBs / PAHs / TBT / DBT)	Solvent extraction and clean up followed by GC-MS-MS analysis.

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:45

EPA Dumping at Sea Permit Application - Material Analysis Reporting Form (Version 1.0)
Sheet 3. Results

Sample ID code	Company Name	Location	Sampling date (dd/mm/yyyy)	Sampling Location ID	Position Latitude (WGS84 decimal degrees)	Position Longitude (WGS84 decimal degrees)	Sampling depth below seabed m	Lab Report ID	Sample appearance (e.g. colour, texture, signs of life)
new 1	Hydromaster	Dublin Port	16/04/2020	new 1	53.34479	-6.22156	Surface	MAR00599.020	Grey sandy silty CLAY
new 2	Hydromaster	Dublin Port	15/04/2020	new 2	53.34395	-6.22057	Surface	MAR00599.001	Grey slightly sandy silty CLAY
new 3	Hydromaster	Dublin Port	15/04/2020	new 3	53.34391	-6.2186	Surface	MAR00599.002	Grey sandy SILT
new 4	Hydromaster	Dublin Port	15/04/2020	new 4	53.34573	-6.2194	Surface	MAR00599.003	Grey slightly sandy silty CLAY
new 5	Hydromaster	Dublin Port	15/04/2020	new 5	53.34561	-6.21733	Surface	MAR00599.004	Grey sandy SILT
new 6	Hydromaster	Dublin Port	16/04/2020	new 6	53.34478	-6.21758	Surface	MAR00599.021	Grey slightly sandy silty CLAY
new 7	Hydromaster	Dublin Port	16/04/2020	new 7	53.34554	-6.21537	Surface	MAR00599.022	Grey sandy clayey SILT
new 8	Hydromaster	Dublin Port	16/04/2020	new 8	53.34497	-6.21332	Surface	MAR00599.023	Grey slightly sandy slightly gravelly silty CLAY
new 9	Hydromaster	Dublin Port	16/04/2020	new 9	53.34441	-6.21042	Surface	MAR00599.024	Grey sandy silty CLAY
new 10	Hydromaster	Dublin Port	16/04/2020	new 10	53.34426	-6.20714	Surface	MAR00599.025	Grey slightly sandy silty CLAY
new 11	Hydromaster	Dublin Port	16/04/2020	new 11	53.34414	-6.21353	Surface	MAR00599.026	Grey slightly sandy silty CLAY
new 12	Hydromaster	Dublin Port	15/04/2020	new 12	53.34343	-6.20728	Surface	MAR00599.005	Grey slightly sandy silty CLAY
new 13	Hydromaster	Dublin Port	15/04/2020	new 13	53.34315	-6.20445	Surface	MAR00599.006	Grey slightly sandy silty CLAY

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:45

EPA Dumping at Sea Permit Application - Material Analysis Reporting Form (Version 1.0)
Sheet 3. Results

Sample ID code	Company Name	Location	Sampling date (dd/mm/yyyy)	Sampling Location ID	Position Latitude (WGS84 decimal degrees)	Position Longitude (WGS84 decimal degrees)	Sampling depth below seabed m	Lab Report ID	Sample appearance (e.g. colour, texture, signs of life)
new 14	Hydromaster	Dublin Port	15/04/2020	new 14	53.34294	-6.20152	Surface	MAR00599.007	Grey sandy SILT
new 15	Hydromaster	Dublin Port	15/04/2020	new 15	53.34262	-6.19859	Surface	MAR00599.008	Grey sandy silty CLAY
new 16	Hydromaster	Dublin Port	16/04/2020	new 16	53.34217	-6.18777	Surface	MAR00599.027	Grey sandy SILT
new 17	Hydromaster	Dublin Port	16/04/2020	new 17	53.34223	-6.18673	Surface	MAR00599.028	Grey sandy SILT
new 18	Hydromaster	Dublin Port	16/04/2020	new 18	53.34211	-6.1858	Surface	MAR00599.029	Grey slightly sandy silty CLAY, small ragworms and oil sheen observed on surface
new 19	Hydromaster	Dublin Port	15/04/2020	new 19	53.34496	-6.19467	Surface	MAR00599.009	Grey slightly gravelly silty SAND
new 20	Hydromaster	Dublin Port	15/04/2020	new 20	53.34585	-6.19806	Surface	MAR00599.010	Grey slightly gravelly sandy SILT
new 21	Hydromaster	Dublin Port	15/04/2020	new 21	53.34593	-6.19903	Surface	N/A	Very large rocks only in the localised area. No suitable sample was able to be
new 22	Hydromaster	Dublin Port	15/04/2020	new 22	53.34697	-6.19988	Surface	MAR00599.011	Grey sandy SILT
new 23	Hydromaster	Dublin Port	15/04/2020	new 23	53.34612	-6.20411	Surface	MAR00599.012	Grey slightly sandy silty CLAY
new 24	Hydromaster	Dublin Port	15/04/2020	new 24	53.34693	-6.20394	Surface	MAR00599.013	Grey sandy clayey SILT
new 25	Hydromaster	Dublin Port	15/04/2020	new 25	53.34689	-6.20492	Surface	MAR00599.014	Grey slightly sandy silty CLAY
new 26	Hydromaster	Dublin Port	15/04/2020	new 26	53.34609	-6.20505	Surface	MAR00599.015	Grey slightly sandy silty CLAY

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:45

EPA Dumping at Sea Permit Application - Material Analysis Reporting Form (Version 1.0)
Sheet 3. Results

Sample ID code	Company Name	Location	Sampling date (dd/mm/yyyy)	Sampling Location ID	Position Latitude (WGS84 decimal degrees)	Position Longitude (WGS84 decimal degrees)	Sampling depth below seabed m	Lab Report ID	Sample appearance (e.g. colour, texture, signs of life)
new 27	Hydromaster	Dublin Port	15/04/2020	new 27	53.34642	-6.20626	Surface	MAR00599.016	Grey sandy silty CLAY
new 28	Hydromaster	Dublin Port	15/04/2020	new 28	53.34602	-6.20703	Surface	MAR00599.017	Grey slightly sandy silty CLAY
new 29	Hydromaster	Dublin Port	15/04/2020	new 29	53.34692	-6.20827	Surface	MAR00599.018	Grey sllightly sandy slightly gravelly silty CLAY
new 30	Hydromaster	Dublin Port	15/04/2020	new 30	53.34695	-6.21063	Surface	N/A	Very large rocks only in the localised area. No suitable sample was able to be collected from within the 10m
new 31	Hydromaster	Dublin Port	16/04/2020	new 31	53.34601	-6.20865	Surface	MAR00599.030	Grey sandy clayey SILT
new 32	Hydromaster	Dublin Port	15/04/2020		53.34596	-6.19958	Surface	MAR00599.019	Grey sllightly sandy slightly gravelly silty CLAY
DC03A	Hydromaster	Dublin Port	16/04/2020	DC03A	53.3432	-6.19116	Surface	MAR00599.031	Grey slightly sandy silty CLAY
DC04	Hydromaster	Dublin Port	16/04/2020	DC04	53.34369	-6.18346	Surface	MAR00599.032	Grey sandy SILT
DC05	Hydromaster	Dublin Port	16/04/2020	DC05	53.34332	-6.14829	Surface	MAR00599.033	Grey silty SAND
DC06	Hydromaster	Dublin Port	16/04/2020	DC06	53.33608	-6.08881	Surface	MAR00599.034	Grey slightly gravelly silty SAND
DC07	Hydromaster	Dublin Port	16/04/2020	DC07	53.33274	-6.08881	Surface	MAR00599.035	Light brown SAND

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:45

EPA Dumping at Sea Permit Application - Material Analysis Reporting Form (Version 1.0)
Sheet 3. Results

Sample ID code	% Moisture	Particle size >2mm %	Particle size <2mm >63um %	Partic+B:Nle size <63um %	OC %	Carbonate %	Dry solids %	Al mg kg^{-1}	Cd mg kg^{-1}	Hg mg kg^{-1}	As mg kg^{-1}	Cr mg kg^{-1}	Cu mg kg^{-1}	Pb mg kg^{-1}	Ni mg kg^{-1}
new 1	69.2	0	18.3	81.7	3.62	3.64	30.8	38900	1.2	0.17	16.4	79.7	45.1	70	33.1
new 2	41.8	1.8	52.4	45.8	1.08	1.68	58.2	23900	0.9	0.02	23.7	95.6	39.2	50.4	17.3
new 3	58.2	0	27	73	2.3	3.24	41.8	30100	1.1	0.04	34.8	79.7	42	61.8	25.6
new 4	49.8	1	25.4	73.7	2.38	3.28	50.2	35800	1.3	0.07	36.3	77.2	38.1	71.2	33.1
new 5	49.5	3.1	37.7	59.2	1.94	3.68	50.5	31000	1.1	0.07	35.4	85.8	32.2	53.9	30.1
new 6	56.6	8.1	35.6	56.3	1.49	3.84	43.4	32300	0.9	0.09	12.8	98	27.5	48.9	25.4
new 7	40.2	21.2	50.4	28.3	2.58	3.88	59.8	26600	0.7	0.07	13.1	111	23.6	110	20
new 8	47.8	7.7	32.3	60	1.69	4.24	52.2	35100	1.2	0.11	17.1	101	28.9	78	27
new 9	20.1	81.8	8.9	9.2	0.44	5.44	79.9	18800	1.2	<0.01	16.2	103	15.7	10.6	33.2
new 10	53.2	23.2	26.2	50.7	1.11	6.08	46.8	28200	0.9	0.01	14.9	82.3	22.8	29.8	24.3
new 11	62.8	0	24	76	2.16	3.72	37.2	40800	1.1	0.06	18	90	62.3	51.8	29.2
new 12	49.1	1.2	29.9	69	1.46	3.96	50.9	34000	1	0.02	32.7	81.1	34.6	35	34.1
new 13	57.2	0.1	26.5	73.4	1.67	3.8	42.8	33000	0.9	0.01	28.7	78	37.9	32	43

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:45

EPA Dumping at Sea Permit Application - Material Analysis Reporting Form (Version 1.0)
Sheet 3. Results

Sample ID code	% Moisture	Particle size >2mm %	Particle size <2mm >63um %	Partic+B:Nle size <63um %	OC %	Carbonate %	Dry solids %	Al mg kg^{-1}	Cd mg kg^{-1}	Hg mg kg^{-1}	As mg kg^{-1}	Cr mg kg^{-1}	Cu mg kg^{-1}	Pb mg kg^{-1}	Ni mg kg^{-1}
new 14	52.9	5.1	31.9	63	1.33	4.92	47.1	30700	1.3	0.01	24.9	81.8	22.3	26.4	32.3
new 15	56.1	0	26.1	73.9	1.59	3.32	43.9	35300	0.9	0.06	19.5	78.3	26.1	33.6	30.6
new 16	62	0	20.2	79.8	1.89	3.36	38	43000	0.8	0.04	15.6	81.4	34.1	39.5	28
new 17	70.4	0	18.1	81.9	2.08	3.04	29.6	44400	0.9	0.08	14.3	94.8	34	43.6	29.1
new 18	69.9	0	20.5	79.5	2.06	3.36	30.1	44200	0.9	0.06	11.3	80.8	29	41.6	28.6
new 19	27.3	25.3	65.4	9.3	0.81	0.76	72.7	11700	0.6	<0.01	14.6	91.6	19.9	15.2	24.7
new 20	43	9.8	31	59.2	1.11	4	57	28100	0.9	0.02	14.6	83	24.7	39.7	29.2
new 21															
new 22	48	8.9	43.6	47.4	1	4.16	52	26500	1.1	0.01	13.8	86.5	42.5	24.4	27
new 23	63.6	0	16.2	83.8	2.11	3.36	36.4	40700	0.9	0.05	15.8	85.1	39.9	44.8	35.6
new 24	60.5	1.1	11.8	87.1	1.97	3.96	39.5	43300	1	0.04	12.7	78.8	47.8	57.2	36
new 25	61.5	0.3	17.5	82.2	2.06	3.52	38.5	38000	1.1	0.05	17.4	81.9	34.6	41.9	33
new 26	61.6	0.4	21.8	77.9	1.92	3.72	38.4	41200	0.9	0.04	21.4	78.8	30	36.8	32.8

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:45

EPA Dumping at Sea Permit Application - Material Analysis Reporting Form (Version 1.0)
Sheet 3. Results

Sample ID code	% Moisture	Particle size >2mm %	Particle size <2mm >63um %	Partic+B:Nle size <63um %	OC %	Carbonate %	Dry solids %	Al mg kg^{-1}	Cd mg kg^{-1}	Hg mg kg^{-1}	As mg kg^{-1}	Cr mg kg^{-1}	Cu mg kg^{-1}	Pb mg kg^{-1}	Ni mg kg^{-1}
new 27	64.8	0.1	17.5	82.4	1.9	3.96	35.2	40100	0.9	0.03	19.1	81.3	31.9	38.7	33.1
new 28	62	0.2	21.3	78.5	1.85	3.36	38	38300	0.9	0.05	19.9	77.9	32.5	40.6	32.1
new 29	61.1	0.1	22.8	77.1	1.85	3.44	38.9	36900	1	0.02	18	78.3	31.1	39.4	31.9
new 30															
new 31	47.8	3.9	28.5	67.6	1.63	3.76	52.2	36000	0.9	0.11	10.9	85.7	29.3	48.5	26.5
new 32	45.7	43.6	24.8	31.6	0.79	6.04	54.3	19100	0.8	<0.01	10.7	88.9	46.3	18.6	28.4
DC03A	62.4	0	32.4	67.6	1.35	3.2	37.6	36600	0.7	0.04	9.7	78.9	24.4	31.4	24.3
DC04	48.1	0	38.6	61.4	1.74	3.24	51.9	36500	1	0.18	10.8	76.5	28	65.6	26.4
DC05	42.3	0.5	91.9	7.6	0.24	2.32	57.7	20500	0.2	<0.01	6.1	82.9	6.8	11.7	10.3
DC06	31.9	0.9	94.1	5.1	0.13	2.16	68.1	16000	0.3	<0.01	9	105	6.4	9.7	9.7
DC07	27.3	0.2	97	2.9	0.11	1.84	72.7	13700	0.3	<0.01	10.8	106	6.1	9.9	8.5

Content of copyright owner required for any other use. For inspection purposes only.

EPA Export 28-04-2021:02:37:45

Sample ID code	Zn mg kg^{-1}	TEH g kg^{-1}	HCB (ug kg-1)	g-HCH (ug kg-1)	p,p' DDT (ug kg-1)	p,p' DDD (ug kg-1)	p,p' DDE (ug kg-1)	S DDX (ug kg-1)	TBT mg kg^{-1}	DBT mg kg^{-1}	PCB 028 ug kg^{-1}	PCB 052 ug kg^{-1}	PCB 101 ug kg^{-1}	PCB 138 ug kg^{-1}
new 1	252	0.3850	0.28	0.18	0.21	5.04	0.93	1.74	0.0284	0.019	1.8900	1.4600	0.9500	1.1800
new 2	118	0.2770	0.12	0.14	0.12	0.67	0.31	<0.1	0.016228	0.016086	0.9300	0.5300	0.4000	0.4700
new 3	201	1.0700	0.26	<0.1	0.25	1.73	0.62	0.48	0.056911	0.043275	1.4400	0.9500	1.0000	1.2700
new 4	183	0.6440	<0.1	<0.1	0.19	3.95	1.12	0.84	0.022375	0.012421	2.5300	2.0300	1.2300	1.2900
new 5	149	1.1700	0.19	0.11	0.15	2.68	0.8	0.46	0.033381	0.015365	1.8900	1.3900	1.1900	1.6400
new 6	136	0.5980	0.13	0.21	0.23	4.17	0.79	0.72	0.0181	<0.005	1.6900	1.1200	0.7900	0.8400
new 7	117	0.3120	<0.1	<0.1	<0.1	2.85	0.52	0.62	0.0187	<0.005	1.5700	1.5800	1.5600	1.4200
new 8	145	0.3720	<0.1	<0.1	0.11	7.16	1.3	1.18	0.0636	0.0164	2.5900	1.8000	1.6500	3.1900
new 9	62	0.2670	<0.1	<0.1	0.13	2.67	0.35	0.51	<0.005	<0.005	1.4400	0.8100	0.5600	0.8600
new 10	116	0.3420	<0.1	<0.1	<0.1	2.15	0.47	0.45	<0.005	<0.005	1.0900	0.6200	0.4200	0.4800
new 11	151	0.3670	0.17	<0.1	0.11	2.83	0.66	0.54	0.0234	<0.005	1.2500	0.8500	0.5900	0.6900
new 12	124	0.4890	0.1	<0.1	<0.1	1.15	0.38	0.32	0.01093	0.010994	0.8700	0.5500	0.3700	0.4700
new 13	117	0.3570	0.1	<0.1	0.11	1.55	0.53	0.29	0.01439	<0.005	0.6000	0.3900	0.2600	0.3400

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:45

Sample ID code	Zn mg kg^{-1}	TEH g kg^{-1}	HCB (ug kg-1)	g-HCH (ug kg-1)	p,p' DDT (ug kg-1)	p,p' DDD (ug kg-1)	p,p' DDE (ug kg-1)	S DDX (ug kg-1)	TBT mg kg^{-1}	DBT mg kg^{-1}	PCB 028 ug kg^{-1}	PCB 052 ug kg^{-1}	PCB 101 ug kg^{-1}	PCB 138 ug kg^{-1}
new 14	103	0.3870	<0.1	<0.1	<0.1	0.69	0.17	0.12	<0.005	<0.005	0.2200	0.1600	0.1000	0.1400
new 15	112	0.4330	0.1	<0.1	<0.1	2.18	0.55	0.36	<0.005	<0.005	0.5700	0.4000	0.2800	0.3600
new 16	127	0.4370	<0.1	<0.1	0.31	5.47	0.87	0.52	<0.005	<0.005	0.7600	0.5800	0.3600	0.3700
new 17	154	0.4430	0.1	<0.1	0.25	4.42	0.77	0.87	<0.005	<0.005	0.6700	0.5500	0.3500	0.4500
new 18	133	0.5260	0.13	<0.1	0.29	2.13	0.51	0.66	<0.005	<0.005	0.6700	0.5500	0.3100	0.4100
new 19	95	0.0818	<0.1	<0.1	<0.1	0.35	0.08	0.1	<0.005	<0.005	0.1700	0.1100	<0.08	<0.08
new 20	121	0.8190	<0.1	<0.1	0.12	3.21	1.03	1.27	0.012957	0.019992	1.5500	1.1000	0.9900	0.9300
new 21														
new 22	99	0.3660	<0.1	<0.1	<0.1	0.96	0.27	0.29	<0.005	<0.005	0.4100	0.3000	0.1900	0.2400
new 23	150	0.2920	0.15	<0.1	0.38	2.73	0.65	0.71	<0.005	<0.005	1.2100	0.8000	0.5200	0.6600
new 24	176	0.4980	0.1	<0.1	0.2	2.64	0.72	0.47	<0.005	<0.005	1.3400	0.7600	0.7200	1.1700
new 25	143	0.5200	0.11	<0.1	0.31	3	0.62	0.71	<0.005	<0.005	1.0800	0.6500	0.4800	0.6000
new 26	129	0.3370	0.11	<0.1	<0.1	2.03	0.49	0.41	<0.005	<0.005	0.7100	0.4600	0.3400	0.5100

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:45

Sample ID code	Zn mg kg^{-1}	TEH g kg^{-1}	HCB (ug kg-1)	g-HCH (ug kg-1)	p,p' DDT (ug kg-1)	p,p' DDD (ug kg-1)	p,p' DDE (ug kg-1)	S DDX (ug kg-1)	TBT mg kg^{-1}	DBT mg kg^{-1}	PCB 028 ug kg^{-1}	PCB 052 ug kg^{-1}	PCB 101 ug kg^{-1}	PCB 138 ug kg^{-1}
new 27	144	0.3850	0.12	<0.1	<0.1	2.02	0.51	0.35	<0.005	<0.005	0.7300	0.4400	0.3600	0.4700
new 28	141	0.3510	0.14	<0.1	0.15	3.07	0.53	0.42	<0.005	<0.005	0.9900	0.6800	0.4600	0.6100
new 29	134	0.4030	0.14	<0.1	<0.1	2.01	0.5	0.52	<0.005	<0.005	0.9400	0.5900	0.3900	0.5200
new 30		0.0000												
new 31	137	0.6150	<0.1	<0.1	0.14	5.77	1.29	1.31	0.0347	0.0127	3.7300	2.2400	1.5300	1.7400
new 32	92	0.2810	<0.1	<0.1	<0.1	0.56	0.2	0.11	<0.005	<0.005	0.3100	0.2300	0.1300	0.1900
DC03A	105	0.5170	<0.1	<0.1	<0.1	1.06	0.24	0.29	<0.005	<0.005	0.3400	0.2800	0.1600	0.1700
DC04	139	0.9610	<0.1	0.21	0.15	10.2	3.16	3.29	<0.005	<0.005	5.3900	4.3100	2.0800	2.0200
DC05	36	0.1240	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.005	<0.005	<0.08	<0.08	<0.08	<0.08
DC06	37	0.0353	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.005	<0.005	<0.08	<0.08	<0.08	<0.08
DC07	30	0.0189	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.005	<0.005	0.1000	0.1800	0.1500	<0.08

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:45

Sample ID code	PCB 153 ug kg^{-1}	PCB 180 ug kg^{-1}	PCB 118 ug kg^{-1}	PAH Acenaphthene ug kg^{-1}	PAH Acenaphthylene ug kg^{-1}	PAH Anthracene ug kg^{-1}	PAH Benzo (a) anthracene ug kg^{-1}	PAH Benzo (a) pyrene ug kg^{-1}	PAH Benzo (b) fluoranthene ug kg^{-1}	PAH Benzo (ghi) perylene ug kg^{-1}	PAH Benzo (k) fluoranthene ug kg^{-1}	PAH Chrysene ug kg^{-1}	PAH Dibenz (a,h) anthracene ug kg^{-1}	PAH Flourene ug kg^{-1}	PAH Fluoranthene ug kg^{-1}	PAH Indeno (1,2,3–cd) pyrene ug kg^{-1}
new 1	1.3700	0.6500	1.1000	32.40	77.70	120.00	334.00	448.00	403.00	333.00	201.00	368.00	70.60	69.10	519.00	323.00
new 2	0.4700	0.2200	0.5000	46.20	40.80	95.00	193.00	269.00	271.00	184.00	103.00	217.00	42.30	65.00	353.00	184.00
new 3	1.2400	0.5300	1.1400	43.90	91.70	123.00	308.00	432.00	380.00	302.00	178.00	250.00	69.60	86.90	468.00	302.00
new 4	1.4700	0.6400	1.3000	45.20	104.00	135.00	329.00	427.00	409.00	294.00	207.00	265.00	68.00	99.70	533.00	299.00
new 5	1.7900	0.8100	1.4000	89.30	432.00	531.00	1340.00	1580.00	1070.00	818.00	620.00	1240.00	203.00	285.00	1700.00	823.00
new 6	1.0100	0.4500	0.9300	15.20	51.90	76.70	198.00	278.00	241.00	196.00	127.00	207.00	44.80	43.00	301.00	203.00
new 7	1.3300	0.4500	1.8000	19.60	40.70	81.30	173.00	252.00	212.00	166.00	126.00	185.00	33.10	40.80	259.00	169.00
new 8	3.8000	2.4400	1.5800	17.10	86.40	107.00	265.00	404.00	317.00	271.00	160.00	245.00	56.80	57.70	283.00	283.00
new 9	1.1400	1.4600	0.5300	9.11	41.30	60.40	103.00	213.00	174.00	138.00	72.00	113.00	28.10	30.50	118.00	141.00
new 10	0.5500	0.2600	0.5200	14.00	38.50	52.20	115.00	183.00	168.00	136.00	76.90	123.00	31.60	40.10	146.00	132.00
new 11	0.7900	0.3800	0.6500	24.00	63.80	88.30	215.00	288.00	252.00	212.00	113.00	232.00	48.70	63.30	327.00	215.00
new 12	0.4800	0.2500	0.4400	30.60	51.90	70.50	176.00	226.00	222.00	163.00	93.30	183.00	32.80	59.60	275.00	171.00
new 13	0.3800	0.1900	0.3400	15.20	47.90	37.60	101.00	145.00	153.00	117.00	65.40	124.00	27.40	49.00	145.00	120.00

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:45

Sample ID code	PCB 153 ug kg^{-1}	PCB 180 ug kg^{-1}	PCB 118 ug kg^{-1}	PAH Acenaphthene ug kg^{-1}	PAH Acenaphthylene ug kg^{-1}	PAH Anthracene ug kg^{-1}	PAH Benzo (a) anthracene ug kg^{-1}	PAH Benzo (a) pyrene ug kg^{-1}	PAH Benzo (b) fluoranthene ug kg^{-1}	PAH Benzo (ghi) perylene ug kg^{-1}	PAH Benzo (k) fluoranthene ug kg^{-1}	PAH Chrysene ug kg^{-1}	PAH Dibenz (a,h) anthracene ug kg^{-1}	PAH Flourene ug kg^{-1}	PAH Fluoranthene ug kg^{-1}	PAH Indeno (1,2,3–cd) pyrene ug kg^{-1}
new 14	0.1400	<0.08	0.1300	20.30	59.40	45.20	116.00	167.00	148.00	123.00	75.30	139.00	26.50	50.40	160.00	121.00
new 15	0.4100	0.2100	0.3800	20.20	94.20	82.40	235.00	319.00	256.00	207.00	120.00	248.00	52.50	64.60	261.00	202.00
new 16	0.5100	0.2800	0.4300	12.40	39.60	45.60	139.00	197.00	167.00	150.00	102.00	195.00	34.00	35.90	211.00	158.00
new 17	0.4900	0.2600	0.4300	18.40	121.00	100.00	276.00	387.00	304.00	261.00	176.00	291.00	63.90	68.70	296.00	271.00
new 18	0.4100	0.1900	0.4300	20.90	41.90	48.70	137.00	215.00	196.00	158.00	108.00	168.00	37.00	41.00	195.00	171.00
new 19	<0.08	<0.08	<0.08	2.69	3.01	6.21	17.20	22.60	24.90	15.60	10.80	22.00	3.73	4.40	23.50	14.90
new 20	1.0800	0.4700	1.1700	38.40	72.30	111.00	283.00	361.00	349.00	264.00	126.00	308.00	55.30	78.30	412.00	257.00
new 21																
new 22	0.2600	0.1000	0.2000	45.20	36.70	100.00	298.00	292.00	269.00	174.00	138.00	314.00	45.30	51.70	593.00	182.00
new 23	0.7100	0.4100	0.7300	18.00	35.60	53.70	145.00	202.00	189.00	159.00	94.80	170.00	34.10	36.70	229.00	148.00
new 24	1.2100	0.6800	0.9100	16.00	49.20	66.90	162.00	266.00	243.00	197.00	134.00	181.00	44.50	45.60	219.00	197.00
new 25	0.7400	0.3800	0.6900	9.36	28.20	35.00	94.40	137.00	122.00	115.00	70.50	115.00	23.20	25.90	153.00	110.00
new 26	0.5500	0.2900	0.4500	15.00	31.90	43.90	112.00	155.00	146.00	128.00	71.90	133.00	27.90	30.90	165.00	128.00

Consent of copyright owner required for any other use.
For inspection purposes only.

EPA Export 28-04-2021:02:37:45

Sample ID code	PCB 153 ug kg^{-1}	PCB 180 ug kg^{-1}	PCB 118 ug kg^{-1}	PAH Acenaphthene ug kg^{-1}	PAH Acenaphthylene ug kg^{-1}	PAH Anthracene ug kg^{-1}	PAH Benzo (a) anthracene ug kg^{-1}	PAH Benzo (a) pyrene ug kg^{-1}	PAH Benzo (b) fluoranthene ug kg^{-1}	PAH Benzo (ghi) perylene ug kg^{-1}	PAH Benzo (k) fluoranthene ug kg^{-1}	PAH Chrysene ug kg^{-1}	PAH Dibenz (a,h) anthracene ug kg^{-1}	PAH Flourene ug kg^{-1}	PAH Fluoranthene ug kg^{-1}	PAH Indeno (1,2,3–cd) pyrene ug kg^{-1}
new 27	0.5100	0.2400	0.4600	12.20	29.90	44.00	126.00	162.00	158.00	129.00	82.20	143.00	25.70	32.00	179.00	132.00
new 28	0.6900	0.3700	0.6700	12.40	32.70	48.50	123.00	175.00	170.00	144.00	84.40	145.00	27.90	35.70	180.00	144.00
new 29	0.5800	0.3100	0.4900	13.50	49.00	66.80	141.00	205.00	205.00	163.00	91.70	164.00	35.10	39.90	190.00	160.00
new 30																
new 31	1.9300	0.9500	1.6900	21.40	78.30	100.00	230.00	352.00	302.00	251.00	159.00	236.00	56.80	57.90	294.00	259.00
new 32	0.1700	<0.08	0.1900	9.23	14.20	21.70	115.00	229.00	253.00	212.00	108.00	186.00	50.40	17.90	185.00	218.00
DC03A	0.2200	0.0800	0.2200	28.30	146.00	133.00	383.00	522.00	383.00	322.00	180.00	395.00	76.60	86.10	398.00	336.00
DC04	2.4200	1.3300	2.5400	46.80	83.90	167.00	395.00	472.00	449.00	370.00	260.00	459.00	75.10	94.00	669.00	383.00
DC05	<0.08	<0.08	<0.08	7.83	7.44	19.10	38.70	49.90	54.70	36.60	20.00	49.90	8.70	11.50	67.00	38.10
DC06	<0.08	<0.08	<0.08	1.63	2.86	6.11	9.36	17.00	18.60	15.30	10.10	13.20	3.67	4.42	13.30	16.20
DC07	0.0900	<0.08	0.1100	1.22	1.84	4.05	5.50	7.75	10.80	7.67	6.45	6.87	1.78	2.95	8.37	8.33

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:45

Sample ID code	PAH Naphthalene ug kg^{-1}	PAH Phenanthrene ug kg^{-1}	PAH Pyrene ug kg^{-1}											
new 1	71.60	270.00	603.00											
new 2	44.50	248.00	436.00											
new 3	80.80	222.00	698.00											
new 4	91.20	247.00	642.00											
new 5	179.00	378.00	2800.00											
new 6	40.70	155.00	354.00											
new 7	36.10	131.00	378.00											
new 8	59.20	139.00	510.00											
new 9	28.00	74.50	255.00											
new 10	36.50	88.40	232.00											
new 11	63.90	160.00	421.00											
new 12	53.00	150.00	309.00											
new 13	54.90	95.50	181.00											

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:45

Sample ID code	PAH Naphthalene ug kg^{-1}	PAH Phenanthrene ug kg^{-1}	PAH Pyrene ug kg^{-1}											
new 14	53.50	104.00	220.00											
new 15	57.20	141.00	385.00											
new 16	43.20	118.00	258.00											
new 17	67.60	154.00	459.00											
new 18	62.70	154.00	249.00											
new 19	5.02	10.40	33.10											
new 20	77.40	230.00	460.00											
new 21														
new 22	86.50	355.00	546.00											
new 23	47.30	139.00	295.00											
new 24	55.50	135.00	333.00											
new 25	36.60	82.40	175.00											
new 26	45.70	107.00	199.00											

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:45

Sample ID code	PAH Naphthalene ug kg^{-1}	PAH Phenanthrene ug kg^{-1}	PAH Pyrene ug kg^{-1}											
new 27	50.70	110.00	222.00											
new 28	58.60	117.00	215.00											
new 29	58.50	123.00	240.00											
new 30														
new 31	56.60	164.00	425.00											
new 32	22.30	71.20	193.00											
DC03A	61.20	199.00	660.00											
DC04	133.00	247.00	787.00											
DC05	14.40	43.80	104.00											
DC06	8.89	13.00	16.50											
DC07	3.76	6.92	11.10											

Consent of copyright owner required for any other use.
For inspection purposes only.

EPA Export 28-04-2021:02:37:45

Sample ID code						
new 1						
new 2						
new 3						
new 4						
new 5						
new 6						
new 7						
new 8						
new 9						
new 10						
new 11						
new 12						
new 13						

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:45

Sample ID code						
new 14						
new 15						
new 16						
new 17						
new 18						
new 19						
new 20						
new 21						
new 22						
new 23						
new 24						
new 25						
new 26						

Consent of copyright owner required for any other use.
For inspection purposes only.

EPA Export 28-04-2021:02:37:45

Sample ID code						
new 27						
new 28						
new 29						
new 30						
new 31						
new 32						
DC03A						
DC04						
DC05						
DC06						
DC07						

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:45

Reference Type	Reference Material	OC %	TEH g kg^{-1}	Cu mg kg^{-1}	Zn mg kg^{-1}	Cd mg kg^{-1}	Hg mg kg^{-1}	Pb mg kg^{-1}	As mg kg^{-1}	Cr mg kg^{-1}	Ni mg kg^{-1}	Li mg kg^{-1}	Al mg kg^{-1}	DBT mg kg^{-1}	TBT mg kg^{-1}
CRM (measured % recovered)		N/A	94~	78.0	90.0	253.0	25.0	89.0	105.0	80.0	82.0	93.0	98.0	97.0	81.0
CRM result				91.0	439.0	2.0	0.01	118.0	47.5	280.0	62.0	73.0	82400.0	743	389
QA/QC In-House Refernece Material (%				103.0	100.0	100.0	102.0	98.0	120.0	102.0	102.0	97.0	106.0		
QC Blank			<100	<2	<3	<0.1	<0.01	<2	<1	<0.5	<0.5	<0.5	<10	<1	<1
	~ Indicates result is for an In-house Reference Material as no Certified														
	Reference Materials are avaliable.														

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:45

Reference Type	PCB 028 ug kg^{-1}	PCB 052 ug kg^{-1}	PCB 101 ug kg^{-1}	PCB 138 ug kg^{-1}	PCB 153 ug kg^{-1}	PCB 180 ug kg^{-1}	PCB 118 ug kg^{-1}	PAH Acenaphthene ug kg^{-1}	PAH Acenaphthylene ug kg^{-1}	PAH Anthracene ug kg^{-1}	PAH Benzo (a) anthracene ug kg^{-1}	PAH Benzo (a) pyrene ug kg^{-1}	PAH Benzo (b) fluoranthene ug kg^{-1}
CRM (measured % recovered)	66	90	85	120	90	83	96	70	100	68	64	56	90
CRM result	2.98	4.75	4.43	4.33	4.95	2.7	4.04	27	53	125	214	200	408
QA/QC In-House Refernece Material (%													
QC Blank	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1	<1	<1	<1	<1	<1

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:45

Reference Type	PAH Benzo (ghi) perylene ug kg^{-1}	PAH Benzo (k) fluoranthene ug kg^{-1}	PAH Chrysene ug kg^{-1}	PAH Dibenz (a,h) anthracene ug kg^{-1}	PAH Flourene ug kg^{-1}	PAH Fluoranthene ug kg^{-1}	PAH Indeno (1,2,3–cd) pyrene ug kg^{-1}	PAH Naphthalene ug kg^{-1}	PAH Phenanthrene ug kg^{-1}	PAH Pyrene ug kg^{-1}	HCB (ug kg-1)
CRM (measured % recovered)	69	90	88	110	52	79	67	60	75	69	99
CRM result	212	203	256	58	44	514	228	509	305	401	5.78
QA/QC In-House Refernece Material (%											
QC Blank	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.1

For inspection purposes only.
Consent of copyright owner required for any other use.

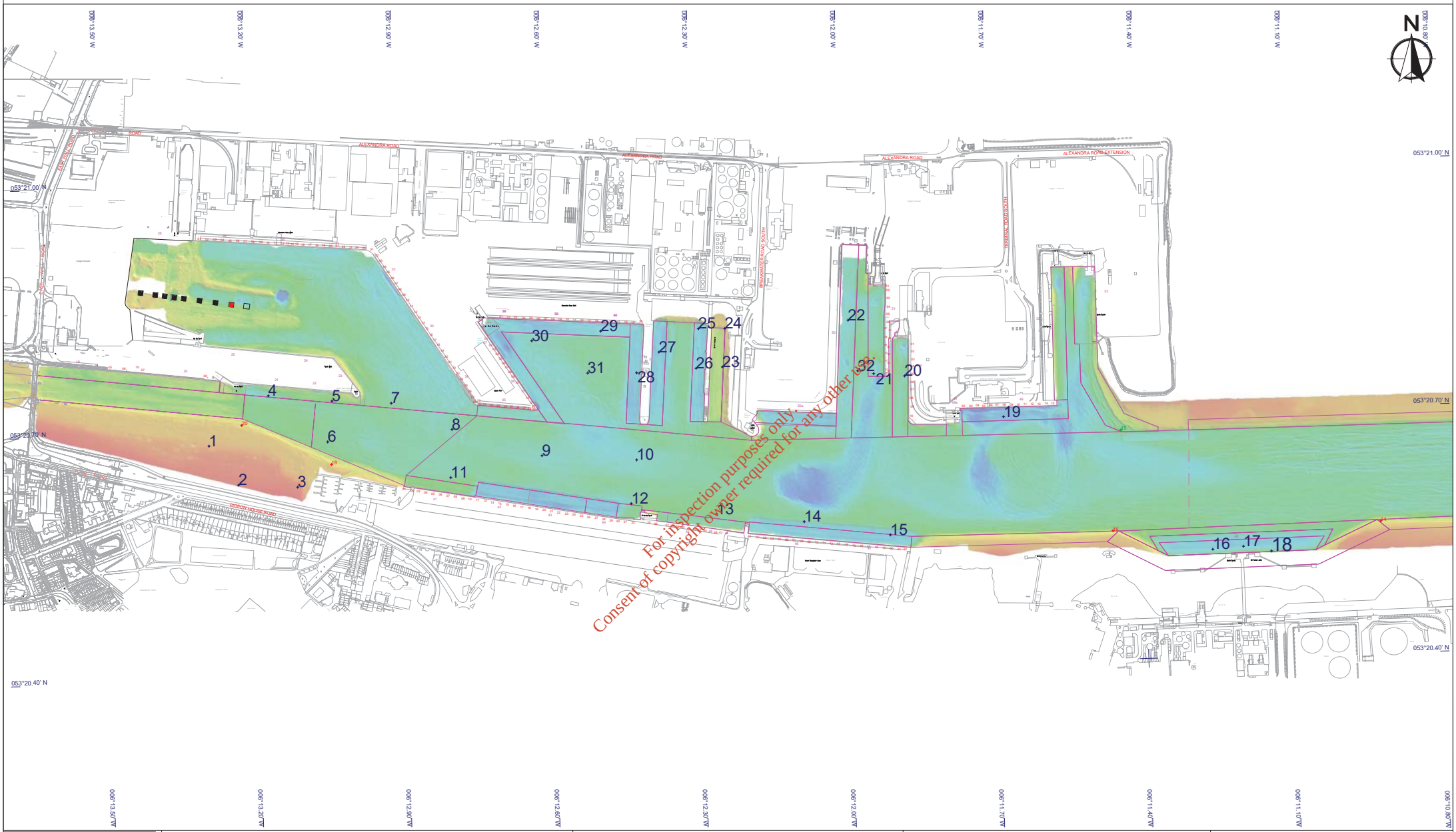
EPA Export 28-04-2021:02:37:45

Reference Type	g-HCH (ug kg-1)	p,p' DDT (ug kg-1)	p,p' DDD (ug kg-1)	p,p' DDE (ug kg-1)	S DDX (ug kg-1)	Please add columns here for additional parameters		
CRM (measured % recovered)	83~	101~	74	74	45~			
CRM result			3.45	2.37				
QA/QC In-House Refernece Material (%								
QC Blank	<0.1	<0.1	<0.1	<0.1	<0.1			

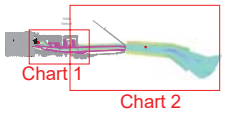
For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:45

Dublin Grab samples location - chart 1 (2020 licenÃed)



KEY PLAN



LEGEND:

-0.5 m
0.5 m
1.5 m
2.5 m
3.6 m
4.7 m
5.8 m
6.9 m
8.0 m
9.0 m
10.1 m
11.2 m
12.2 m
13.3 m

Maintenance dredge design
Navigation Buoys position
2020 licenÃed grab sample locations

0 40.0 160.0 320.0 m

GENRAL NOTES:

Soundings/Grid: Navigation Depths - Shoal Bias
Contours: Average Depths (every meter)

Datum: Chart Datum (OD Malin - 2.51 m)
Projection: Geographic - WGS84

Survey Location: Dublin Port
Survey method: Grab sampling
Survey Date: 15th and 16th April 2020

Contractor: Hydromaster Ltd

HYDROMASTER LTD

DRAWING REVISION

Date:	Rev:	Description:	Drawn By:
15/05/2020	0	Draft	CM

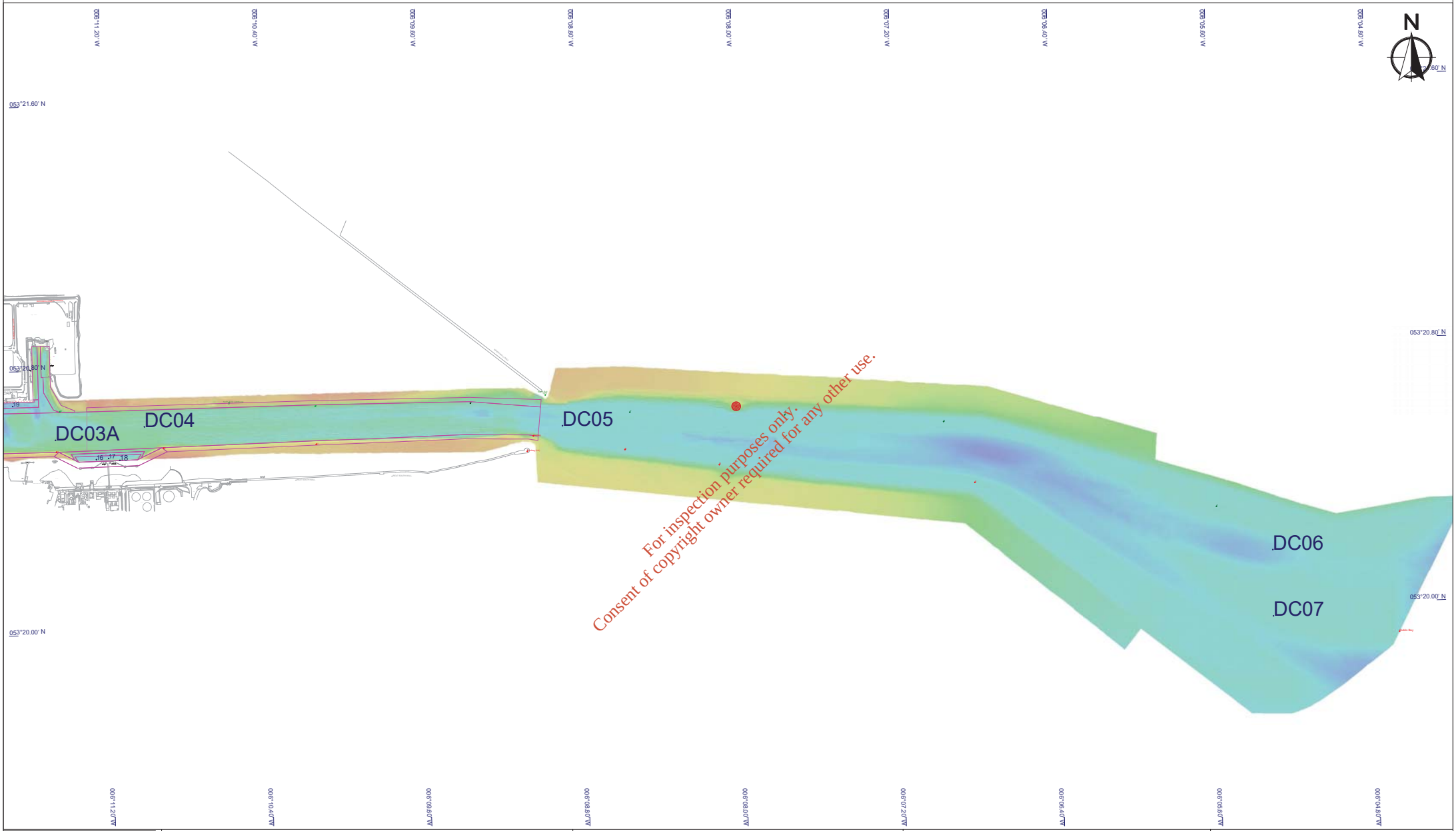
CLIENT:

COMHLACHT CHALAFORT ÁTHA CLIATH
DUBLIN PORT COMPANY

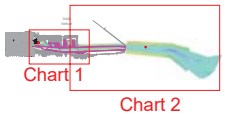
Project: Dublin Sediment sampling (contamination)
Drawing Title: Dublin Grab sample location - Chart 1 (2020 licenÃed)
Paper size and scale: 1:4000 @ A1
Job Number: 2004_GS
Drawn By: CM
Checked By: BS

EPA Export 28-04-2021:02:37:45

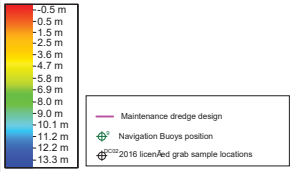
Dublin Grab samples location - chart 2 (2016 licenÆed)



KEY PLAN



LEGEND:



GENRAL NOTES:

Soundings/Grid: Navigation Depths - Shoal Bias
Contours: Average Depths (every meter)

Datum: Chart Datum (OD Malin - 2.51 m)
Projection: Geographic - WGS84

Survey Location: Dublin Port
Survey method: Grab sampling
Survey Date: 15th and 16th April 2020

Contractor: Hydromaster Ltd

HYDROMASTER LTD

DRAWING REVISION

Date:	Rev:	Description:	Drawn By:
15/05/2020	0	Draft	CM

CLIENT:

COMHLACHT CHALAFORT ÁTHA CLIATH
DUBLIN PORT COMPANY

Project: Dublin Sediment sampling (contamination)
Drawing Title: Dublin Grab sample location - Chart 2 (2016 licenÆed)
Paper size and scale: 1:10000 @ A1
Job Number: 2004_GS
Drawn By: CM
Checked By: BS

EPA Export 28-04-2021:02:37:45

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	**MAR00599**	
Issue Version	3	
Customer	Hydromaster Ltd, 7 Howley Court, Dublin Road, Oranmore, Co. Galway, Ireland H91 V1KD	
Customer Reference	Dublin Port	
Date Sampled	15-Apr-20	
Date Received	17-Apr-20	
Date Reported	26-May-20	
Condition of samples	Cold	Satisfactory

This is a revised report containing the actual CRM values in addition to the % Recovery

For inspection purposes only.
Consent of copyright owner required for any other use.

Authorised by: Marya Hubbard

Position: Laboratory Manager

Any additional opinions or interpretations found in this report, are outside the scope of UKAS accreditation.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:45

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

Client Reference:	SOCOTEC Ref:	Matrix	Visual Description
2	MAR00599.001	Sediment	Grey slightly sandy silty CLAY
3	MAR00599.002	Sediment	Grey sandy SILT
4	MAR00599.003	Sediment	Grey slightly sandy silty CLAY
5	MAR00599.004	Sediment	Grey sandy SILT
12	MAR00599.005	Sediment	Grey slightly sandy silty CLAY
13	MAR00599.006	Sediment	Grey slightly sandy silty CLAY
14	MAR00599.007	Sediment	Grey sandy SILT
15	MAR00599.008	Sediment	Grey sandy silty CLAY
19	MAR00599.009	Sediment	Grey slightly gravelly silty SAND
20	MAR00599.010	Sediment	Grey slightly gravelly sandy SILT
22	MAR00599.011	Sediment	Grey sandy SILT
23	MAR00599.012	Sediment	Grey slightly sandy silty CLAY
24	MAR00599.013	Sediment	Grey sandy clayey SILT
25	MAR00599.014	Sediment	Grey slightly sandy silty CLAY
26	MAR00599.015	Sediment	Grey slightly sandy silty CLAY
27	MAR00599.016	Sediment	Grey sandy silty CLAY
28	MAR00599.017	Sediment	Grey slightly sandy silty CLAY
29	MAR00599.018	Sediment	Grey slightly sandy slightly gravelly silty CLAY
32	MAR00599.019	Sediment	Grey slightly sandy slightly gravelly silty CLAY
1	MAR00599.020	Sediment	Grey sandy silty CLAY
6	MAR00599.021	Sediment	Grey slightly sandy silty CLAY
7	MAR00599.022	Sediment	Grey sandy clayey SILT
8	MAR00599.023	Sediment	Grey slightly sandy slightly gravelly silty CLAY
9	MAR00599.024	Sediment	Grey sandy silty CLAY
10	MAR00599.025	Sediment	Grey slightly sandy silty CLAY
11	MAR00599.026	Sediment	Grey slightly sandy silty CLAY
16	MAR00599.027	Sediment	Grey sandy SILT
17	MAR00599.028	Sediment	Grey sandy SILT
18	MAR00599.029	Sediment	Grey slightly sandy silty CLAY
31	MAR00599.030	Sediment	Grey sandy clayey SILT
DC03A	MAR00599.031	Sediment	Grey slightly sandy silty CLAY
DC04	MAR00599.032	Sediment	Grey sandy SILT
DC05	MAR00599.033	Sediment	Grey silty SAND
DC06	MAR00599.034	Sediment	Grey slightly gravelly silty SAND
DC07	MAR00599.035	Sediment	Light brown SAND

For inspection purposes only.
Consent of copyright owner required for any other use.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:45

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	%	%	%	%	%	mg/m3
		Method No	ASC/SOP/303	ASC/SOP/303	SUB_01*	SUB_01*	SUB_01*	SOCOTEC Doncaster*
		Limit of Detection	0.2	0.2	N/A	N/A	N/A	N/A
		Accreditation	UKAS	UKAS	N	N	N	N
Client Reference:	SOCOTEC Ref:	Matrix	Total Moisture @ 120°C	Total Solids	Gravel (>2mm)	Sand (63-2000 µm)	Silt (<63 µm)	Particle Density
2	MAR00599.001	Sediment	41.8	58.2	1.8	52.4	45.8	2.66
3	MAR00599.002	Sediment	58.2	41.8	0.0	27.0	73.0	2.63
4	MAR00599.003	Sediment	49.8	50.2	1.0	25.4	73.7	2.68
5	MAR00599.004	Sediment	49.5	50.5	3.1	37.7	59.2	2.70
12	MAR00599.005	Sediment	49.1	50.9	1.2	29.9	69.0	2.69
13	MAR00599.006	Sediment	57.2	42.8	0.1	26.5	73.4	2.66
14	MAR00599.007	Sediment	52.9	47.1	5.1	31.9	63.0	2.69
15	MAR00599.008	Sediment	56.1	43.9	0.0	26.1	73.9	2.63
19	MAR00599.009	Sediment	27.3	72.7	25.3	65.4	9.3	2.70
20	MAR00599.010	Sediment	43.0	57.0	9.8	31.0	59.2	2.61
22	MAR00599.011	Sediment	48.0	52.0	8.9	43.6	47.4	2.60
23	MAR00599.012	Sediment	63.6	36.4	0.0	16.2	83.8	2.67
24	MAR00599.013	Sediment	60.5	39.5	1.1	11.8	87.1	2.67
25	MAR00599.014	Sediment	61.5	38.5	0.3	17.5	82.2	2.64
26	MAR00599.015	Sediment	61.6	38.4	0.4	21.8	77.9	2.66
27	MAR00599.016	Sediment	64.8	35.2	0.1	17.5	82.4	2.62
28	MAR00599.017	Sediment	62.0	38.0	0.2	21.3	78.5	2.66
29	MAR00599.018	Sediment	61.1	38.9	0.1	22.8	77.1	2.69
32	MAR00599.019	Sediment	45.7	54.3	43.6	24.8	31.6	2.66
1	MAR00599.020	Sediment	69.2	30.8	0.0	18.3	81.7	2.53
6	MAR00599.021	Sediment	56.6	43.4	8.1	35.6	56.3	2.69
7	MAR00599.022	Sediment	40.2	59.8	21.2	50.4	28.3	2.68
8	MAR00599.023	Sediment	47.8	52.2	7.7	32.3	60.0	2.64
9	MAR00599.024	Sediment	20.1	79.9	81.8	8.9	9.2	2.67
10	MAR00599.025	Sediment	53.2	46.8	23.2	26.2	50.7	2.70
11	MAR00599.026	Sediment	62.8	37.2	0.0	24.0	76.0	2.66
16	MAR00599.027	Sediment	62.0	38.0	0.0	20.2	79.8	2.66
17	MAR00599.028	Sediment	70.4	29.6	0.0	18.1	81.9	2.63
18	MAR00599.029	Sediment	69.9	30.1	0.0	20.5	79.5	2.54
31	MAR00599.030	Sediment	47.8	52.2	3.9	28.5	67.6	2.70

For inspection purposes only.
Consent of copyright owner required for any other use.

* See Report Notes

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:45

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	%	% M/M
		Method No	SOCOTEC Env Chem*	SOCOTEC Env Chem*
		Limit of Detection	00/01/1900	0.02
		Accreditation	N	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Carbonate**	**TOC**
2	MAR00599.001	Sediment	1.68	1.08
3	MAR00599.002	Sediment	3.24	2.30
4	MAR00599.003	Sediment	3.28	2.38
5	MAR00599.004	Sediment	3.68	1.94
12	MAR00599.005	Sediment	3.96	1.46
13	MAR00599.006	Sediment	3.80	1.67
14	MAR00599.007	Sediment	4.92	1.33
15	MAR00599.008	Sediment	3.32	1.59
19	MAR00599.009	Sediment	6.76	0.81
20	MAR00599.010	Sediment	4.00	1.11
22	MAR00599.011	Sediment	4.16	1.06
23	MAR00599.012	Sediment	3.36	2.11
24	MAR00599.013	Sediment	3.96	1.97
25	MAR00599.014	Sediment	3.52	2.06
26	MAR00599.015	Sediment	3.72	1.92
27	MAR00599.016	Sediment	3.96	1.90
28	MAR00599.017	Sediment	3.36	1.85
29	MAR00599.018	Sediment	3.44	1.85
32	MAR00599.019	Sediment	6.04	0.79
1	MAR00599.020	Sediment	3.64	3.62
6	MAR00599.021	Sediment	3.84	1.49
7	MAR00599.022	Sediment	3.88	2.58
8	MAR00599.023	Sediment	4.24	1.69
9	MAR00599.024	Sediment	5.44	0.44
10	MAR00599.025	Sediment	6.08	1.11
11	MAR00599.026	Sediment	3.72	2.16
16	MAR00599.027	Sediment	3.36	1.89
17	MAR00599.028	Sediment	3.04	2.08
18	MAR00599.029	Sediment	3.36	2.06
31	MAR00599.030	Sediment	3.76	1.63

* See Report Notes

Consent of copyright owner required for any other use.
For inspection purposes only.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:45

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

			Units	%	%	%	%	%	mg/m3
			Method No	ASC/SOP/303	ASC/SOP/303	SUB_01*	SUB_01*	SUB_01*	SOCOTEC Doncaster*
			Limit of Detection	0.2	0.2	N/A	N/A	N/A	N/A
			Accreditation	UKAS	UKAS	N	N	N	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**		**Total Moisture @ 120°C**	**Total Solids**	**Gravel (>2mm)**	**Sand (63-2000 µm)**	**Silt (<63 µm)**	**Particle Density**
DC03A	MAR00599.031	Sediment		62.4	37.6	0.0	32.4	67.6	2.65
DC04	MAR00599.032	Sediment		48.1	51.9	0.0	38.6	61.4	2.66
DC05	MAR00599.033	Sediment		42.3	57.7	0.5	91.9	7.6	2.63
DC06	MAR00599.034	Sediment		31.9	68.1	0.9	94.1	5.1	2.75
DC07	MAR00599.035	Sediment		27.3	72.7	0.2	97.0	2.9	2.64

* See Report Notes

For inspection purposes only.
Consent of copyright owner required for any other use.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:45

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	%	% M/M
		Method No	SOCOTEC Env Chem*	SOCOTEC Env Chem*
		Limit of Detection	00/01/1900	0.02
		Accreditation	N	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Carbonate**	**TOC**
DC03A	MAR00599.031	Sediment	3.20	1.35
DC04	MAR00599.032	Sediment	3.24	1.74
DC05	MAR00599.033	Sediment	2.32	0.24
DC06	MAR00599.034	Sediment	2.16	0.13
DC07	MAR00599.035	Sediment	1.84	0.11

* See Report Notes

For inspection purposes only.
Consent of copyright owner required for any other use.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:45

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*
		Limit of Detection	1	0.1	0.5	2	2	0.5	3
		Accreditation	UKAS	N	N	UKAS	UKAS	Nickel	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Arsenic**	**Cadmium**	**Chromium**	**Copper**	**Lead**	**Nickel**	**Zinc**
2	MAR00599.001	Sediment	23.7	0.9	95.6	39.2	50.4	17.3	118
3	MAR00599.002	Sediment	34.8	1.1	79.7	42.0	61.8	25.6	201
4	MAR00599.003	Sediment	36.3	1.3	77.2	38.1	71.2	33.1	183
5	MAR00599.004	Sediment	35.4	1.1	85.8	32.2	53.9	30.1	149
12	MAR00599.005	Sediment	32.7	1.0	81.1	34.6	35.0	34.1	124
13	MAR00599.006	Sediment	28.7	0.9	78.0	37.9	32.0	43.0	117
14	MAR00599.007	Sediment	24.9	1.3	81.8	22.3	26.4	32.3	103
15	MAR00599.008	Sediment	19.5	0.9	78.3	26.1	33.6	30.6	112
19	MAR00599.009	Sediment	14.6	0.6	91.6	19.9	15.2	24.7	95.0
20	MAR00599.010	Sediment	14.6	0.9	83.0	24.7	39.7	29.2	121
22	MAR00599.011	Sediment	13.8	1.1	86.5	42.5	24.4	27.0	99.0
23	MAR00599.012	Sediment	15.8	0.9	85.1	39.9	44.8	35.6	150
24	MAR00599.013	Sediment	12.7	1.0	78.8	47.8	57.2	36.0	176
25	MAR00599.014	Sediment	17.4	1.1	81.9	34.6	41.9	33.0	143
26	MAR00599.015	Sediment	21.4	0.9	78.8	30.0	36.8	32.8	129
27	MAR00599.016	Sediment	19.1	0.9	81.3	31.9	38.7	33.1	144
28	MAR00599.017	Sediment	19.9	0.9	77.9	32.5	40.6	32.1	141
29	MAR00599.018	Sediment	18.0	1.0	78.3	31.1	39.4	31.9	134
32	MAR00599.019	Sediment	10.7	0.8	88.9	46.3	18.6	28.4	92
		Certified Reference Material 2702 (% Recovery)	105	253	80	78	89	82	90
		Certified Reference Material 2702 (Result)	47.5	2	280	91	118	62	439
		Certified Reference Material 1646a (% Recovery)	-	-	-	-	-	-	-
		Certified Reference Material 1646a (Result)	-	-	-	-	-	-	-
		QA/QC In-House Refernece Material (% Recovery)	120	100	102	103	98	102	100
		QC Blank	<1	<0.1	<0.5	<2	<2	<0.5	<3

For inspection purposes only.
Consent of copyright owner required for any other use.

* See Report Notes
~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:45

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*
		Limit of Detection	10	0.5	0.01
		Accreditation	UKAS	N	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Aluminium**	**Lithium**	**Mercury**
2	MAR00599.001	Sediment	23900	23.9	0.02
3	MAR00599.002	Sediment	30100	32.7	0.04
4	MAR00599.003	Sediment	35800	39.8	0.07
5	MAR00599.004	Sediment	31000	34.2	0.07
12	MAR00599.005	Sediment	34000	35.9	0.02
13	MAR00599.006	Sediment	33000	35.8	0.01
14	MAR00599.007	Sediment	30700	32.4	0.01
15	MAR00599.008	Sediment	35300	37.8	0.06
19	MAR00599.009	Sediment	11700	14.1	<0.01
20	MAR00599.010	Sediment	28100	30.5	0.02
22	MAR00599.011	Sediment	26500	29.5	0.01
23	MAR00599.012	Sediment	40700	44.3	0.05
24	MAR00599.013	Sediment	43300	46.0	0.04
25	MAR00599.014	Sediment	38000	40.4	0.05
26	MAR00599.015	Sediment	41200	42.7	0.04
27	MAR00599.016	Sediment	40100	42.2	0.03
28	MAR00599.017	Sediment	38300	40.6	0.05
29	MAR00599.018	Sediment	36900	38.8	0.02
32	MAR00599.019	Sediment	19100	21.8	<0.01
		Certified Reference Material 2702 (% Recovery)	98	93	-
		Certified Reference Material 2702 (Result)	82400	73	-
		Certified Reference Material 1646a (% Recovery)	-	-	25
		Certified Reference Material 1646a (Result)	-	-	0.01
		QA/QC In-House Refernece Material (% Recovery)	106	97	102
		QC Blank	<10	<0.5	<0.01

* See Report Notes

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

For inspection purposes only.
Consent of copyright owner required for any other use.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:45

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*
		Limit of Detection	1	0.1	0.5	2	2	0.5	3
		Accreditation	UKAS	N	N	UKAS	UKAS	N	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Arsenic**	**Cadmium**	**Chromium**	**Copper**	**Lead**	**Nickel**	**Zinc**
1	MAR00599.020	Sediment	16.4	1.2	79.7	45.1	70.0	33.1	252
6	MAR00599.021	Sediment	12.8	0.9	98.0	27.5	48.9	25.4	136
7	MAR00599.022	Sediment	13.1	0.7	111	23.6	110	20.0	117
8	MAR00599.023	Sediment	17.1	1.2	101	28.9	78.0	27.0	145
9	MAR00599.024	Sediment	16.2	1.2	103	15.7	10.6	33.2	62.0
10	MAR00599.025	Sediment	14.9	0.9	82.3	22.8	29.8	24.3	116
11	MAR00599.026	Sediment	18.0	1.1	90.0	62.3	51.8	29.2	151
16	MAR00599.027	Sediment	15.6	0.8	81.4	34.1	39.5	28.0	127
17	MAR00599.028	Sediment	14.3	0.9	94.8	34.0	43.6	29.1	154
18	MAR00599.029	Sediment	11.3	0.9	80.8	29.0	41.6	28.6	133
31	MAR00599.030	Sediment	10.9	0.9	85.7	29.3	48.5	26.5	137
DC03A	MAR00599.031	Sediment	9.7	0.7	78.9	24.4	31.4	24.3	105
DC04	MAR00599.032	Sediment	10.8	1.0	76.5	28.0	65.6	26.4	139
DC05	MAR00599.033	Sediment	6.1	0.2	82.9	6.8	11.7	10.3	36.0
DC06	MAR00599.034	Sediment	9.0	0.3	105	6.4	9.7	9.7	37.0
DC07	MAR00599.035	Sediment	10.8	0.3	106	6.1	9.9	8.5	30.0
Certified Reference Material 2702 (% Recovery)			90	218	86	80	94	87	93
Certified Reference Material 2702 (Result)			40.9	2	303	95	125	66	450
Certified Reference Material 1646a (% Recovery)				-	-	-	-	-	-
Certified Reference Material 1646a (Result)			-	-	-	-	-	-	-
QA/QC In-House Refernece Material (% Recovery)			103	100	98	107	104	98	97
QC Blank			<1	<0.1	<0.5	<2	<2	<0.5	<3

For inspection purposes only.
Consent of copyright owner required for any other use.

* See Report Notes
~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:45

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)	mg/Kg (Dry Weight)
		Method No	SOCOTEC Env Chem*	SOCOTEC Env Chem*	SOCOTEC Env Chem*
		Limit of Detection	10	0.5	0.01
		Accreditation	UKAS	N	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Aluminium**	**Lithium**	**Mercury**
1	MAR00599.020	Sediment	38900	40.8	0.17
6	MAR00599.021	Sediment	32300	34.0	0.09
7	MAR00599.022	Sediment	26600	28.5	0.07
8	MAR00599.023	Sediment	35100	36.0	0.11
9	MAR00599.024	Sediment	18800	16.1	<0.01
10	MAR00599.025	Sediment	28200	29.3	0.01
11	MAR00599.026	Sediment	40800	42.1	0.06
16	MAR00599.027	Sediment	43000	44.5	0.04
17	MAR00599.028	Sediment	44400	46.5	0.08
18	MAR00599.029	Sediment	44200	45.6	0.06
31	MAR00599.030	Sediment	36000	36.8	0.11
DC03A	MAR00599.031	Sediment	36600	36.7	0.04
DC04	MAR00599.032	Sediment	36500	37.4	0.18
DC05	MAR00599.033	Sediment	20500	16.9	<0.01
DC06	MAR00599.034	Sediment	16000	13.6	<0.01
DC07	MAR00599.035	Sediment	13700	12.5	<0.01
		Certified Reference Material 2702 (% Recovery)	100	94	-
		Certified Reference Material 2702 (Result)	84400	73	-
		Certified Reference Material 1646a (% Recovery)		-	0.01
		Certified Reference Material 1646a (Result)	-	-	25
		QA/QC In-House Refernece Material (% Recovery)	108	99	101
		QC Blank	<10	<0.5	<0.01

For inspection purposes only.
Consent of copyright owner required for any other use.

* See Report Notes
~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:45

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	
		Method No	ASC/SOP/301	
		Limit of Detection	1	1
		Accreditation	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Dibutyltin (DBT)**	**Tributyltin (TBT)**
2	MAR00599.001	Sediment	16.1	16.2
3	MAR00599.002	Sediment	43.3	56.9
4	MAR00599.003	Sediment	12.4	22.4
5	MAR00599.004	Sediment	15.4	33.4
12	MAR00599.005	Sediment	11.0	10.9
13	MAR00599.006	Sediment	<5	14.4
14	MAR00599.007	Sediment	<5	<5
15	MAR00599.008	Sediment	<5	<5
19	MAR00599.009	Sediment	<5	<5
20	MAR00599.010	Sediment	20.0	13.0
22	MAR00599.011	Sediment	<5	<5
23	MAR00599.012	Sediment	<5	<5
24	MAR00599.013	Sediment	<5	<5
25	MAR00599.014	Sediment	<5	<5
26	MAR00599.015	Sediment	<5	<5
Certified Reference Material BCR-646 (% Recovery)			97	81
Certified Reference Material BCR-646			743	389
QC Blank			<1	<1

* See Report Notes

For inspection purposes only.
Consent of copyright owner required for any other use.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:45

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	
		Method No	ASC/SOP/301	
		Limit of Detection	1	1
		Accreditation	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Dibutyltin (DBT)**	**Tributyltin (TBT)**
27	MAR00599.016	Sediment	<5	<5
28	MAR00599.017	Sediment	<5	<5
29	MAR00599.018	Sediment	<5	<5
32	MAR00599.019	Sediment	<5	<5
1	MAR00599.020	Sediment	19.0	28.4
6	MAR00599.021	Sediment	<5	18.1
7	MAR00599.022	Sediment	<5	18.7
8	MAR00599.023	Sediment	16.4	63.6
9	MAR00599.024	Sediment	<5	<5
10	MAR00599.025	Sediment	<5	<5
11	MAR00599.026	Sediment	<5	23.4
16	MAR00599.027	Sediment	<5	<5
17	MAR00599.028	Sediment	<5	<5
18	MAR00599.029	Sediment	<5	<5
31	MAR00599.030	Sediment	12.7	34.7
DC03A	MAR00599.031	Sediment	<5	<5
DC04	MAR00599.032	Sediment	<5	<5
		Certified Reference Material BCR-646 (% Recovery)	84	72
		Certified Reference Material BCR-646	649	345
		QC Blank	<1	<1

* See Report Notes

For inspection purposes only.
Consent of copyright owner required for any other use.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:45

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	
		Method No	ASC/SOP/301	
		Limit of Detection	1	1
		Accreditation	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Dibutyltin (DBT)**	**Tributyltin (TBT)**
DC05	MAR00599.033	Sediment	<5	<5
DC06	MAR00599.034	Sediment	<5	<5
DC07	MAR00599.035	Sediment	<5	<5
Certified Reference Material BCR-646 (% Recovery)			103	81
Certified Reference Material BCR-646			797	390
QC Blank			<1	<1

* See Report Notes

For inspection purposes only.
Consent of copyright owner required for any other use.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:45

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**ACENAPTH**	**ACENAPHY**	**ANTHRACN**	**BAA**	**BAP**	**BBF**
2	MAR00599.001	Sediment	46.2	40.8	95.0	193	269	271
3	MAR00599.002	Sediment	43.9	91.7	123	308	432	380
4	MAR00599.003	Sediment	45.2	104	135	329	427	409
5	MAR00599.004	Sediment	89.3	432	531	1340	1580	1070
12	MAR00599.005	Sediment	30.6	51.9	70.5	176	226	222
13	MAR00599.006	Sediment	15.2	47.9	37.6	101	145	153
14	MAR00599.007	Sediment	20.3	59.4	45.2	116	167	148
15	MAR00599.008	Sediment	20.2	94.2	82.4	235	319	256
19	MAR00599.009	Sediment	2.69	3.01	6.21	17.2	22.6	24.9
20	MAR00599.010	Sediment	38.4	72.3	111	283	361	349
Certified Reference Material CRM180013 1941b (% Recovery)			70	100	68	64	56	90
Certified Reference Material CRM180013 1941b			27	58	125	214	200	408
QC Blank			<1	<1	<1	<1	<1	<1

For full analyte name see method summaries

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

For inspection purposes only.
Consent of copyright owner required for any other use.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:45

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**BENZGHIP**	**BKF**	**CHRYSENE**	**DBENZAH**	**FLUORANT**	**FLUORENE**
2	MAR00599.001	Sediment	184	103	217	42.3	353	65.0
3	MAR00599.002	Sediment	302	178	250	69.6	468	86.9
4	MAR00599.003	Sediment	294	207	265	68.0	533	99.7
5	MAR00599.004	Sediment	818	620	1240	203	1700	285
12	MAR00599.005	Sediment	163	93.3	183	32.8	275	59.6
13	MAR00599.006	Sediment	117	65.4	124	27.4	145	49.0
14	MAR00599.007	Sediment	123	75.3	139	26.5	160	50.4
15	MAR00599.008	Sediment	207	120	248	52.5	261	64.6
19	MAR00599.009	Sediment	15.6	10.8	22.0	3.73	23.5	4.40
20	MAR00599.010	Sediment	264	126	308	55.3	412	78.3
Certified Reference Material CRM180013 1941b (% Recovery)			69	90	88	110	79	52
Certified Reference Material CRM180013 1941b			212	203	256	58	514	44
QC Blank			<1	<1	<1	<1	<1	<1

For full analyte name see method summaries

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

For inspection purposes only.
Consent of copyright owner required for any other use.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:45

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/306
		Limit of Detection	1	1	1	1	100
		Accreditation	UKAS	UKAS	UKAS	UKAS	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**INDPYR**	**NAPTH**	**PHENANT**	**PYRENE**	**THC**
2	MAR00599.001	Sediment	184	44.5	248	436	277000
3	MAR00599.002	Sediment	302	80.8	222	698	1070000
4	MAR00599.003	Sediment	299	91.2	247	642	644000
5	MAR00599.004	Sediment	823	179	378	2800	1170000
12	MAR00599.005	Sediment	171	53.0	150	309	489000
13	MAR00599.006	Sediment	120	54.9	95.5	181	357000
14	MAR00599.007	Sediment	121	53.5	104	220	387000
15	MAR00599.008	Sediment	202	57.2	141	385	433000
19	MAR00599.009	Sediment	14.9	5.02	10.4	33.1	81800
20	MAR00599.010	Sediment	257	77.4	230	460	819000
		Certified Reference Material CRM180013 1941b (% Recovery)	67	60	75	69	94~
		Certified Reference Material CRM180013 1941b	228	509	305	401	
		QC Blank	<1	<1	<1	<1	<100

For full analyte name see method summaries

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

For inspection purposes only.
Consent of copyright owner required for any other use.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:45

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**ACENAPTH**	**ACENAPHY**	**ANTHRACN**	**BAA**	**BAP**	**BBF**
22	MAR00599.011	Sediment	45.2	36.7	100	298	292	269
23	MAR00599.012	Sediment	18.0	35.6	53.7	145	202	189
24	MAR00599.013	Sediment	16.0	49.2	66.9	162	266	243
25	MAR00599.014	Sediment	9.36	28.2	35.0	94.4	137	122
26	MAR00599.015	Sediment	15.0	31.9	43.9	112	155	146
27	MAR00599.016	Sediment	12.2	29.9	44.0	126	162	158
28	MAR00599.017	Sediment	12.4	32.7	48.5	123	175	170
29	MAR00599.018	Sediment	13.5	49.0	66.8	141	205	205
32	MAR00599.019	Sediment	9.23	14.2	21.7	115	229	253
1	MAR00599.020	Sediment	32.4	77.7	120	334	448	403
6	MAR00599.021	Sediment	15.2	51.9	76.7	198	278	241
7	MAR00599.022	Sediment	19.6	40.7	81.3	173	252	212
8	MAR00599.023	Sediment	17.1	86.4	107	265	404	317
9	MAR00599.024	Sediment	9.11	41.3	60.4	103	213	174
10	MAR00599.025	Sediment	14.0	38.5	52.2	115	183	168
11	MAR00599.026	Sediment	24.0	63.8	88.3	215	288	252
16	MAR00599.027	Sediment	12.4	39.6	45.6	139	197	167
17	MAR00599.028	Sediment	18.4	121	100	276	387	304
18	MAR00599.029	Sediment	20.9	41.9	48.7	137	215	196
Certified Reference Material CRM180013 1941b (% Recovery)			70	100	65	66	60	90
Certified Reference Material CRM180013 1941b			27	53	120	221	215	408
QC Blank			<1	<1	<1	<1	<1	<1

For inspection purposes only.
Consent of copyright owner required for any other use.

For full analyte name see method summaries
~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.
As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:45

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**BENZGHIP**	**BKF**	**CHRYSENE**	**DBENZAH**	**FLUORANT**	**FLUORENE**
22	MAR00599.011	Sediment	174	138	314	45.3	593	51.7
23	MAR00599.012	Sediment	159	94.8	170	34.1	229	36.7
24	MAR00599.013	Sediment	197	134	181	44.5	219	45.6
25	MAR00599.014	Sediment	115	70.5	115	23.2	153	25.9
26	MAR00599.015	Sediment	128	71.9	133	27.9	165	30.9
27	MAR00599.016	Sediment	129	82.2	143	25.7	179	32.0
28	MAR00599.017	Sediment	144	84.4	145	27.9	180	35.7
29	MAR00599.018	Sediment	163	91.7	164	35.1	190	39.9
32	MAR00599.019	Sediment	212	108	186	50.4	185	17.9
1	MAR00599.020	Sediment	333	201	368	70.6	519	69.1
6	MAR00599.021	Sediment	196	127	207	44.8	301	43.0
7	MAR00599.022	Sediment	166	126	185	33.1	259	40.8
8	MAR00599.023	Sediment	271	160	245	56.8	283	57.7
9	MAR00599.024	Sediment	138	72.0	113	28.1	118	30.5
10	MAR00599.025	Sediment	136	76.9	123	31.6	146	40.1
11	MAR00599.026	Sediment	212	113	232	48.7	327	63.3
16	MAR00599.027	Sediment	150	102	195	34.0	211	35.9
17	MAR00599.028	Sediment	261	176	291	63.9	296	68.7
18	MAR00599.029	Sediment	158	108	168	37.0	195	41.0
Certified Reference Material CRM180013 1941b (% Recovery)			67	85	87	99	79	54
Certified Reference Material CRM180013 1941b			206	191	253	52	514	46
QC Blank			<1	<1	<1	<1	<1	<1

For inspection purposes only.
Consent of copyright owner required for any other use.

For full analyte name see method summaries
~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.
As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:45

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/306
		Limit of Detection	1	1	1	1	100
		Accreditation	UKAS	UKAS	UKAS	UKAS	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**INDPYR**	**NAPTH**	**PHENANT**	**PYRENE**	**THC**
22	MAR00599.011	Sediment	182	86.5	355	546	366000
23	MAR00599.012	Sediment	148	47.3	139	295	292000
24	MAR00599.013	Sediment	197	55.5	135	333	498000
25	MAR00599.014	Sediment	110	36.6	82.4	175	520000
26	MAR00599.015	Sediment	128	45.7	107	199	337000
27	MAR00599.016	Sediment	132	50.7	110	222	385000
28	MAR00599.017	Sediment	144	58.6	117	215	351000
29	MAR00599.018	Sediment	160	58.5	123	240	403000
32	MAR00599.019	Sediment	218	22.3	71.2	193	281000
1	MAR00599.020	Sediment	323	71.6	270	603	385000
6	MAR00599.021	Sediment	203	40.7	155	354	598000
7	MAR00599.022	Sediment	169	36.1	131	378	312000
8	MAR00599.023	Sediment	283	59.2	139	510	372000
9	MAR00599.024	Sediment	141	28.0	74.5	255	267000
10	MAR00599.025	Sediment	132	36.5	88.4	232	342000
11	MAR00599.026	Sediment	215	63.9	160	421	367000
16	MAR00599.027	Sediment	158	43.2	118	258	437000
17	MAR00599.028	Sediment	271	67.6	154	459	443000
18	MAR00599.029	Sediment	171	62.7	154	249	526000
Certified Reference Material CRM180013 1941b (% Recovery)			69	62	76	72	102~
Certified Reference Material CRM180013 1941b			235	526	309	418	
QC Blank			<1	<1	<1	<1	<100

For inspection purposes only.
Consent of copyright owner required for any other use.

For full analyte name see method summaries

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:45

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**ACENAPTH**	**ACENAPHY**	**ANTHRACN**	**BAA**	**BAP**	**BBF**
31	MAR00599.030	Sediment	21.4	78.3	100	230	352	302
DC03A	MAR00599.031	Sediment	28.3	146	133	383	522	383
DC04	MAR00599.032	Sediment	46.8	83.9	167	395	472	449
DC05	MAR00599.033	Sediment	7.83	7.44	19.1	38.7	49.9	54.7
DC06	MAR00599.034	Sediment	1.63	2.86	6.11	9.36	17.0	18.6
DC07	MAR00599.035	Sediment	1.22	1.84	4.05	5.50	7.75	10.8
Certified Reference Material CRM180013 1941b (% Recovery)			70	96	68	65	60	90
Certified Reference Material CRM180013 1941b			27	51	125	218	215	408
QC Blank			<1	<1	<1	<1	<1	<1

For full analyte name see method summaries

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

For inspection purposes only.
Consent of copyright owner required for any other use.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:45

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**BENZGHIP**	**BKF**	**CHRYSENE**	**DBENZAH**	**FLUORANT**	**FLUORENE**
31	MAR00599.030	Sediment	251	159	236	56.8	294	57.9
DC03A	MAR00599.031	Sediment	322	180	395	76.6	398	86.1
DC04	MAR00599.032	Sediment	370	260	459	75.1	669	94.0
DC05	MAR00599.033	Sediment	36.6	20.0	49.9	8.70	67.0	11.5
DC06	MAR00599.034	Sediment	15.3	10.1	13.2	3.67	13.3	4.42
DC07	MAR00599.035	Sediment	7.67	6.45	6.87	1.78	8.37	2.95
		Certified Reference Material CRM180013 1941b (% Recovery)	73	94	90	100	84	49
		Certified Reference Material CRM180013 1941b	224	212	262	53	547	42
		QC Blank	<1	<1	<1	<1	<1	<1

For full analyte name see method summaries

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

For inspection purposes only.
Consent of copyright owner required for any other use.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:45

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/306
		Limit of Detection	1	1	1	1	100
		Accreditation	UKAS	UKAS	UKAS	UKAS	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**INDPYR**	**NAPTH**	**PHENANT**	**PYRENE**	**THC**
31	MAR00599.030	Sediment	259	56.6	164	425	615000
DC03A	MAR00599.031	Sediment	336	61.2	199	660	517000
DC04	MAR00599.032	Sediment	383	133	247	787	961000
DC05	MAR00599.033	Sediment	38.1	14.4	43.8	104	124000
DC06	MAR00599.034	Sediment	16.2	8.89	13.0	16.5	35300
DC07	MAR00599.035	Sediment	8.33	3.76	6.92	11.1	18900
		Certified Reference Material CRM180013 1941b (% Recovery)	72	58	73	75	95~
		Certified Reference Material CRM180013 1941b	246	492	296	436	
		QC Blank	<1	<1	<1	<1	<100

For full analyte name see method summaries

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

For inspection purposes only.
Consent of copyright owner required for any other use.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:45

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.08	0.08	0.08	0.08	0.08	0.08	0.08
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB28**	**PCB52**	**PCB101**	**PCB118**	**PCB138**	**PCB153**	**PCB180**
2	MAR00599.001	Sediment	0.93	0.53	0.40	0.50	0.47	0.47	0.22
3	MAR00599.002	Sediment	1.44	0.95	1.00	1.14	1.27	1.24	0.53
4	MAR00599.003	Sediment	2.53	2.03	1.23	1.30	1.29	1.47	0.64
5	MAR00599.004	Sediment	1.89	1.39	1.19	1.40	1.64	1.79	0.81
12	MAR00599.005	Sediment	0.87	0.55	0.37	0.44	0.47	0.48	0.25
13	MAR00599.006	Sediment	0.60	0.39	0.26	0.34	0.34	0.38	0.19
14	MAR00599.007	Sediment	0.22	0.16	0.10	0.13	0.14	0.14	<0.08
15	MAR00599.008	Sediment	0.57	0.40	0.28	0.38	0.36	0.41	0.21
19	MAR00599.009	Sediment	0.17	0.11	<0.08	<0.08	<0.08	<0.08	<0.08
20	MAR00599.010	Sediment	1.55	1.10	0.99	1.17	0.93	1.08	0.47
22	MAR00599.011	Sediment	0.41	0.30	0.19	0.20	0.24	0.26	0.10
23	MAR00599.012	Sediment	1.21	0.80	0.52	0.73	0.66	0.71	0.41
24	MAR00599.013	Sediment	1.34	0.76	0.72	0.91	1.17	1.21	0.68
25	MAR00599.014	Sediment	1.08	0.65	0.48	0.69	0.60	0.74	0.38
26	MAR00599.015	Sediment	0.71	0.46	0.34	0.45	0.51	0.55	0.29
27	MAR00599.016	Sediment	0.73	0.44	0.36	0.46	0.47	0.51	0.24
28	MAR00599.017	Sediment	0.99	0.68	0.46	0.67	0.61	0.69	0.37
29	MAR00599.018	Sediment	0.94	0.59	0.39	0.49	0.52	0.58	0.31
32	MAR00599.019	Sediment	0.31	0.23	0.13	0.19	0.19	0.17	<0.08
Certified Reference Material SRM 1941b (% Recovery)			66	90	85	96	120	90	83
Certified Reference Material SRM 1941b (Result)			2.98	4.75	4.43	4.04	4.33	4.95	2.70
QC Blank			<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08

For full analyte name see method summaries

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

Consent of copyright owner required for any other use.
For inspection purposes only.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:45

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Accreditation	UKAS	UKAS	UKAS	N	UKAS	UKAS	UKAS	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**AHCH**	**BHCH**	**GHCH**	**DIELDRIN**	**HCB**	**DDE**	**DDT**	**DDD**
2	MAR00599.001	Sediment	<0.1	<0.1	0.14	<0.1	0.12	0.31	0.12	0.67
3	MAR00599.002	Sediment	<0.1	<0.1	<0.1	0.48	0.26	0.62	0.25	1.73
4	MAR00599.003	Sediment	<0.1	<0.1	<0.1	0.84	<0.1	1.12	0.19	3.95
5	MAR00599.004	Sediment	<0.1	<0.1	0.11	0.46	0.19	0.80	0.15	2.68
12	MAR00599.005	Sediment	<0.1	<0.1	<0.1	0.32	0.10	0.38	<0.1	1.15
13	MAR00599.006	Sediment	<0.1	<0.1	<0.1	0.29	0.10	0.53	0.11	1.55
14	MAR00599.007	Sediment	<0.1	<0.1	<0.1	0.12	<0.1	0.17	<0.1	0.69
15	MAR00599.008	Sediment	<0.1	<0.1	<0.1	0.36	0.10	0.55	<0.1	2.18
19	MAR00599.009	Sediment	<0.1	<0.1	<0.1	0.10	<0.1	0.08	<0.1	0.35
20	MAR00599.010	Sediment	<0.1	<0.1	<0.1	1.27	<0.1	1.03	0.12	3.21
22	MAR00599.011	Sediment	<0.1	<0.1	<0.1	0.29	<0.1	0.27	<0.1	0.96
23	MAR00599.012	Sediment	<0.1	<0.1	<0.1	0.71	0.15	0.65	0.38	2.73
24	MAR00599.013	Sediment	<0.1	<0.1	<0.1	0.47	0.10	0.72	0.20	2.64
25	MAR00599.014	Sediment	<0.1	<0.1	<0.1	0.71	0.11	0.62	0.31	3.00
26	MAR00599.015	Sediment	<0.1	<0.1	<0.1	0.41	0.11	0.49	<0.1	2.03
27	MAR00599.016	Sediment	<0.1	<0.1	<0.1	0.35	0.12	0.51	<0.1	2.02
28	MAR00599.017	Sediment	<0.1	<0.1	<0.1	0.42	0.14	0.53	0.15	3.07
29	MAR00599.018	Sediment	<0.1	<0.1	<0.1	0.52	0.14	0.50	<0.1	2.01
32	MAR00599.019	Sediment	<0.1	<0.1	<0.1	0.11	<0.1	0.20	<0.1	0.56
Certified Reference Material SRM 1941b (% Recovery)			83~	110~	83~	45~	99	74	101~	74
Certified Reference Material SRM 1941b (Result)							5.78	2.37		3.45
QC Blank			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

For inspection purposes only.
Consent of copyright owner required for any other use.

For full analyte name see method summaries

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:45

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.08	0.08	0.08	0.08	0.08	0.08	0.08
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB28**	**PCB52**	**PCB101**	**PCB118**	**PCB138**	**PCB153**	**PCB180**
1	MAR00599.020	Sediment	1.89	1.46	0.95	1.10	1.18	1.37	0.65
6	MAR00599.021	Sediment	1.69	1.12	0.79	0.93	0.84	1.01	0.45
7	MAR00599.022	Sediment	1.57	1.58	1.56	1.80	1.42	1.33	0.45
8	MAR00599.023	Sediment	2.59	1.80	1.65	1.58	3.19	3.80	2.44
9	MAR00599.024	Sediment	1.44	0.81	0.56	0.53	0.86	1.14	1.46
10	MAR00599.025	Sediment	1.09	0.62	0.42	0.52	0.48	0.55	0.26
11	MAR00599.026	Sediment	1.25	0.85	0.59	0.65	0.69	0.79	0.38
16	MAR00599.027	Sediment	0.76	0.58	0.36	0.43	0.37	0.51	0.28
17	MAR00599.028	Sediment	0.67	0.55	0.35	0.43	0.45	0.49	0.26
18	MAR00599.029	Sediment	0.67	0.55	0.31	0.43	0.41	0.41	0.19
31	MAR00599.030	Sediment	3.73	2.24	1.53	1.69	1.74	1.93	0.95
DC03A	MAR00599.031	Sediment	0.34	0.28	0.16	0.22	0.17	0.22	0.08
DC04	MAR00599.032	Sediment	5.39	4.31	2.08	2.54	2.02	2.42	1.33
DC05	MAR00599.033	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
DC06	MAR00599.034	Sediment	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
DC07	MAR00599.035	Sediment	0.10	0.18	0.15	0.11	<0.08	0.09	<0.08
Certified Reference Material SRM 1941b (% Recovery)			71	87	88	103	109	96	83
Certified Reference Material SRM 1941b			3.23	4.56	4.50	4.36	3.93	5.28	2.71
QC Blank			<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08

For full analyte name see method summaries

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

For inspection purposes only.
Consent of copyright owner required for any other use.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:45

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Accreditation	UKAS	N	UKAS	N	UKAS	UKAS	UKAS	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**AHCH**	**BHCH**	**GHCH**	**DIELDRIN**	**HCB**	**DDE**	**DDT**	**DDD**
1	MAR00599.020	Sediment	<0.1	<0.1	0.18	1.74	0.28	0.93	0.21	5.04
6	MAR00599.021	Sediment	0.11	0.14	0.21	0.72	0.13	0.79	0.23	4.17
7	MAR00599.022	Sediment	<0.1	<0.1	<0.1	0.62	<0.1	0.52	<0.1	2.85
8	MAR00599.023	Sediment	<0.1	<0.1	<0.1	1.18	<0.1	1.30	0.11	7.16
9	MAR00599.024	Sediment	<0.1	<0.1	<0.1	0.51	<0.1	0.35	0.13	2.67
10	MAR00599.025	Sediment	<0.1	<0.1	<0.1	0.45	<0.1	0.47	<0.1	2.15
11	MAR00599.026	Sediment	<0.1	<0.1	<0.1	0.54	0.17	0.66	0.11	2.83
16	MAR00599.027	Sediment	<0.1	<0.1	<0.1	0.52	<0.1	0.87	0.31	5.47
17	MAR00599.028	Sediment	<0.1	<0.1	<0.1	0.87	0.10	0.77	0.25	4.42
18	MAR00599.029	Sediment	<0.1	<0.1	<0.1	0.66	0.13	0.51	0.29	2.13
31	MAR00599.030	Sediment	<0.1	<0.1	<0.1	1.31	<0.1	1.29	0.14	5.77
DC03A	MAR00599.031	Sediment	<0.1	<0.1	<0.1	0.29	<0.1	0.24	<0.1	1.06
DC04	MAR00599.032	Sediment	<0.1	<0.1	0.21	3.29	<0.1	3.16	0.15	10.2
DC05	MAR00599.033	Sediment	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
DC06	MAR00599.034	Sediment	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
DC07	MAR00599.035	Sediment	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Certified Reference Material SRM 1941b (% Recovery)			125~	160~	145~	170~	114	90	76~	185
Certified Reference Material SRM 1941b							6.65	2.89		8.63
QC Blank			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

For inspection purposes only.
Consent of copyright owner required for any other use.

For full analyte name see method summaries

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:46

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID MAR00599
Issue Version 3
Customer Reference Dublin Port

REPORT NOTES

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
SOCOTEC Env Chem*	MAR00599.001-035	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
SOCOTEC Doncaster*	MAR00599.001-035	Analysis was conducted by an internal SOCOTEC laboratory.
SUB_01*	MAR00599.001-035	Analysis was conducted by an approved subcontracted laboratory.
ASC/SOP/301	MAR00599.005-009, .011-019, .021, .022, .024-.029, .031, .032-.035	The matrix of this sample has been found to interfere with the result for this test. The sample has therefore been diluted, but in doing so, the detection limit for this test has been elevated.
ASC/SOP/302	MAR00599.001-035	The Primary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with Dieldrin and p,p'-Dichorodiphenyldichloroethane falling outside acceptable limits. The remaining data gives the Laboratory confidence that the test has performed satisfactorily and that the validity of the data may not have been significantly affected. However in line with our QMS policy we have removed accreditation, where applicable, from the affected analytes . These circumstances should be taken into consideration when utilising the data.
ASC/SOP/302	MAR00599.020-035	The Primary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with beta-Hexachlorocyclohexane falling outside acceptable limits. The remaining data gives the Laboratory confidence that the test has performed satisfactorily and that the validity of the data may not have been significantly affected. However in line with our QMS policy we have removed accreditation, where applicable, from the affected analytes . These circumstances should be taken into consideration when utilising the data.
ASC/SOP/303/304	MAR00599.001-035	Chrysene is known to coelute with Triphenylene and these peaks can not be resolved. It is believed Triphenylene is present in these samples therefore it is suggested that the Chrysene results should be taken as a Chrysene (inc. Triphenylene). This should be taken into consideration when utilising the data.

DEVIATING SAMPLE STATEMENT

Deviation Code	Deviation Definition	Sample ID	Deviation Details. The following information should be taken into consideration when using the data contained within this report
D1	Holding Time Exceeded	N/A	N/A
D2	Handling Time Exceeded	N/A	N/A
D3	Sample Contaminated through Damaged Packaging	N/A	N/A
D4	Sample Contaminated through Sampling	N/A	N/A
D5	Inappropriate Container/Packaging	N/A	N/A
D6	Damaged in Transit	N/A	N/A
D7	Insufficient Quantity of Sample	N/A	N/A
D8	Inappropriate Headspace	N/A	N/A
D9	Retained at Incorrect Temperature	N/A	N/A
D10	Lack of Date & Time of Sampling	N/A	N/A
D11	Insufficient Sample Details	N/A	N/A
D12	Sample integrity compromised or not suitable for analysis	N/A	N/A

For inspection purposes only.
Consent of copyright owner required for any other use.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:46

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR00599
Issue Version	3
Customer Reference	Dublin Port

Method	Sample and Fraction Size	Method Summary
Total Solids	Wet Sediment	Calculation (100%-Moisture Content).Moisture content determined by drying a portion of the sample at 120°C to constant weight.
Particle Size Analysis	Wet Sediment	Wet and dry sieving followed by laser diffraction analysis.
Total Organic Carbon (TOC)	Air dried and ground	Carbonate removal and sulphurous acid/combustion at 1600°C/NDIR.
Carbonate	Air dried and ground	Quantitative digestion with Hydrochloric Acid back titration with 1M Sodium Hydroxide to pH 7
Metals	Air dried and ground	Hydrofluoric Acid extraction followed by ICP analysis.
Mercury	Air dried and ground	Nitric/Peroxide digest followed by ICPMS analysis
Organotins	Wet Sediment	Solvent extraction and derivatisation followed by GC-MS analysis.
Polyaromatic Hydrocarbons (PAH)	Wet Sediment	Solvent extraction and clean up followed by GC-MS analysis.
Total Hydrocarbon Content (THC)	Wet Sediment	Solvent extraction and clean up followed by GC-FID analysis.
Polychlorinated Biphenyls (PCBs)	Air dried and seived to <2mm	Solvent extraction and clean up followed by GC-MS-MS analysis.
Organochlorine Pesticides (OCPs)	Air dried and seived to <2mm	Solvent extraction and clean up followed by GC-MS-MS analysis.

Analyte Definitions

Analyte Abbreviation	Full Analyte name	Analyte Abbreviation	Full Analyte name	Analyte Abbreviation	Full Analyte name
ACENAPTH	Acenaphthene	CHRYSENE	Chrysene	THC	Total Hydrocarbon Content
ACENAPHY	Acenaphthylene	DBENZAH	Dibenzo[ah]anthracene	AHCH	alpha-Hexachlorocyclohexane
ANTHRACN	Anthracene	FLUORANT	Fluoranthene	BHCH	beta-Hexachlorocyclohexane
BAA	Benzo[a]anthracene	FLUORENE	Fluorene	GHCH	gamma-Hexachlorocyclohexane
BAP	Benzo[a]pyrene	INDPYR	Indeno[1,2,3-cd]pyrene	DIELDRIN	Dieldrin
BBF	Benzo[b]fluoranthene	NAPTH	Naphthalene	HCB	Hexachlorobenzene
BENZGHIP	Benzo[ghi]perylene	PHENANT	Phenanthrene	DDD	p,p'-Dichorodiphenyldichloroethane
BKF	Benzo[k]fluoranthene	PYRENE	Pyrene	DDE	p,p'-Dichorodiphenyldichloroethylene
				DDT	p,p'-Dichorodiphenyltrichloroethane

For inspection purposes only.
Consent of copyright owner required for any other use.

This report shall not be reproduced, except in full, without the written permission of the laboratory
Results contained herewith only apply to the samples tested

EPA Export 28-04-2021:02:37:46

Instructions

As part of an application for a Dumping at Sea (DAS) Permit, sediment chemistry results must be submitted using this form. When completing this form, please ensure that you:

* Complete all worksheets in full - i.e. sheets "2. Project Info", "3. Results" and "4. QA".
* Report all results in the units specified (e.g. mg kg^{-1} versus $\mu g\ kg^{-1}$).
* Do not alter the format of this spreadsheet by changing units, by moving columns or by inserting new columns amongst the existing used columns.
* Insert additional rows as necessary at the end of the existing rows in sheet. "3 Results"
* Insert other determinants as necessary in the empty columns to the right in sheet. "3 Results".
* Any additional information should be included as inserted comments or in the Notes column in sheet. "3 Results".
* Provide a brief description of methodology used in sheet "2. Project Info".
* Enter the measured value (as well as the certified value) for Certified Reference material in sheet "4. QA"
* If in-house reference material is used, insert the measured value and the range normally achieved.
* Refer to the Dumping at Sea Application Form Guidance Note for further relevant information: http://www.epa.ie/downloads/forms/lic/das/name,30267,en.html

Key	
Location	Name of area e.g. Cork Harbour, Dublin Bay
CRMs	Certified reference materials used in analyses for metals, organics & TBT
Fraction analysed	Specify which fraction of sediment was analysed. < 2mm is requested, but some labs use < 63um
Analysing laboratory	Main laboratory where samples were sent to for analysis
Sub-contract lab	Sub-contracted laboratory where samples were sent by main laboratory
Sample ID code	Sample number assigned by sampler
Lab Report ID	Code assigned by analysing laboratory
Position (dd.ddd)	Give lat/long coordinates in decimal degrees (dd.dddd) of the position from where the sample was taken. List also the datum & projection.
Sampling depth (m)	The depth below the seabed surface at which the sample was collected.
<2mm	Grain size % < 2mm
<63um	Grain size % < 63mm
OC	Organic carbon (NOT organic matter)
Cd	Cadmium mg/kg
Hg	Mercury mg/kg
As	Arsenic **mg/kg**
Cr	Chromium mg/kg
Cu	Copper mg/kg
Pb	Lead mg/kg
Ni	Nickel mg/kg
Zn	Zinc mg/kg
TEH	Total extractable hydrocarbons g/kg
ΣPAH16	Sum of USEPA 16 PAH - acenaphthene, acenaphthylene, anthracene, benzo[a]anthracene, benzo[b]fluoranthene, benzo[k]flouranthene, benzo[a]pyrene, benzo[ghi]perylene, chrysene, dibenz(ah)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene and pyrene,
ΣPCB7	Sum of the seven ICES polychlorinated biphenyls: PCB 028, PCB 052, PCB 101, PCB 138, BCB 153, PCB 180, PCB 118.
HCB	Hexachlorobenzene
γ-HCH	γ-Hexachlorocyclohexane (Lindane)
p,p' DDT	pp DDT ug/kg
p,p' DDD	pp DDD ug/kg
p,p' DDE	pp DDE ug/kg
TBT	TBT (mg/kg)
DBT	DBT (mg/kg)

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:46

1. General Information	Applicant (company name)	
	Location (port/harbour)	
	Dredge Quantity (tonnes)	
	Permit Application Reg. No. (to be assigned by EPA)	
2. Survey Information	Survey Company	Hydromaster
	Sampling Date	15th and 16th of April 2020
	Analysing Laboratory	Socotec
	Sub Contract Lab	
	Analysis Date	11th May 2020
3. Methods Information	Fraction analysed	
	Water content of sample (reported as %)	Calculation (100%-Moisture Content).Moisture content determined by drying a portion of the sample at 120°C to constant weight.
	Are results reported as wet weight or dry weight?	Dry Weight
	Granulometry method	Wet and dry sieving followed by laser diffraction analysis.
	TEH method	Solvent extraction and clean up followed by GC-FID analysis.
	Organic carbon (OC) method	Carbonate removal and sulphurous acid/combustion at 1600°C/NDIR.
	Metals (incl. mercury & arsenic) extraction type	Hydrofluoric Acid extraction.
	Methods of detection (metals, incl. mercury & arsenic)	ICP analysis.
	Organics extraction types	Solvent extraction and derivatisation followed by GC-MS analysis.

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:46

Methods of detection (PCBs / PAHs / TBT / DBT)	Solvent extraction and clean up followed by GC-MS-MS analysis.

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:46

EPA Dumping at Sea Permit Application - Material Analysis Reporting Form (Version 1.0)
Sheet 3. Results

Sample ID code	Company Name	Location	Sampling date (dd/mm/yyyy)	Sampling Location ID	Position Latitude (WGS84 decimal degrees)	Position Longitude (WGS84 decimal degrees)	Sampling depth below seabed m	Lab Report ID	Sample appearance (e.g. colour, texture, signs of life)
DC03A	Hydromaster	Dublin Port	16/04/2020	DC03A	53.3432	-6.19116	Surface	MAR00599.031	Grey slightly sandy silty CLAY
DC04	Hydromaster	Dublin Port	16/04/2020	DC04	53.34369	-6.18346	Surface	MAR00599.032	Grey sandy SILT
DC05	Hydromaster	Dublin Port	16/04/2020	DC05	53.34332	-6.14829	Surface	MAR00599.033	Grey silty SAND
DC06	Hydromaster	Dublin Port	16/04/2020	DC06	53.33608	-6.08881	Surface	MAR00599.034	Grey slightly gravelly silty SAND
DC07	Hydromaster	Dublin Port	16/04/2020	DC07	53.33274	-6.08881	Surface	MAR00599.035	Light brown SAND

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:46

EPA Dumping at Sea Permit Application - Material Analysis Reporting Form (Version 1.0)
Sheet 3. Results

Sample ID code	% Moisture	Particle size >2mm %	Particle size <2mm >63um %	Partic+B:Nle size <63um %	OC %	Carbonate %	Dry solids %	Al mg kg^{-1}	Cd mg kg^{-1}	Hg mg kg^{-1}	As mg kg^{-1}	Cr mg kg^{-1}	Cu mg kg^{-1}	Pb mg kg^{-1}	Ni mg kg^{-1}
DC03A	62.4	0	32.4	67.6	1.35	3.2	37.6	36600	0.7	0.04	9.7	78.9	24.4	31.4	24.3
DC04	48.1	0	38.6	61.4	1.74	3.24	51.9	36500	1	0.18	10.8	76.5	28	65.6	26.4
DC05	42.3	0.5	91.9	7.6	0.24	2.32	57.7	20500	0.2	<0.01	6.1	82.9	6.8	11.7	10.3
DC06	31.9	0.9	94.1	5.1	0.13	2.16	68.1	16000	0.3	<0.01	9	105	6.4	9.7	9.7
DC07	27.3	0.2	97	2.9	0.11	1.84	72.7	13700	0.3	<0.01	10.8	106	6.1	9.9	8.5

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:46

EPA Dumping at Sea Permit Application - Material Analysis Reporting Form (Version 1.0)
Sheet 3. Results

Sample ID code	Zn mg kg^{-1}	TEH g kg^{-1}	HCB (ug kg-1)	g-HCH (ug kg-1)	p,p' DDT (ug kg-1)	p,p' DDD (ug kg-1)	p,p' DDE (ug kg-1)	S DDX (ug kg-1)	TBT mg kg^{-1}	DBT mg kg^{-1}	PCB 028 ug kg^{-1}	PCB 052 ug kg^{-1}	PCB 101 ug kg^{-1}	PCB 138 ug kg^{-1}
DC03A	105	0.5170	<0.1	<0.1	<0.1	1.06	0.24	0.29	<0.005	<0.005	0.3400	0.2800	0.1600	0.1700
DC04	139	0.9610	<0.1	0.21	0.15	10.2	3.16	3.29	<0.005	<0.005	5.3900	4.3100	2.0800	2.0200
DC05	36	0.1240	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.005	<0.005	<0.08	<0.08	<0.08	<0.08
DC06	37	0.0353	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.005	<0.005	<0.08	<0.08	<0.08	<0.08
DC07	30	0.0189	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.005	<0.005	0.1000	0.1800	0.1500	<0.08

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:46

Sample ID code	PCB 153 ug kg^{-1}	PCB 180 ug kg^{-1}	PCB 118 ug kg^{-1}	PAH Acenaphthene ug kg^{-1}	PAH Acenaphthylene ug kg^{-1}	PAH Anthracene ug kg^{-1}	PAH Benzo (a) anthracene ug kg^{-1}	PAH Benzo (a) pyrene ug kg^{-1}	PAH Benzo (b) fluoranthene ug kg^{-1}	PAH Benzo (ghi) perylene ug kg^{-1}	PAH Benzo (k) fluoranthene ug kg^{-1}	PAH Chrysene ug kg^{-1}	PAH Dibenz (a,h) anthracene ug kg^{-1}	PAH Flourene ug kg^{-1}	PAH Fluoranthene ug kg^{-1}	PAH Indeno (1,2,3–cd) pyrene ug kg^{-1}
DC03A	0.2200	0.0800	0.2200	28.30	146.00	133.00	383.00	522.00	383.00	322.00	180.00	395.00	76.60	86.10	398.00	336.00
DC04	2.4200	1.3300	2.5400	46.80	83.90	167.00	395.00	472.00	449.00	370.00	260.00	459.00	75.10	94.00	669.00	383.00
DC05	<0.08	<0.08	<0.08	7.83	7.44	19.10	38.70	49.90	54.70	36.60	20.00	49.90	8.70	11.50	67.00	38.10
DC06	<0.08	<0.08	<0.08	1.63	2.86	6.11	9.36	17.00	18.60	15.30	10.10	13.20	3.67	4.42	13.30	16.20
DC07	0.0900	<0.08	0.1100	1.22	1.84	4.05	5.50	7.75	10.80	7.67	6.45	6.87	1.78	2.95	8.37	8.33

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:46

Sample ID code	PAH Naphthalene ug kg^{-1}	PAH Phenanthrene ug kg^{-1}	PAH Pyrene ug kg^{-1}											
DC03A	61.20	199.00	660.00											
DC04	133.00	247.00	787.00											
DC05	14.40	43.80	104.00											
DC06	8.89	13.00	16.50											
DC07	3.76	6.92	11.10											

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:46

Sample ID code						
DC03A						
DC04						
DC05						
DC06						
DC07						

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:46

Reference Type	Reference Material	OC %	TEH g kg^{-1}	Cu mg kg^{-1}	Zn mg kg^{-1}	Cd mg kg^{-1}	Hg mg kg^{-1}	Pb mg kg^{-1}	As mg kg^{-1}	Cr mg kg^{-1}	Ni mg kg^{-1}	Li mg kg^{-1}	Al mg kg^{-1}	DBT mg kg^{-1}	TBT mg kg^{-1}
CRM (measured % recovered)		N/A	94~	78.0	90.0	253.0	25.0	89.0	105.0	80.0	82.0	93.0	98.0	97.0	81.0
CRM result				91.0	439.0	2.0	0.01	118.0	47.5	280.0	62.0	73.0	82400.0	743	389
QA/QC In-House Refernece Material (%				103.0	100.0	100.0	102.0	98.0	120.0	102.0	102.0	97.0	106.0		
QC Blank			<100	<2	<3	<0.1	<0.01	<2	<1	<0.5	<0.5	<0.5	<10	<1	<1
	~ Indicates result is for an In-house Reference Material as no Certified														
	Reference Materials are avaliable.														

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:46

Reference Type	PCB 028 ug kg^{-1}	PCB 052 ug kg^{-1}	PCB 101 ug kg^{-1}	PCB 138 ug kg^{-1}	PCB 153 ug kg^{-1}	PCB 180 ug kg^{-1}	PCB 118 ug kg^{-1}	PAH Acenaphthene ug kg^{-1}	PAH Acenaphthylene ug kg^{-1}	PAH Anthracene ug kg^{-1}	PAH Benzo (a) anthracene ug kg^{-1}	PAH Benzo (a) pyrene ug kg^{-1}	PAH Benzo (b) fluoranthene ug kg^{-1}
CRM (measured % recovered)	66	90	85	120	90	83	96	70	100	68	64	56	90
CRM result	2.98	4.75	4.43	4.33	4.95	2.7	4.04	27	53	125	214	200	408
QA/QC In-House Refernece Material (%													
QC Blank	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<1	<1	<1	<1	<1	<1

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:46

Reference Type	PAH Benzo (ghi) perylene ug kg^{-1}	PAH Benzo (k) fluoranthene ug kg^{-1}	PAH Chrysene ug kg^{-1}	PAH Dibenz (a,h) anthracene ug kg^{-1}	PAH Flourene ug kg^{-1}	PAH Fluoranthene ug kg^{-1}	PAH Indeno (1,2,3–cd) pyrene ug kg^{-1}	PAH Naphthalene ug kg^{-1}	PAH Phenanthrene ug kg^{-1}	PAH Pyrene ug kg^{-1}	HCB (ug kg-1)
CRM (measured % recovered)	69	90	88	110	52	79	67	60	75	69	99
CRM result	212	203	256	58	44	514	228	509	305	401	5.78
QA/QC In-House Refernece Material (%											
QC Blank	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.1

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:46

Reference Type	g-HCH (ug kg-1)	p,p' DDT (ug kg-1)	p,p' DDD (ug kg-1)	p,p' DDE (ug kg-1)	S DDX (ug kg-1)	Please add columns here for additional parameters		
CRM (measured % recovered)	83~	101~	74	74	45~			
CRM result			3.45	2.37				
QA/QC In-House Refernece Material (%								
QC Blank	<0.1	<0.1	<0.1	<0.1	<0.1			

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:46

Appendix 5 - Eco toxicological Report

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:46

Report on the Toxicity Testing of selected sites from Dublin Port using the Ten-Day Polychaete Bioassay using *Hediste diversicolor* and the Microtox bioassay using *Vibrio fischeri.*

(September 2020)

For inspection purposes only.
Consent of copyright owner required for any other use.

Commissioned by: RPS
Undertaken by: Aquatic Services unit (UCC)

(October 2020)

EPA Export 28-04-2021:02:37:46

Introduction

Subtidal sediment sampling using a 0.05m^2 stainless steel Van-Veen grab at selected sites in Dublin Port was carried out on September 7th, 2020 by Hydromaster personnel and delivered the same day to ASU. Sediment from 6 sites was collected for toxicity testing using the 10-day polychaete whole sediment method. *Hediste diversicolor* was the species used for the bioassay. Elutriates of the sediment were also tested using the bioluminescent bacteria *Vibrio fischeri* with the Microtox system by ENVA Ltd. in Cork. The positions of the sediment garb samples are listed in Table 1 and shown Figures 1 and 2. Note that the positions of Sites 2 and 3 had to be moved slightly to alternative positions as the original sites contained only very coarse substrate. Testing commenced on September 11th, 2020 and ended on September 21st, 2019. Testing was carried out in accordance with ASTM (2013) and Microtox guidelines.

Sample ID	Latitude (dd.dd)	Longitude (dd.dd)
Site 1	53.34548	-6.21683
Site 2	53.34529	-6.21407
Site 2 (alternative)	53.34606	-6.21350
Site 3	53.34536	-6.20864
Site 3 (alternative)	53.34668	-6.20758
Site 4	53.34369	-6.18396
Site 5	53.34369	-6.18346
Site 6	53.34368	-6.18297
Control	51.88101	-8.43330
Reference	51.90559	-7.91749

Consent of copyright owner required for any other use. For inspection purposes only.

Table 1: Positions of sediment collection sites from Dublin Port. Positions are expressed in Lat Long.

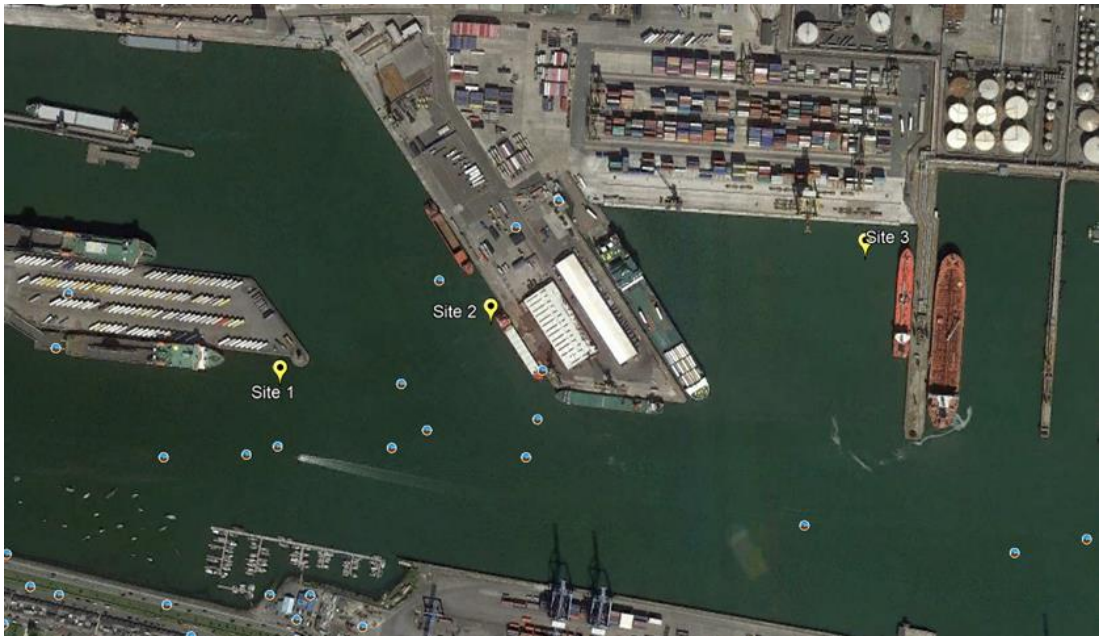


Figure 1: Aerial showing sediment grab positions Sites 1-3 Dublin Port - inner

EPA Export 28-04-2021:02:37:46

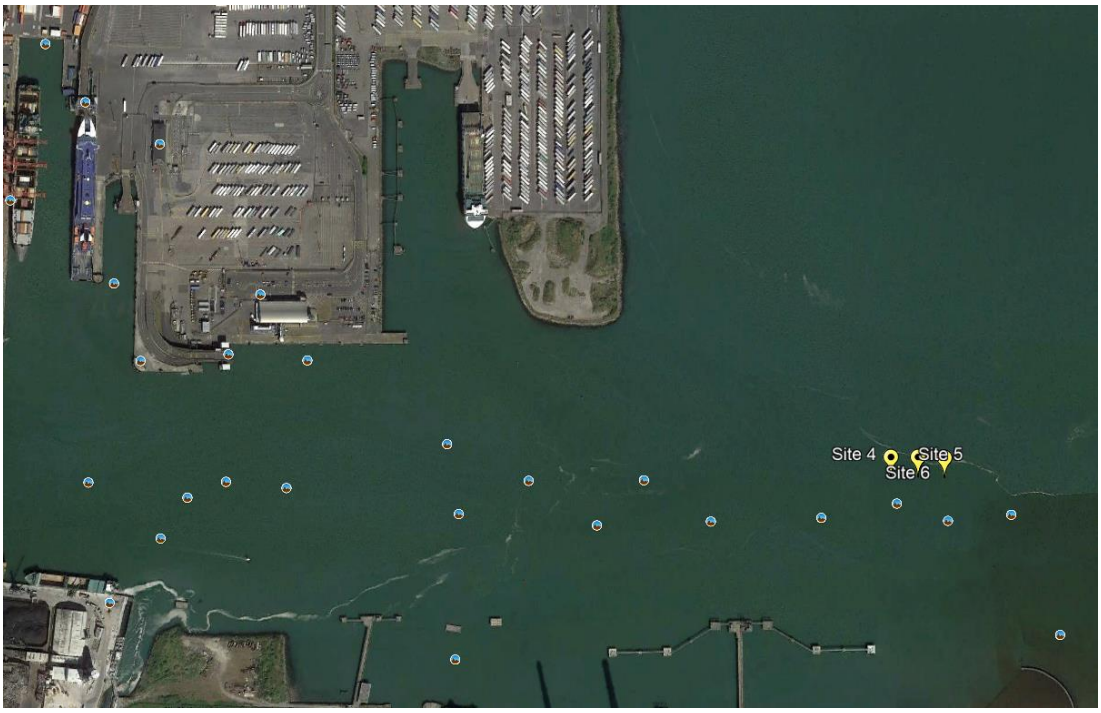


Figure 2: Aerial showing sediment grab positions Sites 4-6 Dublin Port - outer

For inspection purposes only.
Consent of copyright owner required for any other use.

Methods

Whole Sediment Testing

Sample Preparation

The sediment samples after collection were stored in a cold room at 4 ºC until required for testing. Sediment samples for whole sediment testing were then wet sieved on a 500µm nylon sieve to remove any existing fauna and homogenise the sample. Control and reference sediments were also sieved at this time. The sieved sediment samples were then stored at 4ºC until test initiation.

Animal Collection and Holding

Juvenile nereids (*Hediste diversicolor*) were collected locally on September 1st, 2020 from Douglas Estuary in Cork Harbour (approximate position 51.88101°N -8.43330°W). The animals were then transported back to the ASU laboratory and placed in a holding tank with water collected from the site and acclimated to testing conditions in a constant temperature room at 15ºC and 12:12 light/dark cycle for a period of 5 days. During this time the salinity was adjusted in the holding tank gradually from 6 parts per thousand (ppt) to 29.2 ppt by the addition of 33 ppt seawater on a drip basis. Control sediment was also collected from the animal collection site and this was sieved and stored at 15ºC.

Setup

The day prior to test initiation a minimum depth of 2cm (approx. 100mls) of sieved sediment from each site and the control and reference sites was placed into appropriately labelled test chambers (1 litre glass jars), the chambers were then filled with 800ml of 29.2ppt seawater and placed over night with gentle aeration in the environmental chambers. A total of 5 replicates were used per site along with 5

EPA Export 28-04-2021:02:37:46

replicates of control and reference sediment. The control sediment was collected from the same site that the test animals were obtained in the Douglas Estuary and the reference sediment came from the outer Womanagh River estuary in East Cork at the approximate position: 51.90559°N -7.91749°W – a site with full seawater salinity. Additional surrogate test chambers for all of the sites and control and reference sediment were set up to monitor overlying water chemistry (DO, pH, salinity and temperature) throughout the 10-day test. Sediment pore water was extracted by centrifugation of each sediment sample and analysed for ammonia. Results of these analyses are presented in Table 3.

Test Initiation

Prior to starting the bioassay, a water change was performed on all test chambers due to the high ammonia levels measured in porewater samples. The overlying water was carefully decanted so as not to disturb the sediment from each test chamber and replaced with fresh seawater. The water change was carried out to ensure that the high ammonia levels measured in the porewater would not mask the effects of other chemical toxicants present in the sediments.

To initiate the test, 5 juvenile polychaetes (average 16mm in length) were counted into small holding containers and observed for any signs of morbidity, any animals showing signs of ill health were replaced, and 5 animals were then added to each test chamber. The test chambers were then placed back into the environmental chamber and continuous gentle aeration was supplied to each test chamber. The overlying water was measured for dissolved oxygen, pH, salinity and temperature in the surrogates on the day of initiation and on subsequent days throughout the test.

For inspection purposes only.
Consent of copyright owner required for any other use.

During the 10-day test, all chambers were monitored daily to ensure that the aeration system was satisfactory and observe any obvious animal behaviour. Overlying water was changed in all test chambers on Day 3, Day 6 and Day 9 of the test by decanting as described previously.

Reference Toxicant Test

A static, water- only 96-hour reference toxicant test using copper sulphate ($CuSO_4$) was also performed to assess the health and sensitivity of the same stock of salinity-acclimated test organisms. Here, 3 replicates (500 mls) of each concentration were used with 5 animals placed in each test chamber.

Whole Sediment Test - Termination

On the day of test termination, the contents of each test chamber were carefully washed through a 500µm sieve and animals were then removed from the screen and placed in a small beaker with seawater, live animals were then counted by eye. A dissecting microscope was used to determine the status of animals not obviously moving.

Elutriate Preparation for Microtox Testing

Elutriate solutions of each site sample were prepared by mixing homogenised site sediment and deionized water in a 1:4 (v/v) ratio of sediment to water. This was carried out by measuring 10mls of site sediment and mixing it with 40mls of water in 50ml centrifuge tubes. The tubes were then placed on a bench top flask shaker for 1 h, at a

EPA Export 28-04-2021:02:37:46

speed of 700 oscillations per minute. After mixing, the samples were centrifuged at 3000 rpm for 20 min to separate the water from the sediment. The aqueous fraction (elutriate sample) was decanted off and filtered through a 0.45-µm Millipore PVDF filter into clean centrifuge tubes and stored in a fridge at 4°C until required for testing. Elutriate samples were tested within 48hrs of preparation for toxicity.

Sediment Porewater Preparation

Sediment porewater was collected for each site by centrifuging 50ml of sediment placed in 50ml centrifuge tubes for 20mins at 3000 rpm. The porewater samples were then filtered through a 0.45-µm Millipore PVDF filter into clean centrifuge tubes and stored in a fridge at 4°C until required.

Elutriate testing using the Microtox Vibrio fischeri bacteria bioassay.

The luminescent bacteria *Vibrio fischeri* are used exclusively in the Microtox system. Testing was carried out following the Azur Environmental guidelines for a Basic Test (Azur Environmental, 1995). The concentrations of effluent tested ranged from 2.5% to 45%. Two replicates were used for each concentration tested.

Ammonia testing of Elutriate and Porewater.

Total ammonia in the porewater and elutriate samples was analysed by automated salicylate method using the Lachat Quikchem 8000 by Zellweger Analytics, Inc. Milwaukee. USA

Statistical Analyses.

A Kruskal-Wallis test was performed to determine if the mean survival rate was the same at all sample sites. Statistical analyses to determine the LC_{50} for the polychaete reference toxicant test were carried using the Trimmed Spearman-Karber Method (Hamilton *et al.,* 1977) using ToxCalc software (Version 5.0.23). Statistical analyses on the Microtox Data were performed using the proprietary Microtox Omni software (Azur Environmental 1995).

Consent of copyright owner required for any other use. For inspection purposes only.

Results

10-day Polychaete bioassay

Test conditions were satisfactory with greater than 90% survival in the control chambers. Chemical parameters such as dissolved oxygen, pH, salinity and temperature were within the ranges defined in the ASTM guidelines throughout the testing period These data are presented in Appendix 1. Kruskal-Wallis test showed that the null hypothesis was [1]accepted: i.e. that the mean survival rate did not differ between the control, reference or the six test site samples. Mean survival in the test sediments ranged from 92% at Sites 2 and 4 to 100% in sediment from Sites 1, 3, 5 and 6 (Table 2 and Fig 3). The survival rate between individual replicates for the test sediments (Table 3), showed very little variation ranging from 60% and 80% in the Reference and Control Sediments respectively to 80% at the Site 2 and Site 4 Dublin Port site, with 100%

[1] H = 3.115, p = 0.87

EPA Export 28-04-2021:02:37:46

survival in all replicated at Site 1, 3, 5 and 6 in the Dublin Port sediments.

Porewater & Elutriate Ammonia

Total ammonia in sediment porewater (Table 4) has been shown to confound toxicity tests by adding to the toxicity of sediments which may cause toxicity by themselves (Pinza *et al*., 1996). However, this does not appear to have been an issue in this case where the survival rates in the test sediments was comparable or higher to that in the reference and control sediments.

Site Identification	No of Animals Day 1	No of Animals Day 10	Mean Percent Survival
Control	25	24	96
Reference	25	23	92
Site 1	25	25	100
Site 2	25	23	92
Site 3	25	25	100
Site 4	25	23	92
Site 5	25	25	100
Site 6	25	25	100

Table 2: Survival rates for 10-day Sediment Bioassays Test using *Hediste diversicolor* for Dublin Port Sediments.

Consent of copyright owner required for any other use.
For inspection purposes only.

Replicate	Control	Reference	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6
A	100	60	100	80	100	100	100	100
B	80	100	100	100	100	100	100	100
C	100	100	100	100	100	100	100	100
D	100	100	100	80	100	80	100	100
E	100	100	100	100	100	80	100	100

Table 3: **%** Survival rates in each replicate of the 10-day Sediment Bioassays Test using *Hediste diversicolor* for Dublin Port Sediments.

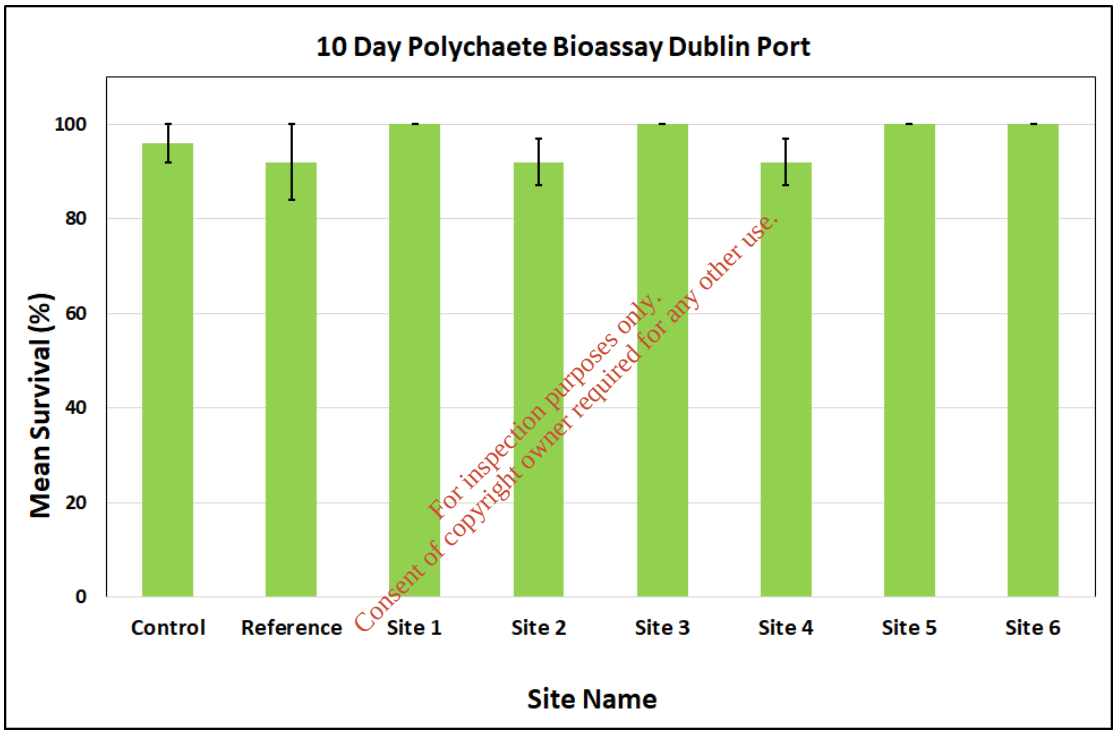
Ref Tox Test

Results for the concurrent reference toxicant (Ref Tox) test were satisfactory with over 100% survival in the control chambers. The Ref Tox displayed a dose dependent decrease in survival rate with increasing concentrations of $CuSO_4$ (Table 4). An LC_{50} (lethal concentration that killed 50% of the animals) of 0.95mg $CuSO_4$/l was determined. This value is agreement with values reported in the literature for copper sulphate (US EPA Ecotox database).

EPA Export 28-04-2021:02:37:46

Site	Porewater Ammonia (mg/l, N)	Elutriate Ammonia (mg/l, N)
Site 1	7.28	2.11
Site 2	30.59	8.55
Site 3	27.45	6.95
Site 4	13.08	2.93
Site 5	16.45	3.19
Site 6	19.87	4.40
Control	5.26	2.41
Reference	4.39	3.05

Table 4: Porewater and elutriate ammonia of Dublin Port Sites



For inspection purposes only.
Consent of copyright owner required for any other use.

Figure 3: 10-day Polychaete bioassay survival at Dublin Port Sites. Error bars represent standard error of the mean.

Concentration (mg/L $CuSO_4$)	No of Animals 0 hours	No of Animals 96 hours	Percent Survival
Control	15	15	100
0.25	15	15	100
0.5	15	15	100
0.75	15	12	80
1.0	15	7	46.7
1.5	15	0	0
2.0	15	0	0
4.0	15	0	0

Table 4: Reference Toxicant Test ($CuSO_4$) Survival Results for *Hediste diversicolor*

EPA Export 28-04-2021:02:37:46

Elutriate Testing Results.

Exposure of the marine bacterium *Vibrio fischeri* to elutriate samples from any of the Dublin Port test sites did not produce any significant toxicity as compared to the controls. Exposure of the bacteria to the elutriates caused a stimulatory effect on light production. This effect was observed for all Dublin Port sites and the Reference site. The Control sediment's elutriate sample produced minor decreases in light production at concentrations up to 22.5 % elutriate as compared to the Microtox control. The highest concentration tested 45% produced a neutral effect on light production i.e. 99.94% compared the 100% for the Microtox control. This bio stimulatory effect exhibited by all the Dublin Port test sediments and the Reference sediment was shown to generally increase in a dose dependent manner and increased exposure time, levelling off or decreasing slightly at 45% elutriate concentration (Figure 4 and Appendix 2). This effect ranged from an increase of between 108 (Site 4) and 126 (Site 6) percent light production as compared to the Mictotox Test Control (100%). The results from the Microtox elutriate testing following 30minutes exposure time are graphed in Figure 4. The complete set of results for both 15min and 30min exposure times for all sites are presented in Appendix 2.

This bio stimulatory response has been reported previously for sediment elutriate samples using the Microtox method. A study carried out investigating the toxicity of Irish marine sediments recorded similar findings for sediment samples collected from Alexandria Basin in Dublin Port (Mackin *et al.*, 2008). This bio stimulatory effect also described as hormesis is that can occur following exposure to sub inhibitory levels of toxicants, it was also evident in the Microtox testing undertaken on Dublin Port samples in 2019 (ASU, 2019).

For inspection purposes only.
Consent of copyright owner required for any other use.

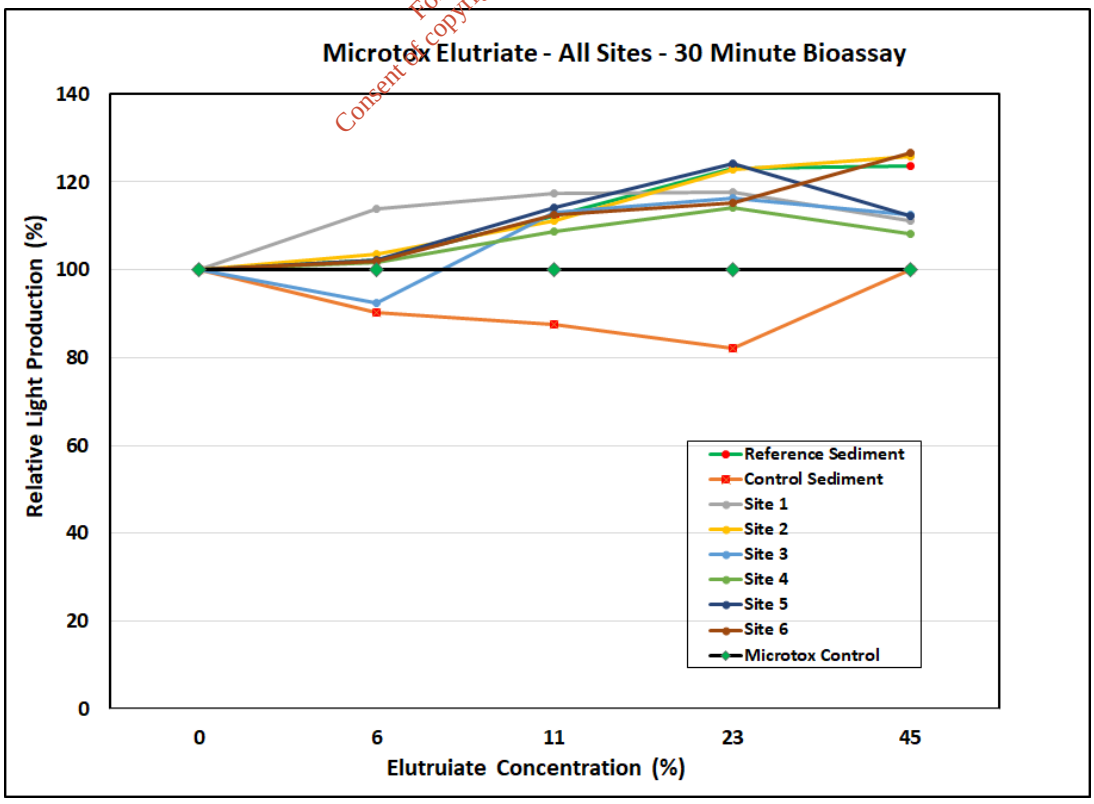


Figure 4: Relative light production of Vibrio fishery following 30 mins exposure to Dublin Port elutriate samples.

EPA Export 28-04-2021:02:37:46

Summary and Discussion

The toxicity of selected sites from Dublin Port were assessed for toxicity using the 10-Day polychaete whole sediment bioassay and Microtox elutriate test. Exposure of marine polychaetes to all 6 test samples from Dublin Port produced very low mean rates of mortality which didn't differ significantly from Control and Reference sediments. Exposure of the Microtext bacteria, *Vibrio fischeri*, to elutriate samples made from Dublin Port samples did not produce any significant toxicity as compared to the Microtox test controls. Hormesis or bio stimulation was recorded for all sites tested from Dublin Port. This effect has been reported previously for samples from Alexandra Basin.

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:46

References

ASTM (American Society for Testing and Materials). (1994) *Standard guide for collection, storage, characterization and manipulation of sediment for toxicological testing, E1391-1394,* Philadelphia, PA.

ASU (2019) Report on the Toxicity Testing of selected sites from Dublin Port using the Ten-Day Polychaete Bioassay using *Hediste diversicolor* and the Microtox bioassay using *Vibrio fischeri*. A report to RPS on behalf of Dublin Port Company.

Azur Environmental, 1995. Microtox Acute Basic Test Procedures. Azur Environmental ,. Carlsbad, California, USA.

Hamilton, M. A., Russo, R. C. and R.V. Thurston (1977) Trimmed Spearman-Karber method for estimating median lethal concentrations in toxicity bioassays. *Environmental Science and Technology 11, 714-719.*

Mackin, A., Giltrap, M.,Foley, B.,Mcgovern, E.,McHugh, B., and Davoren, M. (2008). An integrated approach to the toxicity assessment of Irish marine sediments:Validation of established marine bioassays for the monitoring of Irish Marine sediments. *Environmental International*, 34:1023-1032.

Pinza, MR, Kohn, NP, Ohlrogge, NP, Ferguson, CJ, Word, JQ. 1996. Reducing the effects of total ammonia in 10-day sediment toxicity tests with the amphipod, *Rhepoxynius abronius*. In DA Bengtson, DS Henshel, eds, *Environmental Toxicology and Risk Assessment: Biomarkers and Risk Assessment*, Vol 5. STP 1306. American Society for Testing and Materials, Philadelphia, PA, pp 285– 300.

US Army Core of Engineers, 1991. Evaluation of Dredged material proposed for ocean disposal Testing Manual, US EPA 503/8-91/001

U.S EPA, 2007. ECOTOX User Guide: ECOTOXicology Database System. Version http:/www.epa.gov/ecotox.

Consent of copyright owner required for any other use. For inspection purposes only.

EPA Export 28-04-2021:02:37:46

Appendix 1- 10 Day Polychaete Water Quality Observations

Appendix 1 - 10-Day Water Quality Results								
SAMPLE	Day	Time	pH	DO (mg/l)	%sat	Sal	Temp	Water Change
Reference	0	09:21	7.70	6.99	84.2	29.6	15.6	
Reference	1	09:40	7.81	7.09	85.6	29.2	16.0	
Reference	2	09:36	7.69	6.23	75.1	29.3	16.0	
Reference	3	09:49	7.75	6.90	82.6	29.4	15.9	X
Reference	4	08:22	7.80	6.62	79.5	29.1	15.9	
Reference	5	08:49	7.83	7.22	86.3	29.4	15.9	
Reference	6	07:33	7.62	4.75	56.5	29.3	15.7	X
Reference	7	07:43	7.69	7.26	86.8	29.4	15.6	
Reference	8	08:26	7.79	7.41	88.5	29.3	15.5	
Reference	9	07:52	7.80	7.29	81.1	29.4	15.6	X
Reference	10	07:23	7.75	5.95	70.0	29.2	15.3	
SAMPLE	Day	Time	pH	DO (mg/l)	%sat	Sal	Temp	Water Change
Control	0	09:21	7.68	6.80	81.2	27.9	15.6	
Control	1	09:40	7.73	6.63	79.7	28.9	15.9	
Control	2	09:36	7.61	6.03	72.3	28.7	16.0	
Control	3	09:49	7.48	7.92	96.8	28.6	15.7	X
Control	4	08:22	7.87	7.52	90.6	29.0	15.9	
Control	5	08:49	7.84	7.24	86.6	29.0	15.9	
Control	6	07:33	7.83	7.28	86.1	28.9	15.6	X
Control	7	07:43	7.82	7.29	86.9	29.3	15.6	
Control	8	08:26	7.64	6.28	75.2	29.2	15.6	
Control	9	07:52	7.61	6.14	73.1	29.2	15.5	X
Control	10	07:23	7.59	5.72	67.3	29.2	15.1	
SAMPLE	Day	Time	pH	DO (mg/l)	%sat	Sal	Temp	Water Change
Site 1	0	09:21	7.76	6.94	83.5	29.2	15.7	
Site 1	1	09:40	7.94	7.51	90.6	29.3	15.8	
Site 1	2	09:36	7.89	7.41	88.4	29.3	16.0	
Site 1	3	09:49	7.89	7.23	86.8	29.3	15.9	X
Site 1	4	08:22	8.00	7.55	90.8	29.3	15.9	
Site 1	5	08:49	7.99	7.49	89.7	29.3	15.9	
Site 1	6	07:33	8.07	7.58	90.2	29.3	15.6	X
Site 1	7	07:43	7.86	7.49	88.8	29.3	15.6	
Site 1	8	08:26	8.24	7.15	85.4	29.4	15.5	
Site 1	9	07:52	8.33	7.24	86.5	29.3	15.5	X
Site 1	10	07:23	8.41	6.16	73.0	29.3	15.0	

Consent of copyright owner required for any other use.
For inspection purposes only.

EPA Export 28-04-2021:02:37:46

Appendix 1(Continued)- 10 Day Polychaete Water Quality Observations

Appendix 1 - 10-Day Water Quality Results								
SAMPLE	Day	Time	pH	DO (mg/l)	%sat	Sal	Temp	Water Change
Site 2	0	09:21	7.83	6.95	84.2	29.5	15.8	
Site 2	1	09:40	7.93	7.25	86.9	29.2	15.9	
Site 2	2	09:36	7.84	6.99	84.3	29.3	16.0	
Site 2	3	09:49	7.97	7.55	90.9	29.4	15.8	X
Site 2	4	08:22	7.96	7.40	88.9	29.3	15.8	
Site 2	5	08:49	7.98	7.31	87.4	29.3	15.9	
Site 2	6	07:33	8.19	7.00	83.3	29.4	15.7	X
Site 2	7	07:43	8.16	6.88	82.2	29.4	15.5	
Site 2	8	08:26	8.11	7.24	87.0	29.4	15.5	
Site 2	9	07:52	8.19	7.19	85.7	29.4	15.5	X
Site 2		07:23	8.39	6.83	80.2	29.3	15.1	
SAMPLE	Day	Time	pH	DO (mg/l)	%sat	Sal	Temp	Water Change
Site 3	0	09:21	7.80	6.90	83.6	29.6	15.8	
Site 3	1	09:40	7.78	7.03	84.9	29.2	16.1	
Site 3	2	09:36	7.86	7.25	87.7	29.3	16.1	
Site 3	3	09:49	7.96	7.53	90.8	29.4	15.8	X
Site 3	4	08:22	8.06	6.99	84.6	29.3	15.9	
Site 3	5	08:49	8.11	7.09	85.0	29.3	16.0	
Site 3	6	07:33	8.35	6.93	82.3	29.4	15.7	X
Site 3	7	07:43	8.11	7.19	85.8	29.4	15.5	
Site 3	8	08:26	8.06	7.40	88.0	29.3	15.5	
Site 3	9	07:52	8.04	7.38	88.5	29.3	15.5	X
Site 3	10	07:23	8.10	7.19	85.3	29.3	15.1	
SAMPLE	Day	Time	pH	DO (mg/l)	%sat	Sal	Temp	Water Change
Site 4	0	09:21	7.73	6.58	79.8	29.4	15.8	
Site 4	1	09:40	7.69	6.91	79.4	29.2	15.8	
Site 4	2	09:36	7.58	5.55	66.6	29.3	15.9	
Site 4	3	09:49	7.90	7.38	89.1	29.4	15.8	X
Site 4	4	08:22	7.89	6.60	79.5	29.3	15.9	
Site 4	5	08:49	7.77	6.72	80.7	29.3	15.9	
Site 4	6	07:33	7.82	6.96	82.4	29.4	15.6	X
Site 4	7	07:43	7.61	6.13	72.9	29.3	15.6	
Site 4	8	08:26	7.71	6.35	76.4	29.3	15.6	
Site 4	9	07:52	7.73	6.54	78.2	29.3	15.5	X
Site 4	10	07:23	7.77	6.70	79.2	29.3	15.3	

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:46

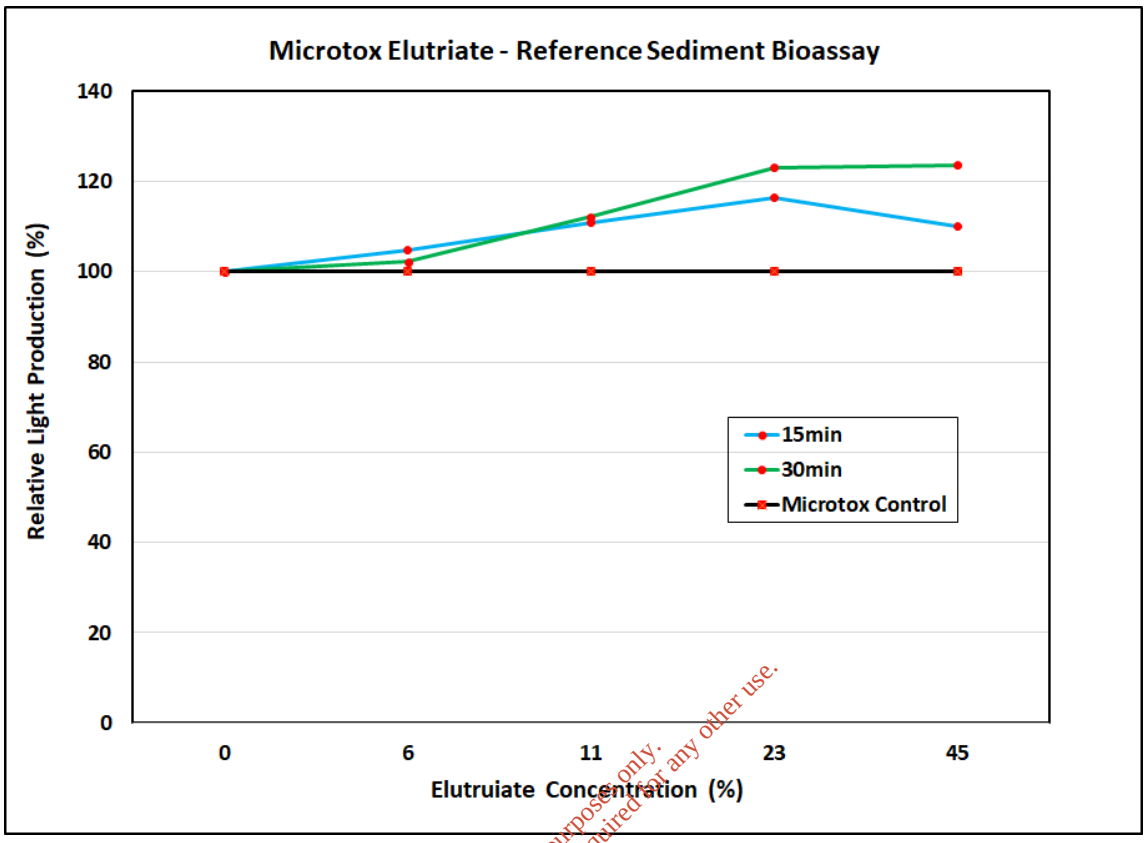
Appendix 1(Continued)- 10 Day Polychaete Water Quality Observations

Appendix 1 - 10-Day Water Quality Results								
SAMPLE	Day	Time	pH	DO (mg/l)	%sat	Sal	Temp	Water Change
Site 5	0	09:21	7.96	7.14	86.1	29.4	15.7	
Site 5	1	09:40	7.72	6.43	77.5	29.2	15.8	
Site 5	2	09:36	7.64	6.08	73.4	29.3	15.9	
Site 5	3	09:49	7.89	7.37	89.0	29.4	15.9	X
Site 5	4	08:22	7.94	7.01	84.5	29.3	15.8	
Site 5	5	08:49	7.86	7.06	84.9	29.3	16.0	
Site 5	6	07:33	7.86	7.32	86.6	29.4	15.6	X
Site 5	7	07:43	7.73	6.88	81.5	29.3	15.6	
Site 5	8	08:26	7.90	7.11	84.6	29.3	15.6	
Site 5	9	07:52	7.95	7.28	86.9	29.3	15.5	X
Site 5	10	07:23	7.92	7.38	87.5	29.3	15.1	
SAMPLE	Day	Time	pH	DO (mg/l)	%sat	Sal	Temp	Water Change
Site 6	0	09:21	7.78	7.16	86.8	29.5	15.7	
Site 6	1	09:40	7.76	7.10	85.3	29.2	15.9	
Site 6	2	09:36	7.80	6.99	83.8	29.3	15.9	
Site 6	3	09:49	8.13	7.54	90.9	29.3	15.9	X
Site 6	4	08:22	8.46	7.11	85.9	29.3	15.8	
Site 6	5	08:49	8.50	7.24	87.0	29.3	16.0	
Site 6	6	07:33	8.33	6.95	82.4	29.4	15.6	X
Site 6	7	07:43	8.08	7.40	88.0	29.3	15.5	
Site 6	8	08:26	8.00	7.43	88.3	29.3	15.5	
Site 6	9	07:52	7.92	7.10	84.4	29.3	15.5	X
Site 6	10	07:23	7.99	7.49	88.8	29.3	15.1	

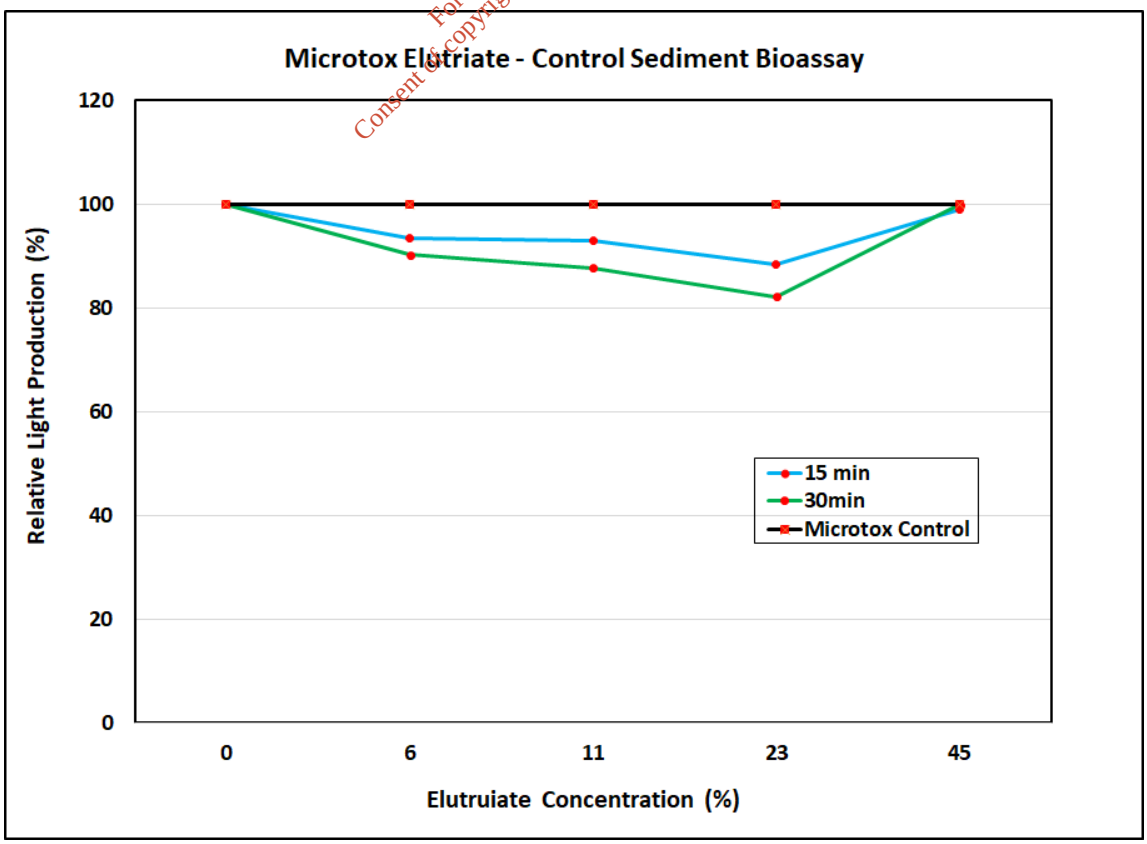
For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:46

Appendix 2- Microtox Bioassay Results for Dublin Port Site Elutriates

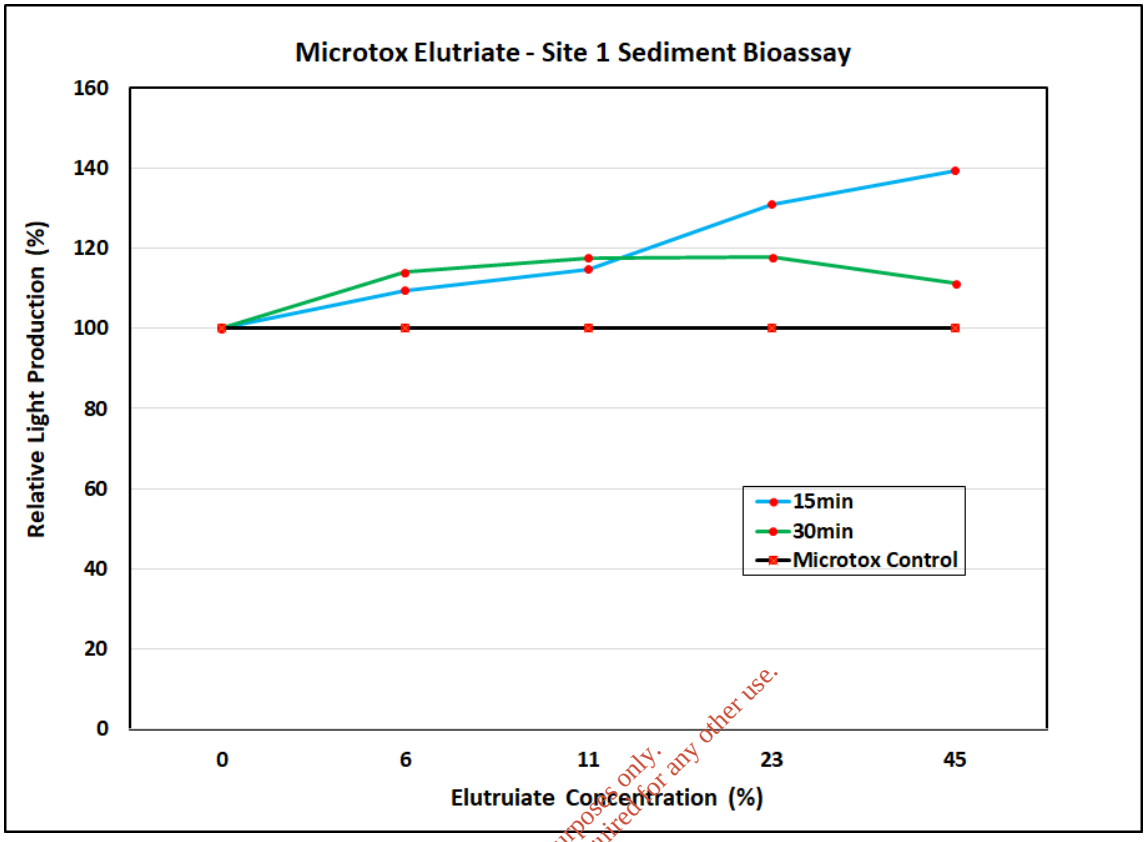


For inspection purposes only.
Consent of copyright owner required for any other use.

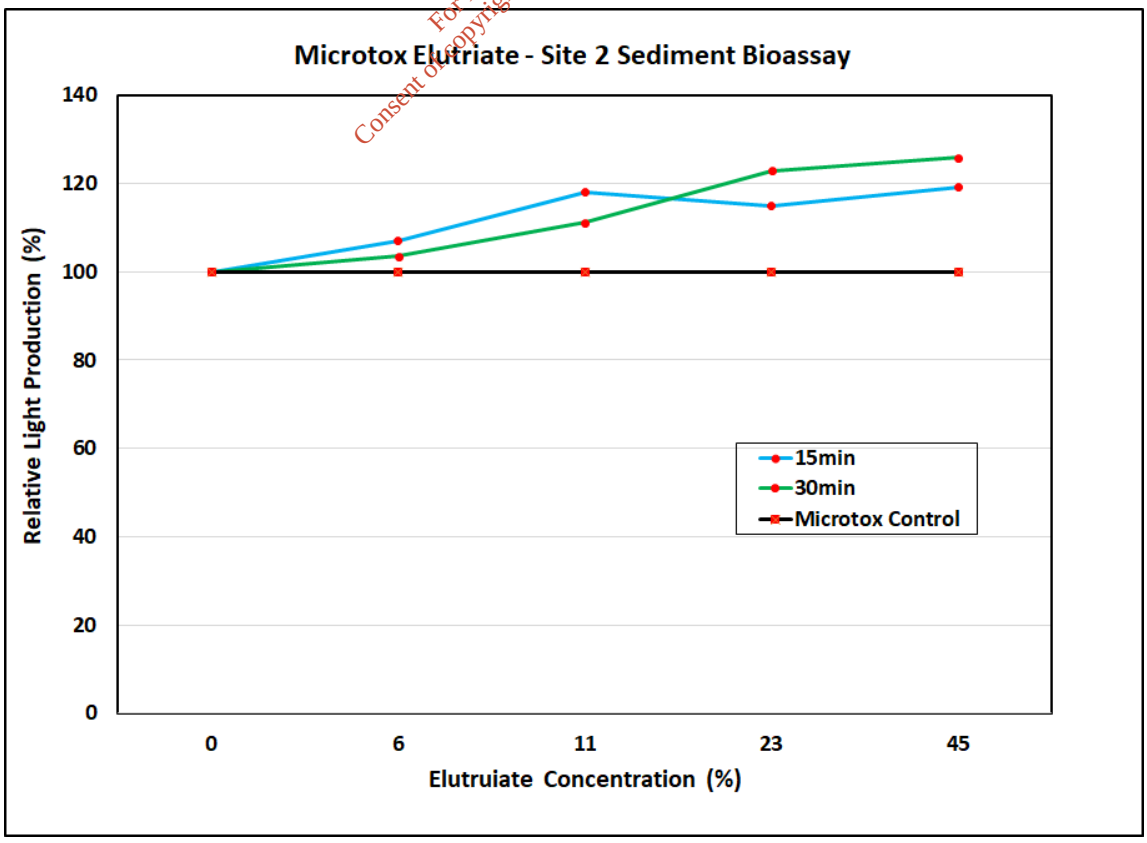


EPA Export 28-04-2021:02:37:46

Appendix 2 (Cond:)- Microtox Bioassay Results for Dublin Port Site Elutriates

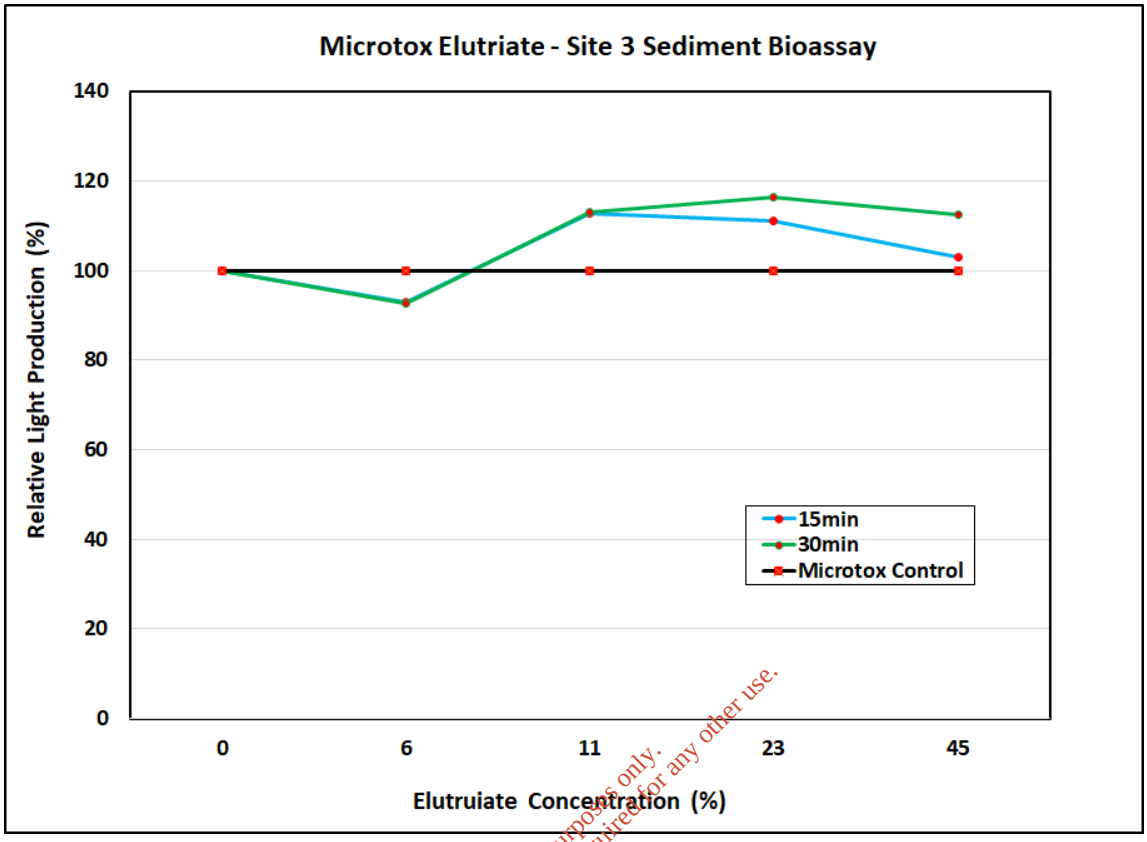


For inspection purposes only.
Consent of copyright owner required for any other use.

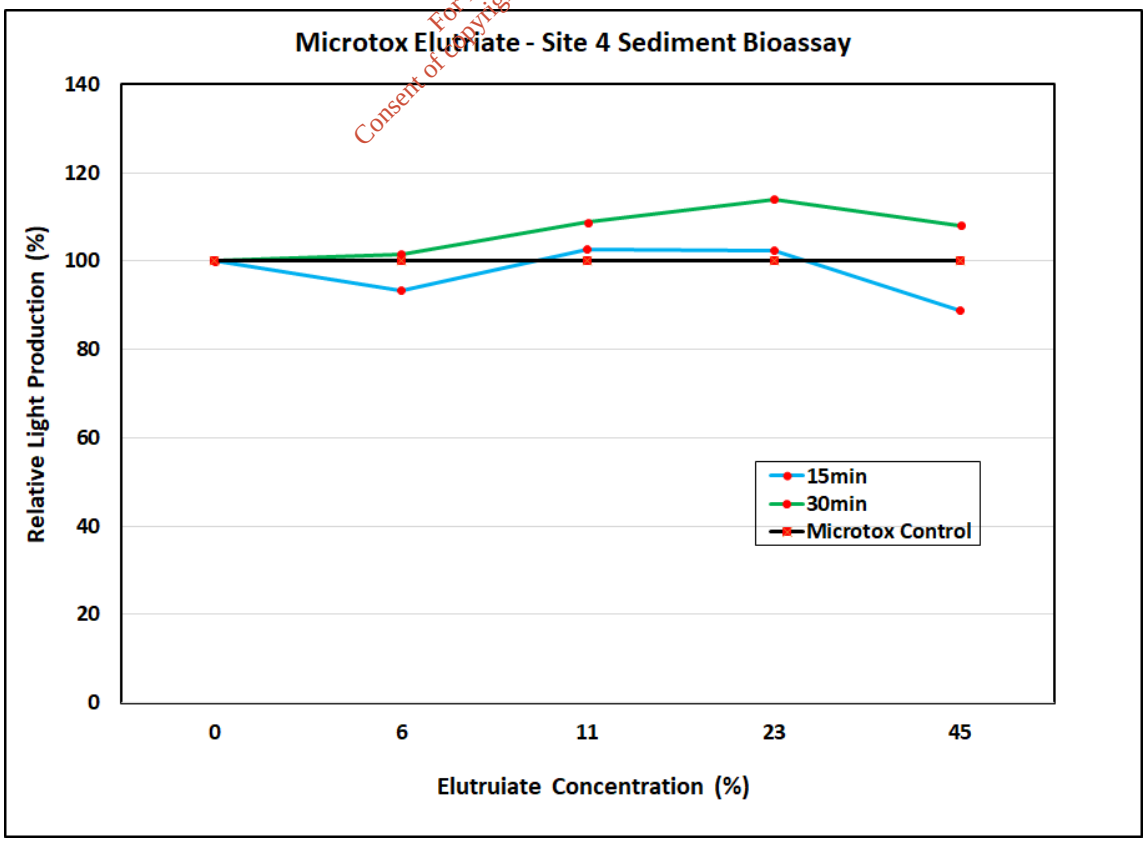


EPA Export 28-04-2021:02:37:46

Appendix 2 (Continued)- Microtox Bioassay Results for Dublin Port Site Elutriates

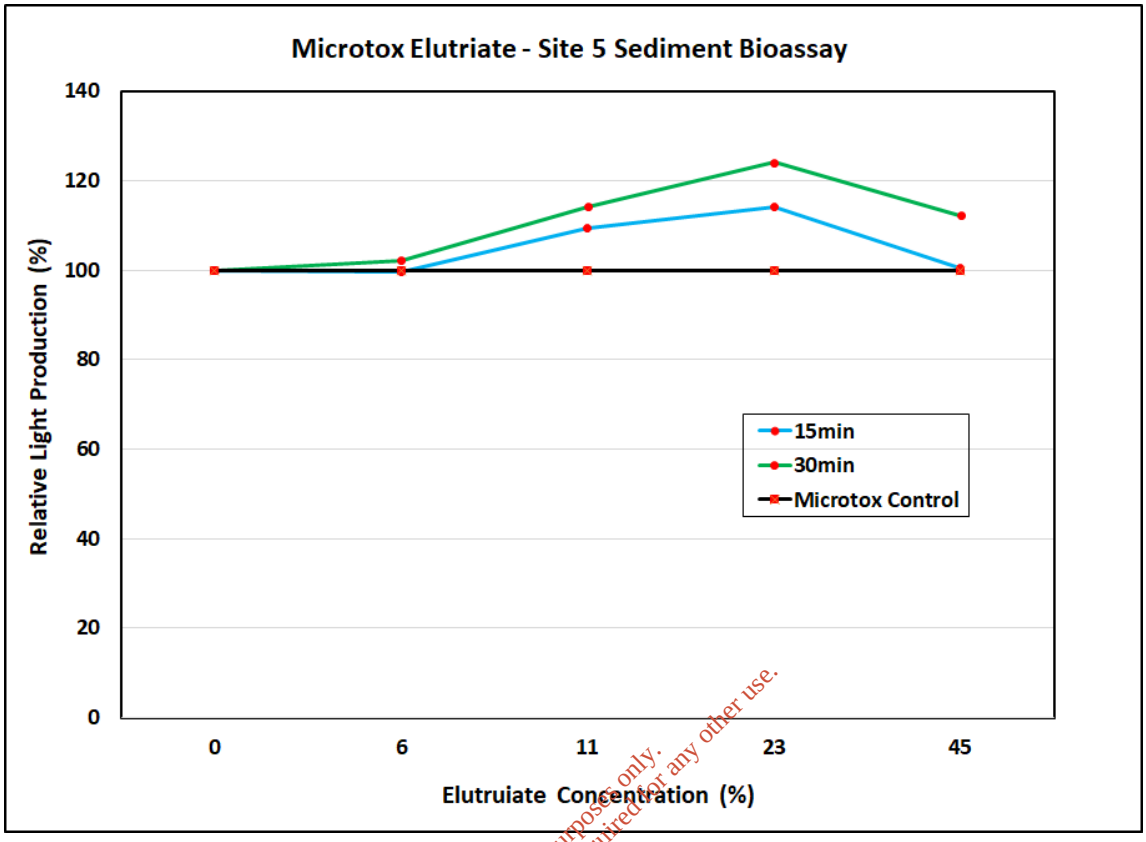


For inspection purposes only.
Consent of copyright owner required for any other use.

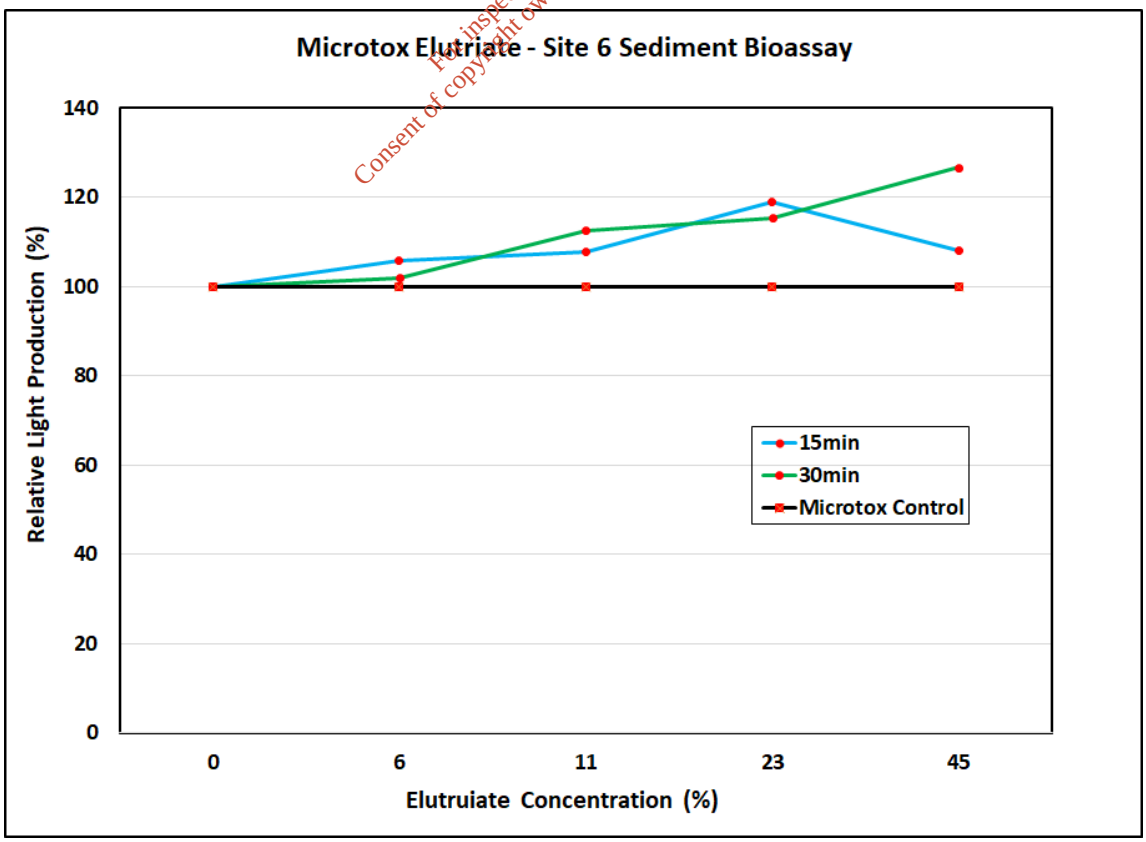


EPA Export 28-04-2021:02:37:46

Appendix 2 (Continued)- Microtox Bioassay Results for Dublin Port Site Elutriates



For inspection purposes only.
Consent of copyright owner required for any other use.



EPA Export 28-04-2021:02:37:46

Appendix 6 - Radiological Result

For inspection purposes only.
Consent of copyright owner required for any other use.

EPA Export 28-04-2021:02:37:46

Office of Radiological Protection

3 Clonskeagh Square
Clonskeagh Road
Dublin 14, D14 H424, Ireland

3 Ceamóg Cluain Sceach
Bóthar Cluain Sceach
Baile Átha Cliath 14, D14 H424, Éire

T: +353 1 268 0100
F: +353 1 268 0199
E: info@epa.ie
W: www.epa.ie

LoCall: 1890 33 55 99

Ms Ruth Barr

Senior Associate - RPS
Consulting Engineers, Elmwood House, 74 Boucher Road,
Belfast, BT12 6RZ.
Northern Ireland

17th May 2017

For personal use only.
Consent of copyright owner required for any other use.

Dear Ms Barr,

Further to your query regarding analysis of sediment samples in Dublin Port area I would like to inform you that radiological analysis was carried out in this area in 2007 and 2009 in accordance *with IAEA-TEC-DOC-1375, Determining the suitability of materials for disposal at sea under the London Convention 1972: A radiological assessment procedure*. The measurements made at the time were found to be *de minimis*, indicating that the dumping of these materials at sea will not result in a radiological hazard.

There is no requirement on our part to analyse further samples on this occasion as the samples analysed previously are sufficient to cover the area of the intended dredging operations.

If you require any further information please do not hesitate to contact us.

Yours sincerely,

Ms Máirín O'Colmáin
Radiation Monitoring
Office of Radiation Protection and Environmental Monitoring

Cc. Dr Kevin Kelleher, EPA - ORM

EPA Export 28-04-2021:02:37:46