EemsEnergyTerminal

Floating LNG-Terminal

at the port of Eemshaven

Terminal Marine Manual

(ELNG-RHD-OPS-OPS-IOM-000001)

Note: The Terminal Marine Manual is subject to further amendments and was prepared by EemsEnergyTerminal exercising all reasonable care. While the information herein is believed to be correct at the time of publishing this document, EemsEnergyTerminal makes no guarantee and assumes no responsibilities regarding it or any information, which may appear in other, supplemental publications. Information furnished herein may be revised from time to time.

Rev	Date	Revision	Prepared by	Verified by	Approved by
	21-10	Complete version	N. Zonneveld	S. Huisman B. van Vliet	J. Fidder
1	02.11.2023	Updated complete version	M. Hömmen	D. Pol	C. Patricio
2.1	17.04.2024 26.07.2024 24.01.2025 27.06.2025	Update section 3.4.5 Update section 4.15 Update section 2.2 Update section 4.5	M. Hömmen	O. Kuipers	C. Patricio
3.1	22-01-2026	Updated section 2.17 Updated section 2.18 Updated section 3.4.5 Updated section 4.1 Updated section 4.2 Updated section 4.4 Updated section 4.6	E. Heijkoop	O.Kuipers	S. Berbers

Department: EemsEnergy Terminal
Document: EET Terminal Marine Manual
Date version: 22-01-2026
Our reference: ELNG-RHD-OPS-OPS-IOM-000001
Status: Version 3.1

Concourslaan 17
9727 KC Groningen

Postbus 19
9700 MA Groningen

T: +31 (0)50 521 91 11
KVK 86125877

E: info@EemsEnergyTerminal.com
EemsEnergyTerminal.com

Port and Terminal Contact Details

Port Authority and Related Services	Organisation	Contact details
Harbour Master (Pieter van der Wal)	Groningen Seaports	+31 (0)596 640 400 pvdw@groningen-seaports.com
Port Security Officer	GSP (PSO)	+31 (0)596 640 400 portsecurity@groningen-seaports.com
Operational Shipping Affairs	GSP	+31 (0)596 640 400 operations@groningen-seaports.com
Nautical Service Centre ("NSC")	GSP	+31 (0)596 640 477 nsc@groningen-seaports.com VHF channel 66
Vessel Traffic Centre Ems	Joined RWS & WSA	VHF channel 74
VTS Eemshaven	(part of NSC)	VHF channel 01
Immigration Office Eemshaven		+31 (0)596 516 101
Access Channel Authority	Rijkswaterstaat NN ("RWS")	+31 (0)887 974 400 vergunningenrwsnn@rws.nl
Wasserstraßen- und Schifffahrtsamt Ems-Nordsee (WSA Ems-Nordsee)		Normally contacted via RWS +4927-1877-281 VHF 74 (24/7) VTS-EMS@wsv.bund.de
Coast Guard		+31 (0) 88 958 4000 ccc@kustwacht.nl
Pilotage	Loodswezen	
Delfzijl Pilot Station		VHF 19
Towage and agencies	Wagenborg	+31 (0)596 636 230 for towage@wagenborg.com and +31 (0)596 636 254 for agency@wagenborg.com
Terminal Operator	EET	
Emergency		+31 (0) 50 521 15 00 (CCP)
Port Facility Security Officer	PFSO	Portfacilitysecurityofficer @eemsenergyterminal.com
Control Room		Operations@eemsenergyterminal.com
Marine Supervisor		+31 628585188 Marinesupervisor @eemsenergyterminal.com
Main Office		Sales@eemsenergyterminal.com
FSRU Energos Igloo	Control room	+31 643 56 54 68 EnergosIgloo@nmm.stena.com
FSRU Eemshaven LNG	Control room	+32 478 87 04 47 master@eemshaven-lng.com
Police		112
Fire Brigade		112
Ambulance		112

Table of Contents

1 Introduction

1.1 Statement of Purpose

This manual brings together relevant information on Eemshaven / Groningen Seaports (GSP), the Ems-Dollar estuary access channel controlled by Rijkswaterstaat (RWS) in cooperation with the Wasserstraßen- und Schifffahrtsamt Ems-Nordsee (WSA Ems-Nordsee)) and the EemsEnergyTerminal (EET) for the Liquefied Natural Gas (LNG) shipping activities related to the Floating Storage and Regasification Unit (FSRU) LNG Import Terminal in the Wilhelmina haven in Eemshaven. In a later stage, the terminal is planned to be redeveloped into an onshore LNG import terminal. This document only applies to the FSRU-based facility but is a live document and revisions/updates will be prepared regularly.

1.2 Scope of Application

This document does not replace any of the formal Port or Terminal procedural requirements, but merely highlights some key information. For marine issues and questions, the LNG vessel Master is advised to contact the Marine Supervisor at EET, the Harbour Master, or the Nautical Service Centre at GSP.

The matters addressed in this manual are subject to contracts between EET and its customers, GSP and RWS regulations, and regulations issued by international organizations. Masters using this manual are obliged to make sure they have the latest versions of all relevant regulations at their disposal and may not rely on this manual for the correct version of any applicable laws, regulations or international standards or practices. Masters are also obliged to make sure they are in compliance with all health, immigration, notification and customs requirements. This Manual gives an overview of some of the requirements.

1.3 References

In addition to the documents included in the Appendices, the following documents (or their updated revisions) (may) contain useful and relevant information:

1. LNGC Admission Policy (Appendix DD)
2. LNGC Admission Protocol (Appendix EE)
3. International Convention on Load Lines, 1966 with Protocol of 1988 and amendments up to 2018
4. International Convention for the Safety of Life at Sea Consolidated 2020 and Amendments up to 2020
5. International code for the Construction and equipment of Ships carrying Liquefied Gases in Bulk (IGC Code)
6. International Convention for Prevention of Collision at Sea 1972 (COLREGS) and amendments up to 2013
7. International Convention for the Prevention of Pollution from Ships, 1973 (Convention, 1978 (1978 Protocol), 1997 (Protocol – Annex VI) (MARPOL 73/78) and Amendments up to 2018.
8. International Telecommunication Union (ITU) Radio Regulation, 2008

9. International Convention on Tonnage Measurement of Ships, 1969 as amended by IMO Resolutions.
10. IMO Resolution A.468(XII) "Code on Noise Levels on Board Ships".
11. IMO Resolution A.343(IX) "Recommendation on Methods of Measuring Noise Levels at Listening Posts".
12. OCIMF "Mooring Equipment Guidelines, MEG4 (2018)
13. OCIMF Guidelines and recommendations for the safe mooring of large ships at piers and sea islands 1994
14. OCIMF Recommendations for ships' fittings for use with tugs, 2002
15. OCIMF / SIGTTO Recommendations for Liquefied Gas Carrier Manifolds 2018
16. Ship to Ship Transfer Guide for Petroleum, Chemicals and Liquefied Gases first ed 2013
17. IMPA Recommendation for pilot ladders
18. SIGTTO Recommendations for the installation of cargo strainers on LNG carriers 1992
19. SIGTTO Guidelines for the Alleviation of Excessive Surge Pressures on ESD for Liquefied Gas Transfer Systems (2nd ed 2018)
20. SIGTTO ESD Systems Recommendations for Emergency Shutdown and Related Safety Systems (2nd Ed 2021)
21. SIGTTO Port information for LNG export and import terminals
22. SIGTTO Liquefied Gas Handling Principles on Ships and Terminals (4th ed)
23. SIGTTO Guidance on Gas Carrier and Terminal Gangway Interface (2021)
24. SIGTTO LNG Shipping Suggested Competency Standards (2021)
25. SIGTTO Detection and reporting of Fugitive Methane Emissions from LNG Carriers (1st Ed 2022)
26. ISO 4406: 1999 Hydraulic fluid power fluids method for coding level of contamination by solid particles
27. IMO Resolution A.330 (IX) "Safe access to and working in ballast spaces"
28. IMO Resolution A.601 (15) Provision and display of manoeuvring information on board ships
29. IMO Resolution A.708 Navigating bridge visibility and functions (except side visibility)
30. IMO Resolution A.719 (17) Prevention of air pollution on ships
31. IMO Resolution A.830 (19) Code on alarms and indicators
32. IMO Resolution A.868 (20) Guidelines for the control and management of ship's ballast water to minimize the transfer of harmful aquatic organisms and pathogen (except ballast water management plan)
33. IMO Resolution MSC.137 (76) Standards for ship manoeuvrability
34. IMO MSC Circular 1053 Explanatory notes to the standards for ship manoeuvrability
35. IMO MEPC.1(Circ.511 Integrated bilge water treatment systems
36. IMO MSC Circular 1097, June 2003 Guidance relating to the implementation of SOLAS Chapter XI-2 and the ISPS Code (Part A (Mandatory) only)
37. IMO Publication No. 978 Performance standards for navigational equipment (1997 edition)
38. International convention for the control and management of ship's ballast water and sediments 2004
39. International convention on the control of harmful anti-fouling systems on ships, 2001
40. International convention on standards of training certification and watchkeeping (STCW) 1995 and later amendments
41. ISGOTT Ship-Shore Safety Checklist (for FSRU to Shore and Ship-Ship)

42. ISO 14276-1 Ships and marine technology – Identification colours for the content of piping systems – Part 1: Main colours and media - Part 2: Additional colours for different media and/or functions (the pipeline will be marked with colour tape)
43. ISO 45001 Occupational health and safety management systems
44. ISO 7547: 2002 (E) Accommodation ventilation & air conditioning (design conditions and basis of calculation)
45. ISO 8861: 1998 Shipbuilding – engine-room ventilation in diesel engine ships design requirements and basis of calculation
46. ISPS International Ship and Port facilities Security
47. GIIGNL 2017 LNG Custody Transfer Handbook
48. ISO/TR 17177 Guidelines for the marine interfaces of hybrid LNG terminals
49. OHSAS 18001

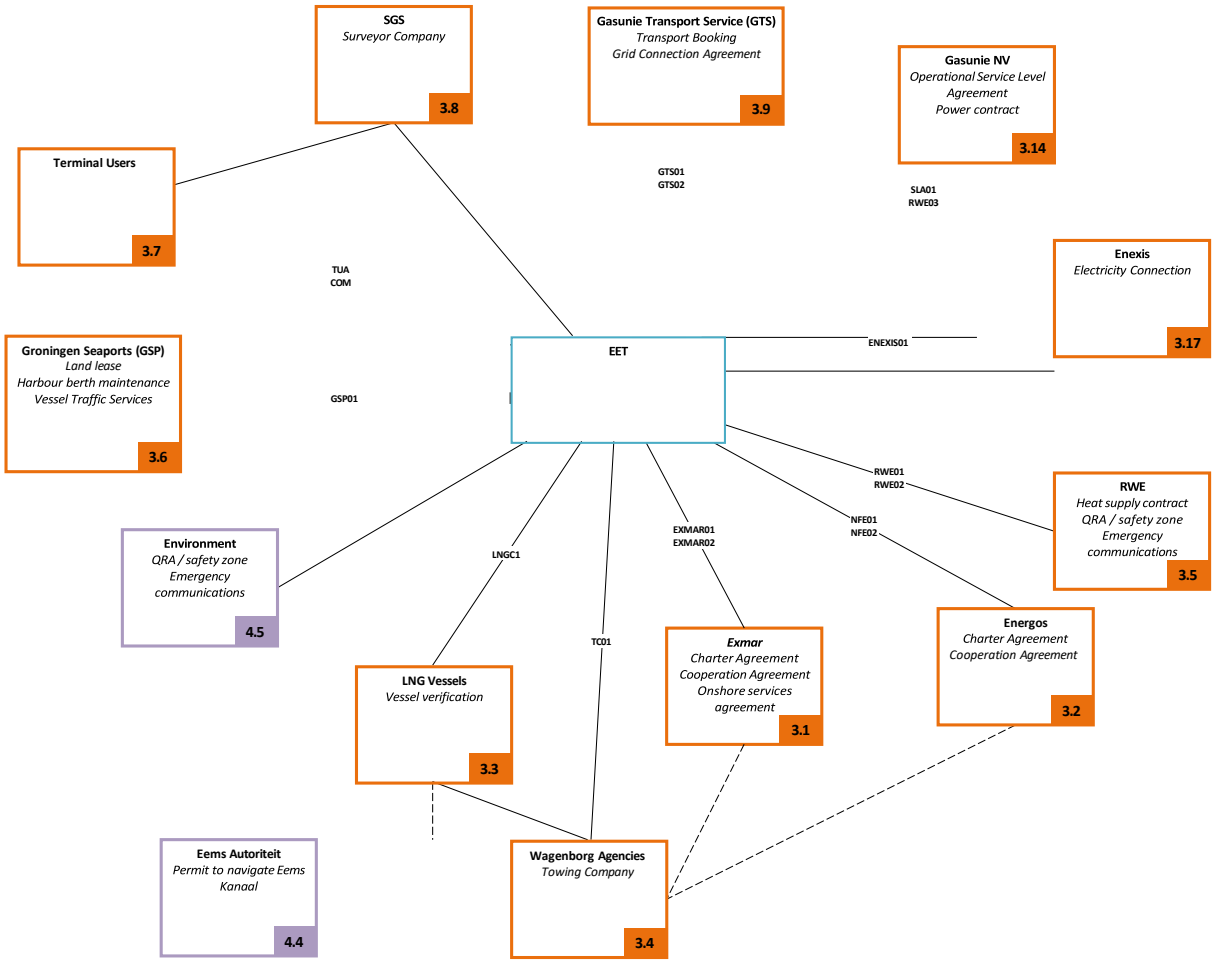
1.4 Definitions/Acronyms

CL	Centre Line
CTS	Custody Transfer System
EET	EemsEnergy Terminal
ESD	Emergency Shutdown (System)
ETA	Estimated Time of Arrival
ETD	Estimated Time of Departure
FSRU	Floating Storage and Regasification Unit
GSP	Groningen Seaports
IMO	International Maritime Organization
IOPP	International Oil Pollution Prevention Certificate
ISGOTT	International Safety Guide for Oil Tankers and Terminals
ISPS	International Ship and Port Facility Security Code
LNG	Liquefied Natural Gas
LNG vessel	The visiting LNG carrier, supplying LNG to EET
MARPOL	(Marine Pollution) – International Convention for the Prevention of Pollution From Ships
MBL	Minimum Break Load
NMS	Navigator Marginal Ships
NOR	Notice of Readiness
NSC	Nautical Service Centre (the main contact for visiting LNGC)
OCIMF	Oil Companies International Marine Forum
Terminal Operator	EET
PBS	Pilot Boarding Station
PERC	Powered Emergency Release Coupler
Port	Eemshaven or Groningen Seaports
PPE	Personal Protective Equipment
QRH	Quick Release Hook
RWS	Rijkswaterstaat (Access Channel Authority)
SIGTTO	Society of International Gas Tanker and Terminal Operators
SOLAS	International Convention for the Safety of Life at Sea
SOPEP	Shipboard Oil Pollution Emergency Plan
Terminal	EET

TUA	Terminal Use Agreement
VTS	Vessel Traffic Service (incl. berths, tugs, weather info)

1.5 Organograms

In below graphic, the organizational set-up of EET and the relation/interaction with various parties is depicted.



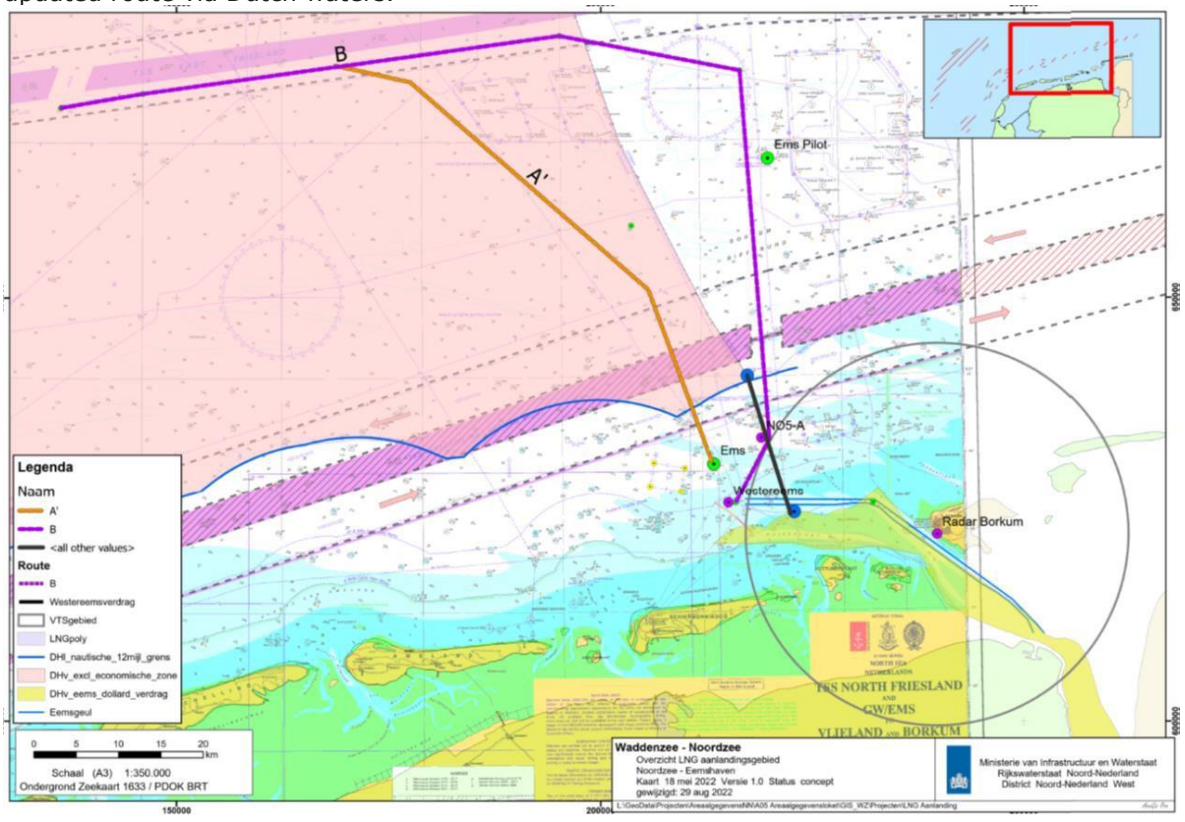
2 Eemshaven

2.1 Port Location and Description

Eemshaven is a commercial and industrial port complex in the northeast of the Netherlands in an area reclaimed from the sea between 1970 and 1974. This relatively new deep-sea port complex undergoes a fast development as energy port. Groningen Seaports (GSP) manages the port as well as the industrial area. Eemshaven contains several power plants (gas, coal, wind – 8 GW installed capacity), a substantial recycling industry and cargo transhipment and storage facilities for dry and liquid bulk, roro, and general cargo. Annual cargo throughput Eemshaven in 2021 was over 7 million tons.

2.2 LNG vessel Approach and Anchorage

Description / illustrations of main access route(s) from open sea via the TSS East Friesland (Northern TSS) towards the pilot boarding area, also showing the anchorage 9 for larger waiting vessels that go for anchor. If Anchorage 9 is full the LNGC may contact the Dutch coastguard for guidance on an alternative anchorage area or decide to stay sailing (dead-slow ahead) North of the Terschelling – German Bight (Southern TSS). The seabed North of the Southern TSS has not yet been surveyed for potential presence of debris.
The new route map also to show a production platform South of the Northern TSS some 10 NM west of Gemini 2, which LNGC must pass before turning South towards the Eemshaven pilot boarding via the updated route via Dutch waters.



A nautical safety study for access of LNG vessels by Marin is available with support from RWS & Dutch Coastguard (and after consultation with WSA). Reference Marin rep nr 34294-1-MO-1.1 dated 30 Aug 2022

plus addendum memo (rev 0.1) with expert opinion reroute 4 and on the image above shown as A[1] (as amendment to route 2).

Based on the available info two viable routes are available for initial approaches from the TSS East Friesland (Northern TSS) to the WesterEems Racon buoy for Dutch pilot boarding station South of the TSS Terschelling – German Bight (Southern TSS) (using a pilot tender).
One of these (A[1]) stays in Dutch waters and no pilot boarding is required to cross the TSS Terschelling – German Bight (Southern TSS). The second (B) (somewhat longer) route passes through German waters and requires a German pilot boarding (with aid of a helicopter) at Ems Pilot before crossing the TSS Terschelling – German Bight (Southern TSS) towards the pilot boarding at WesterEems Racon buoy, where the German pilot is changed for two Dutch pilots before passage entry into the channel towards the Eemshaven port. Dutch pilots normally will board the LNG vessel using a pilot tender, but in more adverse sea-waters a helicopter transfer can act as back-up to allow using an available high-water tide-port.

Currently the TSS Terschelling – German Bight (Southern TSS) is banned for all dangerous cargo vessels larger than 10,000 GT.

DISCLAIMER

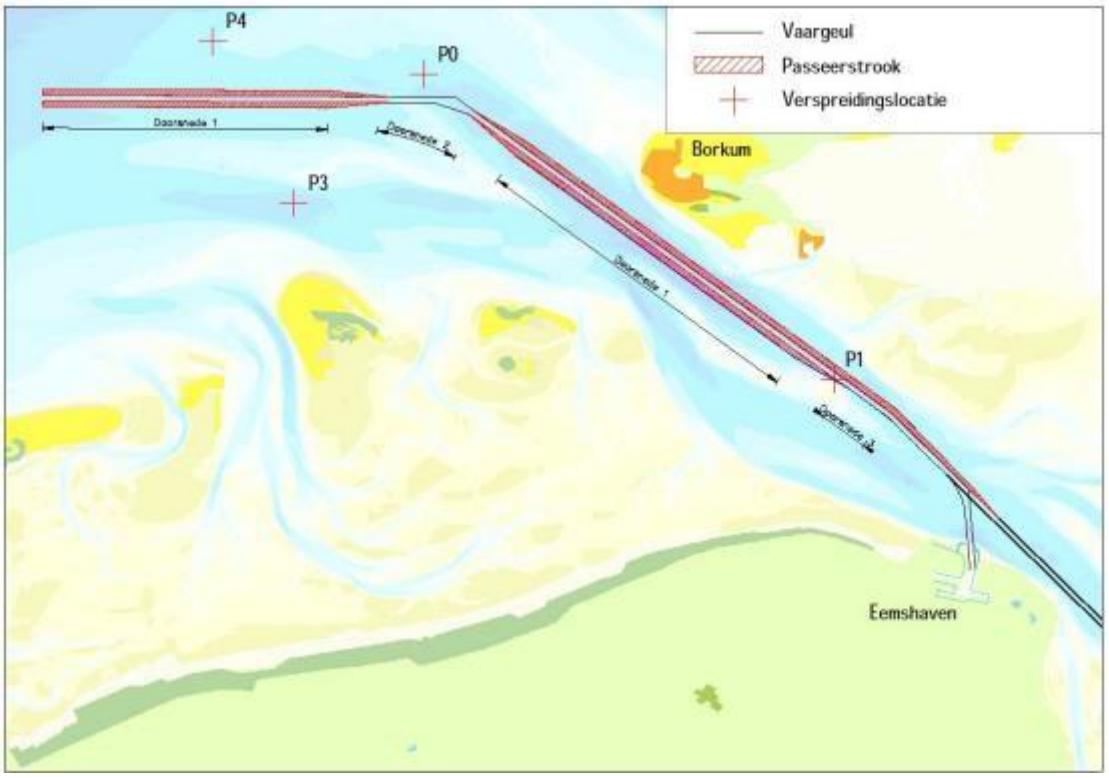
From a nautical, practical and operational perspective route A is regarded by EET as the most safe approach of the Weterems pilot station from the TSS East Friesland. From a legal perspective there is discussion whether this route can be defined as the shortest route from the TSS to the destination "which is safe". EET nor Rijkswaterstaat cannot be held responsible for any consequences if the authority, responsible for law enforcement, decides to start prosecution for having used route A.

2.3 Access Channel Location and Description

Access to/from the port from/to the North Sea / Wadden Sea is provided via a buoyed/dredged channel through the Ems-Dollard estuary of approx. 20 nautical miles. The Access Channel Authority is Rijkswaterstaat (RWS). GSP and RWS work closely together via the Nautical Service Centre (NSC).
Access though the channel and assigning arrival (and departure) tidal windows is regulated by a computer program called "Protide", as operated by the NSC (refer section 2.7). In this specific vessel data (such as main dimensions and actual draft) are combined with met-ocean conditions (and other deep draft channel vessel movement).

The channel is used by seagoing ships to the ports of Eemshaven, as well as Delfzijl and Emden (Germany). Total call is around 6000 per year, or 12,000 vessel movements in the channel. Smaller ships (e.g., IWT-vessels, pleasure craft) also use the estuary, but are not channel bound. In recent years tidal restricted access to (or from) the Eemshaven occurred approx. once per day.

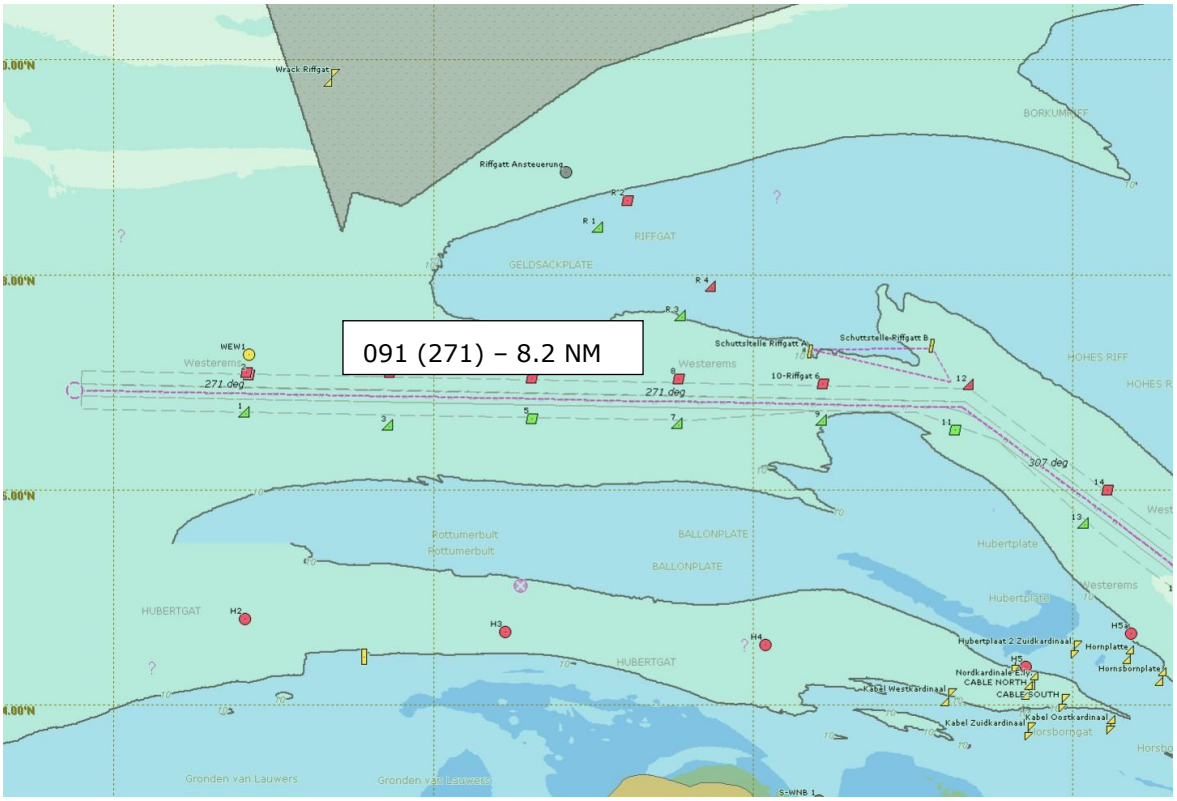
The present Access Channel to the Eemshaven port is shown below.



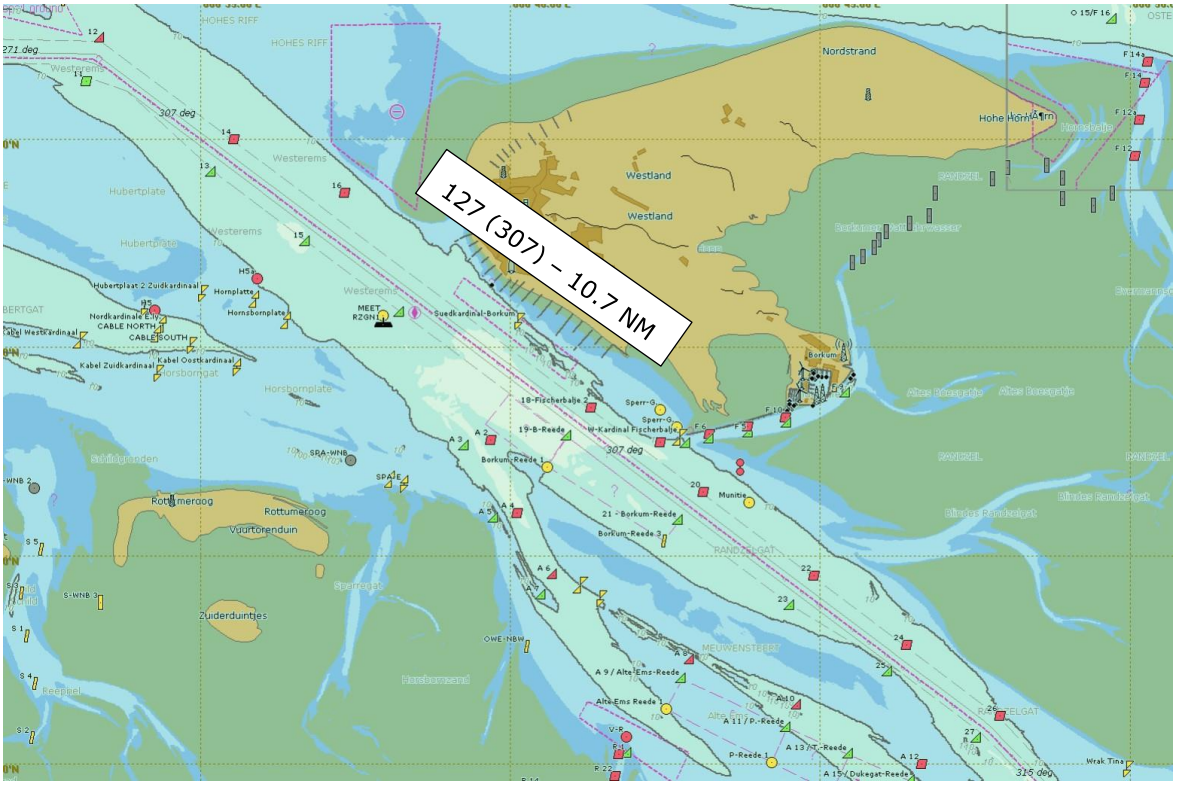
In the table below and subsequent figures the tracks of the route through the approach channel are given. The total length from start of the channel until alongside in the Wilhelmina haven is 23.8 NM.

Track (reciprocal)	From waypoint	To waypoint	Distance [NM]	Distance [km]
091 (271)	Buoys 1 & 2	Buoys 11 & 12	8.2 NM	15.3 km
127 (307)	Buoys 11 & 12	Buoys 26 & 27	10.7 NM	19.8 km
135 (315)	Buoys 26 & 27	Buoy 30	2.1 NM	3.9 km
175 (355)	Buoy 30	Inside port moles	1.5 NM	2.7 km
195 (015)	Inside port moles	Turning area	0.6 NM	1.2 km
105 (285)	Turning area	LNG terminal	0.7 NM	1.3 km

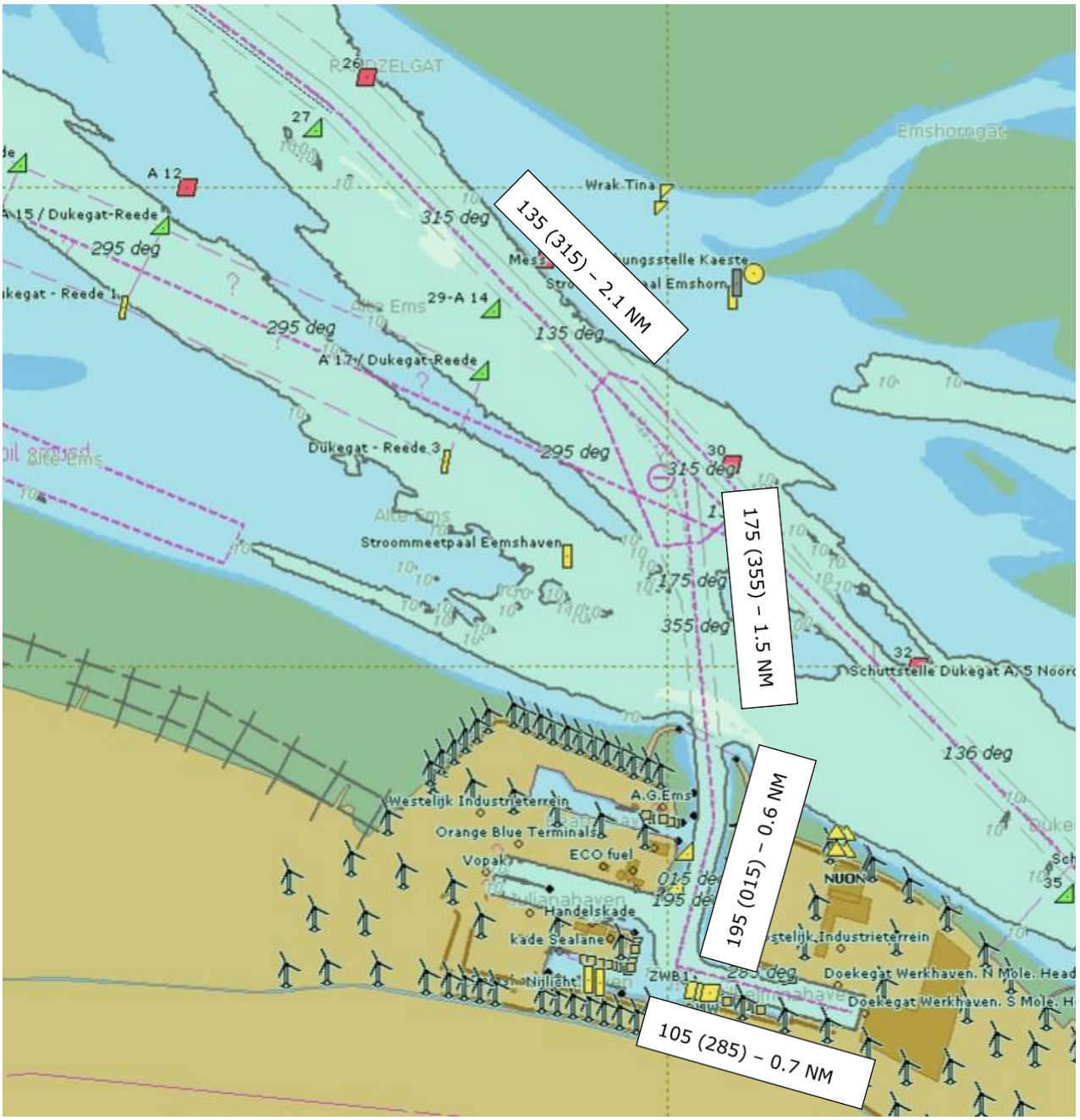
Outer section of the approach channel



Middle section of the approach channel



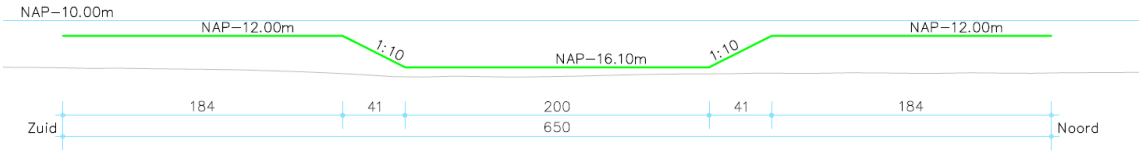
Inner section of the approach channel



Final approach to the Eemshaven port entry

The widened channel SW of buoy 30 is called the "diamant", and is a designated zone where vessels can turn back to open sea for the event the entry to the port would not be possible (e.g. due to sudden dense fog).

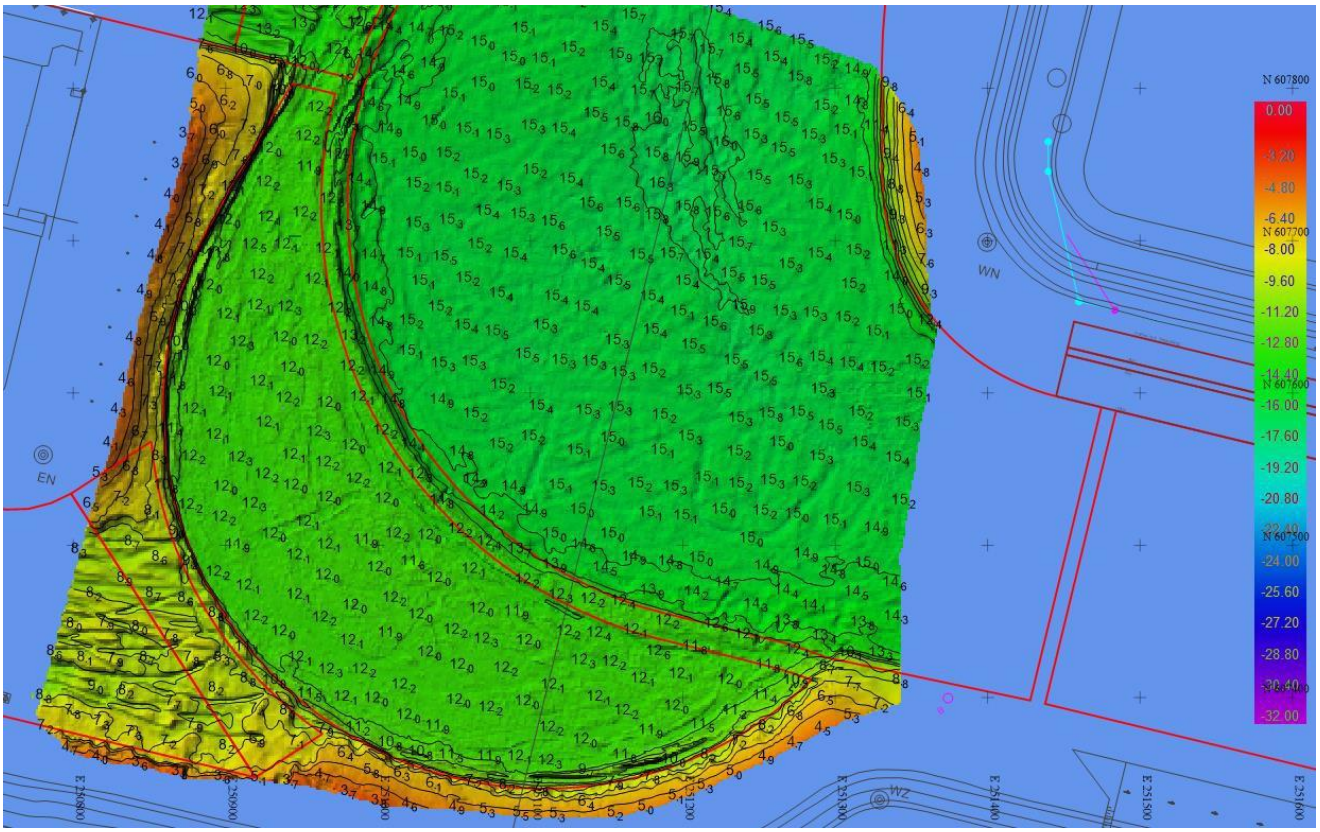
Parts of the access channel have limited natural depth and are regularly dredged. A typical cross section of the dredged sections of the (outer) channel is shown in the following figure for a straight section. Note: NAP = MSL = LAT + 1.9m.



Channel width and design dredged depth along the channel reduces from NAP -16.1 m in the outer section to -15.0 just outside the port entrance

More information is available on https://www.groningen-seaports.com/en/ and the GSP Nautical Directory.

The following figure reflect the latest bathymetric info as received from GSP for the Doekegat channel turn area and the berth area inside the Wilhelmina port basin, showing that maintained water-depths in the main approach channel and berth area is maintained at 15 m from NAP (= MSL), whilst the South side of the turn area for arriving LNG vessels at high tide provides 12 m water-depth below NAP.



2.4 Terminal Location and Description

The EET is (in the first phase of development) based on two FSRUs. Along the north quay of the Wilhelmina haven, a large FSRU ('Energos Igloo') is permanently moored, as well as a smaller FSRU barge ('Eemshaven LNG'; formerly known as 'S188'). LNG vessels will moor (bow-west) alongside the Energos Igloo via ship-to- ship mooring and transfer their cargo into the Energos Igloo via cryogenic hoses. All mention of 'FSRU' in this document refers to the Energos Igloo and not the FSRU-barge ("Eemshaven LNG") , unless explicitly mentioned otherwise.

An impression of the terminal configuration is provided below, a Marine Layout drawing is provided in Appendix B.

2.5 Admission Policy for LNG vessels

In principle, LNG vessels of 180,000m3 carrying capacity maximum are acceptable at EET. The following LNG vessel maximum dimensions will apply: Loa 300m / Beam 50m / Draft 12m, as per LNGC Admission Protocol issued by RWS (reference 2). This was among others established via desk- to analysis and full-mission bridge simulations at Marin (refer to Marin report on channel assessment and full-mission bridge simulation: "Nautical studies for LNG import in the Eemshaven", report no. 34226-1-MO rev 1.0 dated 21 July 2022).

LNG vessels require a compatibility assessment prior cargo delivery to EET. See also Section 4.2. An LNG vessel mooring at EET FSRU based terminal is mandatory 'bow out' (i.e., 'starboard side alongside'). No exceptions will be allowed.

Due to the proximity of the east quay in the Wilhelmina haven and the activities there, LNG (spherical) vessels with large manifold offset from midship will not be acceptable, as they would encroach on the marine operational area there. LNG vessels with a distance between manifolds centre line and stern of more than 157.5m will extend too much 'behind' the FSRU and will not be allowed to call at the facility, as they would be less than 75m from the east quay.

After completion of the ship/shore compatibility assessment by EET upon first nomination of the subject vessel and with positive result, for each planned visit a permit needs to be applied for with the access

channel authority Rijkswaterstaat (RWS). The permit application (in Dutch) needs to be dealt with by the Ship's Agent. The related form (see Appendix E) needs to be completed and submitted preferably at least three working days prior to arrival, but in extraordinary cases an emergency procedure time of less than 4 hours may be feasible.

After acceptance of the LNG vessel by EET, RWS and GSP, at least 96 hrs prior to arrival at the terminal, ETA should be communicated. All Port and Access Channel Authority admission and communication procedures (GSP and RWS) should be adhered to, especially as tidal window restrictions apply to ships with draught deeper than 11.0m see Section 2.7.

In principle, LNG vessels should wait and possibly anchor outside the access channel, in case of early arrival or if so instructed by EET or LNG vessel's agent (e.g. for Terminal delayed availability). Info on movements or anchorage of waiting LNG vessel to be communicated with the Dutch coastguard or on the river Ems, Ems traffic. Channel passage should be in principle uninterrupted from fairway buoy to EET. In case of unexpected events, several locations along the access channel allow for (emergency) stoppage and anchorage. Anchorage and possible turn-back locations are further described in Section 2.2.

Pilotage and towage are compulsory, see Sections 2.9 and 2.10.

2.6 Port Met-ocean Environmental Data

For general and actual information regarding existing weather, tides, current, sea conditions, fog, ice, etc. VTS Eemshaven can be contacted via VHF channel 01, or the NSC at +31 (0)596 640 477.

Actual information and predictions for a variety of relevant parameters (tide, current, wave, wind) for Eemshaven and the access channel and online weather information (in Dutch) can also be found at https://waterberichtgeving.rws.nl/klanten/regio-eemsmond.

2.6.1 Tide/water level

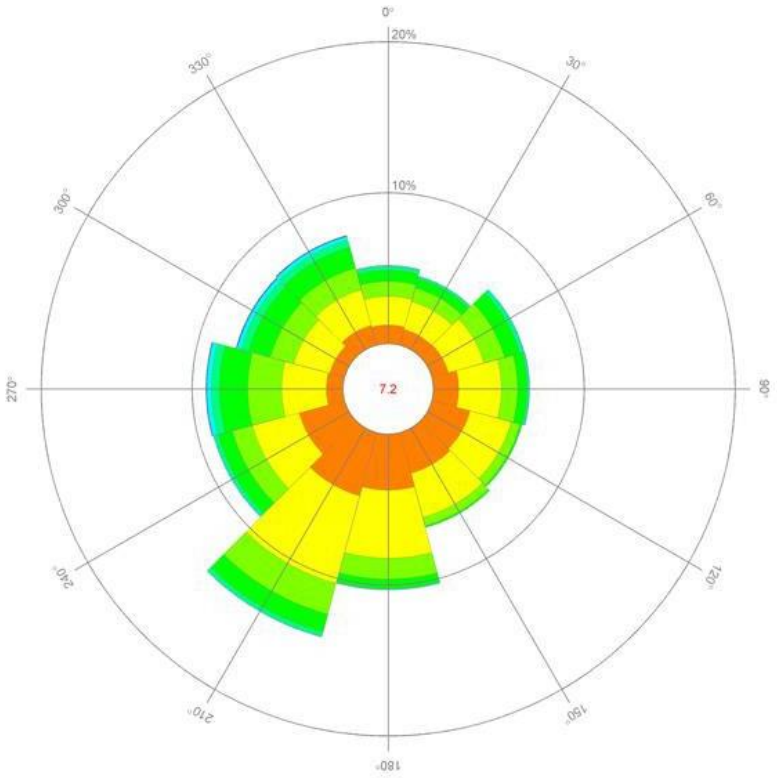
Actual tidal information is provided on the previously mentioned website. Eemshaven tidal levels are as indicated in below table.

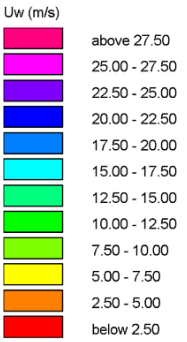
Tidal level	Water level [m NAP]
HAT	+1.65
MHWS	+1.34
MHW	+1.22
MHWN	+1.02
MLWN	-1.19
MLW	-1.40
MLWS	-1.57
LAT	-1.92

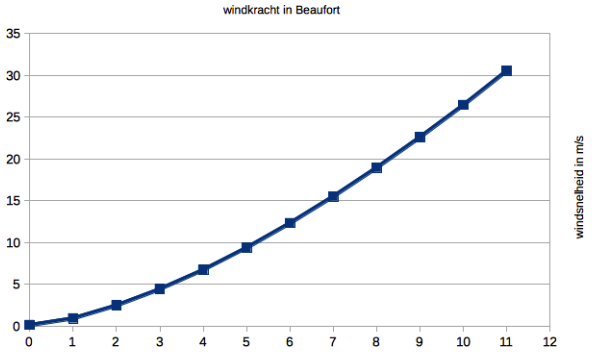
NAP = Nieuw Amsterdams Peil, or Mean Sea Level (MSL)

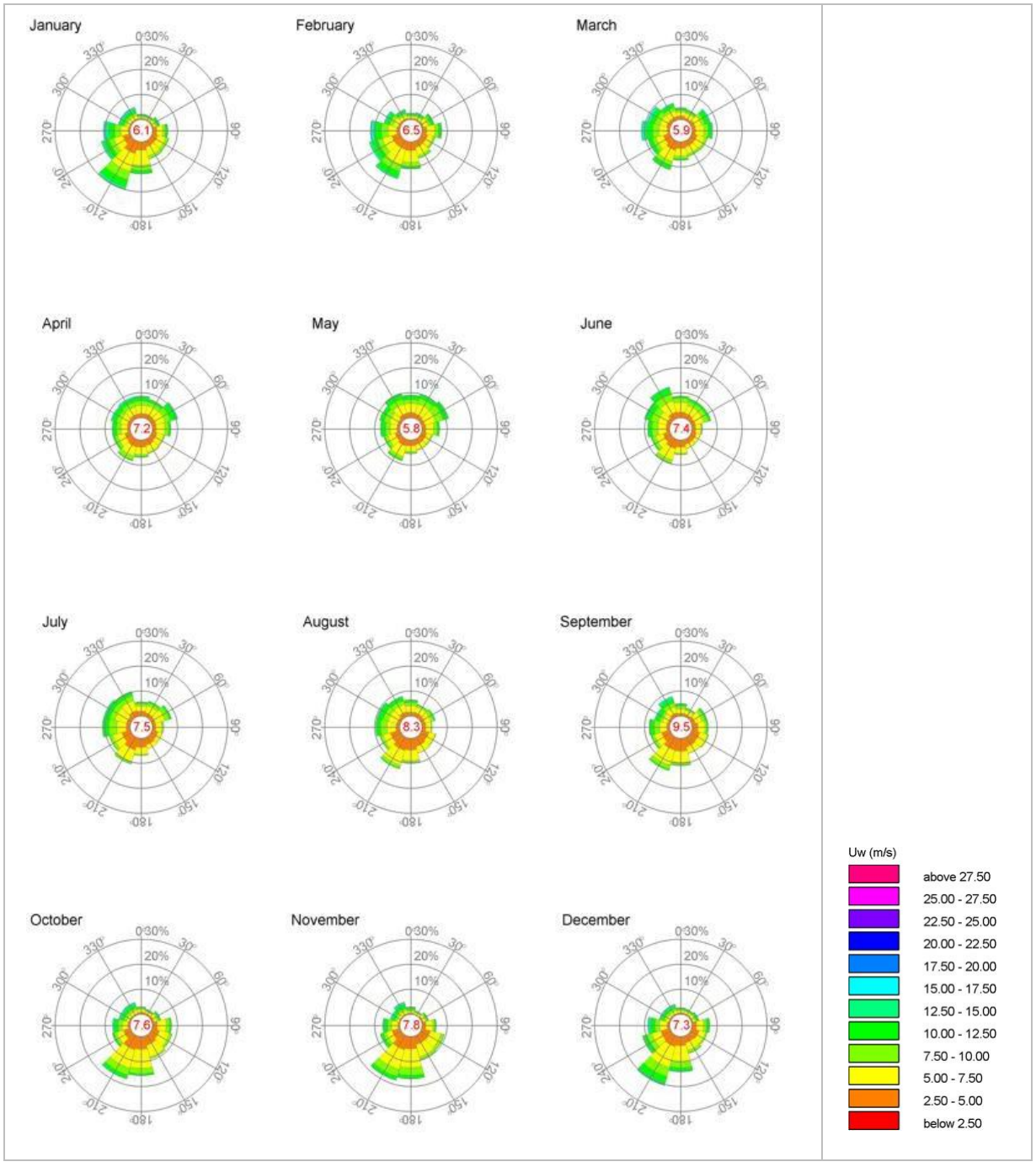
2.6.2 Wind

Annual 10-min wind speed and frequency for Eemshaven is shown in below graph; monthly data, including pivot table overleaf.









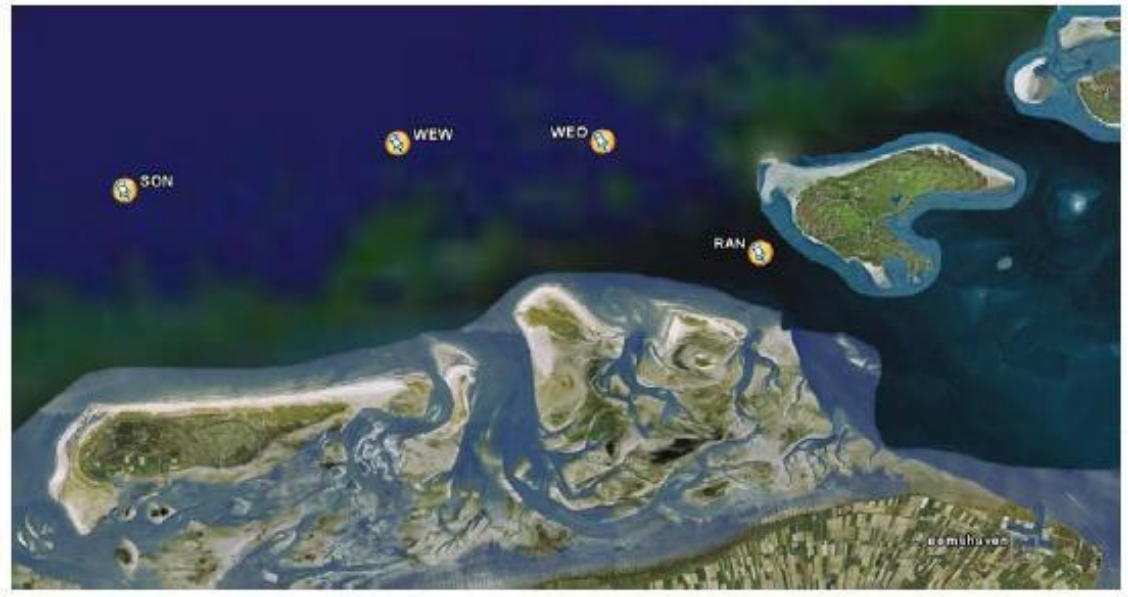
Uw (m/s)		Direction (degree N) -15 15	15 45	45 75	75 105	105 135	135 165	165 195	195 225	225 255	255 285	285 315	315 345	All classes [%]
0	2.5	0.424	0.431	0.390	0.508	0.731	0.878	0.966	1.164	0.684	0.354	0.296	0.423	7.249
2.5	5	1.237	1.079	1.121	1.673	2.619	2.788	3.708	4.331	3.111	1.098	1.006	1.348	25.119
5	7.5	1.893	1.895	2.440	2.825	2.809	3.028	4.506	6.013	3.206	2.966	2.468	2.444	36.494
7.5	10	0.995	0.936	1.425	1.076	0.617	0.575	1.392	2.112	1.374	2.251	1.614	1.504	15.87
10	12.5	0.750	0.628	1.035	0.620	0.130	0.113	0.603	1.228	0.981	1.858	1.502	1.421	10.87
12.5	15	0.213	0.144	0.246	0.132	0.004	0.003	0.078	0.272	0.230	0.543	0.503	0.486	2.855
15	17.5	0.077	0.051	0.069	0.045	0.000	0.001	0.033	0.063	0.079	0.306	0.267	0.260	1.251
17.5	20	0.022	0.003	0.008	0.007	0.000	0.000	0.002	0.008	0.009	0.048	0.059	0.047	0.214
20	22.5	0.002	0.001	0.002	0.000	0.000	0.000	0.000	0.001	0.002	0.015	0.018	0.024	0.066
22.5	25	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.004	0.002	0.01
25	27.5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.002
Total [%]		5.613	5.168	6.737	6.886	6.911	7.386	11.288	15.191	9.677	9.443	7.739	7.96	100

2.6.3 Waves

Waves in the Wilhelmina haven are negligible as the port is very sheltered, but during channel passage, waves do play a role.

For Bft 7 wind conditions, the general maximum allowable wind condition, the related significant wave heights from 5 directions for various locations is shown in below graphics.

"The mentioned BF7 is the general limit for channel passages for larger vessels that require to use the deeper channel. For LNG vessels the initial access regime will state a maximum of Bft 6 (or 13.8 m/sec) for channel passages and manoeuvres inside the Eemshaven port.



wind	sector		ZW	W	NW	NO	O
	dir	[°N]	225	270	315	45	90
	u	[m/s]	15.5	15.5	15.5	15.5	15.5
SON	Hs	[m]	2	2.7	3.2	2.8	1.9
	Tp	[s]	7	8	9	8	7
	dir	[°N]	270	295	315	20	45
WEW	Hs	[m]	2	2.7	3.2	2.6	1.7
	Tp	[s]	7	8	9	8	7
	dir	[°N]	270	295	315	20	45
WEO	Hs	[m]	1.8	2.3	2.9	2.4	1.5
	Tp	[s]	7	8	9	8	7
	dir	[°N]	270	295	315	0	45
RAN	Hs	[m]	1	1.3	1.4	1.0	0.5
	Tp	[s]	7	8	9	8	7
	dir	[°N]	270	295	315	315	120
overgang B27	Hs	[m]	0.7	0.9	1.0	0.7	0.5
	Tp	[s]	7	8	9	8	7
	dir	[°N]	270	295	315		120
Eemshaven	Hs	[m]	0.5	0.6	0.8	0.5	0.5
	Tp	[s]	7	8	9	8	7
	dir	[°N]	270	295	315		120

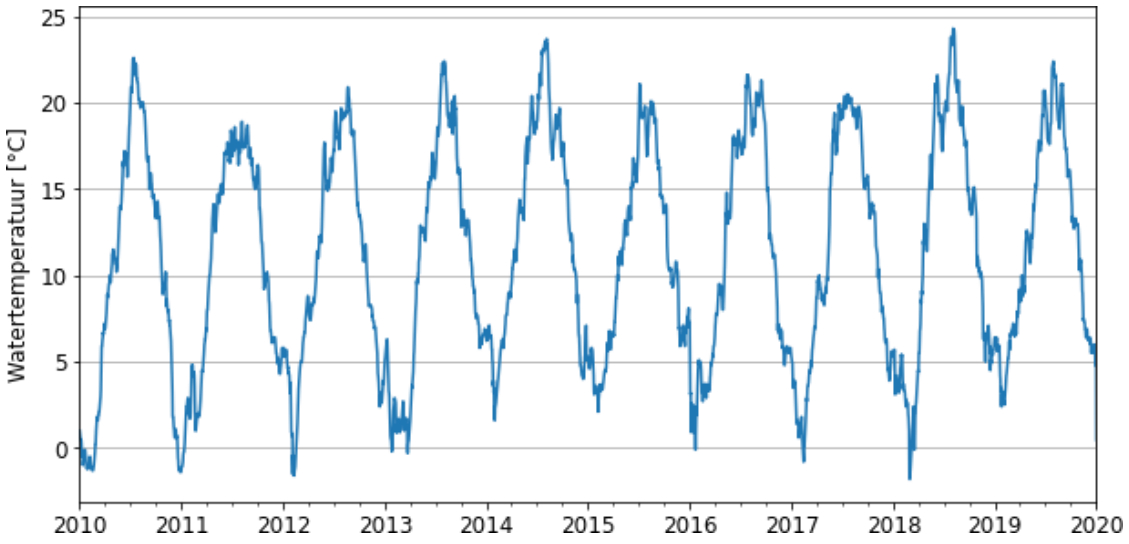
2.6.4 Current

Currents in the Wilhelmina haven are negligible.

Currents just outside the port entrance can be strong, hence the mandatory arrival and departure at slack tide. In general, ~1.5 m/s (3 kn) current in direction ~300 and ~120 occurs essentially at every ebb and flood maximum flow rate.

2.6.5 Water temperature

Daily averaged water temperature measurements in Eemshaven as collected by RWS near the Doekegat turning circle during the last decade are provided in the graph below



2.6.6 Water density

General range near port entrance from 1027 kg/m3 at high tide (in winter) to 1008 kg/m3 at low tide (in summer), based on water temperature and salinity range measurements, respectively -2 to +25°C and 15-33 psu. Additional information may be obtained via Harbour Master's Office.

2.6.7 Ice

Ice occurrence in Eemshaven and the surrounding waters is rare, and not recorded in a logical and structured manner. In harsh winters it can however occur. During four relatively recent 'harsh' winters, namely 1963 (~1:100 yr severity) and 1979, 1985 and 1996 (~1:10-20 yr severity), anecdotal evidence indicates that ice thickness may be up to 30 cm. When material ice formation was observed in the past, tugs (in port) and ice breakers on the channel were deployed to maintain access via the channel and in the main port basins. Costs for possible ice-breaking services are for the shippers that require access.

Chances of occurrence of certain thickness and number of days of occurrence cannot be estimated. During harsh winters, additional and actual information may be obtained via Harbour Master's Office and warnings and information (in Dutch) will be posted on https://waterberichtgeving.rws.nl/klanten/regio-eemsmond.

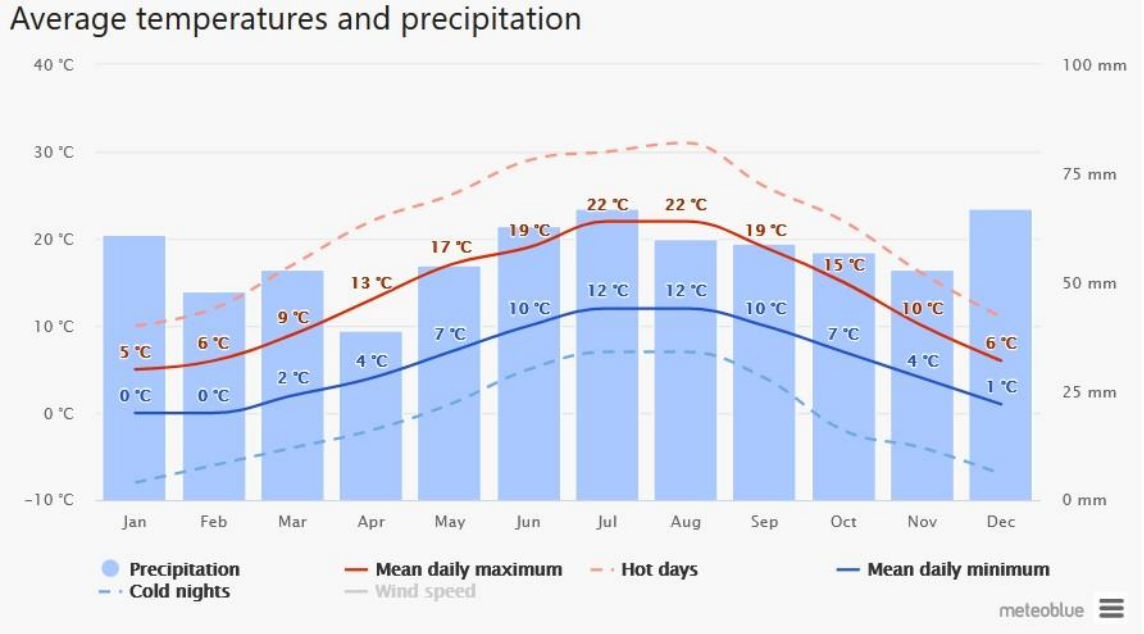
2.6.8 General weather

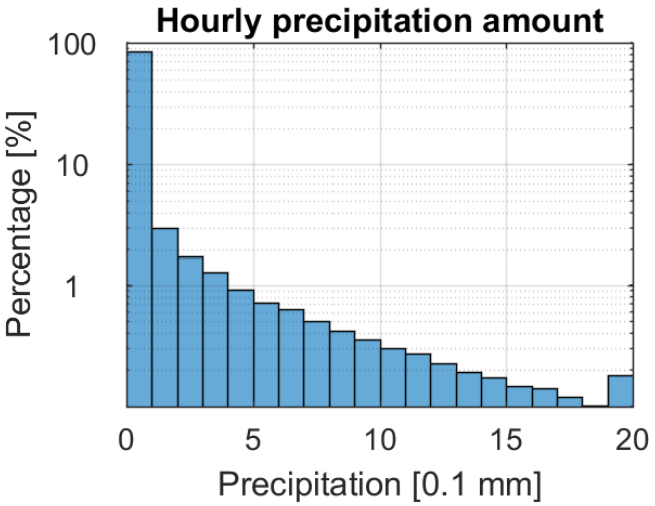
Air temperature

Air temperatures are relatively mild, due to the proximity of the Atlantic Ocean, with an absolute daily maximum summer temperature reaching 30°C and a relatively mild winter climate with an absolute daily minimum temperature reaching -25°C.

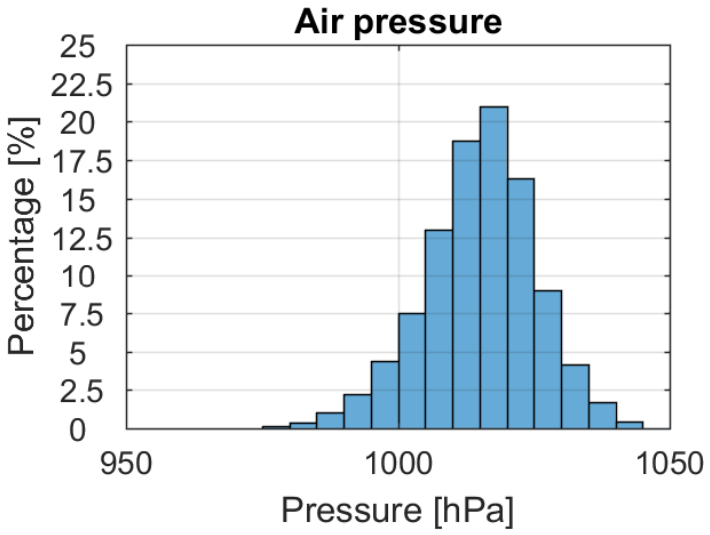
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temp [°C]	3.2	3.6	5.7	9.1	12.6	15.5	17.9	18.0	15.2	11.1	7.0	4.1

Rainfall

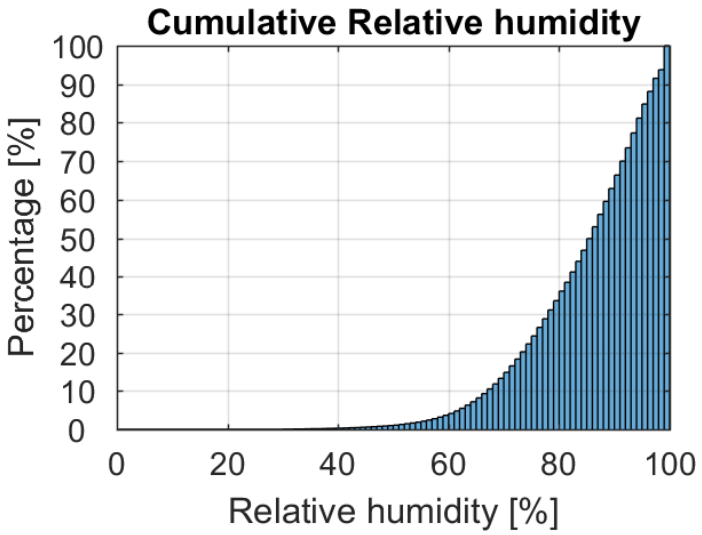




Atm. Pressure



Humidity



Visibility

Visibility is generally good. Rain and fog do from time to time reduce visibility and sometimes obstruct marine traffic (when visibility drops below 1 km.)

- Frequency of visibility less than 2,000 m is 6.2% of the year
- Frequency of visibility less than 1,500 m is 4.6% of the year
- Frequency of visibility less than 500 m is 2.3% of the year

2.7 Port Access Tidal Limitations

The Eemshaven port entry is relatively shallow and needs to be passed at high tide only, for vessels with deeper draft than 11.0m. The tidal access window for the LNG vessel is determined by the Nautical Service Centre / VTS (GSP with the use of PROTIDE, a Probabilistic Tidal Window Determination program. See e.g. https://protide.rws.nl/PROTIDE and https://protide.rws.nl/Project as well as https://protide.eu/Home. The LNG vessel shall strictly adhere to any instruction received from GSP or pilots based on Protide.

Every vessel must (via agency) give their details, also regarding the stability of the vessel and for each vessel a tidal window will be calculated with Protide via tijpoort@groningen-seaports.com. As the LNG vessel actual draft is crucial input in the tidal window, the LNG vessel should inform GSP (NSC), pilots and any other relevant party of changes in the ship's draft (forward middle and aft) as and when these occur. At least 24 hours prior to ETA also the pilot chart should be made available to the pilots (via agency).

The procedures, operations and relevant parties for the Eemshaven access channel passage are described in the Operational Handbook channel-bound vessels North Sea – Eemshaven, (in Dutch: Operationele Handboek geulgebonden schepen Noordzee – Eemshaven) accessible via https://waterberichtgeving.rws.nl/klanten/regio-eemsmond and included in Appendix A.

A dedicated LNGC Admission Policy (Appendix DD) and LNGC Admission Protocol (Appendix EE) has been developed with GSP, RWS and GDWS/WSA. This policy includes the following general principles:

- The Admission policy sets strict upper limits on maximum vessel dimensions and there is no upward margin of tolerance. One cm exceedance may suffice to refuse access.
- The use of Protide, in which all vessel parameters are entered, and which then will analyse all met-ocean data etc to determine a (high tide) arrival window.
- LNG vessels will be admitted only at high tides and when tidal cross currents outside the port entrance are less than 0.5 knots, yielding a typical tidal window of approx. 1 hour. Unloaded LNG vessels in ballast draft may also use ebb-tide tidal-windows to leave the port.
- For each high tide, only one single deep channel vessel bound for Eemshaven will be admitted in view of port dimension and tug fleet limitations.
- Other typical criteria that will dictate if an LNG vessel can enter the Eemshaven will be a max (10 min average) windspeed of 13.8 m/sec and visibility of at least 1 km (at pilot boarding and Eemshaven). If during the inbound voyage visibility suddenly reduces to less than 500 m, the pilot may request after consultation with captain to turn in the "diamant" near buoy 30 and turn back to pilot boarding.
- A laden LNG vessel will not be admitted into the access channel to approach the Eemshaven until a preceding unloaded LNG vessel has cleared the Port area and the Terminal has declared to be ready for the next LNG vessel.
- LNG vessel will not be admitted if for the next 48 hours after arrival at pilot boarding and entry to the channel wind speeds are predicted that may exceed safe mooring limits as calculated i.e. max 10 min average wind speed in excess of 20 m/sec and/or if there is no outlook after unloading for a ballast LNG vessel to leave the port within 24 hours (at high or low tide) due to wind speeds higher than 13.8 m/s.
  This is to avoid that LNG vessel get trapped in port for prolonged times and/or avoid forced early departures before unloading is completed.

2.8 Port Access Weather Limitations

The following limiting conditions have been determined by simulations and will be implemented for port/terminal access:

Maximum acceptable/allowable wind speed (10 min average) for LNG vessel port entry or departure: 13.8 m/s wind.

Maximum acceptable/allowable tidal cross current speed near the Port entrance:

- Arrival (loaded): 0.5 kt
- Departure (ballasted): 0.5 kt for flood tide (which may be adjusted after experience is gained)
- Departure (ballasted): 0.5 kt for ebb tide (which may be adjusted after experience is gained)

The tidal windows will be determined with the use of Protide, see Section 2.7

When visibility (prediction) is below 1,000 m, access into the channel (or departure) will not be allowed and for Port entry visibility below 500 m may force a LNGC back towards the pilot boarding station.

For terminal mooring and operational limits, see Section 4.5 and 4.6.

2.9 Pilotage

Pilotage (by two pilots) is compulsory for both arrival and departure.

Ordering a Pilot

When the ETA-12 hour prior to arrival at the Westereems racon buoy notice is made, indicate the need for two pilots, as per GSP regulations. Pilot chart is to be available 24 hours prior to planned pilot boarding. According to the Nautical Admission Policy for LNG vessels the reporting policy is uniform to deep draught vessels. Reporting the ETA-12-hour notice needs to be done via your local agent. For additional information on ordering pilots contact your local agent.

On departure from Eemshaven, the pilots can be obtained from Delfzijl Pilot Station again, with a notice of 2 hours prior to departure, through VHF Channel 19 or telephone +31 (0)596 61 36 72. This is usually arranged for by/via the Agent.

Pilot Communication

At ETA-6 hours is done via VHF channel 19 to "Delfzijl Pilot Station". ETA-4 hours need to be done as well. Communication with the Pilots tenders can be accomplished via VHF Channel 19 to "Delfzijl Pilot Station". For more practical information on Pilotage, please contact your local agent for all practical matters, including all communication rules regarding pilotage.

Pilot boarding on arrival

Normal Pilot boarding is by tender (preferred) or by helicopter.
The Pilots for entering the Eemshaven and the access channel will board the LNG vessel at the Westereems racon buoy, which is located near the entrance of the Access Channel [ref section 2.2].
Normal Pilot boarding by tender may be suspended when wave heights reach 2 to 2.7 m; The helicopter will continue to fly.
LNG vessel can go at anchor or stem the current until safe conditions return.

2.10 Tug requirements

In principle for all larger LNG vessels four tugs will be required to satisfy the Port's LNG Admission Policy. Ordering the tugs can be done through the LNG vessel's agent, through the Delfzijl Pilot Station or through the Nautical Service Centre / VTS Eemshaven (VHF channel 01).

All four tugboats are stand-by and ready to use when the LNG vessel passes the Westereems fairway buoy (inbound) and two tugboats stay stand-by till the LNG vessel passes the Westereems fairway buoy (outbound). For the incoming LNG vessels the stern tugboat must make fast at buoy 25 latest, but subject to instructions by pilots may already join the incoming LNG vessel from buoy 17 onwards with tow-line made fast well before buoy 25, depending on wind directions and experience gained. The other three tugboats must assist at buoy 27 latest.

Additional tugs must pick up the LNG vessel outside the harbour entrance at typical LNG vessel sailing speeds of 4 to 6 knots. On VTS sector channel you can arrange a working channel with the tugs. The pilots work on different channels with the tugs.

Also, for departures four tugs will be deployed, but once the LNG vessel is sailing North in the Doekegat Channel in the port towards the port exit tugs will be released (in stages) and the last tug(s) will be let go when outside the port moles.

In principle, based on available tugs in Eemshaven, three tugs of 56T bollard pull capacity and one tug of (at least) 70T bollard pull capacity will attend to the larger LNG vessels. Currently the 4th tug as available has a capacity of 80T

2.11 Health

Prior to arrival, the master has to complete and sign a Maritime Declaration of Health. The standard international form has to be used and can be found at website:
https://www.groningen-seaports.com/wp-content/uploads/Model-of-Maritime-Declaration-of-Health.pdf

In case one of the form questions is answered by "yes", or in the case of other quarantine problems:

- Advise the Delfzijl Pilot Station at VHF Channel 19, the ship agent and the NSC at +31 (0)596 6404477
- Mail this form to GSP Operations at operations@groningen-seaports.com and the NSC: nsc@groningen-seaports.com
- Keep the person responsible for medical care on board to answer any questions.

In all cases keep the Maritime Declaration of Health form at hand. In case of an epidemic threat the master can be requested to report the health situation on board to VTS Eemshaven.

2.12 Immigration

Prior to Arrival the Master must forward a Crew and Passenger list (IMO FAL form no. 5 and 6) to their local agent and report the presence of any stowaways. The use of standard IMO forms is mandatory. The Master or his Agent should make sure these forms are delivered to the Koninklijke Marechaussee (Military Police, responsible for Border Control).

Compliance with relevant rules and regulations of the Authorities responsible for immigration) is compulsory at all times. Any specific additional requirements should be obtained from the agent. In the circumstances where the provisions of the Aliens Act (regulations pertaining to foreigners) fail to be complied with, the persons responsible may be reported.

Prior to Departure the Master must duly notify the Koninklijke Marechaussee Immigration Office Eemshaven +(31 (0)596 51 61 01) of his intent to depart from the Netherlands, at least 2 hours before ETD.

2.13 Customs

Documents

Prior to arrival, from Customs perspective the following documents must be available on board:

- Cargo-statements (Bills of Lading, Cargo manifest, Cert of Origin if available)
- Crew's effects declaration (IMO FAL form no. 4)
- Vessel's stores declaration (IMO FAL form no. 3)

It is strongly recommended that these papers are at hand before arrival in Eemshaven.
The cargo for unloading vessels must be cleared by the customs prior arrival and confirmation by customs made available via the customs agent, appointed by the customer and given to EET prior to tendering vessel NOR.

Bonded store

Goods, which are not to be cleared, must be stored in one room, which room can be sealed by Customs. It is recommended to put these goods in that room before entering the harbour. Masters of ships must be careful that these seals are not damaged. If renewal or removal is wanted, this can be applied by Customs.

Prior to departure

A vessel is not allowed to proceed to sea without having obtained a clearance certificate from Customs (IMO FAL form no. 1). The Dutch Customs Office Eemshaven can be contacted at +31 (0)596 51 64 49.

More information on Customs is available on the Dutch Customs website:
http://www.douane.nl/english/

2.14 Vessel Documentation

GSP and EET place importance on complying with rules and regulations. The vessel could be subject to inspection by inspectors of the Transport and Environmental Safety Department or Port State Control. Because port operations take place around the clock, these inspections can take place during day- and night-time. To ensure a smooth operation, the following documentation and certificates (or certified copies of certificates) need to be available at all times at LNG vessels:

- IOPP
- SOPEP
- Shipboard marine pollution emergency plan
- Garbage record book
- Oil record book part I and II
- Certificate of Fitness chemical/gas, including product list
- Procedures and arrangements manual
- Cargo record book

- ISGOTT Ship Shore Safety checklist
- Stowage plan arrival and departure Eemshaven
- Material safety datasheet('s)
- Bill of lading
- Shipping document for bulk liquid cargoes

2.15 Safety and Emergencies

Emergency Contacts
In case of emergencies, inform Harbour, EET Operator via radio, portophone, hotline or telephone (+31 (0)596 640 477), EET Shift supervisor via telephone (+31 6 43 56 54 69) or Marine Supervisor (+31 6 28 58 51 88). Also, inform GSP Harbour Master and Operations (+31 (0)596 640 410) and NSC +31 (0)596 640 477 / VHF 66. International distress VHF channel 16 may also be used.
When moored alongside the Energos Igloo emergencies also need to be communicated with the Energos Igloo control room.

Incidents and accidents on board: Inform VTS and/or GSP/NSC on the relevant VHF channel depending on location or by telephone on the above numbers – see also Section 'Emergency Contacts at beginning of this document.

For emergency assistance in the case of an incident or accident on board and to order and to alert the police, fire fighters, ambulances department /ambulance service) or other assistance, you can directly contact GSP/NSC via VHF66.
Details to be reported: name of ship, location and/or name and number of berth, nature of calamity.

Emergency Coordination Centre
In addition to the police department, fire department and the health authorities, the Harbour Master is one of the emergency services within the municipal organization for incident response. The emergency coordination centre is the NSC, with direct links to police, fire fighters, and ambulances.

Emergency Scenarios
If there is a major calamity, port sirens will be activated (see appendix H). If only a limited area is affected, the public will be informed by police patrol cars. On the first Monday of every month, the sirens are tested at 12:00am. The General Emergency alarm (ships horn of FSRU Energos Igloo) is tested weekly every Monday at 12:00am.
Should the siren be activated as the result of a technical defect, VHF channel 01 and 66 (that should be monitored by the radio listening watch at all times) will advise all concerned.

Emergency Procedures In Case of Alarm
- Go inside and stay there until further notice
- Close all air inlets and outlets
- Put the air conditioning on recirculation
- Render help to others and offer shelter
- Inform other people
- When a ship is underway, maintain a listening watch via the appropriate sector channel
- Consult the map VTS sector channels on the website
- When a ship is alongside, maintain a listening watch via VHF channel 01 and 66.

Emergency Procedure in Case Ship has to be evacuated

- Shut down all engines
- Take only the utmost necessities (personal medicines, protective or warm clothing, valuables, passports, money, toilet articles, domestic animals and if possible, a portable radio)
- Lock the doors
- Coastguard or EET will provide public transport, if possible, as will be announced by the patrol cars or boats
- Reception centres will be established for displaced persons
- Sick and disabled people will be transported by ambulance or wheelchair taxis if necessary.

Spills

All spills have to be reported to NSC VHF 66. Failure to comply with this is punishable by law. Details to be reported: name of ship, location/name of berth, activity or incident, substance spilled, estimated volume, if spill has ended or ongoing, measures taken (if any), any other details as relevant.

Collisions / Groundings

On losing anchors or chain, running aground, anchored in port, sunk by collision or in any way out of control or in situations that may endanger the safety of shipping, contact NSC VHF 66 and VTS Eemshaven VHF 01. Details to be reported: name of ship, position, nature of situation.

2.16 LNG vessel Maintenance and Repairs

All maintenance and repairs on the LNG vessel are prohibited alongside the FSRU unless explicit written permission is received from both EET, GSP and the Master of the FSRU. Two types of repairs are distinguished, 'cold' and 'hot' work, i.e. works/repairs not involving and with no risk of fire or sparks, or works/repairs involving or with a risk of fire or sparks.

These activities require a permit that will be arranged via the GSP Harbour Master. To request such a permit, contact the NSC.

Notwithstanding the above, any maintenance affecting availability of main propulsion of LNGC is prohibited while inside the Port and alongside FSRU. LNGC main propulsion should always be available on short notice.

2.17 Port Security

General

All requirements and regulations on Port Security can be found on the following website: https://www.groningen-seaports.com/en/shipping/laws-and-regulations/isps-port-security/

At an early stage, the LNG vessel's agent and EET PFSO will have contact regarding the security aspects of the planned visit to the EET. The agent will take care that an up-to-date crew list and visitor list is available at the main gate of EET. When a ship reports in front of the facility, or so much earlier as is deemed necessary, the PFSO and SSO share info to verify the ship's security level and, if necessary, make further agreements or pass on particular details. Upon arrival of the vessel the PFSO and the SSO will meet and have the Declaration of Security filled in – see Section 3.4.5 and Appendix C, if there is a difference in security level between ship and the Terminal or on request of the PFSO or the SSO.

In addition: Master of LNGc to send latest 36 hrs prior berthing a crewlist, including any and all possible crewchanges to: SecurityOfficeEET@eemsenergyterminal.com; PFSO@eemsenergyterminal.com

Security Level

The actual ISPS Security level in Eemshaven can be verified with the PSO at the NSC, +31 (0)596 640 400

Reporting to Port Security
Eemshaven has its own Port Security Officer. The Port Security Officer, who is also the Harbour Master, notifies the EET Port Facility Security Officer as necessary regarding specific details of the security situation of the port or the calling ship.

Embarking and Disembarking Crew and Visitors

Should be reported to the Port Facility Security Officer of EET. This is normally done via the vessel's agent and will be verified with the SSO after the vessel is moored.
If the actual security level is 2 or 3, more security checks may be in force before admittance to the terminal is allowed (e.g. pick up and return service from/to the main gate by host/hostess of the visitor, baggage check). If this cannot be realized via the vessel, admittance of these visitors will be refused.
Movements of crew members or visitors to and from shore across the Energos Igloo require coordination and approval of the Energos Igloo and will always be accompanied by a Energos Igloo crew member.
Base is that no crew-visitors for LNGc will be allowed on Terminal FSRU, embarking and disembarking by seaside barge, this to be arranged by agency accordingly

2.18 Stores and Bunkering

Stores and Bunkers Over Land
This is not allowed or possible at EET, except for small items which can be carried in one hand.

Stores and Bunkers by Launches, Tugboats, and bunker barges
This is expected to be possible using a small service craft if available in the Port and approval may be requested from EET, Wagenborg and NSC (for occupying extra space along the LNG vessel in the port basin). If permission is granted (via Agent), provision of supplies (and spare parts) and collection of garbage are only allowed prior to or after cargo transfer is completed and if there is sufficient time left before departure (depending on the planning of EET). Bunkering operations only after completion of discharge. Time (and associated cost) needed for these operations are on account of the LNG vessel.

2.19 Dangerous Goods and Waste

LNG vessels must report any dangerous goods via their local agent to the Harbour Master on departure from the last port of loading or ultimately on entering Dutch territorial waters. For departure this must be done 3 hours before leaving Eemshaven. For details to be reported please contact your local agent.

EET does not have facilities/possibilities to handle waste (via the FSRU) to shore, see paragraph 3.4.1.

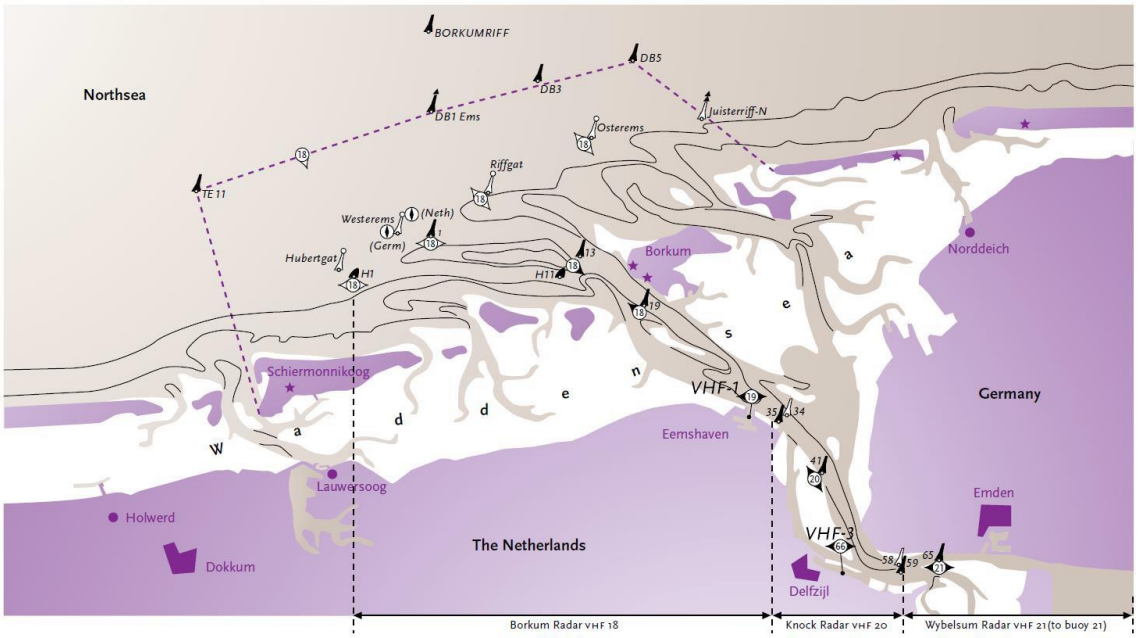
2.20 Port Communication, including VHF Channels

See https://www.groningen-seaports.com/contact/ , and the NSC contact details in Appendix D, as well as the contact list at the start of this document.

2.21 Port Traffic Control – Vessel Traffic Service

An integrated German/Dutch radar chain has been installed along the River Ems comprising the radar stations Borkum (Germany), Oudeschip 1+2 (Netherlands), Knock (Germany) and Wybelsum (Germany). This radar chain is controlled by Vessel Traffic Centre Ems.

The LNG Carrier Admission Protocol (issued by RWS) states that for the first 6 months of LNG shipping operations the (Dutch) pilots shall consult the Borkum Radar centre for traffic info for the river transit towards the Eemshaven port. After 6 months it will be evaluated if this service is to be continued.



Guidance and assistance

Station	Area	VHF Channel
Borkum radar	River Ems from Westereems buoys 1/2 or Huibertgat buoys H1/H2 to buoy 35	18
Ems Traffic	River Ems from buoy 35 to entrance port of Delfzijl buoys 56/57	74
Ems Traffic	River Ems from buoys 56/57 to entrance port of Emden	74

2.22 Local Time Zone

In principle GMT+1 hour. However, as a result of implementation of Daylight Savings Time, from 2AM in the night of the last Saturday on Sunday in March until 3AM in the night of the last Saturday on Sunday in October, the Local Time is GMT+2 hr.

2.23 Flags and Signals

When within Eemshaven Port Limit or the access channel, from sunrise to sunset, all vessels shall fly their national flag and the national flag of the Netherlands. In addition, vessels shall at all times, comply with the International Code of Signals and display flags, shapes and lights as required by the International Regulations for the Prevention of Collision at Sea.

3 Terminal Information

3.1 General Description

The EemsEnergyTerminal is located in the Wilhelmina haven in Eemshaven in the Netherlands. The Terminal consists of two interconnected FSRUs and has an initial nominal combined send-out capacity of up to approx. 8 billion m^3 (BCM) per annum.

The facility consists of approx. 170,000 m^3 LNG storage in the Energos Igloo and 25,000 m^3 storage in the Eemshaven LNG barge. Nominal/max send out of the "Eemshaven LNG" is 400/600 mmscfd, nominal/max send out for the Energos Igloo is 500/750 mmscfd.

The Energos Igloo is connected with cryogenic and vapour return lines to the Eemshaven LNG and provides the Eemshaven LNG with LNG. Visiting LNG vessels moor 'ship-to-ship' against the Energos Igloo and transfer their LNG cargo via cryogenic hoses. As both FSRUs have 'open-loop' regasification, low winter water temperatures would reduce (or stop) send-out, hence modifications are made to allow intake of warm water from adjacent power plants to ensure the regassification process equipment is fed with water between 12 and 15 degrees C, subject to send-out nominations.

Visiting LNG vessel size is limited to maximum 180,000 m^3 LNG carrying capacity based on vessel size and cargo capacity (refer also section 2.5).

In the future, it is possible that the FSRU-based terminal will be replaced by an onshore LNG terminal facility.

3.2 Terminal/FSRU Technical Characteristics

FSRU Energos Igloo:

- Built: 2013
- Yard: Samsung Heavy Industries, South Korea
- Hull No.: 2031
- Ship type: LNG vessel with regasification facilities
- LNG Containment: Membrane system, GTT Mark-III
- LNG Storage Capacity: 170,150 m3 @ 100% capacity
- IMO No.: 9633991
- Call Sign: V7AE6
- Flag: Marshall Islands
- Service speed: 19.5 knots at MCR including 21% sea margin
- Main engine rating: 26,750 kW
- Complement: 38 persons + 6 Suez crew

Class notations:
Classification Society: Det Norske Veritas Class Notation: ✠1A1 Tanker for liquefied gas type 2G (Membrane tank, Maximum pressure 70KpaG, Minimum Temperature -163Deg C and Specific Gravity 500kg/m3), BIS, COAT-PSPC(B), COMF(C-3, V-2) CSA(2) E0, Gas fuelled, NAUT(OC), NAUTICUS (Newbuilding), Recyclable, REGAS(2), TMON

Main dimensions:

- Overall length: 292.5 m
- Beam: 43.4 m
- Depth: 26.6 m
- Design draft: 11.9 m (/Summer draft: 12.3 m)
- Scantling draft: 12.9 m
- Deadweight at design draft: Approx. 82,200 tonnes

FSRU Eemshaven LNG:

- Built: 2017
- Yard: Wison Nantong Heavy Industry, China
- Hull No.: -
- Ship type: Gas Processing vessel
- LNG Containment: 2 Independent, 9% Nickel Steel, Ihi Design, Polyurethane Foam Lined, Prismatic, Horizontal Aligned Tank(s)
- LNG Storage Capacity: 25,794 m3 @ 100%capacity
- IMO No.: 9757694
- Call Sign: D5OC8
- Flag: Belgian
- Service speed: unpropelled
- Main engine rating: n/a
- Complement: 28 crew

Class notations:
Class Society: Bureau Veritas Class Notation: I ✠ Offshore service barge RV Liquified gas storage AUTO , ✠ POSA , LSA , CPS(WBT) , ✠ VeriSTAR-HULL DFL 30 years , GREEN PASSPORT , Liquefied gas offloading , ✠ ALM , INWATERSURVEY , ✠ OHS Service Restriction: Coastal area to be confirmed when selected.

Main dimensions:

- Overall length: 120.0 m
- Beam: 33.0 m
- Depth: 22.5 m
- Design draft: 7.9 m
- Scantling draft: 8.6 m
- Deadweight at design draft: Approx. 19,500 tonnes

Berth for LNG vessels:	Side by side to Energos Igloo's Port Side
Maximum vessel LOA	300m
Minimum vessel Length	250m
Maximum Loaded vessel Draft	Target: 12.00 m
Maximum vessel Beam	Target: 50.00 m
Design water depth (port entry & berth area)	N.A.P. (= MSL) -15.0m
Water depth at berth	Currently approx. N.A.P. (MSL) -16 m
Maximum Approach Speed to FSRU/fenders	10cm/s
Maximum Docking Angle	5 degrees
Port's Chart Datum Level	N.A.P. (= MSL) (= L.A.T. + 1.9m)
Dock Water Density Range	1012-1025 kg/m3
LNG density range	430-480 kg/m3
Cryogenic hoses	4 LNG, 2 vapour return
Connectors	10 inch "Quick connect" type hydraulic couplers
FSRU Design working pressure (max)	700 mbar

Usual FSRU working pressure	50 to 250mbar
Emergency release	Yes
FSRU maximum loading rate	8,000m3/hr
Return vapour temperature	Below – 130 degree C after cool-down

3.3 Terminal and Berth Location

The EET and FSRU berth are located on the north quay of the Wilhelmina haven in Eemshaven, in the southeast corner of the port, close to the RWE power plant as shown in the figure below. The coordinates for the facility are approx. 53°26'40' N, 6°51'7 E.

3.4 Policies

3.4.1 General

Responsibilities of the Master of an LNG vessel

Primary responsibility for the safe conduct of operations on board the LNG vessel rests with the Master. The Master should take care that he and all other persons whilst on board as well as ship's personnel whilst on the premises of EET/GSP carefully follow all rules, regulations, formalities, measures and directions given and/or to be given by or on behalf of the authorities and/or EET.

The Master should take care that all agreements made between EET and persons on board are carefully observed. All operations on board relative to the LNG vessel and/or the cargo are to be executed under surveillance of the Master, also if such operations are carried out by personnel of EET or the FSRU Operator.

LNG vessel requirements

Vessels must be maintained in class with a member of the International Association of Classification Societies, (IACS), which has prior experience in classifying LNG vessels, and in compliance with all applicable treaties, conventions, laws, and regulations, as well as the requirements of the LNG vessel registry country and of any relevant governmental authority in the Netherlands, which relate to seaworthiness, design, safety, navigation, operation, pollution and similar technical and operational matters.

The vessel must be staffed with a competent crew, including all key officers and a sufficient number (in accordance with minimum safe manning certificate issued by ship's flag state and comply with SOLAS) of other crew members fluent in both written and spoken English and/or Dutch to be able to coordinate with personnel at the EET, and a Master, Chief Engineer, Chief Mate, and Cargo Engineer (and such other officers having responsibilities associated with the handling of cargo) who are all appropriately licensed, fully conversant with, and experienced in, LNG operations.

The vessel must be in compliance with all Safety of Life At Sea (SOLAS) requirements, and other industry guidelines as recommended by OCIMF and/or SIGTTO and have available a SIRE inspection report not older than 1 year.

The vessel must be constructed, safely manned, operated and maintained in compliance with all relevant laws, regulations and standards applicable to it and as would be exercised by a Competent, Reasonable and Prudent Person.

The vessel must have entered (with full Protection and Indemnity coverage) with a P & I Club that is a member of the International Group Agreement of P & I Clubs.

The vessel must be equipped with adequate facilities, designed in accordance with OCIMF's and/or SIGTTO's recommendations, for mooring, unmooring, and handling LNG Cargo, i.e., it must have mooring lines with soft tails, all fitted on drums/winches with brakes, capable to pull up to 10% of the MBL of the lines, and typical winch brake holding power of approx. 60% of the MBL of the mooring lines. The LNG vessel must have compatible ship/shore communication links (for telecom and data transfer) based on glass-fibre optic system and/or electric (Pyle) 37-pin backup (to North Atlantic pin allocation standard) in compliance with international regulations in order to enable the LNG vessel to communicate with the FSRU and EET. For further details on communication links, see Section 4.8.

Lifeboat Tests

The vessel is not permitted to test its lifeboats without prior authorisation of EET and GSP. The launching of freefall lifeboats, which may be obstructed by mooring lines or nearby moored vessels, is not permitted.

Standby Tugs

May be required in certain weather conditions (to be determined), as per GSP instruction or when maintenance activities have been approved for implementation that may affect the mooring system of the vessel (as specified in Section 3.4.3 of this manual). Minimum standard is ASD to 56 Ton Bollard pull.

Direct transfer from ship to ship

For any handling of goods (excluding LNG transfer related matters) which is to take place between the vessel and the FSRU or another vessel, prior permission from EET is required, and obviously that of the FSRU Master. Even if EET has allowed this transfer, it will take place under the Master's responsibility and is for account and risk of the Master and the owner of the LNG vessel and not for account and risk of EET.

Utilities

With prior approval by EET, the following utilities can be arranged by the Ship's agent for delivery to the vessel (before or after cargo unloading). Supplies may only be transferred to the vessel from the water side, not via the FSRU, see Section 2.18.

Freshwater

In general, the vessel should order supplies of potable water before arrival via the Ship's Agent. The agent will arrange that the water barge arrives at the right time. No transfer of water to the ship will be allowed while LNG cargo unloading is ongoing. Reporting of planned bunkering of fresh water is mandatory upon arrival to the EET representative.

Ship's stores/provisions

Must be arranged through the Ship's Agent with proper notification and approval of EET.

Bulk Ship's stores/provisions must be loaded from a supply boat aft of the vessel's accommodation block using the Ship's stores crane. Small items which can be carried in one hand may be taken from the quay via the FSRU gangway and transferred from FSRU to vessel by suitable means, but only after permission from EET and FSRU Operator/Master has been given.

Bunkering
Must be arranged through the Ship's Agent with proper notification and approval of EET and be delivered by barge. Note a Letter of Indemnity needs to be signed for bunkering activities.

Water pollution
Unless officially approved, it is forbidden to discharge any substances, in any way or for any reason at the EET or into the water. Deck scuppers, drain holes and drip trays on the vessel within the area of any potential pollution must be suitably plugged and any accumulated water drained off. Any water drained from the vessel must be free from all polluting agents.

Waste Management
There are no disposal facilities available at EET. The vessel shall provide for the storage of waste material, including hazardous wastes and oil from pollution incidents, or have the Ship's agent arrange for collection via a service barge.

Barges alongside for stores, bunkers, etc.
Are allowed only:

- After approval of EET and GSP
- Before or after the LNG vessel the ship-to-ship transfer, not allowed during the transfer.
- Any delays due to these operations shall be the responsibility of the LNG vessel.

Note that water supply or waste disposal barges are not (yet) available in Eemshaven.

Mooring Winches
All vessels' equipped with automatic line tension capability shall be set to 'manual' while at moored against the FSRU, with brakes applied correctly.

3.4.2 LNG vessel "State of Readiness"

The Master is required to maintain a general state of readiness, therefore the vessel must maintain sufficient positive stability to ensure the safety of the vessel, EET that includes the FSRUs, the cargo unloading process and to be prepared for an emergency unberthing if necessary, by:

- Managing the vessel's ballast water to minimize the reduction in draft created by the cargo unloading process
- Maintaining zero list while moored
- Maintaining the appropriate trim while moored, taking into account the depth of water available.

Sufficient Crew must be retained aboard the vessel to ensure the safety of cargo transfer and to face any emergency that may occur, including emergency departure from the FSRU if needed. All the vessel's crew must be suitably rested and fit for duty in accordance with the obligations of the current Maritime Labour Convention 2006 (MLC 2006) and IMO's STCW Convention, 1978, as substantially amended in 1995 and 2010.

Unless prior written approval has been given by EET, boilers, generators, main engines, steering machinery and other equipment essential for manoeuvring the vessel must be maintained in standby mode to enable the vessel to use her own engines and steering system at short notice in the event of an emergency un-berthing.

3.4.3 Maintenance and Repairs by LNG vessel while moored

Any repair or maintenance work (either Hot Work or Cold Work) which would impair the safety of the cargo operations (above deck), or the manoeuvrability of the LNG vessel is prohibited. In the event that the vessel experiences any incident while alongside which affects the cargo operations or the manoeuvrability of the vessel, EET shall be immediately notified. EET and vessel shall agree on appropriate actions to mitigate any dangers to both parties and the safety of cargo operations.

All other work required by the vessel while alongside the FSRU must be approved by EET using the Work Authorization form found in Appendix F. During the pre-cargo meeting, the vessel will provide the EET representative with a "daily work plan." Both the vessel and EET will be required to sign the Work Authorization form. The vessel must comply with its own "Permit To Work" procedures and a full risk analysis shall be carried out by the vessel and discussed with EET before the Work Authorization form will be approved and signed.

In either of the above scenarios, EET has the right to require the vessel to have a standby tug in place to assure safety while the work is being performed.

For GSP policies regarding Maintenance and Repairs contact your local agent.

3.4.4 Fire Prevention and Safety Policies

The LNG vessel's Safety Plan must be posted in clearly visible places on the ship while the LNG vessel is moored at EET against the FSRU, along with a cabin plan and up to date crew list and must be made available to EET prior to mooring.

Any LNG vessel crewmember that leaves the vessel for any reason must comply with EET Personal Protection Equipment (PPE) requirements as listed in Appendix G and shall obviously follow any additional requirements from the FSRU Operator while on board there.

The LNG vessel staff must be familiar with all EET Emergency Alarm Signals and policies listed in Appendix H.

The LNG vessel should be familiar with the existence of the FSRU's firefighting equipment and capabilities which are listed in Appendix I.

The LNG vessel's water spray system (deluge) must be on standby at all times, & capable of being pressurized at short notice. All fire hoses fitted with dual jet/fog nozzles in the area of the cargo tanks and manifold area are to be connected to the LNG vessel's fire main system and led out, ready for immediate use. The LNG vessel's fire main must be fully pressurized whilst alongside.

The LNG vessel's fixed dry-powder (DP) systems must also be ready for immediate use. If applicable, hoses shall be led out for those systems used to protect the manifold areas. Portable dry powder fire extinguishers must be available at each side of the cargo manifold. The vessels fixed DP monitors must be configured and positioned correctly.

Windows and portholes of the LNG vessel must remain closed while alongside. All external doors except those designated for personnel access must remain closed. Those doors designated for personnel access must be closed immediately after use.

Air conditioning intakes must be set to ensure that the atmospheric pressure inside the accommodation is always greater than that of the external atmosphere. Air conditioning systems must not be set to 100% recirculation, as this will cause the pressure of the internal atmosphere to fall to less than that of the external atmosphere, due to the extraction fans operating in sanitary spaces and galleys. If at any time it is suspected that gas is being drawn into the accommodation, central air conditioning and mechanical ventilation systems should be stopped, and the intakes covered or closed.

Portable and fixed electric and electronic equipment used in the LNG vessel's Hazardous Areas must be of an approved type for such areas and satisfactorily maintained.

The use of Naked Lights is prohibited on board the LNG vessel and in EET.

Smoking within EET perimeter is strictly prohibited, except in explicitly designated areas. Smoking on board the LNG vessel may only take place in enclosed spaces that are specifically designated by the Master in consultation with the Marine Supervisor or his representative. A maximum of two smoking areas are permitted whilst alongside, these must be declared prior to cargo operations commencing.

Mobile phones use is strictly prohibited in the Hazardous Areas of EET and onboard the LNG vessel, unless of an explosion proof (EX)-approved type. Non-approved types must be switched off. Non EX-approved mobile phones are only to be used in the accommodation area of the LNG vessel with the Master's permission.

Matches, lighters and any other sources of ignition, including portable electronic equipment, such as iPad's, cameras, etc. are not permitted in EET, except in designated indoor areas.

3.4.5 Terminal Security

Terminal Security and access is the joint responsibility of EET and the LNG vessel under the International Ship and Port Security (ISPS) Code. EET's Security Officer (PFSO), and the LNG vessel's Master or Ship Security Officer (SSO) will review and agree to the security measures each will implement. This will be documented by the signing of the Declaration of Security (Appendix C).

Evidence of any serious breach, repeated deficiencies, or significant lack of understanding or implementation of the requirements of ISPS Code by the LNG vessel's Crew may result in cessation of cargo operations and rejection of an LNG vessel and/or identified crew members or visitors. Above mentioned issues may be identified via spot checks done by the Port Security Officer (PSO), PFSO, Deputy PFSO and/or SSO. The incident will be discussed with the responsible person(s) after which a Letter of Protest can be issued. In addition, all visitors and ship's crew are advised that taking pictures/video of EET is strictly forbidden.

Access to EET is strictly limited to terminal personnel, the LNG vessel's Crew and approved visitors or contractors.

The LNG vessel's arrival crew list, including any embarking personnel must be transmitted by email to EET prior to the LNG vessel's arrival. See chapter 2.17. LNG vessel owner, management personnel, government officers, vendors (unless not specifically approved), and other visitors with a valid reason for entry and who

have been pre-approved by the Master may also be allowed into EET. The list of visiting personnel should be advised to EET by email before the arrival of the LNG vessel. Any changes to this list must be communicated to EET immediately.

EET requires personal photographic identification (seaman's ID or national ID documents) and reserves the right to search all visitors, vehicles and packages entering and leaving EET's facility. No unaccompanied baggage will be permitted into the facility. EET reserves the right to board the LNG vessel at any time to ensure that her Security Plan and applicable regulations are being observed.

Persons on board the LNG vessel being present on EET's premises as well as those who enter the EET's premises on request of the Master and/or the persons on board, do so entirely at their own risk, also when this happens with permission of or under escort by EET. EET is never liable for death, injury, damage, loss, fines, costs or other harm incurred by those who set foot on EET's premises.
EET reserves the right to refuse entry of personnel, packages vehicles etc. into the EET premises.

Shore leave for members of the LNG vessel's Crew will be granted, subject to Customs & Immigration approval and compliance to EET policies and procedures (LNG vessels' Crew embark/disembark LNG vessel by portside only).

Depending on the used personnel transfer method (gangway or service boat) the LNG's vessel's Crew transits the quay/EET premises (see paragraph 4.7)

Service boats

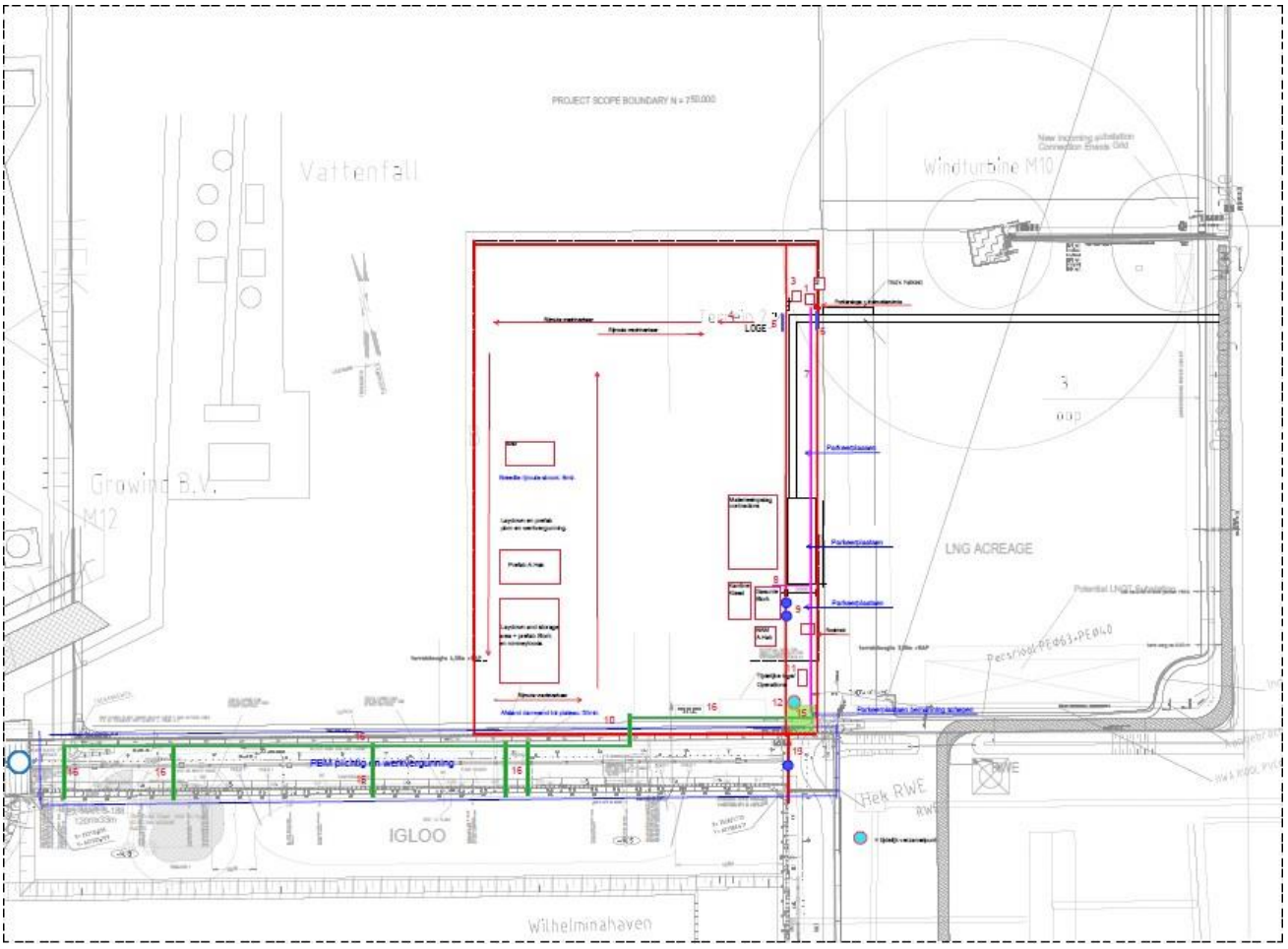
LNG vessel's Crew that leaves the LNG vessel and does not transit the quay/EET premises:

- Must have a valid photographic ID (seaman's ID or national ID)

Gangway

LNG vessel's Crew that leaves the LNG vessel (in case LNG vessel port side cannot be used and with agreement of Master FSRU Energos Igloo and EemsEnergy Terminal) and transit the quay/EET premises:

- Must have a valid photographic ID (seaman's ID or national ID)
- Must comply fully with EET's Security Procedures & all terminal regulations concerning safety
- Must have permission from EET Security Personnel and FSRU master to transit from the LNG vessel to the Security gate
- May be subject to drugs and alcohol testing at the security gate. Failure to participate in proving a sample or a positive detection may result in access restriction and notification to the Ship's Master
- Must proceed directly to and from the Security gate after leaving the LNG vessel and reaching the shore/quay
- Are responsible to make necessary arrangements for the collection and drop-off of the Crew at the EET Security gate
- Must follow the (onshore PPE Free) Safety Corridor. A painted line is the designated access route for LNG vessel's Crew to enter or leave the quay from the LNG vessel (See figure below). Only this area may be transited by the LNG vessel's Crew



Routing with Safety Corridor

Access to the quay and / or the Safety Corridor to the EET Security gate may be prohibited during cool-down / warm-up, ramp down / ramp up or connection / disconnection of the unloading hoses.

3.4.6 Other Safety Policies

Engine Safety

Testing of engine can only be performed after informing and green light from FSRU Master. Testing of LNGC Main Engine and Rudder before departure will not normally be allowed when LNGC is alongside FSRU, for purpose of avoidance of clogging vital FSRU water intakes. These tests will be done after departure with tugs, while LNGC is at safe distance from FSRU – normally at the turning area between Emma and Wilhelmina basins of the Eemshaven Port.

The cargo transfer hoses may not be connected until the LNG vessel reports to EET and FSRU that the LNG vessel Master has received confirmation from the engine room staff that her main engine(s) is/are off, and the turning gear (if present) is engaged. Similarly, main engine warm up may not commence until all cargo hoses are clear of the LNG vessel.

Cargo Tank Venting

Under normal operating conditions venting cargo vapours to the atmosphere is not permitted. The LNG vessel shall take all necessary action to prevent such venting. In the event of an emergency situation that requires venting, cargo unloading will be stopped. EET, FSRU and GSP shall be notified of the emergency.

Gas freeing

Gas freeing of any of the LNG vessel's cargo tanks and fuel oil tanks to the atmosphere is prohibited alongside the FSRU or in the GSP area.

Main fuel

Whilst in port the LNG vessel is to preferentially use NG as fuel for his power generation, instead of burning (LS)HFO. This in order to minimize air emissions as far as practical. The LNG vessel may request a (duly justified) deviation from this guideline (well) before sending the LNG vessel Notice of Readiness to the terminal.

Alcohol and Drugs

The use of alcohol and drugs is strictly prohibited while the LNG vessel is moored alongside the FSRU. Masters are advised that operations will cease, if the actions of a person or persons involved in operations are not under proper control as a result of the use of alcohol and/or drugs. Operations will not resume until the matter has been reported to and fully investigated by relevant authorities and the staff of EET considers it safe to do so. Delay or cancellation in a vessel's departure could be the result. Access to any part of EET for a person or persons suspected to be affected by alcohol and/or drugs will be denied. EET may carry out testing to determine whether personnel are under the influence of alcohol or drugs while at the Terminal (in accordance with GDPR).

Manifold Valves

EET requires that each LNG vessel has a "double block and bleed configuration" at the manifold to increase safety and to facilitate a timely unloading process. Any LNG vessel not equipped in this manner or with any possible malfunction should notify EET immediately.

Other Activities

No diving, swimming or fishing is allowed from the FSRU, LNG vessel or quay.

4 Terminal Procedures

4.1 General LNG vessel requirements

Each LNG vessel must be:

(a) equipped with a near mid-ships manifold to OCIMF standards, and with a manifold elevation over still water between 15.5 and 26.0 m and with a modest max forward manifold offset that limits the distance between the LNG vessel manifold centre (VR line) and LNG vessel stern to max. 157.5 m;

(b) The manifold shall be able, after mounting of reducers to receive four 10-inch liquid cargo hoses with 10 inch 150 lbs. ANSI B16.5 flanges and two 10-inch vapor return hoses with 10 inch 150 lbs. ANSI B16.5 flanges. The four reducers for connecting the LNG transfer hoses shall be installed prior to the LNG vessel arrival in Port, if the LNG vessel carries these on-board. For connecting the two vapor return hoses the Terminal will supply a Y-piece to LNG vessel for mounting after berthing alongside;

(c) designed, equipped and staffed so as to safely and reliably permit the transportation and unloading of LNG with densities of 430 up to 480 kg/m3 at maximum rate of 8,000 m3/h, against an LNG head of about 100 meters liquid column at the inlet of the (four) unloading hoses, corrected for the installation of the strainers, at the LNG Receipt Point;

(d) capable of maintaining an operating pressure of its LNG tanks at sea when arriving at the Terminal of approximately 110 mbarg. Expected range of LNG saturation pressures at start of unloading between 70 and 120 mbarg;

(e) having the ability to receive warm vapours from shore at start of unloading process;

(f) equipped with an oily bilge water separator, and a safe means of transferring engine room bilge liquids to designated holding tanks aboard the LNG vessel, as required by MARPOL 73/78, Annex 1, Regulation 17;

(g) equipped with adequate facilities, designed in accordance with OCIMF's and/or SIGTTO's recommendations, for mooring, unmooring, and handling LNG Cargo: (h) mooring lines all fitted on drums/winches with brakes and with soft tails. Typical MBL of mooring lines fitted onboard between 120 and 150 Ton. Winches to be capable to pull at least 10% of the MBL of the lines and having a typical winch brake holding powers of approx. 60% of the MBL of the mooring lines.; Operating Manual EemsEnergy Terminal B.V. Subject to further review by EET. Draft dated 31 August 2022.

(h) compatible ship/shore communication links (for telecom and data transfer) based on glass-fibre optic system and/or electric (Pyle) 37-pin backup (to North Atlantic pin allocation standard) in compliance with international regulations in order to enable the LNG vessel to communicate with the FSRU and EET

(i) maintained in class with a member of the International Association of Classification Societies which has prior experience in classifying LNG vessels, and in compliance with all applicable treaties, conventions, laws, and regulations, as well as the requirements of the LNG vessel registry country and of any relevant governmental authority in the Netherlands, which relate to seaworthiness, design, safety, navigation, operation, pollution and similar technical and operational matters;

(j) staffed with a competent crew, including all key officers and a sufficient number (in accordance with minimum safe manning certificate issued by ship's flag state and comply with SOLAS) of other crew members fluent in both written and spoken English and/or Dutch to be able to coordinate with personnel at the EET, and a Master, Chief Engineer, Chief Mate, and Cargo

Engineer (and such other officers having responsibilities associated with the handling of cargo) who are all appropriately licensed, fully conversant with, and experienced in, LNG operations;

In Last 3 years LNG STS minimum experience requirement for onboard staff:
AA) Master, Ch Off, Gas / Cargo Eng = Minimum 3 STS Operation each in rank.
BB) Senior Officers: Senior Deck & Engine Officers = Minimum Aggregate 5 STS Operations
CC) In the event the standard experience cannot be met, LNGC Owners are to appoint a third party or in house STS experienced person with at least 5 STS operations in the past year **AND** any of the officers in the ranks mentioned in AA) and BB) that do not meet the experience criteria must have undertaken and hold a STS training certificate issued within the past three years.

(k) The LNG vessel must be in compliance with all Safety of Life At Sea (SOLAS) requirements, and other industry guidelines as recommended by OCIMF and/or SIGTTO and have available a valid SIRE inspection report not older than 1 year; (m) The vessel must be constructed, safely manned, operated and maintained in compliance with all relevant laws, regulations and standards applicable to it and as would be exercised by a Competent, Reasonable and Prudent Person.;

(l) The vessel must have entered (with full Protection and Indemnity coverage) with a P & I Club that is a member of the International Group Agreement of P & I Clubs.

4.2 LNG vessel Compatibility Assessment

Before a vessel can berth at the Terminal, a compatibility study needs to be completed, the CoU needs to be signed, the Ship-to-Ship questionnaire and necessary documentation needs to be exchanged and the vessel must be declared compatible and acceptable for EET.

As a general instruction, if the manifolds Centre Line of the LNG vessel is at more than 157.5m from stern, the vessel will not be accepted, see Section 2.5.

In order to verify both the technical compatibility of the LNG vessel with EET and the operational aspects, it is important that the LNG vessel Operator, Charterer, EET and the FSRU Operator understand each other's operating procedures. In order to arrange for this, EET will provide the following information to Charterer/LNG vessel Operator:

- Vessel file - file to be used as input to perform compatibility/Optimoor analysis which needs to be delivered to the Terminal for review. For completeness purposes, as an additional information input (if wanted to be used), the Terminal will also deliver the Berth file which indicates inputs/information of FSRU Energos Igloo mooring to the onshore. An Optimoor study is required to be carried out by TTI.
- Condition of Use - document to be signed by the Master of the arriving LNG vessel and to be delivered to be signed by Terminal side.
- Ship-to-ship compatibility questionnaire - checklist to be fulfilled and delivered to the Terminal for review.
- List of documents/certificates - documents/certificates to be delivered to the Terminal for review. The documentation requested is:
    - SIRE report (not older than 6 months)
    - Q88 (not older as seven days at screening date)
    - Class Survey status report (not older as seven days at screening date)
    - Mooring Tail Certificate(s)

- Retirement policy of the mooring tails
- Mooring Line Certificate(s)
- Retirement policy of the mooring lines
- GA Plan
- BOG Certificate
- Cargo ship Safety Security Equipment Certificate
- Classification Certificate
- CTMS Certificate
- Fire Control and Safety Plan
- Gas form C
- IOPP
- ISPS Certificate
- Mooring Arrangements
- P & I Cert of Entry
- Safety Management Certificate
- HVPQ from OCIMF- SIRE database (not older as seven days at screening date)
- STS side manifold area details
- STS side manifold pictures
- Pictures of mooring areas
- Manifold details drawing
- Cool Down Table
- Officers' matrix with STS experience (not older as seven days at screening date)
- Full copy of Cargo Tank Gauging Tables
- Sister ship statement
- Running hours Mooring lines & Mooring Tails (Conform MEG-4 & Line Management Plan)

Based on the EET information provided, the LNG vessel Operator shall prepare and present:

- A Compatibility / Optimoor analysis
- Fulfilled Ship-to-ship compatibility questionnaire
- Documentation/Certificates
- Signed Condition of Use

EET will review (directly or via a third party) the above received documentation.

Upon exchange of all required information/documentation between the LNG vessel and the Terminal LNG vessel will be declared as technically compatible and a Terminal Acceptance Letter will be issued for the vessel.

Upon declaring the LNG vessel technically compatible, the Terminal will send further instruction to the LNG vessel on what should be performed once the LNG vessel leaves the port of loading.

If the LNG vessel is found to be technically incompatible with the Terminal, the LNG vessel will not be allowed to berth at the Terminal. In such case the Terminal User will need to nominate another vessel and send the fulfilled Request for Technical Compatibility to the Terminal so that a new LNG Vessel verification process is started.

List of approved LNG vessels will be updated regularly and will include a list of all vessels which are declared as technically compatible with the Terminal.

4.3 EET Pre-Arrival Procedures

After a vessel is nominated, i.e. the Compatibility Assessment is completed, the vessel is declared compatible and acceptable for EET. This can also mark the moment for making an application (via the Agent) for the access permit for any new vessel that needs to be applied for to RWS prior to first planned port call, if such Permit has not already earlier been requested. Such RWS permit is valid for one year.

4.3.1 Pre-arrival checks

Before every first call for a vessel a pre-arrival meeting may be scheduled in order to prepare and align all parties involved regarding e.g., arrival conditions, BOG handling, operational tank pressures and unloading plan. The LNG vessel's crew shall perform pre-arrival checks that (at a minimum) comply with the recommendations of SIGTTO. Records shall be maintained and made available to EET and GSP when required. Confirmation of completion of pre-arrival checks and any deficiencies shall be reported to EET in the Pre-Arrival Information notice. Any defects which may affect the safety of navigation, berthing or cargo operations must also be reported to GSP as applicable.

The Pre-Arrival checks shall include but not be limited to in particular Cargo Readiness, i.e. all necessary preparations for handing cargo that need to be completed prior to docking at the Terminal. As a minimum this includes:

- Having the proper size manifold presentation flange/reducers available – 10" for connection of the four LNG hoses. The Y-piece (1 x 16" to 2 x 10") for connecting to vapor return hoses will be supplied via the FSRU, who may also carry the required reducers as back-up.
- Short Distance Pieces (SDPs) to be installed on liquid manifolds only
- Manifold flanges inspected and approved for service prior to arrival
- Strainer of correct mesh size (20 or 60) in place
- Scuppers in place
- Fire prevention precautions in place
- Mooring lines and associated equipment inspected and ready for use
- If equipped with a double block and bleed configuration at the manifold: arrive with deck lines as agreed (warm and empty or pre-cooled and inventoried.)
- Necessary documentation is completed and available for review once moored

4.3.2 Terminal Acceptance Letter

After it is confirmed that the vessel is technically compatible with the Terminal an initial Terminal Acceptance Letter will be issued. After the cargo operation the final Terminal Acceptance Letter will be issued.

The issued final Terminal Acceptance Letter is valid up to two years for each individual LNG vessel, from the Letter issuance date. If there were no modifications related to technical compatibility and safety/managerial aspects made on the LNG vessel in the period from issuance of the Letter until second (or any subsequent) arrival to the Terminal, occurring in the mentioned period of two years, the LNG vessel will not need to pass through the overall 'confirmation of technical compatibly' procedure. In such case, the LNG vessel representative will need to submit the List of necessary documents and the signed Condition of Use document to Terminal representative, for verification. Upon verification of the documentation, the vessel will be considered as successfully nominated.

4.3.3 LNG vessel Pre-arrival Notice Requirements

Cargo Information Notice

For each LNG cargo to be unloaded via the Terminal, EET must receive a Cargo Information Notice by email (operations@eemsenergyterminal.com and marinesupervisor@eemsenergyterminal.com) upon departure of the LNG vessel previous port. The form of the notice can be found in Appendix K and includes important information about the condition of the cargo upon departure and the expected characteristics of the LNG cargo upon arrival at EET. If the destination of the LNG vessel after departure from the previous port was changed to EET, the Cargo Information Notice shall be delivered to EET as soon as possible after such acquisition or diversion.
Via the Agent relevant vessel properties (like actual draft and hydrodynamic detail shall be made available (via NSC) to load the Protide program that will allocate a tidal window for arrival

Estimated Time of Arrival (ETA) Notice

The LNG vessel is required to provide EET with an ETA Notice by email (operations@eemsenergyterminal.com and marinesupervisor@eemsenergyterminal.com) immediately upon departure from the last port. The notice will include an estimated time of arrival of the LNG vessel at the Pilot Boarding Station (ETA) as well as other important information. The LNG vessel must also provide updates at prescribed intervals along the voyage so EET may adequately manage all of its activities and commitments. The required form for the initial notice and all updates can be found in Appendix L. The required update intervals are:

- 96 hours before the then current ETA at PBS
- 72 hours before the then current ETA at PBS
- 48 hours before the then current ETA at PBS
- 24 hours before the then current ETA at PBS (incl. Pilot Chart dispatch via Agent to Pilots org.)
- 12 hours before the then current ETA at PBS

If the destination of the LNG vessel after departure from the previous port was changed to EET, the ETA Notice shall be delivered to EET as soon as possible after such acquisition or diversion and all updates still possible will be delivered on schedule.

Daily Report Form

Vessels are to send daily reports to the terminal if they arrive before the scheduled arrival window and are re-directed to anchorage to wait for confirmation to enter the Port area and berth at the Terminal. Daily reports are to be sent at 12:00 LT, to the Terminal by using the Daily Report Form (see Appendix M).

Notice of Readiness

A Notice of Readiness shall be tendered to the Terminal by the LNG vessel, by using the format in Appendix N, to the following emails: operations@eemsenergyterminal.com, marinesupervisor@eemsenergyterminal.com and EnergosIgloo@nmm.stena.com as soon as the LNG vessel has reached the Pilot Boarding Station and:

a) The Pilots have boarded the LNG vessel
b) Has cleared the necessary formalities with RWS, GSP and all other relevant authorities and has complied with all necessary customs notification requirements
c) Is ready in all respects to proceed to the Terminal's unloading berth at the FSRU and commence unloading

Please note that:

- For the Terminal purposes, the NOR should be tendered immediately after the Pilot is on board the LNG vessel.
- Once the Pilot is onboard the LNG vessel, and the NOR has been tendered, the LNG vessel can

proceed to the Terminal, under the guidance of the Pilot.

- The Notice of Readiness will be signed from the Terminal side on the pre-cargo transfer meeting, which will occur after the vessel is declared all fast.

4.3.4 Terminal Pre-arrival Notice Requirements

Acceptance or Rejection of the Notice of Readiness.

If the LNG vessel has tendered the NOR and EET or Master encounters or foresees a problem which will cause a delay to the LNG vessel in berthing, unloading or departing the Terminal, it must notify the other party immediately by email using the form in Appendix O.

Terminal Status Notice

EET will provide the LNG vessel with a Terminal Status Notice at least 24 hours prior to the then current ETA. The form for this can be found in Appendix P and will be given by e-mail. The notice will contain information on the allocated high-water slot.

4.4 EET Cargo Sequence of Events

Mooring / Berthing

1. "All fast" and "Ready to Receive personnel basket, or ship-ship gangway" Notice by LNG vessel
2. Personnel transfer to/from FSRU by ship-ship gangway as needed
   (Note: if gangway access not available then the LNG vessel accommodation gangway plus pilot ladder for using a service launch (or tug) for people transfer (before or after cargo transfer)
3. Satisfaction of Immigration & Customs Requirements
4. Installation of ESDS (Emergency Shutdown System) / Communications links
5. Pre-Cargo Transfer Meeting
6. Cargo Transfer Process:
   (a) Install hose saddles on LNG vessel
   (b) Hoist hoses from the FSRU to the LNGC
   (c) Start Water Curtain
   (d) Connect cargo hoses
   (e) Hoses Purging with N2 / Leak Test
   (f) Initial Gauging
   (g) ESD's test Warm Condition
   (h) LNG vessel cargo lines (if needed) & Hoses Cooling Down
   (i) ESD's test Cold Condition
   (j) Start cargo operations
   (k) Take sample bombs to verify LNG properties
   (l) Finish cargo operations
   (m) Inhibit ESD
   (n) Drain & Purge Hoses
   (o) Final Gauging
   (p) Disconnecting Liquid & Vapour Hoses
   (q) Stop Water Curtain
   (r) Return Hoses to the FSRU
   (s) Remove hose saddles
7. Post Cargo Transfer Meeting
8. Disconnection ESD's / Communication Links
9. Personnel transfer to/from FSRU by ship-ship gangway as needed
10. "ship-ship gangway removed" and "Ready to Disconnect" Mooring Lines Notice by EET to LNG vessel

11. Un-berthing

Additional information that will be shared with the LNG vessel via email is:

- **IGLOO EEMS ENERGY TERMINAL CONSOLIDATED OPERATIONS MANUAL** - general document prepared to help the STS operations and familiarize with equipment involved in the operation (Appendix BB, CC).
- **LNGC Admission Protocol** - Admittance protocol issued by the Authorities (Appendix EE).
- **Spring line preparation before arrival** - instructions on preparation of spring lines before arrival to the Terminal (Appendix FF).
- **SSLink Setup for IGLOO Terminal** - recommended setup from LNG vessel ESD Cabined.
- **Saddle information** - 10-1019-1 - saddle information.
- **Loading hoses connection and disconnection procedure**

4.5 EET Operational Limits for LNG vessels

It is noted that the LNG vessel and the FSRU are located in an enclosed basin, with little to no wave action (see Section 2.6.3), and virtually zero current (see Section 2.6.4). The only relevant operational limiting parameter is wind speed.
The 10-minute average wind limitation for access (and departure) into (/from) the port is set at 13.8 m/s (see Section 8 and Marin report "Nautical Investigations" 34226-1-MO-rev 1). When wind speeds well in excess of this nature are expected for a period of several days after planned arrival, the LNG vessel is unlikely to be allowed in the port, as it might not be able to depart again. Also, if wind speed forecasts for the planned port period (max 48 hours) are predicted to be in excess of 20 m/s the LNG vessel will not be allowed into the port.
Higher than 20 m/sec actual wind speeds should not be a direct problem for a moored LNG vessel, but for wind speeds in in excess of 21 to 24 m/s tug assistance to the moored LNG vessel may be required, subject to wind direction and LNG vessel mooring system capabilities (refer Marin report STS DMA no 34226-5-PO rev 1.1 dated July 2022). If unexpected higher than predicted wind speeds are encountered the LNG vessel may also consider lowering its freeboard by taking in some extra ballast water.

In summary:

- Max wind speed for port entry or departure: 13.8 m/s
- Max wind speed for safe mooring alongside Igloo (without extra mitigations): 20 m/s
- Max wind speed to stop STS LNG transfer: above 16 m/s

All passing vessels in the vicinity of the LNG vessel when moored alongside the Igloo will be required to maintain a minimum clearance of 30 m (when there is no STS LNG transfer) and 100 m when full-flow STS LNG transfer is operational.
LNG transfer may need to be reduced temporarily, as instructed by GSP/VTS to EET / FSRU operator, when larger third-party vessels approach or depart from the east or south quay in the Wilhelmina haven. These vessels may need to pass at a distance that would encroach on the defined "safety exclusion zone for uncontrolled sources of ignition" around the full-flow STS LNG hose transfer system (of approx. 145 m radius). By temporarily reducing LNG transfer rates to some 2,500 m3/h the defined safety exclusion zone reduces in size and allows the east/south quay-bound vessels to pass at a minimum clearance to the LNG vessel of some 50 m (refer DNV report "Ignition free zone assessment for LNGC transfer activities" report 10359374-4, Rev. 1 dated 28 June 2022). This may happen a few times per day.

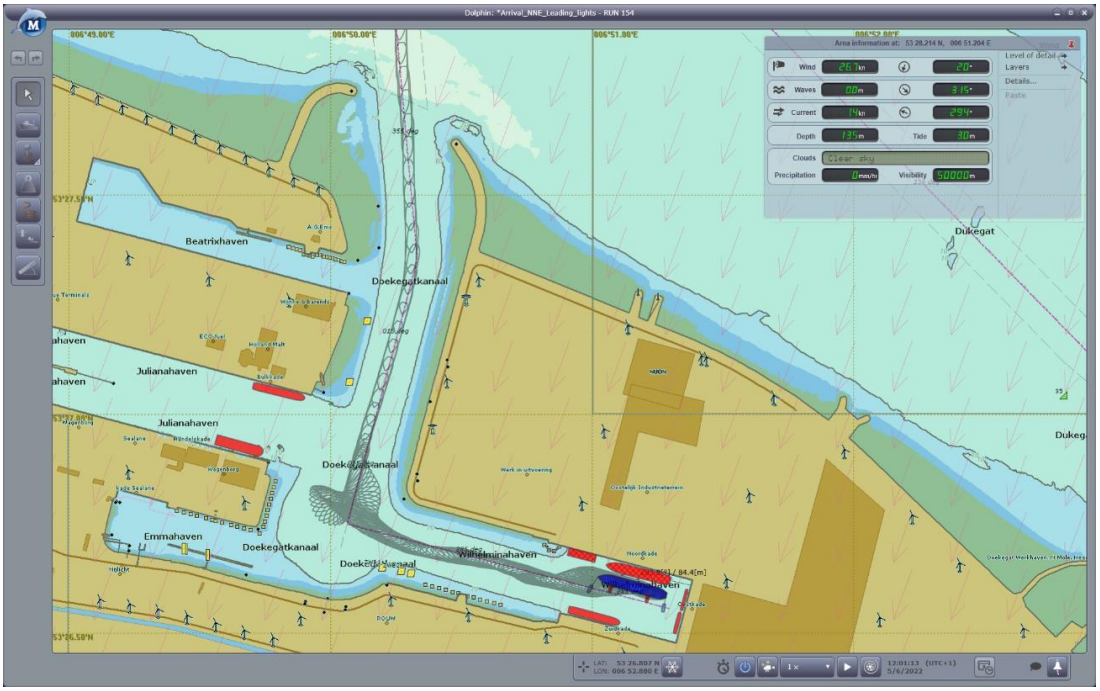
Vessels serving the LNG vessel (for supplies etc), may berth along the LNG vessels but not during STS LNG transfer (after notification to GSP/VTS).

(Emergency) unberthing limit for LNG vessel moored against FSRU

Unberthing will normally be restricted to periods of wind speeds at max 13.8 m/s. However, exiting the port will require a tidal window, in part set by max crosscurrents outside the port and tide level. Within the Eemshaven port there are no other berths available for berthing / mooring the LNGC, so in practice most emergencies onboard the Energos Igloo and/or the LNG vessel will need to be dealt with whilst the LNGC stays moored alongside the FSRU (or in a most extreme scenario perhaps the LNGC moved away from the Igloo and kept in a controlled position elsewhere in the port by means of a full tug spread). As a minimum 2 tugs in port are equipped with FiFi firewater application hardware to assist as may be required.

4.6 Mooring / Berthing the LNG vessel

Arriving LNG vessels proceed from the port entrance to the turning basin where they will be turned (clockwise, as shown in below Figure taken from Marin nautical simulations report 34226-1-MO) and then pushed and pulled by tugs (stern first) alongside the FSRU (as directed by EET).



Final position will be as indicated in below artist impression seen from Wilhelmina haven East Quay.

The FSRU berth and cargo transfer systems are designed for LNG vessels to moor starboard side alongside, with the vessel's bow facing the sea and prevailing winds. This is the required mooring pattern for all vessels moored at EET.

To assist vessels with their approach, portable navigation aid systems (NMS) are used by the pilots and temporarily installed on the LNG vessel. Also, the LNG vessel GPS will take care of the LNG vessel approach velocity and angle monitoring. The maximum approach speed allowed is 10 cm/s and the maximum permitted angle between the LNG vessel's side and the FSRU/floating fenders is five (5) degrees.

FSRU QRH and line pattern drawings are provided in below images, rated loads (SWL), info on the Yokohama floating fenders etc is also provided below.

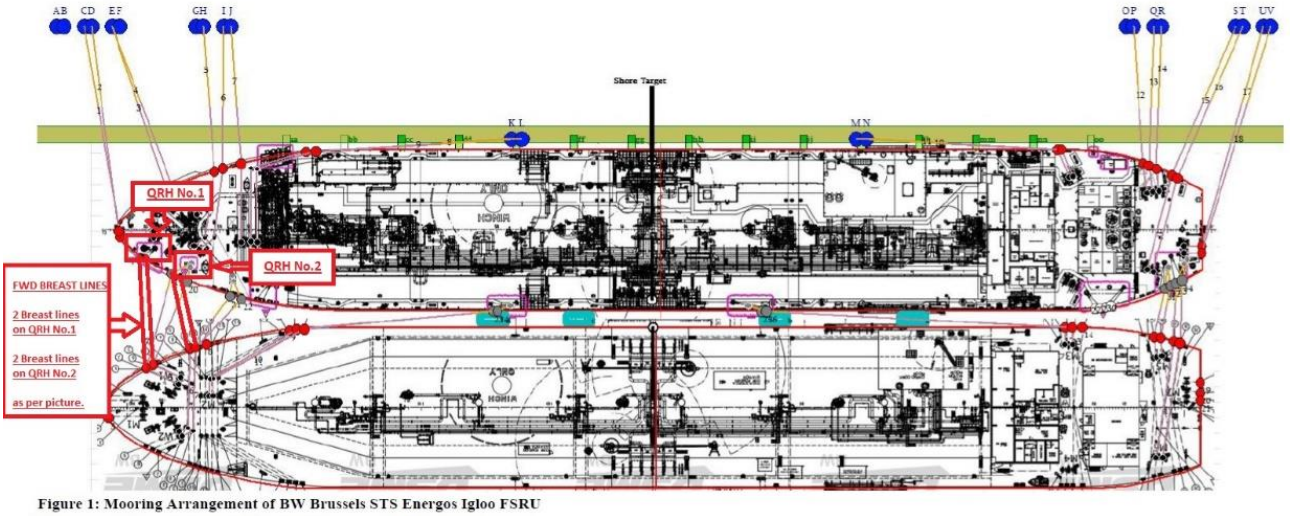


Figure 1: Mooring Arrangement of BW Brussels STS Energos Igloo FSRU

Layout of STS mooring system.

Generic description of typical (required) LNG vessel mooring system:

- 8 breast-lines and 4 spring lines
- wires or HMPE lines with at least MBL of 125 Ton fitted with 11 m long polyester/polypropylene stretchers
- target line pretension: 10 Ton.
- QRH: SWL 150 tons (on the FSRU) (QRH's available)
- Primary fenders: four (4) Pneumatic fenders (Type I, LP-50 or LP-80, 9.0 m x 4.5 m plus chain tire net); and

  Secondary (baby) fenders: two (2) Pneumatic fenders (3.0 m x 1.5 m) with one (1) placed forward and one (1) placed aft at the upper and outer ends of the parallel mid-body, suspended approximately 1.5 m below the main deck

The LNG vessel's Master must ensure that all used mooring lines are clean and will not pollute the Wilhelmina haven. The LNG vessel's mooring lines may be passed to the FSRU when the distance between the vessels is close enough for heaving lines or a pneumatic line-throwing device to be used. The LNG vessel's Master or other authorized person during mooring alongside the FSRU shall specify to FSRU Master on which hook each line should be fasten in accordance with the approved mooring layout. Any deviation with regard to mooring lines' location shall be agreed with LNG vessel's and FSRU's Masters and EET. Mooring lines fastened to the same (double) mooring hook arrangement or in the same direction (e.g. sternward) must be of a similar breaking strength and comprised of the same materials. The mooring crew and gangs on both sides are required to be equipped with proper personal protective equipment (PPE).

The LNG vessel's Master is responsible for safe mooring and the tension of mooring lines. Moreover, the LNG vessel's Master shall ensure that mooring lines loads are evenly distributed over the mooring pattern and that no lines are allowed to become slack or over-tight, by designating for this purpose an appropriate crew member.

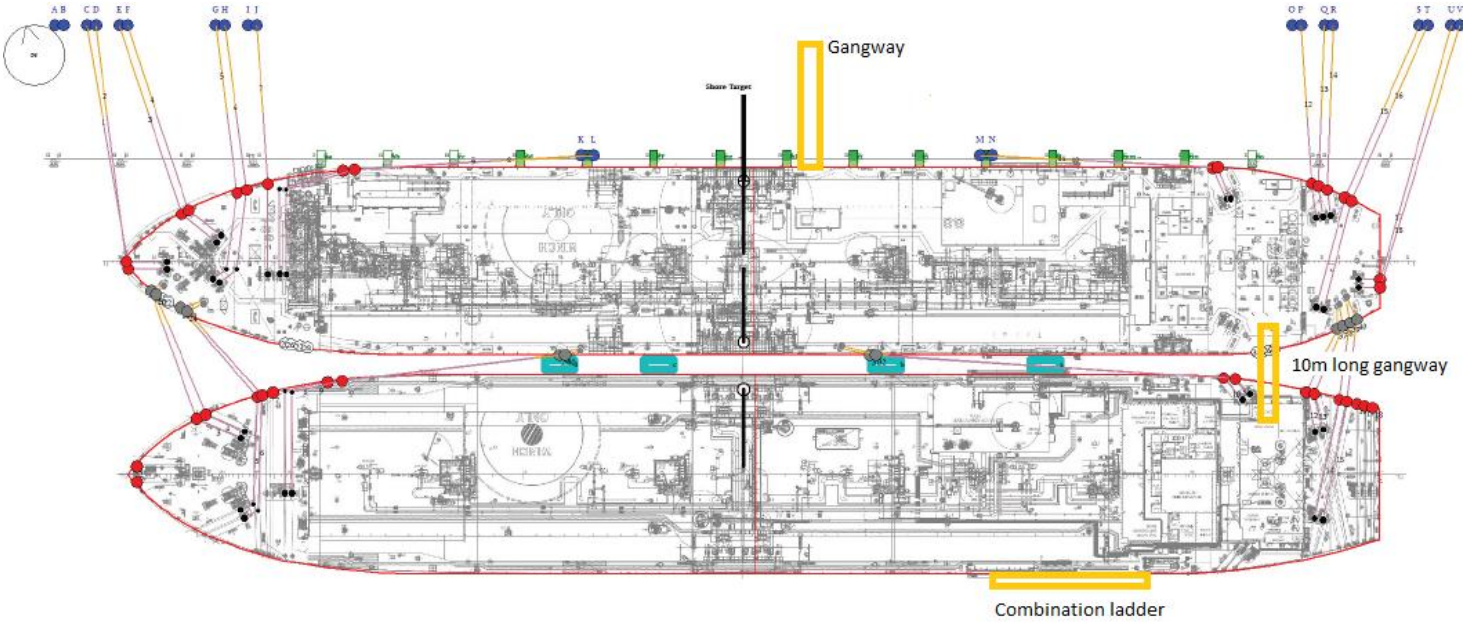
Checks are to be made to ensure that tending of the moorings is maintaining the LNG vessel in a satisfactory position within the safe working envelope of the unloading hoses.

Fire wires are not needed to be prepared. Both EET and GSP adopted the OCIMF recommendations on ETOPS (July 2010).

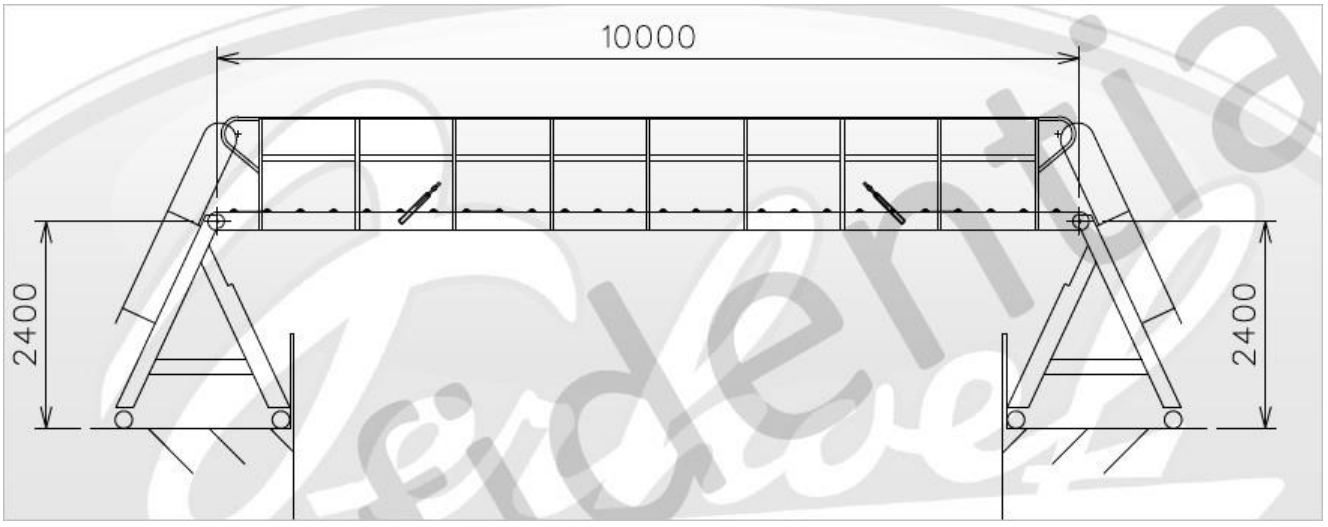
4.7 LNG vessel – Personnel Transfer

In general, transfer of personnel between both ships must be kept to the minimum.

FSRU Energos Igloo has one shore gangway – aft of the LNG manifold ship's main deck to the quay.



The prime access between LNG vessel and FSRU will be a lightweight (10 m long) gangway with deck-ladders either side and with handrails, lifted onboard the visiting LNG vessel by the Igloo aft provisions crane. Other access would always be a combination ladder on port side of the LNGC (dry weather and daylight only) – a pilot launch type boat would be necessary in this case – it should be requested 6hrs in advance. This path will be available for embarking/disembarking Pilot, Port Authorities on arrival/departure, Surveyors, EET/Gasunie Representatives, incl. their Loading Master, and also essential FSRU personnel that need to attend Pre and Post Transfer Meetings, including opening and closing CTMS.



4.8 LNG vessel – EET/FSRU Communications

Primary LNG vessel/EET/FSRU communications will be provided by means of a glass-fibre optic link or an electric (Pyle National 37 pin) multi-pin back-up depending on the LNG vessel's systems. Only the primary or back-up link will be connected, not both. This link provides both phone and ESD capabilities. This link will be set immediately after the confirmation of "All fast" has been given. FSRU staff will transfer the communications cable, the LNG vessels crew will connect (or on departure disconnect) the cable. It will remain operative until the mooring lines are about to be disconnected for un-berthing. The LNG vessel must ensure that the onboard ESD connection is in good condition and clear of any obstructions.

The ESD system shall only be "inhibited" on agreement with EET. EET will require the ESD system to be inhibited during hose connection / disconnection operations.

Technical details of the Communications/ESD Links can be found in Appendix BB.

The link will allow the following:

- Hot line between EET/FSRU and LNG vessel Bi-directional
- ESD LNG vessel - EET/FSRU Bi-directional

All LNG vessels will also be provided with an Intrinsically Safe, portable UHF radio. This radio is for use as communication back up and also direct communication to the FSRU operations staff, however the primary communication should continue to be the Hot Line.

When an LNG vessel is alongside, it should also maintain a listening watch via VHF channels 01 and 66.

The Language that will be used for all communications between EET/FSRU and LNG vessel will be English or Dutch.

The use of LNG vessel's GMDSS (Global Maritime Distress Safety System) installation for transmitting, except the GMDSS satellite communications and VHF radio on one (1) watt power, is not authorized while the cargo hoses are connected. The LNG vessel's main transmitting aerials must be disconnected and earthed.

The LNG vessel's radars shall be switched off while the cargo hoses are connected.

Additionally, the LNG vessel's AIS unit should also be either switched off while alongside or set to a power setting of equal to or less than 1 watt.

4.9 Pre-Cargo Transfer Meeting

These procedures are established to facilitate a safe, pre-planned cargo transfer and must be adhered to. The Terminal's Loading Master or his representative, a senior FSRU officer and the LNG vessel's Master or his designee will hold a Pre-Cargo Transfer Meeting onboard the LNGc to discuss all items listed in Appendix Q – (Pre-Cargo Transfer Meeting Checklist). The forms referenced in Appendix Q (and discussed below) must be discussed, completed and agreed to, signified by signing prior to cargo unloading.

1. Declaration of Security (Appendix C)
2. Work Authorization Form (Appendix F)
3. Ship Shore Safety Checklist from ISGOTT. Follow-up safety checks will be conducted at agreed intervals throughout the unloading period and the checklist will be signed accordingly sample as attached in Appendix R.
4. Safety Declaration (Appendix S)
5. LNG Cargo Transfer Agreement (Appendix T)
6. Statement of compliance (Appendix U)
7. Smoking Notice (Appendix V)

Before the hoses are connected, EET's Loading Master or his representative will board the LNG vessel accompanied by a representative of EET's Customer for Custody Transfer, mostly a surveyor.

The quantity that will be transferred will be based on the Custody Transfer System of the LNG vessel tanks gauging. To verify the composition of LNG (as landed) during cargo transfer, EET staff or its appointed surveyor will at intervals take sample bombs onboard of the LNGC, if and when EET decides not to merely rely on the Bill of Lading and aging models, see Section 4.13.

4.10 Cargo Transfer Preparations

As per ISGOTT, SIGTTO recommendations, grounding cables are not used as the Terminal cargo hoses have insulating flanges.

Unloading of the LNG vessel will be carried out using four 10-inch liquid cargo hoses with 10 inch 150 lbs ANSI B16.5 flanges and two 10-inch vapour return hoses with 10 inch 150 lbs ANSI B16.5 flanges. If the number of liquid cargo hoses or vapour hoses available is different, the LNG vessel will be notified, and agreement will be made at the Pre-Cargo Transfer Meeting. Flowrates as indicated in Section 3.2.

4.11 Cargo Transfer Hoses Connection

Hose saddles – see also Appendix BB

The typical LNG vessel is not fitted with a cargo hose-railing in the way of the manifold to support the weight of the hose filled with product, transferring the static and dynamic loads to the deck, while maintaining the minimum bend radius of the hose. The FSRU is outfitted with adjustable hose support saddles for use during the STS operation. The saddles are designed and engineered for their intended purpose, constructed of marine grade aluminium, and have a 'strap-down' system with ratchet straps. The saddle on the FSRU includes a hose-brake system designed to lower the cargo hose after an ESD-2 actuation to prevent damage to the hose or ERC assembly and the LNG vessel hull.

The saddle for the LNG vessel does not contain the hose-brake system. The saddle to be transferred from the FSRU to the LNG vessel has lifting eyes integral to the structure and a dry weight of ~240 kg. Prior to arrival the LNG vessel Manifold shall have fire hoses rigged to fill the hose saddles with ballast upon the instruction from the FSRU Supervisor to the LNG vessel staff attending the LNG vessel hose connection operations.

Connecting the hoses

The LNG vessel staff is responsible for connecting the hoses to the LNG vessel's manifolds (fitted with SDPs on liquid manifolds as explained in Section 4.3.1 of this manual) and the FSRU's staff may be requested to assist as appropriate. The LNG vessel shall ensure that her lines and valves allow for safe connection.

The FSRU shall provide the following persons who will attend the LNG vessel Manifold:

- Supervisor - Chief Officer
- Cargo Engineer
- At least one additional Crew Member

STS equipment handling, and hose connection shall be guided by the FSRU Supervisor who will attend the LNG vessel manifold during the connection process. The LNG vessel crew shall be actively involved in the physical securing of the saddles and the final bolting of the 16"x10" reducers once they are in position (if not already done prior to arrival in port), therefore the LNG vessel shall provide an adequate number of competent crew members for the hose connection process.

Flange insulation sets shall be inserted on board the FSRU between the reducing spool piece and the Emergency Release Coupling in each hose string. A hull bonding cable between the vessels shall NOT be connected.

Liquid manifold connections not used for the cargo transfer shall remain blinded and secured with bolts / nuts in all flange connection holes. Usually, the cargo transfer hoses shall be connected starting with the second liquid manifold connection (L-2) and working aft until all hoses are connected.

Prior to beginning the lifting of the STS Hoses from the FSRU to the LNG vessel the following checks shall be carried out on the Hose Support Saddles:

- No visible damage to the Teflon sheet that could damage hoses
- Horizontal securing strap and putting blocks are in place
- The hose support saddle is stable.

Hose buns designed to support and protect the composite hose when lifted by the crane shall be provided by the FSRU. The hose bun shall be secured to each hose and used to lift the hose thus avoiding external damage and excessive bending.

STS Hoses are connected with a manual bolting arrangement. For manual bolting the flange connections shall be set with a torque 350 Nm for 16" flanges and 250 - 270 Nm for 10" flanges, each with a new packing/gasket installed. The responsible LNG vessel officer shall verify the torque settings on the LNG vessel manifolds.

If (optional/future) Clamp Connections are utilized, then only FSRU Staff are permitted to handle such connections on board the LNG vessel.

Cargo Hose Inerting and Flange Leak Test

Once the cargo hoses are connected, the manifolds, spools and hoses shall be purged of oxygen using nitrogen supplied by the FSRU (supplying 7 bar, Size 1/2" off coupler, 15-20m hose length). The pressure shall be raised to 500 kPa (5 bar) in the liquid lines and 200 kPa (2 bar) in the vapour line. The pressure shall be maintained while a leak test is carried out on the flanged connections using a soapy water solution. Once the leak test has been completed the pressure shall be released to atmosphere by the LNG vessel and the hose atmosphere shall be tested. Purging is considered complete once the O_2 level is < 5%. All hoses shall be depressurized to 5-10 kPa after the leak test and purged.

Control and Supervision

At all times the cargo operations must be supervised onboard the LNG vessel by a qualified/certified person appointed by the Master. The person so appointed shall maintain communications with EET/FSRU and the Master.

EET/FSRU Personnel

EET and FSRU personnel will be present for the berthing, connection, initial gauging and cool down, as well as for the final gauging and disconnection of the LNG vessel.

Cargo Equipment Condition

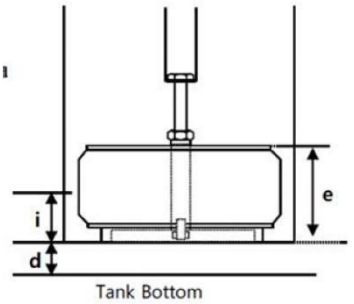
The LNG vessel Master is required to ensure that all the LNG vessel's equipment used in or essential to the safe and efficient cargo operation is properly manned and maintained throughout the cargo operation. Any deficiency that impacts the safety or efficiency of the cargo operation must be immediately reported to EET.

Cargo Measurement

The LNG vessel is required to conduct initial (OCT) and final gauging (CCT) of the cargo tanks prior to the start of and after completion of cargo transfer. The Master shall ensure that the cargo gauging is done in compliance with the LNG vessel's Custody Transfer Measurement System (CTMS) Manual. The Loading Master and a surveyor will witness the Cargo Gauging.

If the cargo tank(s) contain a heel, secondary level gauges must be buoyant in order to compare with primary level gauges. This means that there must be sufficient liquid in all cargo tanks that none of the floats are grounded, unless agreed otherwise.

The float level gauge is located inside a guide pipe and the pipe is fixed from the top. In cryogenic condition, the guide pipe will be contracted, and the end of the pipe will more 'gap' between the tank bottom and the end of the pipe (distance "d" in graphic) than when it is in ambient temperature (during recalibration). So the float won't be able to go further down.



4.12 Water Curtain

Prior to line and hose cool down commence, the water curtain shall be started, both, on the LNG vessel (including area under manifold deck to be flooded with water) and on the FSRU. The fire main shall remain pressurized at all times on both the FSRU and the LNG vessel.

4.13 Cargo Transfer

EET Personnel
One EET Operator or designated FSRU operator will be in attendance at the LNG vessel during cargo transfer equipment connection/disconnection activities and during initial safety walk.

Warm ESD test
Prior to commencement of the Hose Cool Down, a Warm ESD Test shall be conducted to test the linked ESD System function in accordance with the IGC code. The warm ESD test shall be conducted once cargo transfer hoses are connected and purged. It is important that the ESD valves are not operated before purging has been completed since the cargo transfer hose and spool pieces may contain oxygen and moisture.

Prior to the opening the ESD Valves the LNG vessel shall verify (double check) that the cargo system and cargo lines are set up as per the cargo plan and that the pressure in the cargo lines are the same as the average cargo tank pressures.

When both parties are ready, the LNG vessel shall open their ESD valves first and then check that the pressure at the vapour manifold is the same or lower than the LNG vessel average cargo tank pressures. Once confirmed the FSRU shall open their ESD Valves.

Warm ESD Test(s) shall be activated as agreed in the Pre-Cargo Transfer Meeting and in full compliance with the IGC Code. All valves and equipment connected to the ESD system must be operating properly when the ESD System is released.

Open Vapour Line

Return vapour shall be sent to the LNG vessel by the FSRU using gas from its LNG storage tanks. During unloading the LNG vessel shall control the return vapour pressure it requires. The vessel must ensure that all vapour flow meter readings are recorded prior to and after vapour transfers with the FSRU.

Hose Cool-Down

The unloading LNG vessel shall cool-down the hoses at a rate of max 3° Celsius/min by supplying LNG at approximately 1.0 – 2.5 Bar to the hoses at a reduced flow of approx. 50 m3/hr. The LNG vessel shall adjust cool-down line pressure/flow at the FSRU's direction. The LNG vessel's control of LNG flow and pressure during LNG hose cool-down shall be mutually agreed during the Pre-Cargo Transfer Meeting. The FSRU will monitor the cool-down and ask the LNG vessel to increase or decrease the LNG pressure as required. Hose cool-down should take at least 90 minutes. The LNG vessel is responsible for ensuring effective cooling down of its pipeline system in a timely manner so as not to delay cargo operations.

Cold ESD test

All ESD Valves to be stroked in COLD condition. Before initiating the Cold ESD test both LNG Vessel and FSRU shall confirm their readiness to each other to conduct this test. The FSRU shall remove the ERC Pins. The FSRU following a countdown will initiate the ESD. Both LNG Vessel and FSRU will check their respective ESD valves for proper closure. Closing time of both LNG Vessel and FSRU valves are to be recorded. Only one ESD is required.

Unloading Commencement

The commencement of cargo unloading shall be mutually agreed between EET/FSRU and LNG vessel. The LNG vessel shall notify EET/FSRU of the time it starts the first and subsequent pumps. Additional pumps shall only be started after both have verified its ability to handle the increased rate. Each hose has a maximum rate capability of hose capacity upgraded to 2,250 m3/h (applicable for the 10" diameter hoses that will be used). At no time should this rate be exceeded. The maximum bulk rate will be stipulated by EET during the Pre-Cargo Transfer Meeting.

Cargo Transfer

The LNG vessel and EET will monitor the unloading rate, temperatures, and pressures throughout the cargo transfer. The LNG vessel is to notify EET hourly of the:

- quantity aboard the LNG vessel
- the transfer rate
- the estimated time for completion of the operation.

LNG Sampling

EET will verify the Bill of Lading and assess the expected LNG composition after ageing and voyage using independent aging models. This can currently only be done based on simulation calculations by an independent third party.

Unloading Completion

Cargo unloading shall stop at the agreed heel to remain onboard the LNG vessel.
The LNG vessel shall notify EET/FSRU one hour prior to commencing a reduction of the cargo unloading rate.
The LNG vessel shall notify EET/FSRU of the time it stops a pump and the pump number.

Please note that currently LNG vessels cannot heel out at EemsEnergy Terminal.

4.14 Unscheduled Cargo Transfer Stoppage or Flow Rate Reduction

If conditions require that cargo unloading be stopped, EET and LNG vessel should endeavour to notify the other party beforehand. If this is not practical, they shall stop cargo operation and communicate the situation to the other as soon as it is practical. Cargo operations must be stopped if there is a failure in communication between EET/FSRU and the LNG vessel. EET reserves the right to delay or stop the cargo operation due to operational requirements of the terminal.

EET and LNG vessel will monitor the weather and the LNG vessel's motions and mooring line tension throughout the cargo transfer. If unforeseen (weather) conditions or unexpected LNG vessel's motion endangers the terminal and/or the LNG vessel, either side shall stop the cargo transfer.

Occasionally there may be a need to reduce LNG transfer rates if other vessels have to pass at relatively close distances within 145 m from the LNG transfer point (but maintain at least 50 m clearance to the LNG vessel at its parallel body). This will be communicated as soon as practically possible via GSP VTS and transfer rates will need to drop for some time below 2500 m3/h, see also section 4.5 (refer DNV report 10359374-4, Rev. 1.).

4.15 Cargo Transfer Completion

Draining & Purging cargo hoses

Once the cargo transfer operation has been completed, the ESD valves on the manifold of the FSRU shall be closed. On the LNG vessel the double-block valves shall be closed while the ESD valves remain open to allow draining of the vertical risers and cargo transfer hoses. All cargo transfer hoses shall be drained from the LNG vessel towards the FSRU. After 15 minutes the LNG vessel closes ESD valves & opens double shut valves to liquid free the cargo transfer hoses.

The FSRU shall confirm when hose draining has been completed.

Draining shall be conducted by repeatedly pressurizing the hoses using nitrogen until the pressure reaches up to to five (5) bar and then opening the FSRU manifold ESD bypass valves until pressure drops to 2.5 bar, this step to be performed 3-4 times until hoses are liquid free. During this operation water spray shall be directed onto the LNG hose bight (catenary) to speed up de- icing and vaporization of remaining LNG in the hose maintain positive pressure though all sections of the hose at all times. As the LNG boils-off, the line pressure increase will assist in displacing liquid in the lines. Both vessels shall conduct the drain and purge operation together while all valves at LNGc side remain closed.

It may aid the operation if the FSRU can supply nitrogen, via a flexible hose, to the LNG vessel N_2 rail to aid the pressurization of the cargo hoses from the LNG vessel side. This shall be discussed at the Pre-Cargo Transfer Meeting.

Cargo hoses shall continue to be purged with nitrogen until they contain an atmosphere of less than 2% methane by volume. Hoses may then be disconnected, blind flanges installed, and the hoses passed back to the FSRU.

Disconnection of cargo hoses

In general, the cargo transfer hoses shall be disconnected in a reverse order from how they were rigged. All crane movements will be directed by the FSRU. Only the FSRU crane is expected to be used. The general order shall be to disconnect hoses, spool pieces, remove the saddles and finally collect all tools and miscellaneous equipment.

EET / LNG vessel Post Cargo Transfer Meeting
A Post Cargo Transfer Meeting will be held immediately after the cargo operation and all items in Appendix W shall be discussed and any issues documented. The EET Loading Master and the LNG vessel's Master or his designated person in charge shall attend this meeting.

THE SAFETY OF THE FSRU AND LNG VESSEL SHALL BE OF PARAMOUNT IMPORTANCE THROUGHOUT THE LNG VESSEL'S STAY AT THE TERMINAL.

After cargo transfer completion:
Please provide LNGc departure draft towards Agent and marinesupervisor@eemsenergyterminal.com to be used Protide (to confirm Protide departure draft calculation as soon as possible)

4.16 Unberthing and Departure

The LNG vessel Master is bound to leave the berth and FSRU in the Wilhelmina haven as soon as possible after termination of cargo transfer. EET has the right to demand that the LNG vessel be removed from her berth when EET deems this necessary for reasons of safety, compliance with safety regulations and/or directions from the harbour authorities or other authorities, upon the end of the Allowed Unloading Time (see Appendix O) or for any other valid reason, provided a controlled departure compliant to LNGC port access regime can be arranged.

If the LNG vessel does not leave the berth timely, then EET may take all safe and necessary steps to effect the removal of the LNG vessel from the terminal and the Wilhelmina haven. EET will notify the Master of the remedies it plans in the event that a LNG vessel fails to leave berth timely using the form in Appendix Z. EET will use reasonable endeavours to notify the Master in the event it is required to cancel the next berthing slots due to the fact that the LNG vessel fails to leave the berth in a timely manner, using the form in Appendix AA.

Upon completion of the Post-Cargo Transfer Meeting, EET will give notice to the LNG vessel that it is "Ready to Disconnect Mooring Lines" and will disconnect the communication links.

The LNG vessel can proceed with testing of Propulsion systems as part of pre-departure procedure only if the below mentioned tasks are completed and confirmed:

- all STS equipment including cargo hoses, communication cables and gangway is disconnected / removed and properly secured
- The pilot(s) arrived on board the LNG vessel
- all Tugs have been Made Fast with the LNG vessel
- all mooring lines have been Cast Off from the FSRU Energos Igloo
- LNGC is at safe distance from FSRU, to avoid clogging her water intakes.

Only when all above items are fulfilled, then it is safe to proceed with rudder and Main Engine test Ahead / Astern.

Prior to the commencement of un-berthing, the Master and Pilot shall exchange information that allows for the safe passage of the LNG vessel from the Berth to the pilot station. This shall include any necessary discussions with EET or GSP regarding passage restrictions due to other vessels in Eemshaven or the access channel or any other vessel traffic, or due to tidal window restrictions, that again will be confirmed with the use of Protide.

All tugs shall be made fast, before unmooring manoeuvres can commence. The LNG vessel Master and Pilot shall ensure that EET and the FSRU are aware of the order for releasing the mooring lines. Main engine and rudder test may only be done at safe distance from FSRU – normally in turning area between Emma and Wilhelmina basins.

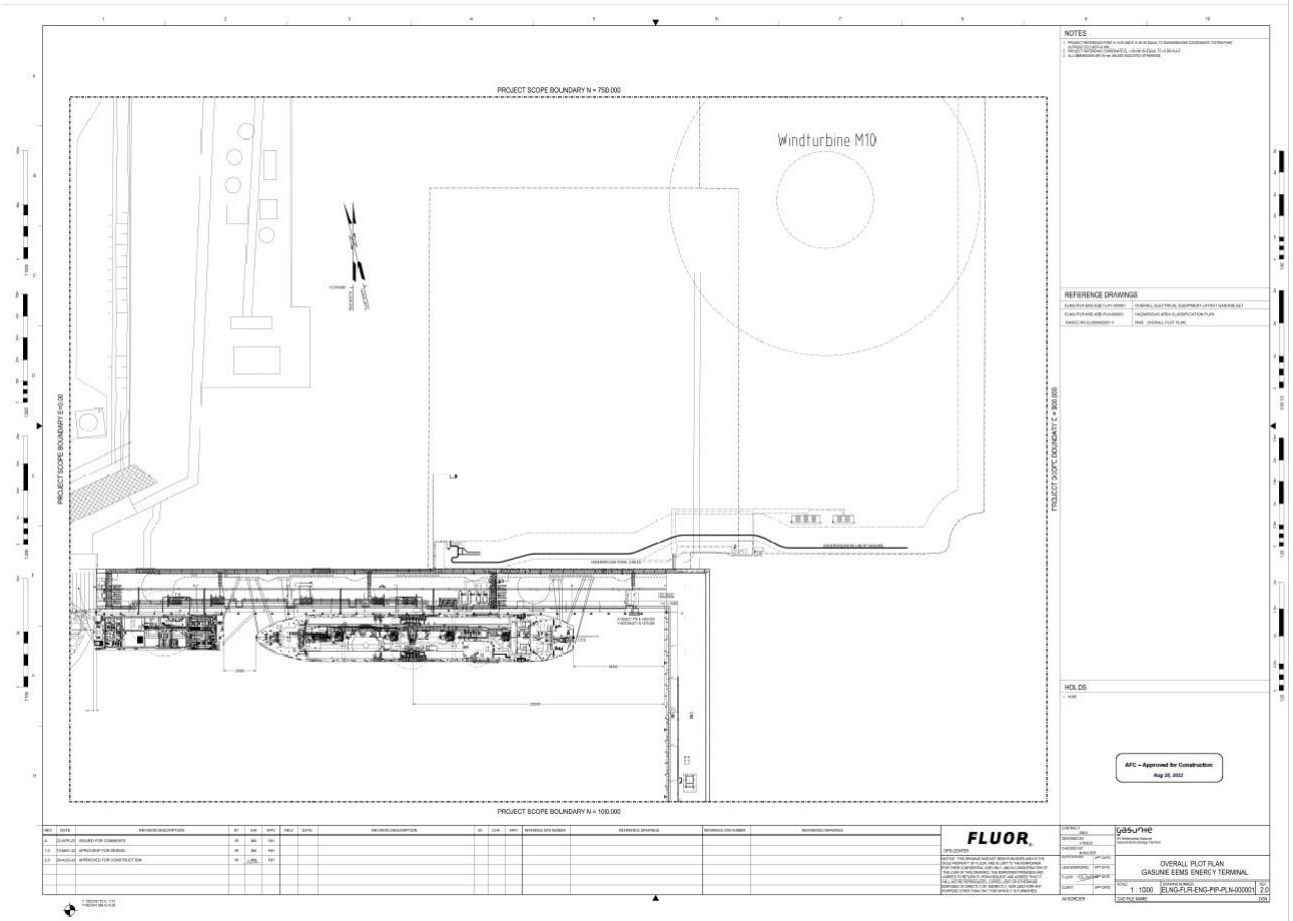
APPENDICES

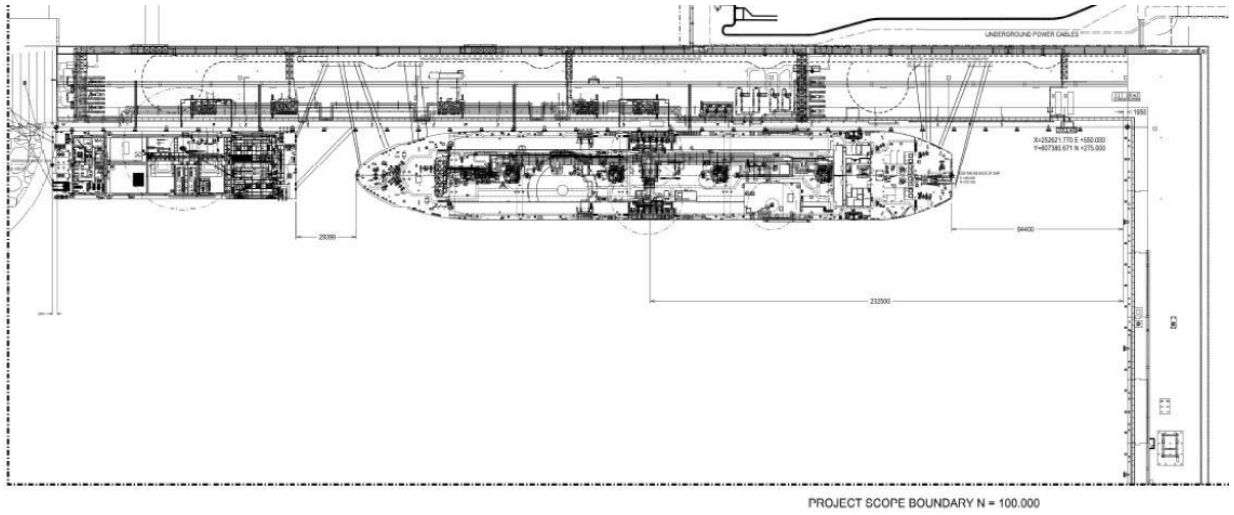
A. Operationele Handboek geulgebonden schepen Noordzee – Eemshaven (in Dutch)

Loodswezen/havenbedrijf regio Eemsmonding - Watermanagement Centrum Nederland (WMCN) (rws.nl)

B. Marine Layout EET

Marine layout drawing - to be replaced by final configuration





C. Declaration of Security

Name of Ship: _____ Port of Registry: _____

IMO Number: _____ Name of Port Facility: **EemsEnergyTerminal**

This Declaration of Security is valid from_____ until_____for the following activities:

- LNG Ships' storing via supply boat via Ship's stores crane
- LNG liquid and vapour transfer hoses connecting, purging, and cool-down
- LNG cargo (un)loading
- LNG liquid and vapour transfer hoses draining, purging, and disconnecting
- LNG Ships' preparations for unberthing and actual unberthing

Under the following security levels:

• Security level(s) for the ship:_____ • Security level(s) for the port facility:_____

The terminal facility and ship agree to the following security measures and responsibilities to ensure compliance with the requirements of Part "A" of the International Code for the Security of Ships and of Port Facilities.

	The affixing of the initials of the (D)PFSO or SSO under these columns indicates that the activity will be done, in accordance with the relevant approved plan, by:	
Activity	**EET Facility**	**The Ship**
Ensuring the performance of all security duties		
Monitoring restricted areas to ensure that only authorized personnel have access		
Controlling access to the port facility		
Controlling access to the ship		
Monitoring of the port facility, including berthing areas and areas surrounding the ship		
Monitoring of the ship. Including berthing areas and areas surrounding the ship		
Handling of cargo		
Delivery of ship's stores		
Handling unaccompanied baggage		
Controlling the embarkation of persons and their effects		
Ensuring that security communication is readily available between the ship and the port facility		

The signatures to this agreement certify that security measures and arrangements for both the port facility and the ship during the specified activities meet the provisions of Chapter XI-2 and Part "A" of the Code that will be implemented in accordance with the provisions already stipulated in their approved plan or the specific arrangements agreed to and set out in this Declaration of Security.

Dated:_____on the _____

Signed for and on behalf of	
Port Facility:	LNG Ship:

Name and title of person who signed	
Name:	Name:
Title:	Title:
Contact Details: Indicate telephone numbers or radio channels to be used	
For the Port Facility	**For the Ship**
PFSO	Master
DPFSO	SSO
	Company
	CSO

D. NSC Contact Details

Nautisch Service Centrum, Verkeersbegeleiders

Aanspreekpunt verkeersbegeleiding en contact voor bestellen van Bootlieden en sleepdienst bij aankomst van een schip. Bereikbaar 24 uur per dag, volgens rooster

Telefoon: 0596-640477

E-mail: nsc@groningen-seaports.com

Operationeel team

EERSTE Aanspreekpunt voor vragen m.b.t. projecten, voorwaarden en alle andere operationele zaken die niet bij een verkeersbegeleider thuishoren. (aan)Vragen over jack-ups en berekeningen van afstanden. Bijzondere transporten en voorwaarden. Bereikbaar van 08:00 tot 17:00 uur op werkdagen

Vragen kunnen per e-mail gesteld worden en zullen worden behandeld door een team van 3 personen Zijnde de heren: Lammerts, Meissner en Van der Woug.

Telefoon: 0596-640410 vragen naar operations.
Email: operations@groningen-seaports.com

Tijpoorten, diepgangen en dieptes.

Aanvragen voor tijpoorten kunnen via de e-mail gedaan worden. Ook de aanvraag voor maximale diepgang in de havens, op de vaarweg en/of de ligplaats kunnen naar onderstaand e-mailadres gestuurd worden. Er worden nooit peilkaarten ter beschikking gesteld, op speciaal verzoek kan een ligplaats gedeelte opgestuurd worden, maar daar kunnen nooit rechten aan worden ontleend.

Tijpoortplanners zijn de heren: Lammerts, Meissner en Van der Woug.

E-mail: tijpoort@groningen-seaports.com

Ligplaatsplanning.

Voor de openbare kades:

- EEMSHAVEN: Beatrixhaven in zijn geheel, Bulkkade, Noordkade Wilhelmina haven, Drijvende Steiger
- DELFZIJL: Palen Handelskade Oost, Kade vak A/B, Drijvende Steiger.

Telefoon: 0596-640477

E-mail: nsc@groningen-seaports.com

PFSO

De openbare kades van Groningen Seaports zijn gecertificeerd voor de ISPS code. Contact met de Port Facility Security officer(s)

Telefoon: 0596-640400
E-mail: PFSO@groningen-seaports.com

PortPass aanvragen openbare kades

Indien men voor het uitvoeren van werkzaamheden op de openbare kades van Groningen Seaports moet zijn, dan kan men via de link www.groningen-seaports.com/ISPS een Portpass aanvragen onder voorwaarden.

E-mail: portpass@groningen-seaports.com

Portsecurity

Vragen met betrekking tot Port security kunt u stellen aan:

E-mail: portsecurity@groningen-seaports.com
Port security officer: Pieter van der Wal
Port security officer: Geert Jan Reinders plv

Facturen

Vragen omtrent scheepvaart gerelateerde facturen, abonnementen of haven- c.q. ligplaatsgeld. Zijnde de heren: Dijk en Van der Sluis

Telefoon: 0596-640400
E-mail: nsc-factuur@groningen-seaports.com

E. SRE Permit Application Form

(in Dutch only)

Note: the currently included form is being updated as LNG vessels do not comply: the form may only be used for ships up to 11m draft and width more than 40m, OR 11-14m draft but width less than 32.3m.

A. Gegevens gemachtigde agentschap

Bedrijfsnaam							
Achternaam contactpersoon		Tussenvoegsel		☐Meneer	☐Mevrouw		
Voorletters		Voornaam					
Telefoonnummer		E-mail adres		KVK/BIN			
Adres		Postcode		Plaats		Land	
Postbusnummer		Postcode		Plaats		Land	

B. Gegevens vaarweggebruiker

Bedrijfsnaam							
Achternaam contactpersoon		Tussenvoegsel		☐ Meneer	☐ Mevrouw		
Voorletters		Voornaam					
Telefoonnummer		E-mail adres		KVK/BIN			
Adres		Postcode		Plaats		Land	
Postbusnummer		Postcode		Plaats		Land	

C. Gegevens buitengewoon groot schip

Naam schip	IMO-nummer	Maximale diepgang (meters)		Loa in meters	Boa in meters	Aankomst diepgang (max. in meters)	Vertrek diepgang (max. in meters)	Lading uitstekend (max. in meters)
		11	14					

D. Route en periode

Van	Via	Naar	In de periode van	Tot en met
Noordzee	Westereems	Haven invoeren		
Haven invoeren	Westereems	Noordzee		

E. Nadere omschrijving / opmerkingen

F. Procedure

SPOEDPROCEDURE	JA/NEE	Gewenste termijn	< 4 UUR	In overleg
MOTIVATIE				

G. Ondertekening

Dit aanvraagformulier is naar waarheid ingevuld

Naam	Datum	Handtekening

H. Toelichting

Dit formulier is voor de aanvraag van een vergunning op grond van art. 28 van het SRE voor een buitengewoon groot schip waarvoor een agentschap gemachtigd is namens een kapitein of een reder. Buitengewoon grote schepen kunnen opgedeeld worden in schepen met een

- diepgang van maximaal 11 meter, en een
  - Loa> 260 meter en/of;
  - Boa > 40 meter.
- diepgang groter dan 11 meter maar maximaal 14 meter, en een
  - Boa van maximaal 32,30 meter

  Opmerking: deze categorie bevat de zogenaamde Panamax-schepen.

Een aanvraag wordt, indien nodig, afgehandeld op werkdagen binnen 72 uur tenzij gemotiveerd kan worden dat de afhandeling binnen een kortere termijn moet plaatsvinden. Indien de termijn korter dient te zijn dan 72 uur kan op verzoek (spoedprocedure) de aanvraag op werkdagen:

- voor 16:00 uur van dezelfde dag afgehandeld worden als de aanvraag voor 12:00 uur binnen is gekomen (< 4 uur), of
- op basis van initiatief van de aanvrager in overleg nadere afspraken gemaakt worden over de afhandeling.

Indien niet duidelijk en volledig is aangegeven dat er sprake is van een spoedprocedure en deze niet is gemotiveerd, wordt de aanvraag binnen 72 uur afgehandeld. De aanvraag moet ingediend worden via: vergunningenrwsnn@rws.nl

F. Work Authorization Form

EET Work Authorization

From the Master of M.V. /S.S. _____Date _____

To: EemsEnergyTerminal

I wish to carry out the following repairs/maintenance while alongside your Berth.
Repairs/maintenance will/will not* involve hot work, will/will not* immobilize the Ship and will take approximately _____hours.

If subsequently it is determined that the repairs/maintenance work is likely to extend beyond the time stated above, the Master will notify the Terminal PIC and request an extension to the agreed time.

Description of repair/maintenance:

_____

_____

_____

_____

_____

* Delete as necessary

The Master will comply with his company's own Permit To Work procedures and has reviewed the Permit To Work that he has requested with EET. A full risk analysis has been carried out by the Master and discussed with EET. It is understood the Master is entirely responsible for ensuring that the repairs/maintenance are carried out safely.

For Ship	For EemsEnergyTerminal
Name:	Name:
Rank:	Position:
Signature	Signature
Date: Time:	Date: Time:

G. Personal Protection Equipment (PPE)

Any LNG vessel crewmember that leaves the vessel for any reason must comply with EET PPE requirements.

Depending on the reason for leaving the vessel different policies apply:

- A crewmember leaving the vessel (e.g. for checking the draft fore and aft) needs to wear full PPE*
- For a crewmember leaving the vessel and heading for the main gate with the intention to pass the main gate, a PPE free corridor is created which must be followed.
- The corridor is clearly marked by coloured lines and is heading directly from the quay to the main gate.
- A visitor for the vessel must wear body covering clothes (no short trousers, skirt or T-shirt) and flat shoes (no high heels)

If a crewmember without PPE is noticed outside the PPE free corridor, all shore leaves will be denied, meaning that crewmembers are not allowed to leave the vessel.

Further the matter will be discussed with the responsible persons on board, a report will be made and a Letter of Protest will be issued.

*Full PPE means:

- Safety shoes or –boots;
- Fire retarding clothes;
- Safety helmet;
- Safety glasses;
- Life vest.

Any specific/other PPE requirements imposed while on the FSRU shall also be strictly followed.

H. Emergency Alarms

	FIRE and OTHER EMERGENCY (oil/gas spill, enclosed space rescue, other)	MAN OVERBOARD	ABANDON SHIP (General emergency)
Signal	——————— Continuous blast on whistle and alarm system + PA message specifying emergency type and location	— — — 3 long blasts on whistle and alarm system + PA message	. . . . . — 7 short + 1 long blast on whistle and alarm system + PA message

I. Fire-fighting Equipment / Capabilities

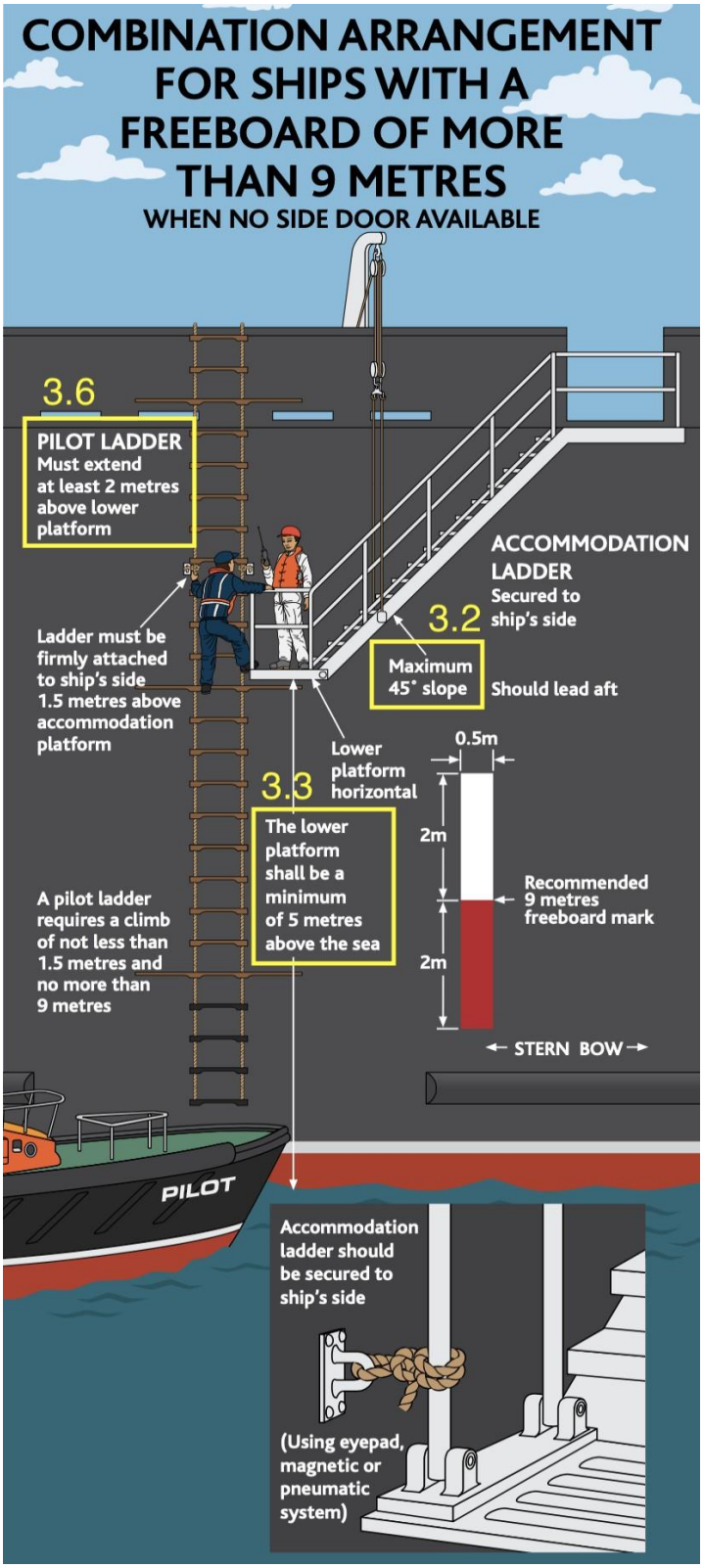
Overview phase 1:

- 2 x diesel driven fire pumps (hydropacks): 1021 m3/hr @ 9 barg, 1 redundant
- Above ground private fire main 12”, normally dry
- 5 x dry pillar type hydrants with 2 x 2,5 Storz connections
- 3 x stationary fixed fire monitors: 1900 – 4800 l/min
- 2 x fire cabinets/box, each including:
  - 1 x mobile fire monitor @ 1900 l/min
  - 1 x 20m fire hose
  - 1 x Axe
  - 1 x mobile pressure reducer for hydrants (1,5 – 6 barg)
- Portable fire protection equipment:
  - 6 x portable powder extinguishers ABC type 9 kg
  - 6 x wheeled powder extinguishers ABC type 50 kg

J. Pilot Ladder

Pilot ladder construction

1. Pilot ladders should be constructed and maintained to the ISO 799-1:2019 standard and be provided with certification. If a ladder constructed to another standard, the manufacturer shall provide an equivalency certificate confirming compliance with Regulation 23 of SOLAS Chapter V.
2. Ladder steps, if made of hardwood, should be made in one piece and be free of knots. If the ladder steps are made of material other than hardwood, they should be of equivalent strength.
3. The four lowest steps may be of rubber of sufficient strength and stiffness.
4. All steps should have an efficient non-slip surface. Steps should not be painted.
5. Steps should be not less than 400 millimetres between the side ropes, 115 millimetres wide and 25 millimetres in depth, excluding any non-slip coating or grooving.
6. Steps should be equally spaced - not less than 310 millimetres or more than 350 millimetres apart.
7. Steps should be secured in such a manner that each will remain horizontal.
8. No pilot ladder should have more than two replacement steps and one replacement spreader.
9. Pilot ladders with more than five steps should have spreader steps of not less than 1.8 metres long installed at regular intervals to prevent the ladder from twisting.
10. The lowest spreader step should be the fifth step from the bottom of the ladder and the interval between two spreader steps should not exceed nine steps.
11. Permanent markings showing the length to the bottom step should be provided at regular intervals (e.g. 1 metre) throughout the length of the ladder.
12. The side ropes of the pilot ladder should consist of two uncovered ropes not less than 18 millimetres in diameter on each side and should be continuous, with no joints and have a breaking strength of at least 24 kN per rope.
13. The two side ropes should each consist of one continuous length of rope, the midpoint half-length being located on a thimble large enough to accommodate at least two passes of side rope.
14. Side ropes should be made of manila or other material of equivalent strength, durability and elongation characteristics.
15. Each pair of side ropes should be secured together both above and below each step with a mechanical clamping device properly designed for this purpose, or seizing method with step fixtures (chocks or widgets), which holds each step level when the ladder is hanging freely.
16. All pilot ladders used for pilot transfer shall be clearly identified with tags or other permanent marking so to enable identification of each appliance for the purposes of survey, inspection and record keeping.
17. A record shall be kept on board to confirm the date the ladder is placed into service and detailing any repairs effected.
18. On all ships, where the distance from sea level to the point of access to, or egress from, the ship exceeds 9 metres, and when it is intended to embark and disembark pilots by means of the accommodation ladder, or other equally safe and convenient means in conjunction with a pilot ladder, the ship shall carry such equipment on each side, unless the equipment is capable of being transferred for use on either side.


COMBINATION ARRANGEMENT FOR SHIPS WITH A FREEBOARD OF MORE THAN 9 METRES
WHEN NO SIDE DOOR AVAILABLE
3.6
PILOT LADDER
Must extend at least 2 metres above lower platform
ACCOMMODATION LADDER
Secured to ship's side
3.2
Maximum 45° slope
Should lead aft
Ladder must be firmly attached to ship's side 1.5 metres above accommodation platform
Lower platform horizontal
3.3
The lower platform shall be a minimum of 5 metres above the sea
0.5m
2m
2m
Recommended 9 metres freeboard mark
A pilot ladder requires a climb of not less than 1.5 metres and no more than 9 metres
STERN
BOW
PILOT
Accommodation ladder should be secured to ship's side
(Using eyepad, magnetic or pneumatic system)

Pilot ladder rigging

1. Personnel engaged in the rigging and operation of any mechanical equipment should receive appropriate instruction and training in the safe procedures to be adopted when using the equipment. The equipment should be tested prior to use.
2. The pilot ladder should be rigged clear of any possible discharges from the ship.
3. The pilot ladder should be within the parallel body length of the ship and, as far as is practicable, within the mid-ship half length of the ship.
4. The single length of pilot ladder should be capable of reaching the water from the point of access to, or egress from, the ship and due allowance should be made for all conditions of loading and trim of the ship, and for an adverse list of 15°.
5. Means should be provided to ensure safe, convenient, and unobstructed passage for any person embarking on, or disembarking from, the ship between the head of the pilot ladder, or of any accommodation ladder, and the ship's deck.
6. The accommodation ladder (i.e., a combination arrangement) shall be sited such that the ladder leads aft.
7. When a combination arrangement is used, means shall be provided to secure the lower platform of the accommodation ladder to the ship's side, to ensure that the lower end of the accommodation ladder and the lower platform are held firmly against the ship's side within the parallel body length of the ship.
8. When a combination arrangement is used for pilot access, means shall be provided to secure the pilot ladder and manropes to the ship’s side at a point of nominally 1.5 metres above the bottom platform of the accommodation ladder. In the case of a combination arrangement using an accommodation ladder with a trapdoor in the bottom platform (i.e. embarkation platform), the pilot ladder and man ropes shall be rigged through the trapdoor extending above the platform to the height of the handrail.
9. When a combination arrangement in use, the lower platform should be a minimum of 5 metres above sea level.
10. The Pilot ladder should be able to be rigged within the horizontal distance to the lower platform between 0.1 and 0.2 m. A responsible person with the radio should be present at the lower accommodation ladder platform and able to assist.
11. The trapdoor should open upwards and be secured either flat on the embarkation platform or against the rails at the aft end or outboard side of the platform and should not form part of the handholds.
12. The pilot ladder should be secured to a strong point, independent of the pilot ladder winch reel by a rolling hitch.
13. The pilot ladder winch reel should not be relied upon to support the pilot ladder when the pilot ladder is in use.
14. All pilot ladder winches should have means of preventing the reel from being accidentally operated because of mechanical failure or human error.
15. When a retrieval line is considered necessary to ensure the safe rigging of a pilot ladder, the line should be fastened at or above the last spreader step and should lead forward. The retrieval line should not hinder the pilot nor obstruct the safe approach of the pilot boat. (Resolution A.1045(27) para 2.1.5).
16. The securing strong points, shackles and securing ropes should be at least as strong as the side ropes.
17. Two-man ropes of not less than 28 millimetres and not more than 32 millimetres in diameter, properly secured to the ship, should be available if required by the pilot.
18. The manropes shall reach the height of the stanchions or bulwarks at the point of access to the deck before terminating at the ring plate on deck.

19. A lifebuoy equipped with a self-igniting light and a heaving line should be available at hand and ready for immediate use.
20. Adequate forward-shining lighting shall be provided to illuminate the transfer arrangements overside and the position on deck where a person embarks or disembarks.
21. A responsible officer, having means of communication with the navigation bridge and who shall also arrange for the escort of the pilot by a safe route to and from the navigation bridge. A responsible officer should give careful attention to the rigging and condition of the ladder before each use, and regularly inspect the ladder during its life.
22. Shipside doors (if in use) used for pilot transfer should not open outwards.
23. Mechanical pilot hoists should not be used. (SOLAS V/23.6). This applies to all ships.

Boarding and disembarking procedure

1. All personnel necessary to attend offload on board of LNG Carrier, including opening/closing CTMS, pre- and post-offload meetings should be manifested to Terminal Representative (EET Loading Master) in advance. Terminal Representative will coordinate boarding/disembarking schedule with Wagenborg Agency and announce service the boat schedule.
2. All agreed and pre-listed personnel will arrive at due time to Eemshaven Floating Peer (chart), equipped with standard PPE + floatation aid. Earlier safety briefing may be required to non-regular personnel.
3. Boat will depart in schedule time, upon direct communication with LNG Carrier.
4. Once service boat is at the port side of LNG Carrier, the transfer of personnel will only be commenced after agreement and with direct presence of LNGC Responsible Deck Officer and assisting crew.
5. One person at the time on pilot ladder; three points of contacts; responsible person with radio on the lower platform of LNGC accommodation ladder to assist.
6. LNGC Captain, Wagenborg service boat Skipper, and Port Authorities have the right not to allow, or abort, any boarding at any time – e.g. other vessel's movements, deteriorating weather (e.g. wind >30kt, heavy rain, lighting, etc.) or any condition on board LNGC, FSRU, EET or harbour constituting high risk to personnel.

K. Cargo Information Notice

Info description	Name, Number, Value
Name Terminal User	
LNG vessel Name & IMO number	
Cargo ID#	
Last Port	
Last port Departure Time and Date	
Estimated Time of Arrival (ETA) at the Pilot Boarding Station	
Estimated Time of Arrival (ETA) at EET	
Quantity of LNG loaded in m3 (total) OR heel (ROB) on board	
Vapour pressure	
Temperature of the liquid	
Quality of the LNG on board	**Value**
Wobbe Index [MJ/m3(n)]	
Gross calorific value of LNG [MJ/kg]	
Density of LNG [kg/m3]	
Saturation pressure [mbar (g)]	
PPM sulphur in LNG	
Estimated quantity of LNG to be unloaded in m3 (less fuel & boil off during the voyage)	
Estimated quantity of LNG to be unloaded in M3 (less fuel & boil off during the voyage)	
Other remarks (e.g. factors affecting voyage time or unloading rate)	
Additional documentation required:	• Surveyor Report • Cargo origin certificate • Cargo quality certificate • Cargo manifest

L. ETA Notice Information

Question	LNG Vessel				Comments
Name of LNG vessel					
Call Sign					
IMO No.					
Country of Registry					
Name of Master					
Name of Owner / Operator (Transporter)					
Total Number of persons onboard					
ETA at EET					
Current position, direction and speed					Optional
LNG consumed since last port					Optional
Last Port of Call					
Date of International Oil Pollution Prevention Certificate (IOPP)					
Confirm that Passage Plan has been prepared for the voyage and covers the period berth to berth.					
Confirm that the primary and secondary cargo measurement systems are functioning					
Confirm that all cargo monitoring systems are operational and that void space atmosphere monitoring systems are functioning.					
Anticipated quantity to unload					
Sailing displacement					
Anticipated berthing displacement					
Distance of manifold vapour connection to stern, bow, and bridge					
Anticipated cargo unloading rate					6,000 m3/hr
Anticipated unloading Time					
Confirm that all pre-arrival checks are performed					
Ship's deficiencies that would affect port performance including the need for repairs					
Requirements for nitrogen, fuel, water, stores garbage removal that will be taken from third parties					
Cargo density in KG/M³					
Cargo Temperature					
Cargo pressure per tank	1	2	3	4	5
Anticipated Saturated Vapour Pressure on arrival					
Ship Inmarsat No's:					
Voice No.					
Ship GSM / Mobile Phone No					
Ship Email:					
MMSI No.					

M. Daily Report Form

Question	LNG Vessel					Comments
Name of LNG vessel						
Call Sign						
IMO No.						
Country of Registry						
Name of Master						
Name of Owner / Operator (Transporter)						
Total Number of persons onboard						
ETA at EET						
LNG consumed since last port						Optional
Last Port of Call						
Confirm that the primary and secondary cargo measurement systems are functioning						
Confirm that all cargo monitoring systems are operational and that void space atmosphere monitoring systems are functioning.						
Anticipated quantity to unload						
Sailing displacement						
Anticipated berthing displacement						
Anticipated cargo unloading rate						6,000 m3/hr
Anticipated unloading Time						
Confirm that all pre-arrival checks are performed						
Ship's deficiencies that would affect port performance including the need for repairs						
Cargo density in KG/M³						
Cargo Temperature						
Cargo Pressure per tank	1	2	3	4	5	
Anticipated Saturated Vapour Pressure on arrival						

N. Notice of Readiness

Terminal User	Unloading port: EemsEnergyTerminal

Dear Sirs,

This is to inform you that the LNG vessel ……, owned by..... under my command, has arrived at the Pilot Boarding Station at…… hours, has cleared the necessary formalities with RWS, GSP and all other relevant authorities, has complied with all necessary customs notification requirements and is ready in all respects to proceed to the EET FSRU berth in the Wilhelmina haven in Eemshaven and commence unloading her cargo of LNG.

Yours Faithfully,

<Date>, <time>

Master

Observations:

Notice accepted by:	at EET on the
Name:	Date:
Role:	
Signature	at hour, min

O. LNG vessel / EET Notice of Delay after Tendering the NOR

Dear Sirs,

We herewith notify you that a problem occurred / is foreseen that will cause a delay to the LNG vessel in berthing/unloading/departing. Please find the details in the table below.:

Cargo ID #	IMO number LNG vessel	NOR tendered at: (hrs:min)	Nature and cause of delay	Estimated delay (hrs:min)

Yours Faithfully

<Date>, <Time>

For and on behalf of <Name Master>/EET

P. Terminal Status Notice

Dear Sirs,

We herewith send you the Terminal Status Notice for the
LNG vessel name:
LNG vessel IMO No:

Name Terminal User	
Cargo ID	
Expected high water slot	
Details relating to any restrictions at the Terminal, which will impact upon the unloading of the Cargo	
Timing and rate of unloading	
Any non-availability of facility equipment	
Weather forecast at Unloading Port	

Yours Faithfully

<Date>
For and on behalf of EemsEnergyTerminal

Q. Pre-Cargo Transfer Meeting Checklist

Document / Discuss:

- Agree on needed adjustments to Laytime
- Issue laptop with operating instructions
- Verify communication channels and procedures to use
- Discuss alarm settings
- Agree on unloading rates and any required adjustments
- Agree on cargo hose cool-down flow and pressure
- Complete and Sign – Ship / Shore Safety Checklist
- Complete and Sign – Safety Declaration
- Complete and Sign – LNG Unloading Agreement
- Complete and Sign – ISPS Declaration of Security
- Complete and Sign – Statement of compliance
- LNG vessel will provide a "daily work plan" to identify maintenance and repair issues
- Others as identified/needed

R. ISGOTT Ship-Shore Safety Checklist

Document will be shared separately

S. Safety Declaration

Terminal: EemsEnergyTerminal Date:_____

The Master SS/MV_____ Port: ***Eemshaven, The Netherlands***

Dear Sir,

Responsibility for the safe conduct of operations whilst your ship is at this terminal rests jointly with you, as master of the ship, and with the responsible terminal representative. We wish, therefore, before operations start, to seek your full co-operation and understanding on the safety requirements set out in the Ship/Shore Safety Check List which are based on safe practices widely accepted by oil, gas and the tanker industries.

We expect you, and all under your command, to adhere strictly to these requirements throughout your stay alongside this terminal and we, for our part, will ensure that our personnel do likewise, and co-operate fully with you in the mutual interest of safe and efficient operations.

Before the start of operations, and from time to time thereafter for our mutual safety, a member of the terminal staff, where appropriate together with a responsible officer, will make a routine inspection of your ship to ensure that the questions on the Ship/Shore Safety Check List can be answered in the affirmative. Where corrective action is needed, we will not agree to operations commencing or, should they have been started, we will require them to be stopped.

Similarly, if you consider safety is endangered by any action on the part of our staff or by any equipment under our control you should demand immediate cessation of operations.

There can be no

Please acknowledge receipt of this letter by countersigning and returning the attached copy.

SHIP	SHORE
Name:	
Rank:	
Signature:	
Date:	
Time:	

T. LNG Cargo Transfer Agreement

Will added in a later version

U. Statement of Compliance

From the Master of M.V. /S.S:

Date:

To: EemsEnergy Terminal B.V.

As Master of the above-named vessel, I acknowledge, for and on behalf of the owner, charterers and operators of the above-named vessel receipt of the latest version of the Terminal Marine Manual of the EemsEnergyTerminal.

In consideration for permission to use the berths of the terminal, I accept and agree to abide and be bound by all the provisions of the Terminal Regulations of EemsEnergyTerminal.

SHIP	SHORE
Name:	
Rank:	
Signature:	
Date:	
Time:	

EemsEnergyTerminal

V. Smoking Notice

VESSEL _____

DESIGNATED SMOKING PLACES

WHILST MOORED ALONGSIDE THE EEMSENERGYTERMINAL SMOKING ABOARD THIS VESSEL IS PERMITTED ONLY IN THE FOLLOWING DESIGNATED PLACES

_____

_____

_____

Note:

Smoking is **NOT** permitted in any other area onboard or within the confines of the terminal, along the Jetty foreshore or in vehicles travelling to or from the Main Gate

W. Post-Cargo Transfer Meeting Checklist

Document / Discuss:

- Terminal issues that arose
- LNG vessel discharge issues that arose
- Resources and Cost associated with any "Relocation Orders"
- Agreement on the Certificate of Quality to be issued
- Recommendations for process improvement
- Exchange of "LNG vessel to Terminal feedback form" and "Terminal to LNG vessel feedback form" (Appendix X and Appendix Y)
- Estimated time before EET issues approval for unberthing (after "Ready to Disconnect" notice by LNG vessel)
- Status of any "Authorized Work" being done by the LNG vessel
- Status of any Crew that is ashore
- Status of incoming LNG vessels that may affect departure
- Any anticipated delays by LNG vessel to get underway
- Weather, traffic or navigation issues for LNG vessel departure

X. LNG vessel to Terminal feedback form

The purpose of this document is to rate level of performance of the Terminal staff. This feedback will serve to Terminal management to further improve operational efficiency and safety standards.

LNG vessel's name:	
LNG vessel's IMO number:	
Port:	Eemshaven / Groningen Seaports (GSP)
Terminal:	EemsEnergy Terminal B.V.
Arrival date:	
Departure date:	

Please rate performance on a scale of 0-5 where 1 is Very Good and 5 is worst. Rating 2 is considered industry standard hence the norm. Please comment on ratings higher than 2.

		0 N/A	1 Very good	2 Good	3 Satisfactory	4 Unsatisfactory	5 Immediate action required
1	Crew Safety Awareness						
Comments:							
2	General Safety						
Comments:							
3	Crew Knowledge of Operation						
Comments:							
4	Pre-Operation preparation						
Comments:							
5	Communication during Operation						
Comments:							

6	Cargo Operation						

Comments:							
7	Mooring Operation						
Comments:							
8	Communication with Owners / Post fixture						
Comments:							

Additional comments:

This form is to be provided to Terminal representative on departure.

Date (DD.MM.YYYY):	Signed by:		
	Name, Surname	Master of the LNG Carrier	Company Stamp (optional)

Date (DD.MM.YYYY):	Received by:		
	Name, Surname	Terminal representative	Company Stamp (optional)

Y. Terminal to LNG vessel feedback form

The purpose of this document is to rate level of performance of the LNG vessel staff. This feedback will serve to LNG vessel for its internal purposes.

LNG vessel's name:	
LNG vessel's IMO number:	
Port:	Eemshaven / Groningen Seaports (GSP)
Terminal:	EemsEnergy Terminal B.V.
Arrival date:	
Departure date:	

Please rate performance on a scale of 0-5 where 1 is Very Good and 5 is worst. Rating 2 is considered industry standard hence the norm. Please comment on ratings higher than 2.

		0 N/A	1 Very good	2 Good	3 Satisfactory	4 Unsatisfactory	5 Immediate action required
1	Crew Safety Awareness						
Comments:							
2	General Safety						
Comments:							
3	Crew Knowledge of Operation						
Comments:							
4	Pre-Operation preparation						
Comments:							
5	Communication during Operation						
Comments:							

6	Cargo Operation						
Comments:							
7	Mooring Operation						
Comments:							
8	Communication with Owners / Post fixture						
Comments:							

Additional comments:

This form is to be provided to Terminal representative on departure.

Date (DD.MM.YYYY):	Signed by:		
	Name, Surname	Terminal representative	Company Stamp (optional)

Date (DD.MM.YYYY):	Received by:		
	Name, Surname	Master of the LNG Carrier	Company Stamp (optional)

Z. EET Remedies for LNG vessel Delays

Dear Sirs,

Your LNG vessel <ship name> with IMO number <IMO number>, failed to leave berth in time and exceeds the Allowed Unloading Time. We plan to undertake the following actions:

-
-
-
-

The reasons for these actions are……

Yours Faithfully,

<Date>

For and on behalf of EET

AA. Notification of need to cancel subsequent Berthing Slot

(due to LNG vessel failing to leave berth in a timely manner)

Dear Sirs,

We herewith notify you that, due to the fact that the LNG vessel <ship name> with IMO number <IMO number> failed to leave the berth in a timely manner, we may be required to cancel the next Berthing Slot, which starts at [date, time].

Yours Faithfully

<Date>

For and on behalf of EET

BB. FSRU Ship to Ship Operation Manual (general)

Document will be shared separately

CC. Addendum to the FSRU Ship to Ship Operation Manual STS Location Eemshaven

Document will be shared separately

DD. LNGC Admission Policy

Document will be shared separately

EE. LNGC Admission Protocol

Document will be shared separately

FF. Spring line preparation before arrival

Document will be shared separately