

Adran yr Economi a'r Seilwaith
Department for Economy and Infrastructure



Llywodraeth Cymru
Welsh Government

The M4 Motorway (Junction 23 (East of Magor) to West of Junction 29 (Castleton) and Connecting Roads) and The M48 Motorway (Junction 23 (East of Magor) Connecting Road) Scheme 201-

The M4 Motorway (Junction 23 (East of Magor) to West of Junction 29 (Castleton) and Connecting Roads) and The M48 Motorway (Junction 23 (East of Magor) Connecting Road) (Amendment) Scheme 201-

The London to Fishguard Trunk Road (East of Magor to Castleton) Order 201-

The M4 Motorway (West of Magor to East of Castleton) and the A48(M) Motorway (West of Castleton to St Mellons)(Variation of Various Schemes) Scheme 201-

The M4 Motorway (Junction 23 (East of Magor) to West of Junction 29 (Castleton) and Connecting Roads) and the M48 Motorway (Junction 23 (East of Magor) Connecting Road) and The London to Fishguard Trunk Road (east of Magor to Castleton) (Side Roads) Order 201-

The Welsh Ministers (The M4 Motorway (Junction 23 (East of Magor) to West of Junction 29 (Castleton) and Connecting Roads) and the M48 Motorway (Junction 23 (East of Magor) Connecting Road) and the London to Fishguard Trunk Road (East of Magor to Castleton)) Compulsory Purchase Order 201-

The M4 Motorway (Junction 23 (East Of Magor) to West of Junction 29 (Castleton) and Connecting Roads) and The M48 Motorway (Junction 23 (East Of Magor) Connecting Road) (Supplementary) Scheme 201-

The Welsh Ministers (The M4 Motorway (Junction 23 (East Of Magor) to West of Junction 29 (Castleton) and Connecting Roads) and The M48 Motorway (Junction 23 (East Of Magor) Connecting Road) and The London to Fishguard Trunk Road (East of Magor to Castleton)) Supplementary Compulsory Purchase Order 201-

Appendices to Proof of Evidence

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APPENDIX A GLOSSARY

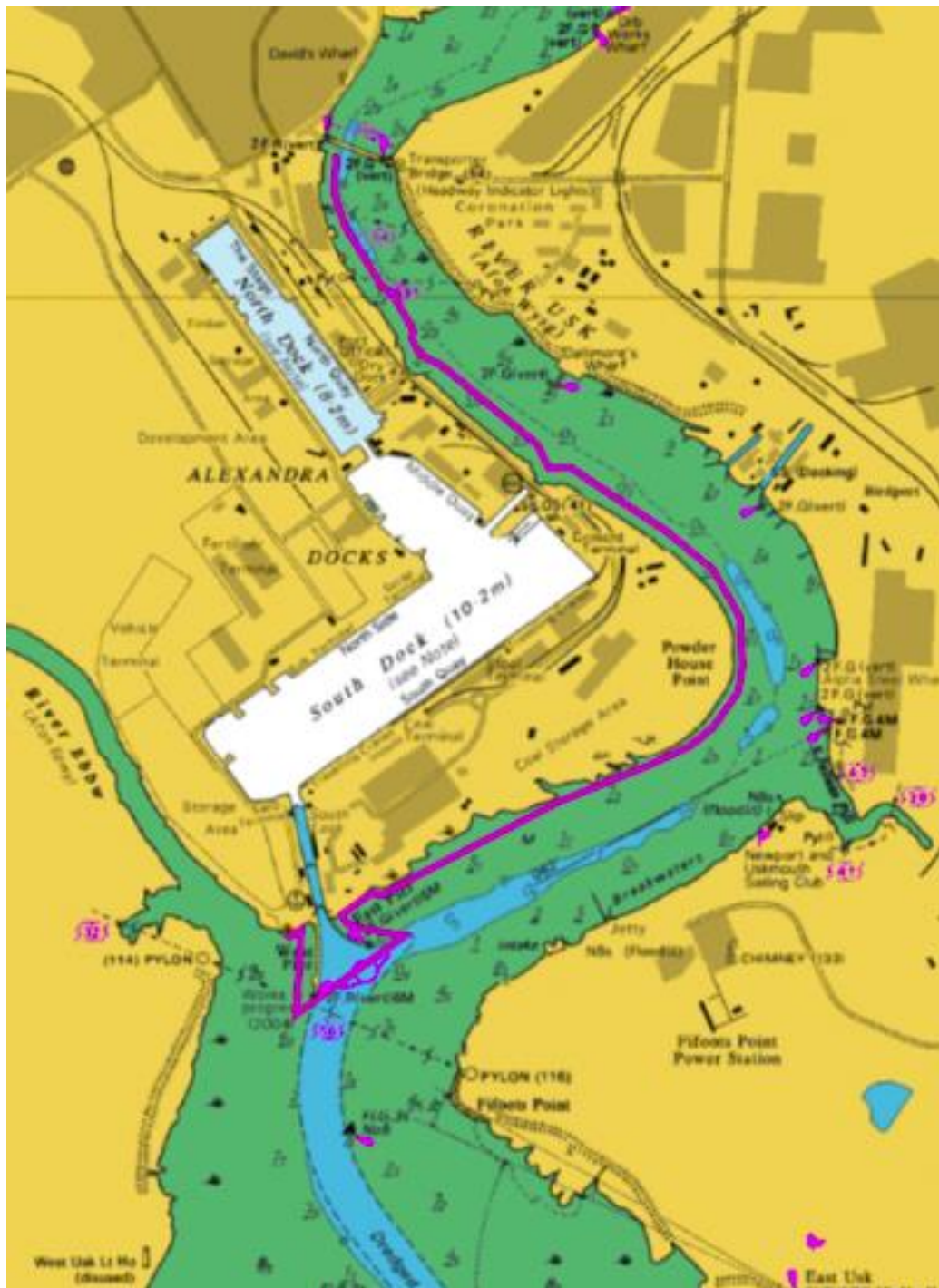
Length Overall (LOA)	A vessel's extreme length in m measured from the bow to stern or vice versa.
Beam	For ship handling and pilotage purposes, can be defined as the maximum horizontal width of the hull.
Freeboard	The vertical distance in m from the waterline to the uppermost continuous deck.
Draught	The vertical distance from the waterline to the vessel's keel. A vessel's draft would be greater when fully laden with cargo than when it is empty or ballasted.
Air draft	The distance in m from waterline to the uppermost part of the ship (usually the top of the mast). A vessel's air draught would decrease when fully laden and increase when it is empty of ballasted
Deadweight (DWT)	The carrying capacity of a vessel measured in tonnes.
Gross Tonnage (GT)	A measure the volume of the enclosed spaces of a ship and is used to form the basis for vessel manning regulations, registration and safety regulations.
Under Keel Clearance (UKC)	The distance in m between a vessel's keel and the seabed and is a function of the draught to the available depth of water.
Net Tonnage (NT)	A measure of the volume of the cargo spaces of a vessel.
Spring Tides	The tide occurring just after new or full moon causing the largest range between high and low water.
Neap Tides	The tide occurring just after the first and third quarters of the moon, when the range between the high and low water is at its least.
Chart Datum	The lowest water level that the tide would not normally go below and is usually taken as the lowest astronomical tide (LAT). Depths in m on British Admiralty charts are referenced to chart datum.
Trim	The difference in the fore and after draughts of the vessel measured in m.
Truck of the mast	The top of the main mast or forward mast.
List	The transverse angle of a vessel from the upright caused by an internal force such as the movement of a weight within the vessel, measured in degrees to either the port or starboard side.
Heel	The transverse angle of the vessel from the upright position caused by an external force, measured in degrees to either the port or starboard side.

Mean High Water Springs (MHWS)	The average height of a spring tide. On British Admiralty Charts the heights of objects such as bridges and lighthouses are referenced to MHWS.
Fresh Water Allowance (FWA)	The amount in millimetre that a vessel's mean draft changes when passing from salt water to fresh water or vice versa (a vessels mean draught would increase when passing from salt water to fresh water).
Dock Water Allowance (DWA)	The amount in millimetre that a vessel's mean draft changes when passing from salt water to dock water or vice versa. When loading within a dock, in order to maximise the amount of cargo carried, a vessel would submerge her load line by an amount equal to the dock water allowance, when the vessel reaches the sea her draught would decrease and the load line would no longer be submerged.
Cardiff Local Port Services (LPS)	ABP coordination centre for the harbour and marine activities

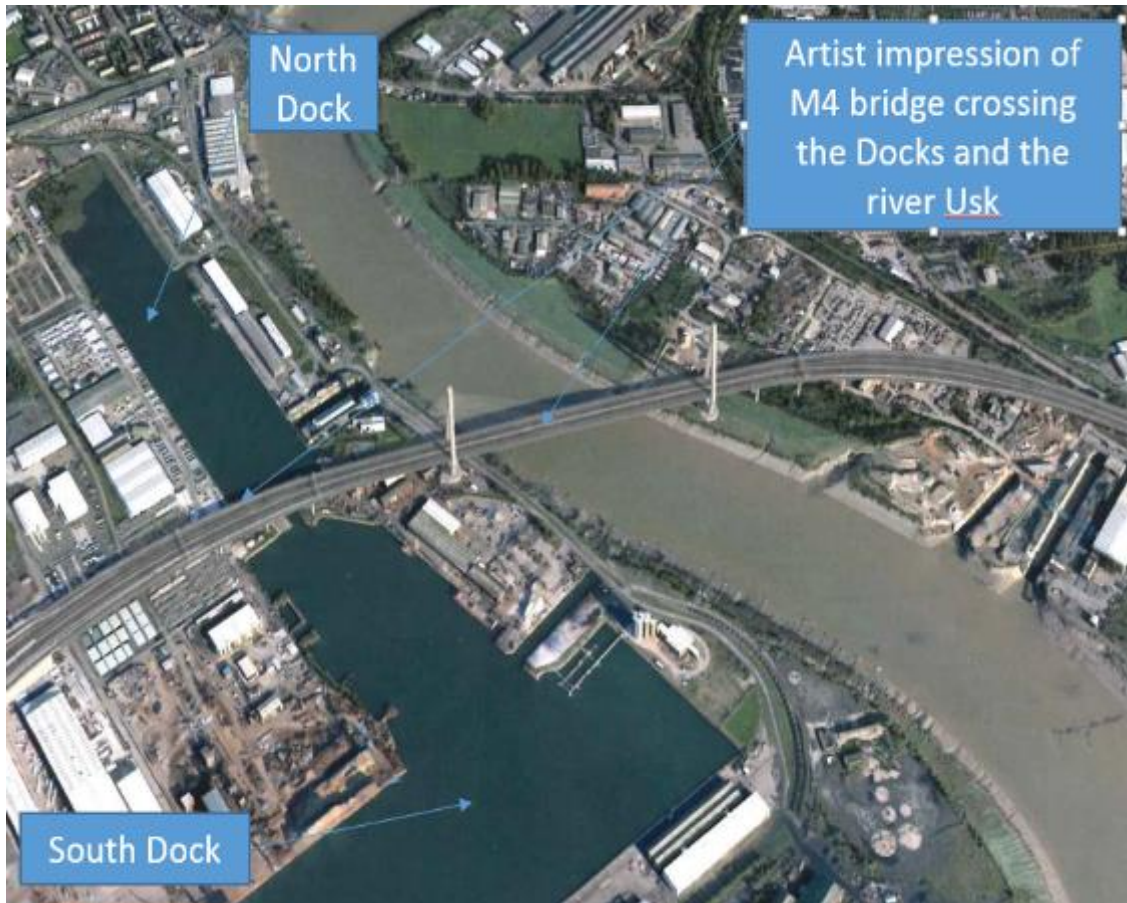
APPENDIX B PORT OF NEWPORT



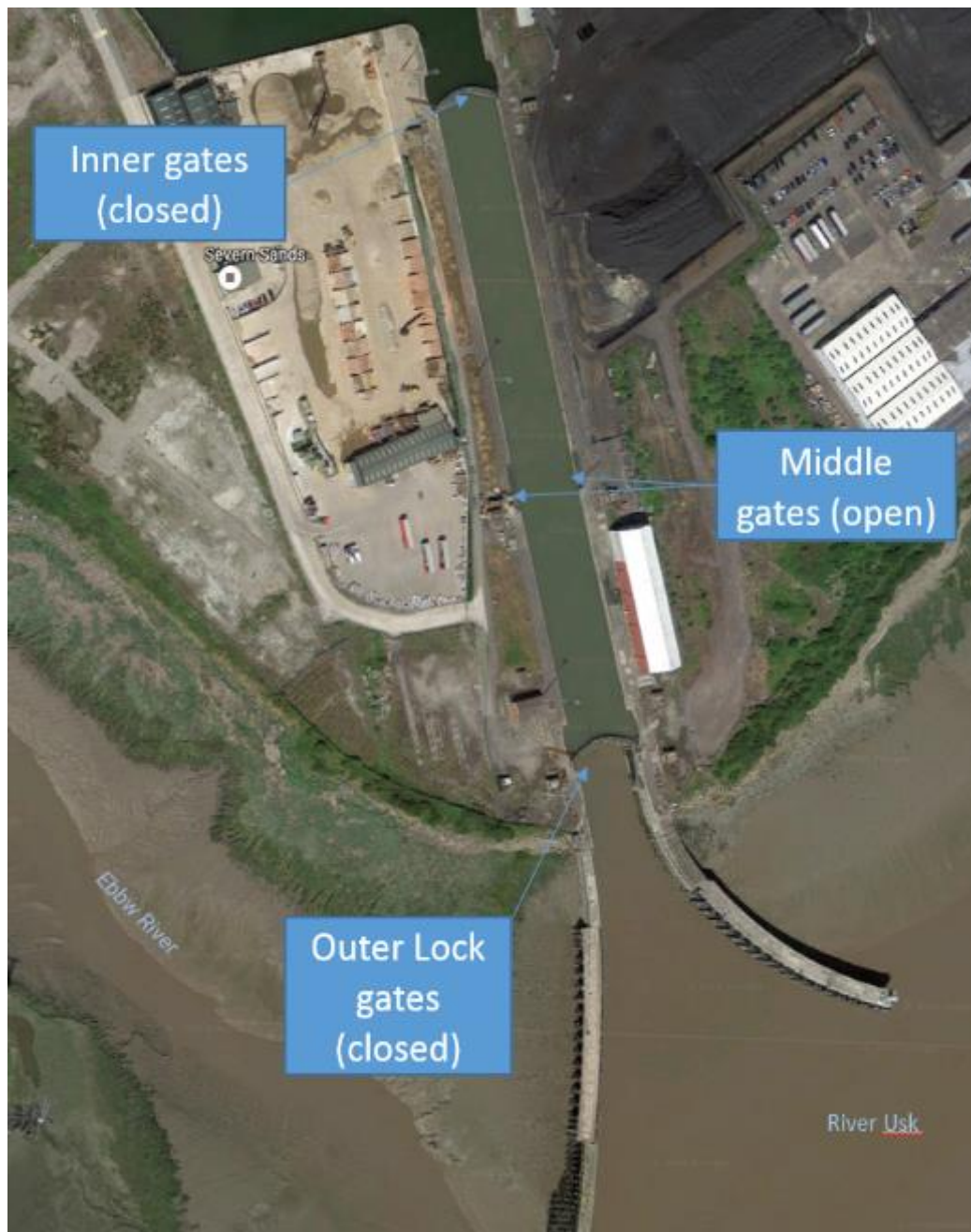
APPENDIX C ABP COMPETENT HARBOUR AUTHORITY JURISDICTION



APPENDIX D ARTIST IMPRESSION OF THE PROPOSED CROSSING

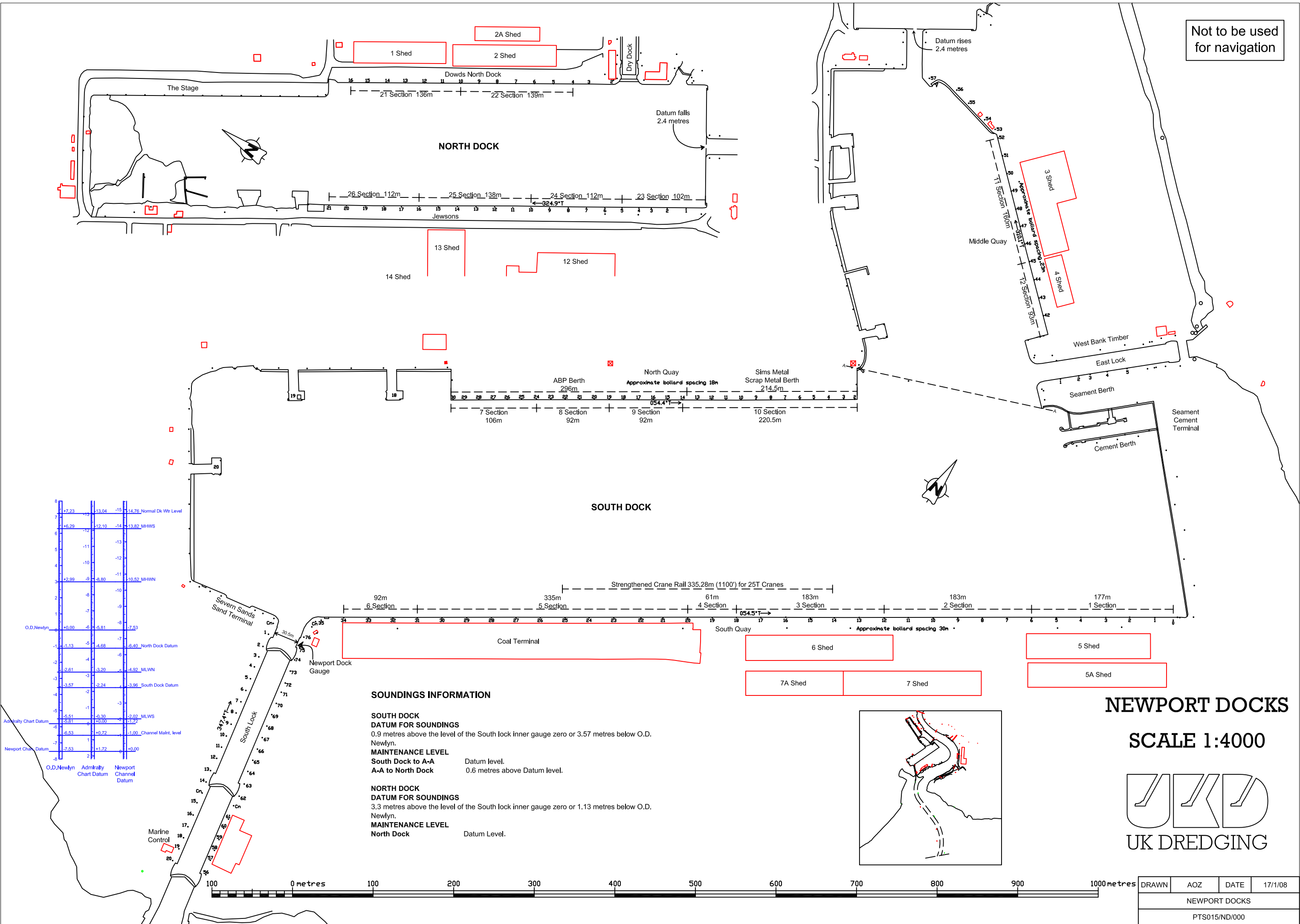


APPENDIX E SOUTH LOCK GATE CONFIGURATION

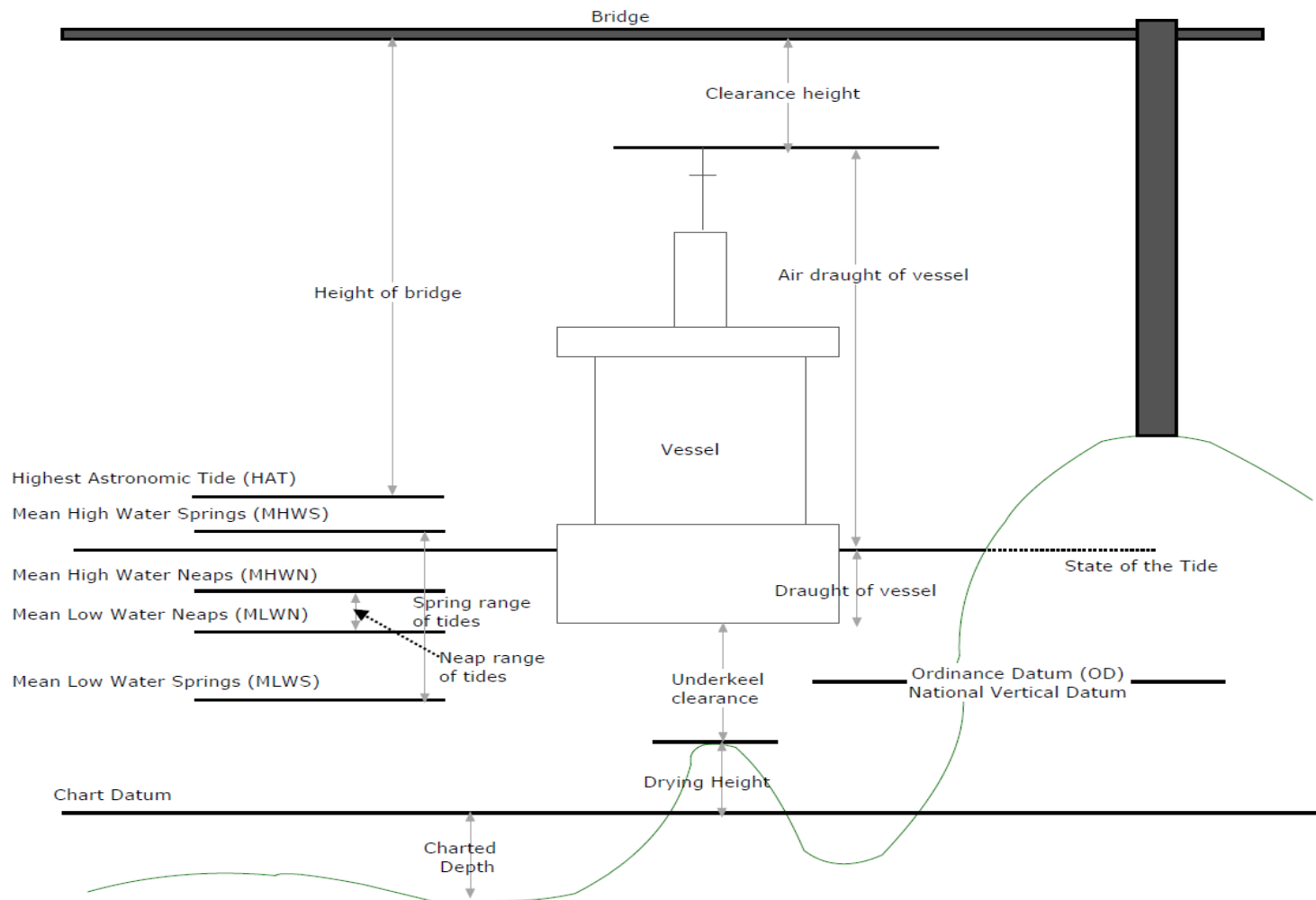


APPENDIX F NEWPORT DOCK PLAN

Not to be used
for navigation



APPENDIX G DRAUGHT, AIR DRAUGHT AND WATER LEVELS



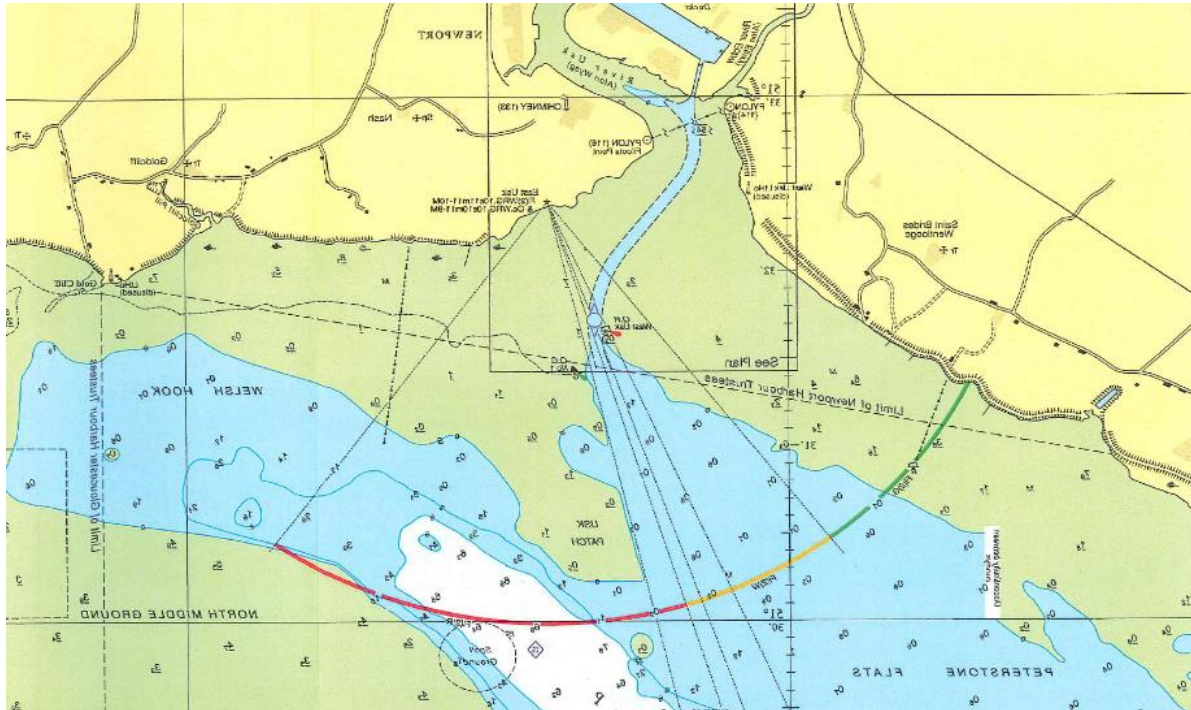
APPENDIX H ABP NEWPORT DOCK ACCEPTANCE DIMENSIONS

Acceptance Table - Newport Docks - January 2016

For a dock level of 11.74 metres

	Vessels may be accepted by Cardiff LPS and/or Lock Controllers up to the draft indicated without referral to the Harbour Master	Vessels may be accepted by Cardiff LPS and/or Lock Controllers up to the beam indicated without referral to the Harbour Master
	South Lock	
Lock		28m
	South Dock	
1 Section	8m	28 m
2 Section	10m	
3 Section	10m	
4 Section	10m	
5 Section	10m	
6 Section	10m	
7 Section	9m	
8 Section	9m	
9 Section	9m	
10 Section	9m	
11 Section	8m	
12 Section	8m	
20 Hoist	5m	
Cement Berth	5m	
East Lock	7m	18m
Junction Cut		16m
	North Dock	
21 Section	7.0m	16m
22 Section	7.0m	
23 Section	6.5m	
24 Section	7.0m	
25 Section	7.0m	
26 Section	7.0m	
Other Areas of the Dock	Vessels destined for areas of the dock which are not mentioned specifically in the table above should be referred to the Dock and Harbour Master for a limiting beam and/or draft.	
*BLU Code vessels	Vessels subject to the provisions of the BLU Code may be accepted by the Quality Control Manager up to a maximum beam of 30 metres.	
Dock Level	The dock level can not be guaranteed but will generally be held at the average level of 11.74m	
Dock Water Density	North Dock	1002
	South Dock	1010
Underkeel Allowance in the Dredged Channel	Flood tide	0.72 m ACD
	Ebb tide	1.28 m ACD

APPENDIX I NHC LIMITS OF JURISDICTION



**APPENDIX J GOOGLE IMAGE OF NEWPORTS DOCKS , RIVER USK AND
USKMOUTH SAILING CLUB LOCATION**



This map of the River Usk provides a detailed view of its industrial and recreational infrastructure. Key features include:

- Church Street Wharf:** Located at the top left, near David's Wharf.
- Lysaghts Wharf:** Situated in the upper right quadrant.
- Dallimores Wharf:** Located in the middle right section.
- Birdport:** Situated further down the river on the right.
- Liberty Steel:** Located near the Birdport area.
- Uskmouth Sailing club:** Situated near the Newport and Uskmouth Sailing Club.
- Transporter Bridge:** A prominent feature in the center, crossing the river.
- Docks:** The North Dock (8.2m) and South Dock (10.4m) are highlighted in pink, with various quays and terminals.
- Other Landmarks:** Coronation Park, Fife's Point Power Station, and various bridges like the Southern Distributor Road Bridge.

APPENDIX L MV ST.CONSTANTINE WITH MAIN MAST LOWERED



APPENDIX M LIST OF VESSELS IN NORTH DOCK WITH AIR DRAFT DATA

Vessel name	IMO number	Deadweight (tonnes)	Length Overall (m)	Beam (m)	Gross Tonnage GT	ABP air draft (m)	Verified air draft (m)
NURAL STEVNS	8213419	2887	79.02	12.6	1892	29	29
SCOT MARINER	9243916	3313	89.98	13.75	2594	26	22
RMS VOERDE	9177882	2455	89.6	11.67	1846	26.8	6.6
LEESWIG	9139335	4515	88	13.6	2901	26	25.5
CALETA ANGELMO	8010415	1053	63.02	11.43	1196	23	22
ISLAY TRADER	9030474	2386	74.94	11.4	1512	26.2	6.75
WILSON GARSTON	9000833	2801	82.51	12.5	2270	24	21.35
VEGA	7510676	2560	81.41	13.42	2219	24	25.65
SCOT TRADER	9368405	4624	89.5	13.7	2956	29	27.9
CARINA	9201827	5360	108.5	15.88	4235	24.5	29
BALTIYSKIY 111	7612448	2649	95	13.21	1926	28	13.2
AHRENSHOOP	7000669	1350	75.7	11.28	1264	23	23
BREMER VICTORIA	9226176	1778	69.6	11.3	1461	22	9.7
KAREN DANIELSEN	8500070	3650	88.6	15.46	3113	28	28
RITA	8209743	2064	80.71	12.62	1843	23	13.5
COUNTESS ANNA	9111125	2684	82.5	11.35	1589	25	10.33
MIKE	8421731	1610	70.01	10.25	978	26	9.02
HOEHBANK	7720439	1851	79.71	12.81	1687	25.6	21.93
LANGELAND	8420098	2287	80.62	12.7	1832	24	9.6
BALTIYSKIY 109	7612515	2649	95	13.21	1926	20	13.2
STORTEBECKER	9195377	3159	82.5	12.4	2301	22	22
LITTLE JANE	8714748	1276	64.33	10.5	851	20	20
FALCON	9006423	2225	77.8	11	1382	21.1	18.25
FEHN MIRAGE	9252929	2974	88.47	11.35	2061	25	20.5
ROGER	8410330	2183	82.48	11.31	1523	25	25
SCOT VENTURE	9243928	3262	89.98	13.75	2594	26	22
RMS WEDAU	8503096	2312	82.48	11.4	1570	25	9.2
TARANTO	9133513	3005	88.45	11.4	2061	24	10.3
PEIKKO	8324684	1723	82.48	11.4	1521	21	5.85
SCOT CARRIER	9137208	2508	81.88	12.5	1882	25	6.5
KORIANGI	9073220	2300	81.44	11.58	1596	25	23.4

KELARVI	9123295	2300	81.44	11.3	1596	25	23.4
SCOT RANGER	9138769	3419	84.9	12.6	2260	26	25.5
HELGA	8402577	2086	79.02	10.91	1473	34	9
FRIDA	8417235	1901	82.02	11.31	1587	25	19
KAIRIT	9195949	4956	94.96	13.17	2997	26	27
FRIGGA	9114701	4216	91.46	13.6	2818	29	29.1
WARFLETH	7920388	1089	73.97	9.5	1022	23	23
MERLE	9106936	3706	87.99	12.9	2456	22	22
DOUWENT	8703139	1996	79.69	11.21	1311	22	6.3
VESTLAND	8412857	1624	69.63	12.62	1561	25	25
MER	8003864	1580	70.01	11.2	1082	27	23
SAJDA	8223074	2904	87.97	11.3	1946	26	20.5
STINA	7047370	1380	76.38	11.8	1318	23	23
CARRIER	8504959	2379	82.02	11.3	1584	22.2	22.2
SEA EMS	9142526	2503	81.7	11	1682	23	9
FJORDBULK	8912493	2165	73.85	11.5	1524	21	23
DOROTHEA	8016689	2950	82.5	12.62	2120	34	24
LASS SATURN	9030515	2366	74.94	11.4	1513	23	23
AMORE	8801060	1276	64.33	10.5	851	20	8.1
ARLAU	9192650	3701	87.9	12.8	2452	28	15
FLUVIUS PLYM	9163611	3211	89.98	12.5	2316	25	24.2
PETERSBURG	8420103	2285	80.6	12.7	1838	26	9.6
ROMI	8922266	4220	88.25	13.17	2373	25	21.5
ROSEBURG	8817370	3005	82.04	12.5	1999	29	24
TOVE	9156175	2517	82.35	11.35	1864	26	9
FAUSTINA	8817356	3015	82.04	12.5	1999	26	24
SEE STERN	9195561	1863	82.225	11.3	1552	26	8.36
ARKLOW RANGER	9250438	5215	89.95	14.4	2999	25	19.1
ANUND	7422037	2750	81.39	13.4	2240	25	25
SVETI NIKOLAY	7630311	4680	123.5	15	3629	20	20
HAV ZANDER	9001849	2999	89.03	12.5	1960	27	20.3
FEHN HEAVEN	9135731	4250	89.77	13.1	2844	30	28
MERMAID	8504181	2302	80.73	12.7	1856	25	13.5

ELBIA	8509856	2452	74.91	12.5	1525	23	9.55
DALARNA	9165085	4400	100.7	16.2	3796	32	32
BLUE SKY	9195767	3836	88.6	12.5	2545	26	24.2
ST CONSTANTINE	9203710	4520	103.23	16.2	3466	24	24
IRINA	9137038	4161	88.05	14.4	3323	28	32.5
DANICA WHITE	8401157	1616	61.57	10.2	997	18	18
ASPEN	9195389	3159	82.5	12.4	2301	25	13.6
WILSON DVINA	9005742	3269	87.42	13	2481	26	22.7
FAST JULIA	8404446	2284	79.78	11	1391	25	6.7
SEA KESTREL	9006459	2225	77.8	11	1382	24	19.2
WESTEWIND	9201970	2815	88.95	12.4	2080	26	9.2
DOLFIJN	8815786	2450	81.2	12.31	1987	24	17
MAPLE	8509844	3053	87.99	12.8	2590	28	28
DORNUM	9015462	2369	81.79	11.5	1662	22	19.6
KRUCKAU	9199141	3683	87.94	12.8	2452	23	19.6
SALIX	8520446	3020	92.18	11.31	2119	27	25
KARINA DANICA	8903014	2130	69.35	11.6	1352	18.8	29
BONA SEA	8602012	1505	74.33	12.4	1525	21.92	21.92
CELTIC MARINER	8515661	2886	87.86	11.3	1957	24	24
DELIA	9234317	2500	89.71	11.65	1846	19	19.88
SANDRA	9195731	3812	88.78	12.5	2545	25	24.3
CELTIC FORTUNE	8415706	3042	92.11	11.3	2119	28	27.2
FINNLAND	9301598	7099	116.98	16.5	5257	26	26
PETRA F	8500408	1976	81.21	11.3	1567	27	27
RMS LAGONA	9223435	2688	88	11.41	1898	24	6.26
EGE M	8003852	1570	70.01	11.21	1055	20	20
VANGUARD	9224116	3300	91.25	13.75	2548	26	14.75
MAX	8866137	805	56.19	11.21	934	22	22
SEA RUBY	9006447	2222	77.8	11	1382	18	18
SHUYA	9105841	4143	96	13.4	2889	30	30
ARUNDO	8504272	2892	87.97	11.3	1957	25	27.7
DEFENDER	7915125	2190	82.45	11.31	1512	24	13.035
ARKLOW RAMBLER	9250426	4400	89.95	14.4	2999	30	19.1

MUSKETIER	9369514	3850	88.6	12.5	2545	23	21.6
AURA	8412003	2356	81.11	12.6	1720	27	27
FAST ANN	7928782	1990	85.86	11.31	1740	24	24
ARKLOW RALLY	9250414	4400	89.95	14.4	2999	24	19.1
SCOT EXPLORER	9137193	2521	81.68	12.5	1882	27	6.5
KINE	9145140	3000	88.45	11.35	2061	24	19.2
RIG	8801137	3200	87	13	2351	27	27
CEDAR	8100624	1766	82.45	11.38	1499	22	22
TIRADOR	9163702	2035	88.15	11.3	1596	25	25
OCEANIC 11	8602945	3651	89.39	12.5	1951	22.2	22.2
FAST FILIP	7928794	1990	85.86	11.38	1740	23	23
CLAVIGO	9014688	3735	87.82	12.8	2446	30	30
RYBNO	8900969	4725	97.8	17.3	3936	32	32
SUNA	9080986	4143	96	13.4	2889	28	28
CELTIC FREEDOM	8520458	3473	92.11	11.31	2120	25	13.5
LUKANDI	9143609	4237	96.3	13.6	2914	26	26
FAST SUS	9136096	3234	89.99	12.5	2055	20	12.65
ANGON	9320635	5045	89.5	13.7	2945	27	24.5
THEA MARIEKE	9195418	3149	82.5	12.4	2311	24	13.6
RAN	8511940	2859	88.84	12.51	1943	22	21.58
SCOT ISLES	9243930	3154	91.25	13.75	2595	27	26.75
AMANDA	9312688	5780	106.12	14.4	3870	30	25.75
KADOS	9137258	3816	98	16	2842	23	23
NIKA	7500786	2471	81.51	13.4	2216	26	26
BEKAU	9197454	3701	87.84	12.9	2461	27	19.6
SEA HAWK	7620201	4654	123.5	15	3629	22	22
SYDLAND	8003943	2574	80.81	13.42	2225	25	25
LIV KRISTEN	8209731	2348	80.73	12.62	1843	25	13.5
ANGUS	7525580	2767	79.05	12.65	1989	29.5	29.5
WILSON LAHN	9198458	2500	83.16	10.9	1559	19.5	19
SHETLAND TRADER	9030486	2386	74.94	11.4	1515	22	8.95
BUSE STEVNS	8213421	2887	79	12.6	1892	29	29
FRIFJORD	8516263	1318	63.02	11.61	1212	22	24

ALMADIEP	9256169	4327	89.98	15.2	2954	18.8	10.9
SHIZHNYA	8871572	3997	105.3	16.5	2829	24	24
HUNTER	8104553	3608	87.97	11.31	1949	24	8.5
VELOX	8918291	3502	85.64	14.2	2033	29	29
ROSITA	7605873	3403	81.36	13.42	2316	27	27
LINDA MARIJKE	9053684	1850	75.25	10.7	1359	22	22
WILSON CLYDE	9178458	4438	99.9	12.8	2999	25	25.35
BARIZO	9188946	5647	95.08	13.2	2999	25.8	25.8
PECHENGA	8416504	4694	99.01	16.01	3754	29.1	34
SWE-TRADER	9194074	4555	98.9	13.8	3170	22	27.5
MERITA	8422034	4496	98.71	15.45	3329	30	28
KIZHI	8867222	3997	105.3	16.5	2829	18	18
RMS SONSBECK	9006306	3713	87.859	12.8	2449	20	18.85
ANTIC	8213457	1234	49.99	9.4	671	14.5	14.5
ULUS WIND	9361976	3689	89.61	15.95	2604	20	20
AKELA	9373199	5575	94.72	17	3766	28	28
ERIC HAMMANN	9011985	1323	58.75	11.65	1156	20	10
KONSTANTIN PAUSTOVSKIY	9057305	3030	89.5	13.2	2319	23	21.3
BARBARA	9113226	5910	99.4	17	4015	36	36
CATHMA	9357482	6090	110.78	14	3990	24	23
GOLD RIVER	NA	0				38	0
MENAS	8504246	2890	87.97	11.3	1957	25	25
CELTIC AMBASSADOR	8917417	5788	92.8	17	3739	28	28
RIVER ALN	9235505	4850	89.75	13.6	2829	27.5	26.1
NIJORD	8007157	3214	89.36	15.73	2696	25	25
RMS RAHM	8814201	1732	74.84	10.5	1307	21	12.8
OSTENAU	9280706	3710	87.83	12.9	2461	24	19.6
JAN/V	8504179	2276	80.73	12.62	1749	19.3	19.3
KATJA	9235490	8961	129.41	15.85	6382	30	27
KAREL	9370721	5495	108.33	16.5	4182	27	27
TOMKE	9197806	3171	82.5	12.6	2301	25	13.6
FLEX DARWIN	9195925	4928	94.905	13.17	3228	27	24.7
DONITA	8213500	4150	99.95	15.71	3632	35	35

ELKE	8402591	2127	79.02	10.9	1473	23	23
NOORDERLICHT	9279068	3670	82.5	12.5	2409	20	25.6
HEINRICH G	9171060	3516	87.97	12.9	2446	25	13.5
PINNAU	9199139	3687	87.97	12.8	2452	23	19.6
PEX	9240249	4267	90.33	15.2	2995	30.1	30.1
ARDENT	8213445	1180	54.77	9.4	700	19	19
KAPITAN SHYRIAGIN	9137234	6258	97.98	16	2842	25	25
RMS SETLARK	8223127	1572	74.91	10.51	1281	20	20
GORKY	8937352	4325	96.3	13.4	2914	25	15.52
AMUR-2528	8727850	3332	116.03	13	3086	23	26.8
PETER 1	9256509	3186	102.5	16.2	3376	20	20
MUEHLENAU	9313668	3691	87.9	12.9	2461	26	15
SUSANNA	8020123	2319	82.48	11.38	1512	21.2	21
VOLODYMYR UKRAINETS	9245304	3850	98	16	2842	16.4	19.615
ARKLOW FAITH	9361718	4950	89.95	14.4	2998	25	21.7
DILEK	9169732	4490	88.2	13.6	2905	28	23.5
RMS NEUDORF	8920256	2620	82.46	12.5	1985	35	10
ARKLOW RACER	9291729	4993	89.99	14	2999	21	20.6
KREMPERTOR	8817409	3432	87	13	2351	25	21.5
ARKLOW FUTURE	9361768	4950	89.95	14.4	2998	27.5	21.7
FRI KARMSUND	9211066	4935	89.75	13.6	2858	35	28
BASKA	8301979	2848	95.61	13.5	2768	27	23
CELTIC NAVIGATOR	9003548	3970	89.99	12.8	2606	26	29.5
LEINE	9313644	2928	88.58	12.4	2164	25	19.3
FEHN CARTAGENA	8222185	1573	75.23	10.7	1372	24	7.2
NORDIC DIANA	9116010	4180	89.8	13.6	2774	28	25.3
MAYA	8128858	3346	99.83	11.35	2318	23.4	23.4
TRANSMAR	9167332	4106	89.72	13.6	2820	28	31.6
RMS LIBAVA	8324696	1566	74.88	10.6	1281	22	8.195
SOLYMAR	9167344	4106	89.72	13.6	2820	26	31.6
JOANNA	8200802	2320	78.57	12.01	1525	25	25
KAREN	9487603	4502	89.92	14	2997	24	24
RMS RHEINHAUSEN	8104606	2700	80.8	13	2363	23	23

ALTONA	8412390	4413	99.8	14.61	2882	28	31
EILSUM	9015436	2376	81.76	11.5	1662	26	19.6
RMS SAIMAA	9313694	2634	80.1	12.4	2069	21.04	11.2
ANKIE	9331359	3638	89.99	12.5	2528	25.2	22.75
ESMERALDA	9141364	4748	89.78	13.27	2834	23	21.7
MARE	9214006	2953	88.95	12.5	2080	26	11.64
WILSON BREMEN	9014717	3735	87.73	12.8	2446	22	19
EEMS DART	9195640	3725	88.6	12.5	2535	21	21.5
JAN D	9013000	3260	89.95	11.9	1981	24	10
EEMS COAST	8418019	1490	77.98	9.96	998	7.85	7.85
KALEVALA	8866644	3997	105.3	16.5	2829	19.5	19.5
ASHLEY	9201944	2953	88.95	12.4	2056	24	9.3
LADY MENNA	9126352	3332	88	12.5	2561	23	27.8
SEA EXPLORER	8603547	5528	103.89	16	3801	25	25
NORDIC ERIKA	9528495	3724	87.9	12.6	2663	25	25.4
KAIE	8906298	4161	88.29	13.17	2374	23.7	23.7
RUSICH-8	9368209	5460	128.2	16.5	4970	21	16.5
MARIANNE K.	9006382	3713	87.84	12.8	2450	29	18.85
VICTRESS	8110875	1622	66.15	11.34	1095	23	23
ALWIS	9454814	6050	114.4	14.4	4255	27.8	25.95
PYALMA	8869543	3997	105.3	16.7	2829	19	19
KOMARNO	9065948	3701	87.78	12.8	2446	20.19	28.3
SEA HUNTER	8914154	3148	87.47	13.02	2443	26	24
EEMSHORN	9393278	6000	110.78	14	3990	25	26
VELSERDIJK	9346691	4450	89.95	14.4	2984	23	24
THESEUS	9199256	2500	89.75	11.65	1846	28	18.8
RMS LAAR	8508400	2304	82.48	11.4	1570	22	9.2
PAMIR	9108439	3004	88.45	11.35	2061	24	21.3
WILSON VIVERO	9268863	5752	111.4	13.35	3995	25	24.35
ROVA STONES	9387310	3850	88.6	12.5	2545	25	21.6
FEHN SIRIUS	9213997	4228	89.25	13.4	2891	24.5	25.95
NORDERAU	9313670	3711	87.82	12.9	2461	27	19.6
ARKLOW RAVEN	9344538	4933	89.99	14	2999	21	20.6

ECHION	9496587	3685	87.84	12.8	2452	21	21
ERLANDA	8922280	3015	82.04	12.5	1999	22	24
RIMINI	9421635	2600	87.27	11.42	1862	21	8.7
OHLAU	9375903	3689	87.9	12.8	2461	21	19.6
RODAU	9313656	3712	87.9	12.9	2461	23	15
EEMS TRANSPORTER	9340300	2900	89.99	13.75	2186	23	23.4
EMUNA	9529188	4500	89.95	15.25	2992	26	25.2
NARVA	7612436	2649	95	13.01	1926	26	13.2
SORMOVSKIY 3052	8222379	3832	119.21	13.21	3041	25	15.92
THAMESTEEL 1	8611221	3217	89.3	12.5	1984	24	20.1
LAUDIO	9135858	4287	91	13.8	2909	26	22.2
WILSON DUBLIN	9390109	3682	87.82	12.8	2452	22	21.4
ALEXANDER GRIN	9057331	3180	89.5	13.2	2319	20	21.3
MEG	9066057	2300	81.44	11.3	1596	23	23.4
FEHN CALAIS	9155688	2270	82.45	11.3	1675	19.6	8.5
FLINTERBOTHNIA	9279408	3480	82.5	12.6	2474	22	21.6
AMUR-2507	8721337	3340	115.7	13	3086	22	13.2
RYSUM	9015424	2381	81.78	11.3	1662	20	19.6
HOLSTENTOR	8801125	3432	87	13	2351	27	21.5
JEVENAU	9356866	3701	87.84	12.9	2461	23	19.6
SANDAL	9083201	2300	81.2	11.3	1596	24	24
AMADEUS (1)	9232498	1680	79.99	10.4	1435	25	9.15
MOANA	9529190	4500	89.95	15.25	2992	24	25.2
CELTIC ENDEAVOUR	8504234	3070	87.97	12.8	2568	25	25
CFL PROSPECT	9376440	6500	118.4	13.35	4106	27.5	24.3
KENTO	9066069	2300	81.44	11.3	1596	25	23.4
BERTHOLD K	9374715	4442	89.92	14.4	2967	0	30
BEN VARREY	8507365	1544	63.84	11.7	997	23	22.74
LE LIE	9166443	3697	87.99	12.3	2450	10.5	10.5
SORMOVSKIY-3055	8419611	3804	119.21	13.02	3041	15.92	15.92
WARBER	9467201	4114	94.7	13.4	2862	23	23
FIDUCIA	9467196	4106	94.7	13.4	2862	23	21.5
NORDICA	9171101	3675	87.97	12.8	2446	24	11.19

NORDSTRAND	9031260	3400	88.3	12.51	1970	26.7	12.05
EEMS SKY	9421647	2600	87.27	11.42	1862	18	8.7
REBECCA HAMMANN	9119634	2423	76.36	11.65	1595	20	12.5
FLINTERBAY	9279434	3483	82.5	12.5	2474	21	21.65
THURKUS	8915744	3284	87.96	12.5	2561	24	27.8
LADY AMALIA	9624847	3700	88	13.35	2544	22.5	8.5
ASTRA	9041318	3582	84.95	12.8	2416	22	22
HAV DOLPHIN	9073880	3027	88.3	12.5	2075	23	21.5
ABERDEEN	9313723	3614	88.3	12.4	2451	21	12.3
SVANUR	8116166	2151	72.52	11.2	1516	24	24
LADY HESTER	9467249	3500	98.2	13.4	2992	22	23.4
ERNST HAGEDORN	8806149	4402	104.8	16	3826	33	32.3
VICTORIA C	9373539	4998	89.8	14.5	2990	24	24.2
FRI TIDE	9195676	3400	89.4	12.5	2218	23	24.25
FRI OCEAN	9195690	3640	89.4	12.5	2218	22	24.25
CAPELLA	9190171	3792	89.25	13.3	2780	25	25
WILSON CARONTE	9125047	4450	99.9	12.8	2997	24	24.85
BALTIC MERCHANT	9138202	3110	82.5	12.3	2280	25	10
GRIMM	9053907	4175	104.75	15.2	3564	24	7.5
DAAN	9201956	2953	88.95	12.4	2080	21	9.3
SEG	9066045	2300	81.44	11.3	1596	23	23.4
DRAIT	9195688	3650	89.4	12.5	2218	25	21
HELEN ANNA	9582867	3650	87.84	12.8	2452	20	22.8
SWE CARRIER	9194048	4550	98.94	13.8	3170	26	27.5
AMKE	9374387	6424	115.46	16.5	5232	23.2	26.5
CELTIC SPIRIT	7521132	4001	91.09	15.51	2978	27	27
RMS RHENUS	9223423	2688	88	11.41	1898	23	8.26
FLINTERMAAS	9180877	6200	111.75	14.95	4503	35	20.8
KAROLI	9180841	5727	100.85	14.5	3954	34	34
KERET	9103972	2300	81.44	11.58	1596	24.5	23.4
LUHNAU	9213595	3720	87.84	12.8	2461	20	19.6
AASLI	9060778	6630	99.95	15.85	3968	28	29
POMMERN	9108427	3006	88.45	11.4	2060	20	24.7

WILSON LIVORNO	9617325	3800	89.86	12.8	2589	20	15.6
PRIWALL	9051208	3735	87.9	12.8	2446	25	25
EEMS SPRINTER	9421611	2620	87.27	11.42	1862	22	8.5
FEHN COURAGE	9556818	2610	87.91	11.41	1942	27	9.25
ELENA	9195901	4956	94.96	13.17	2997	26	21.7
JOMI	9038397	4258	88.2	13.66	2827	27	16.2
PERU	9017410	4279	90.12	15.2	2994	25	25
TINA C	9416331	5664	99.6	14.5	3391	33	24.35
BIRYUZA	9549621	5026	89.96	14.5	3505	24	24
LAUREN C	9373527	5000	89.8	14.5	2990	26	24.3
LADY CHRISTINA	9201815	5375	108.5	15.88	4235	29	29
HANSEATIC TRADER	9229128	4338	89.25	13.4	2901	29	25.3
AASHEIM	9247106	5826	107.05	15	4112	28	26
SUDERAU	9313682	3707	87.98	12.9	2461	24	19.6
EDZARD CIRKSENSA	9375824	3630	88.24	12.4	2451	24	13.5
WILSON HAWK	9064906	4284	91.2	13.8	2811	23	26.2
LADY MARY	9375836	3612	88.3	12.4	2451	23	12.3
STRAMI	8922254	4245	88.25	13.17	2998	23	21.5

APPENDIX N FUNNEL EMISSIONS TECHNICAL NOTE

TECHNICAL NOTE

Client	Arcadis	Attn.	Martin Bates
TN Ref.	J47252	Pages	2
Client Reference	J47252-TN1	GM Reference	J47252
		From	George Reed
Project	M4 Corridor around Newport – Shipping Study		
Subject	Vessel Funnel Emissions		

Author	Checked	Approved
G. Reed	J. Farrell-Dillon	JFD

The guidelines for the emissions from a vessels funnel are outlined by the International Maritime Organization (IMO) MARPOL 73/78 Annex VI guidelines which covers the "Prevention of Air Pollution from Ships".

In order to control the Sulphur Oxide (SO_x) and Nitrogen Oxide (NO_x) particulate count in funnel emissions the IMO states that vessels operating within an Emission Controlled Area must use fuel with the agreed maximum Sulphur content and that all ships built after the year 2000 (and any engine of appropriate size installed after 1990) must meet the nitrogen oxides (NO_x) levels outlined in the IMO Annex V1 Regulation 13 Tier I, II and III grading.

From 1st January 2015 new requirements for ships came into force in the Emission Control Areas (ECA) in North Europe (Including the Baltic Sea, North Sea and English Channel) and North America (200 nautical miles from American and Canadian shore). The regulation lowered the maximum allowed content of sulphur in fuel burned in the ECA's to 0.1% sulphur from 1.0%.

The vessel operator is responsible for the vessel compliance with the IMO rulings and the regulations are enforced by local and international authorities who conduct periodic inspections and audits. Once a vessel has passed the required surveys the vessel is issued with an "International Air Pollution Prevention Certificate", the vessel will hold a "NO_x Technical File" for each engine, the file will contain the engine manufacture documents confirming that each engine complies with the NO_x emissions and will identify every part which is fitted to the engine that can affect the NO_x emissions of the engine, this document is amended as the engine undergoes routine maintenance.

On the assumption that an engine, boiler, inert gas generator and fuel system is operating correctly and within its limits, the emissions from the funnel will be clear or hazy and will not obscure vision.

However black smoke can at times be emitted from engines, oil fired boilers and inert gas generators. The black smoke consists of fuel which has not burnt completely during the combustion process and is generated due to an imbalance in the air fuel mixture.

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Smoke can also be produced from burning waste in incinerators and boilers however waste is prohibited from being burnt in ports, harbors and estuaries and many vessel operators land all waste materials to a shore side disposal facility.

Black smoke from a boiler or an inert gas generator is produced during the startup process, it is typically short term and will disperse rapidly. The prolonged production of black smoke from a boiler will be due to an incorrect setting or a boiler component fault. The Engine Room Department will be alerted to a boiler system fault by the vessels alarm system, and in addition the production of excessive smoke will be observed by the Bridge Watch Keeper who will advise the Engine Room Department to take corrective actions and if required shutdown the boiler.

Black smoke from an engine will occur during engine start up, large or sudden changes in load, component failure, operating outside recommended engine limits or control circuit failure.

Black smoke generated during a large or sudden change in engine load is typically short term and will dissipate. The emissions will return to normal as soon as the fuel air mixture has been restored to correct levels.

On a typical vessel, two different types of engines are operated, auxiliary engines to provide electrical power and main engines to provide propulsion. The auxiliary engines operate at constant speed and their fuel consumption will vary depending on the electrical load. During the arrival to and departure from the berth, the electrical load will not vary significantly, so there will be no significant change in the engine exhaust.

The main engines are operated to provide propulsion and their design is optimised for long term continuous steady operation. However during arrival to and departure from the berth, generally the demand for thrust from the main engine will be minimal and intermittent and the vessel may be manoeuvred with the assistance of tugs. All of these factors will reduce the volume of exhaust gasses generated.

The engine room department will be alerted to an engine component failure or a failure of the control circuit by the vessel alarm system, engine room mimic panels and during engine room inspections. Any deviation from the expected running condition will require the operator to take corrective actions, e.g adjust the engine load, take manual control or shut the engine down. Additionally the Bridge Watch keeper should minimize heavy engine load changes when transiting under structures and will contact the Engine Room Department and alert them when the funnel emissions are observed to be heavier than normal.

To summarise the smoke emissions from a vessels funnel are influenced by the age, role, engine type, engine size and fuel used; however the emissions will be maintained to a minimum when the maintenance schedule for the engines, oil fired boiler or inert gas generator is up to date, approved parts are used and the equipment is operated by skilled persons.

There is always the risk of some smoke production due to an equipment failure, however by using appropriately skilled persons and well maintained equipment the quantity of smoke produced will be kept to a minimum.