

LIST OF PMSC RISK ASSESSMENTS

Risk Assessment Number	Risk Assessment Name	Review at PMSC Liaison Meeting
<u>POTLL PMSC RA 01-01</u>	POTLL - Non Tidal Arrival and Sailing	19/04/2020
<u>POTLL PMSC RA 02-01</u>	POTLL - Tidal arriving and Sailing	19/04/2020
<u>POTLL PMSC RA 03-01</u>	POT11L - Tidal Arriving and Sailing	19/04/2020
<u>POTLL PMSC RA 04-01</u>	POTLL- Non tidal Bunkering Operations	19/04/2020
<u>POTLL PMSC RA 05-01</u>	POTLL - Tidal Bunkering Operations	19/04/2020
<u>POTLL PMSC RA 06-01</u>	POT11L - Tidal Bunkering operation	19/04/2020
<u>POTLL PMSC RA 07-01</u>	POTLL - Non tidal Marine Pollution	19/04/2020
<u>POTLL PMSC RA 08-01</u>	POTLL and POT11L - Tidal Marine pollution	19/04/2020
<u>POTLL PMSC RA 09-01</u>	POTLL Non tidal Diving Operation	19/04/2020
<u>POTLL PMSC RA 10-01</u>	POTLL and POT11 - Tidal Diving Operations	19/04/2020
<u>POTLL PMSC RA 11-01</u>	POTLL - Non tidal towage operations	19/04/2020
<u>POTLL PMSC RA 12-01</u>	POTLL - Tidal Towage Operations	19/04/2020
<u>POTLL PMSC RA 13-01</u>	POT11L - tidal Towage operations	19/04/2020

Red indicates last Reviewed

PMSC RISK ASSESSMENT - RISK RANKING

Rank	HazardID	Hazard What can go wrong (Event leading to a consequence)	Hazard Scoring
1	POTLL PMSC RA 02-01 1.2 Contact	Contact	7.37
2	POTLL PMSC RA 03-01 1.2 Contact	Contact	7.37
3	POTLL PMSC RA 05-01 1.4 Fire/Explosion	Fire/Explosion	5.625
4	POTLL PMSC RA 06-01 1.4 Fire Explosion	Fire/Explosion	5.625
5	POTLL PMSC RA 02-01 1.3 Grounding	Grounding	5.5
6	POTLL PMSC RA 03-01 1.3 Grounding	Grounding	5.5
7	POTLL PMSC RA 11-01 1.3 Contact	Contact	5.5
8	POTLL PMSC RA 01-01 1.1 Collision/Allision	Collision/ allision	5.375
9	POTLL PMSC RA 12-01 1.1 Capsiz/Flooding	Capsize/Flooding	5.375
10	POTLL PMSC RA 12-01 1.2 Fire	Fire	5.38
11	POTLL PMSC RA 01-01 1.2 Contact	Contact	5.25
12	POTLL PMSC RA 12-01 1.3 Contact	Contact	5.25
13	POTLL PMSC RA 05-01 1.2 Contact	Contact	5.125
14	POTLL PMSC RA 06-01 1.2 Contact	Contact	5.125
15	POTLL PMSC RA 12-01 1.4 Collision	Collision	5.125
16	POTLL PMSC RA 04-01 1.2 Contact	Contact	4.75
17	POTLL PMSC RA 04-01 1.3 Loss of Containment (Oil Product)	Loss of Containment (Oil Product)	4.75
18	POTLL PMSC RA 04-01 1.4 Fire/Explosion	Fire/Explosion	4.75
19	POTLL PMSC RA 05-01 1.3 Loss of Containment (Oil Product)	Loss of containment (Oil Product)	4.625
20	POTLL PMSC RA 06-01 1.3 Loss of Containment (Oil Product)	Loss of containment (Oil Product)	4.625
21	POTLL PMSC RA 13-01 1.3 Contact	Contact	4.625
22	POTLL PMSC RA 01-01 1.4 sinking/capsize	Sinking/Capsize	4.5
23	POTLL PMSC RA 03-01 1.6 Loss of Containment (Oil Products)	Loss of Containment (Oil Products)	4.5
24	POTLL PMSC RA 05-01 1.1 Collision with bunker and receiving vessel	Collision with bunker and receiveing vessel	4.5
25	POTLL PMSC RA 06-01 1.1 Collision with bunker and receiving vessel	Collision with bunker and receiving vessel	4.5

26	POTLL PMSC RA 11-01 1.2 Fire	Fire	4.5
27	POTLL PMSC RA 12-01 1.6 Man overboard/personal injury	Man Overboard/Personal Injury	4.5
28	POTLL PMSC RA 04-01 1.1 Collision with bunker and receiving vessel	Collision with bunker and receiving vessel	4.375
29	POTLL PMSC RA 11-01 1.1 Capsiz/Flooding	Capsize/Flooding	4.25
30	POTLL PMSC RA 01-01 1.3 Grounding	Grounding	4.125
31	POTLL PMSC RA 02-01 1.5 Fire/Explosion	Fire/Explosion	4.125
32	POTLL PMSC RA 02-01 1.6 Loss of Containment(Oil Products)	Loss of containment (Oil Products)	4.125
33	POTLL PMSC RA 03-01 1.5 Fire/Explosion	Fire/Explosion	4.125
34	POTLL PMSC RA 02-01 1.1 Collision/Allision	Collision/Allision	4
35	POTLL PMSC RA 02-01 1.4 Sinking/Capsize	Sinking/Capsize	4
36	POTLL PMSC RA 03-01 1.1 Collision Allision	Collision/ Allision	4
37	POTLL PMSC RA 03-01 1.4 Sinking/Capsize	Sinking/Capsize	4
38	POTLL PMSC RA 13-01 1.6 Man overboard	Man overboard	4
39	POTLL PMSC RA 07-01 1.1 Loss of containment (Oil Product)	Loss of containment (Oil product)	3.88
40	POTLL PMSC RA 08-01 1.1 Loss of Containment(Oil product)	Loss of Containment (Oil product)	3.875
41	POTLL PMSC RA 01-01 1.5 Fire/Explosion	Fire/Explosion	3.75
42	POTLL PMSC RA 09-01 1.2 Contact/Collision	Contact/Collision	3.75
43	POTLL PMSC RA 12-01 1.5 Grounding	Grounding	3.75
44	POTLL PMSC RA 10-01 1.2 Contact/Collision	Contact/Collision	3.625
45	POTLL PMSC RA 09-01 1.1 Swamping/ Turbulance/ Interaction	Swamping/Turbulance/Interaction	3.5
46	POTLL PMSC RA 11-01 1.4 Collision	Collision	3.5
47	POTLL PMSC RA 13-01 1.1 Capsize/Flooding	Capsize/ Flooding	3.5
48	POTLL PMSC RA 13-01 1.4 Collision	Collision	3.5
49	POTLL PMSC RA 01-01 1.6 loss of containment (oil products)	Loss of Containment (Oil Product)	3.375
50	POTLL PMSC RA 10-01 1.1 Swamping/Turbulance/Interaction	Swamping/Turbulance/Interaction	3.375
51	POTLL PMSC RA 13-01 1.2 Fire	Fire	3.375
52	POTLL PMSC RA 11-01 1.6 Man overboard/personal injury	Man overboard/personal injury	3
53	POTLL PMSC RA 11-01 1.5 Grounding	Grounding	2.625
54	POTLL PMSC RA 13-01 1.5 Grounding	Grounding	2.5

Risk Assessment Scoring Matrix

LIKELIHOOD

- 1 = Extremely unlikely (More than 100 years)
- 2 = Remote (10 - 99 years)
- 3 = Reasonably likely (1 - 9 years)
- 4 = Likely (Once per Year)
- 5 = Frequent (More than once per year)

CONSEQUENCE

- PEOPLE:**
- 1 = None
 - 2 = Minor, single slight Injury
 - 3 = Slight, multiple moderate or single major injury
 - 4 = Serious, multiple major injuries or single fatality
 - 5 = Major, more than 1 fatality

- PROPERTY:**
- 1 = negligible < £2000
 - 2 = Minor > £2000
 - 3 = Moderate >£20,000
 - 4 = Serious, > £200,000
 - 5 = major, > £2,000,000

- ENVIRONMENT:**
- 1 = localised spill < £2000,
 - 2 = Minor spill Tier 1 local response,
 - 3 = Moderate spill, Tier 2 some outside assistance
 - 4 = Moderate spill, Tier 2 greater outside assistance
 - 5 = Major spill, Tier 3 national response

- BUSINESS:**
- 1 = Negligible impact < £2000
 - 2 = Minor impact > £2000
 - 3 = Moderate impact > £20,000, bad local publicity, short term reduction of activity.
 - 4 = Serious Impact, >£200,000, bad widespread publicity, temporary Port Facility shutdown.
 - 5 = Major impact, > £2,000,000, Port facility Closes for more than 1-2 days.

OVERALL RISK

		5	10	15	20	25
	5	5	10	15	20	25
	4	4	8	12	16	20
Likelihood	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
		1	2	3	4	5
		Consequence				

Red indicates last Reviewed

AMBER Hazards with risk factors within these bands (6 - 10) are termed "consider". These lower risk factors are considered acceptable, but still need careful monitoring to ensure that everything has been done to reduce the consequences and likelihood.

GREEN The lower numbers(5 and below) in the matrix are considered "low-risk", but should still be monitored to ensure that controls remain effective.

POTLL Controls - In Dock and River Berths

Marine Department Scheduling
Marine Department Mooring Reviews
Bunker Checklist/Procedures
Marine Department Dock Patrols
POTLL UKC
POTLL NtMs and PNtMs
POTLL Emergency Procedures
POTLL Port Information and Marine Guidelines
POTLL Weather forecasting
POTLL Wind Parameters
POTLL Fog Procedures
POTLL Surveys
POTLL Dredging program
Dock Byelaws
POTLL Mooring Manual
POTLL Permit to Manoeuvre
POTLL OPRC
POTLL Tier 2 Responders
Lock Gates
POTEMPLA
POTLL Ruling Depths
POTLL CCTV
POTLL Ebb Tide Procedure
POT11L Byelaws
POT11L and PLA MOU
POTLL Tier 2 responder
Bridge simulation Reports
T2 Nav Risk Assessment

PLA Controls - River Berths and Tidal lock Arr/Dep

PLA Pilotage Directions
PLA VTS Service
PLA Hydrographic Surveys
PLA Tidal Information
PLA Ship Towage Code of Practice
PLA Craft Towage Code of Practice
PLA Byelaws and General Directions
PLA NtMs
PLA Tosca

External Controls

Ship towage



FORTH PORTS LIMITED
Risk Assessment

Port of Tilbury - Non Tidal Arrival and Sailing

Ref.	Hazard What can go wrong (Event leading to a consequence)	Causes How can it go wrong	Controls Preventative & Reactive (What action & how frequent)	Risk scored at Residual level (Most Likely)				Risk scored at Residual level (Worst Credible)				Hazard Risk Score			
				Overall Risk				Overall Risk							
				Likelihood	People	Property	Environment	Business	Likelihood	People	Property		Environment	Business	
1.1	Collision / Allision	Technical Failure Bridge Team Error Environmental Conditions	POTLL Permit to Manoeuvre POTLL Berthing Advisors POTLL Marine Department scheduling POTLL PNTMs and NTMs POTLL Ruling Depths POTLL Marine Guidelines and Port Information POTLL Weather forecasting POTLL Wind Parameters POTLL Restricted Visibility procedures POTLL Marine Emergency plans POTLL CCTV POTEMPLA POTLL OPRC POTLL Tier 2 Responders PLA Ship towage Code of Practice Ship Towage	3	3	6	3	3	2	8	8	8	8	5.375	<p>Most Likely - Contact between ship departing in dock berth and Corys tug. No injuries, light/superficial damage to one or both vessels. No interruption to port trade.</p> <p>Worst Credible - Collision between vessel departing in dock berth and a vessel departing lock and manoeuvring for dock berth</p>
1.2	Contact	Technical Failure Bridge Team Error Environmental Conditions Quayside Obstruction	POTLL Permit to Manoeuvre POTLL Berthing Advisors POTLL Marine Department scheduling POTLL PNTMs and NTMs POTLL Ruling depths POTLL Marine Guidelines and Port Information POTLL weather forecasting POTLL Wind Parameters POTLL Restricted Visibility Procedures POTLL Marine emergency plans POTLL CCTV POTEMPLA POTLL OPRC POTLL Tier 2 Responders PLA Ship towage Code of Practice Ship Towage	4	4	8	4	4	2	4	5	4	8	5.25	<p>Most Likely - Light contact with quayside during approach/departure from berth, superficial damage ie scuffing to paintwork and concrete, no damage and no interruption to port trade</p> <p>Worst Credible - Contact with the inner lock gates during departure from dock rendering the lock gates US resulting in loss of trade and revenue for the dock. No injuries</p>
1.3	Grounding	Collision Contact Grounding Technical Failure Human Error Environmental Conditions	POTLL Surveys POTLL Dredging program POTLL Permit to Manoeuvre POTLL Ruling Depths POTLL Marine Department scheduling POTLL PNTMs and NTMs POTLL Marine Guidelines and Port information POTLL weather forecasting POTLL emergency plans POTLL UKC POTEMPLA PLA Ship towage Code of Practice Ship Towage	3	3	3	3	6	2	2	4	4	8	4.125	<p>Most Likely: Vessel touches bottom while manoeuvring for berth, vessel does not take to ground, engines push through the mud and vessel continues to destination with no interruption.</p> <p>Worst Credible: Vessel takes to ground en route to berth, cannot refloat and requires increase in dock level and tug assistance. Potential interruption to port trade.</p>
1.4	Sinking / Capsize	Collision Contact Grounding Technical Failure Failure of Vessel Stability Human Error Environmental Conditions	POTLL Marine Department Scheduling POTLL Berthing Advisors POTLL weather forecasting POTLL Wind parameters POTLL Restricted visibility procedures POTLL PNTMs and NTMs POTLL Marine Guidelines and Port information POTLL mooring manual POTLL Marine emergency procedures POTLL Surveys POTLL UKC POTLL Ruling Depths POTEMPLA Ship Towage	2	2	4	4	2	2	2	8	6	8	4.5	<p>Most Likely: Small boatmen vessel swamped by wash or environmental conditions leading to loss of stability and capsize. No injuries, vessel remains buoyant and is lifted onto quayside, sheen on the water due to fuel escaping from breakers, no response needed.</p> <p>Worst Credible: Machinery deficiency cause vessel to take on water, bilge pumps overwhelmed by volume and vessel continues to take on water. Vessel stranded in dock, requiring tug assistance to move.</p>
1.5	Fire / Explosion	Collision Contact Grounding Human Error Technical Failure Loss of Containment	POTLL Permit to Manoeuvre POTLL Berthing Advisors POTLL Marine Department Scheduling POTLL UKC POTLL Weather forecasting POTLL Wind Parameters POTLL Restricted Visibility Procedures POTLL PNTMs and NTMs POTLL Marine Guidelines and Port information POTLL mooring manual POTLL emergency procedures POTEMPLA POTLL OPRC POTLL Tier 2 Responders PLA Ship towage Code of Practice Ship Towage	2	2	6	4	2	1	4	4	3	5	3.75	<p>Most Likely: Small engine room fire due to malfunctioning equipment, fire contained and extinguished using on board FFE. No injuries, very minor damage</p> <p>Worst Credible: Large engine room fire due to malfunctioning equipment, beyond on board FFE capability. Fire fighting tugs required and delays to shipping caused.</p>
1.6	Loss of Containment (Oil Products)	Collision Grounding Human Error Contact Technical Failure Sinking / Capsizing Fire / Explosion Environmental Conditions	Marine Department scheduling POTLL Berthing Advisors POTLL Bunkering procedure and checklist POTLL Surveys POTLL Dredging program POTLL Marine Guidelines and Port information POTLL OPRC POTLL Tier 2 responders POTLL Ruling Depth document POTLL Lock Gates POTEMPLA POTLL OPRC POTLL Tier 2 responders PLA Ship towage Code of Practice Ship Towage	2	2	2	2	2	1	4	5	5	5	3.375	<p>Most Likely: Loss of small amount of fuel during on board bunkering operations, ie mobile generator. Spill fuel contained on deck.</p> <p>Worst Credible: Collision holes fuel tank resulting in large quantity of heavy fuel oil discharged into the dock. Tier 2 response and interruption to Port business.</p>

Most Likely/Worst Credible Scenarios



FORTH PORTS LIMITED
Risk Assessment

Port of Tilbury - Tidal Arrival / Sailing - PLA Waters to River Berths and Lock

Ref.	Hazard What can go wrong (Event leading to a consequence)	Causes How can it go wrong	Controls Preventative & Reactive (What action & how frequent)	Risk scored at Residual level (Most Likely)				Risk scored at Residual level (Worst Credible)				Hazard Risk Score	Most Likely/Worst Credible Scenarios		
				Overall Risk				Overall Risk							
				Likelihood	People	Property	Environment	Business	Likelihood	People	Property			Environment	Business
1.1	Collision	Technical Failure Bridge Team Error Environmental Conditions	POTLL Marine Department scheduling POTLL PNTMs and NTMs POTLL Marine Guidelines and Port Information POTLL weather forecasting POTLL Marine emergency plans PLA Pilotage Directions PLA VTS service PLA recreational User Guide PLA NIMs PLA Byelaws and General Directions PLA Ship towage Code of Practice Ship Towage Bridge Simulation	3	3	6	3	3	1	5	4	4	4	4	Most Likely - Collision between LCT vessel manoeuvring to/from berth at slow speed and a recreational vessel from West Thurrock Yacht Club Worst Credible - Collision between LCT vessel manoeuvring off berth and a specified tanker bound for the Navigator terminal resulting in serious damage to one or both vessels above and below the waterline
1.2	Contact	Technical Failure Bridge Team Error Environmental Conditions Failure of Aids to Navigation Quayside Obstruction	POTLL Marine Department scheduling POTLL PNTMs and NTMs POTLL Marine Guidelines and Port Information POTLL weather forecasting POTLL emergency plans PLA Pilotage Directions PLA VTS service PLA NIMs PLA Byelaws and General Directions PLA recreational User Guide PLA Ship towage Code of Practice Ship Towage Bridge Simulation	4	4	8	4	4	2	10	8	6	10	6.75	Most Likely - Low speed low energy contact between LCT feeder vessel and quayside resulting in scuffing/scraping of the concrete. No injuries, no disruption to Port. Worst Credible - Contact with LCT gantry crane during arrival/departure resulting in loss of crane, loss of life and substantial damage to vessel and berth.
1.3	Grounding	Technical Failure Bridge Team Error Environmental Conditions Surveying Omission Failure of Aids to Navigation	POTLL Conservancy program POTLL Ruling Depths POTLL Marine Department scheduling POTLL PNTMs and NTMs POTLL Marine Guidelines and Port information POTLL weather forecasting POTLL emergency plans POTLL UKC PLA Hydrographic department PLA VTS Service PLA pilotage Directions PLA NIMs PLA Byelaws and General Directions PLA Ship towage Code of Practice Ship Towage Bridge Simulation	3	3	6	3	6	2	4	8	6	8	5.5	Most likely - Grounding on soft mud while departing Tilbury Grain Inner terminal on the flood tide, refloated on the rising tide. No damage to vessel, no injury and no interruption to port trade Worst Credible - Grounding during Arrival/Departure from LCT on falling tide, vessel cannot refloat, berths blocked for at least one tide. Substantial disruption to terminal, potential damage to grounded vessel, no injuries.
1.4	Sinking Capsize	Collision Contact Grounding Technical Failure Failure of Vessel Stability Human Error Environmental Conditions	POTLL Marine Department Scheduling POTLL weather forecasting POTLL PNTMs and NTMs POTLL Marine Guidelines and Port information POTLL mooring manual POTLL emergency procedures PLA VTS service PLA Pilotage directions PLA ship towage code of practice Ship Towage Bridge Simulation	2	2	6	4	2	1	5	6	4	4	4	Small craft swamped during mooring activities resulting in sinking of craft Loss of stability during cargo operations resulting in sinking, potential for serious injury/loss of life loss of operational berth, pollution, closure of Tilbury Dock
1.5	Fire/Explosion	Collision Contact Grounding Human Error Technical Failure Loss of Containment	POTLL Marine Department Scheduling POTLL weather forecasting POTLL PNTMs and NTMs POTLL Marine Guidelines and Port information POTLL mooring manual POTLL emergency procedures PLA VTS service PLA Pilotage directions PLA ship towage code of practice PLA NIMs PLA Byelaws and General Directions Ship Towage Bridge Simulation	3	3	6	3	3	1	5	5	4	4	4.125	Most Likely: small fire on board due to hot works, extinguished by crew. Minor damage to vessel paint work, no injuries, no disruption to the Port. Worst Credible: Engine room fire caused machinery malfunction, beyond crews capability to extinguish on vessel containing class 1 or 7 hazardous cargo. Multiple injuries to crew, substantial damage to vessel and disruption to the Port.
1.6	Loss of containment (Oil products)	Collision Grounding Human Error Contact Technical Failure Sinking / Capsizing Fire / Explosion Environmental Conditions	Marine Department scheduling POTLL Bunkering procedure and checklist POTLL Surveys POTLL dredging program POTLL Marine Guidelines and Port information POTLL Emergency plans POTLL OPRC POTLL Ruling Depth document POTLL Tier 2 responder PLA Tosca PLA VTS service PLA Pilotage directions PLA ship towage code of practice PLA NIMs PLA Byelaws and General Directions Ship Towage Bridge Simulation	4	4	4	4	4	1	5	5	5	5	4.125	Most Likely: Loss of small amount of fuel during pb board bunkering operations, ie mobile generator. Spilt fuel contained on deck. Worst Credible: Collision holes fuel tank resulting in large quantity of heavy fuel oil discharged into the Thames. Tier 2 response and interruption to Port business.



FORTH PORTS LIMITED
Risk Assessment

Port of Tilbury 2 - Arrival and Sailing PLA waters to Berth

Ref.	Hazard What can go wrong (Event leading to a consequence)	Causes How can it go wrong	Controls Preventative & Reactive (What action & how frequent)	Risk scored at Residual level (Most Likely)				Risk scored at Residual level (Worst Credible)				Hazard Risk Score	Most Likely/Worst Credible Scenarios	
				Overall Risk				Overall Risk						
				Likelihood	People	Property	Environment	Likelihood	People	Property	Environment			
1.1	Collision / Allision	Technical Failure Bridge Team Error Environmental Conditions	POTLL Permit to Manoeuvre POTLL Berthing Advisers POTLL Marine Department scheduling POTLL PNMs and NTMs POTLL Ruling Depths POTLL Marine Guidelines and Port Information POTLL Weather forecasting POTLL Wind Parameters POTLL Restricted Visibility procedures POTLL Marine Emergency plans POTLL CCTV POTEMPLA POTLL OPRC POTLL Tier 2 Responders PLA Ship towage Code of Practice Ship Towage Bridge Simulation T2 Navigational Risk Assessment	3	3	6	3	3	1	5	4	4	4	<p>Most Likely - Collision between vessel manoeuvring to/from berth at slow speed and a boatsmen vessel</p> <p>Worst Credible - Collision between vessel manoeuvring of berth and a specified tanker bound for the Navigator terminal resulting in serious damage to one or both vessels above and below the waterline</p>
1.2	Contact	Technical Failure Bridge Team Error Environmental Conditions Quayside Obstruction	POTLL Permit to Manoeuvre POTLL Berthing Advisers POTLL Marine Department scheduling POTLL PNMs and NTMs POTLL Ruling depths POTLL Marine Guidelines and Port Information POTLL weather forecasting POTLL Wind Parameters POTLL Restricted Visibility Procedures POTLL Marine emergency plans POTLL CCTV POTEMPLA POTLL OPRC POTLL Tier 2 Responders PLA Ship towage Code of Practice Ship Towage Bridge Simulation T2 Navigational Risk Assessment	5	5	10	5	5	2	10	8	10	7.375	<p>Most Likely - Low speed low energy contact between vessel and quayside resulting in scuffing/scraping of the concrete. No injuries, no disruption to Port.</p> <p>Worst Credible - Contact with shoreside infrastructure during arrival/departure resulting in loss of infrastructure, loss of life and substantial damage to vessel and berth.</p>
1.3	Grounding	Collision Contact Grounding Technical Failure Human Error Environmental Conditions	POTLL Surveys POTLL Dredging program POTLL Permit to Manoeuvre POTLL Ruling Depths POTLL Marine Department scheduling POTLL PNMs and NTMs POTLL Marine Guidelines and Port information POTLL weather forecasting POTLL emergency plans POTLL LKC POTEMPLA PLA Ship towage Code of Practice Ship Towage	3	3	6	3	3	2	4	8	8	9.6	<p>Most likely - Grounding on soft mud while departing Tilbury Grain terminal on the flood tide, refloated on the rising tide. No damage to vessel, no injury and no interruption to port trade</p> <p>Worst Credible - Grounding during Arrival/Departure from LCT on falling tide, vessel cannot refloat, berths blocked for at least one tide. Substantial disruption to terminal, potential damage to grounded vessel, no injuries.</p>
1.4	Sinking / Capsize	Collision Contact Grounding Technical Failure Failure of Vessel Stability Human Error Environmental Conditions	POTLL Marine Department Scheduling POTLL Berthing Advisers POTLL weather forecasting POTLL Wind parameters POTLL Restricted visibility procedures POTLL PNMs and NMs POTLL Marine Guidelines and Port information POTLL mooring manual POTLL Marine emergency procedures POTLL Surveys POTLL LKC POTLL Ruling Depths POTEMPLA Ship Towage Bridge Simulation T2 Navigational Risk Assessment	2	2	6	4	2	1	5	5	4	4	<p>Small craft swamped during mooring activities resulting in sinking of craft</p> <p>Loss of stability during cargo operations resulting in sinking, potential for serious injury/loss of life of operational berth, pollution, closure of the berth</p>
	Sinking / Capsize	Collision Contact Grounding Technical Failure Failure of Vessel Stability Human Error Environmental Conditions	Marine Department scheduling POTLL Bunkering procedure and checklist POTLL Surveys POTLL dredging program POTLL Marine Guidelines and Port information POTLL Emergency plans POTLL OPRC POTLL Ruling Depth document POTLL Tier 2 responder PLA Tosca PLA VTS service PLA Pilotage directions PLA ship towage code of practice PLA NMs PLA Byelaws and General Directions Ship Towage Bridge Simulation T2 Navigational Risk Assessment	3	3	6	3	3	1	5	5	4	4.125	<p>Most Likely: small fire on board due to hot works, extinguished by crew. Minor damage to vessel paint work, no injuries, no disruption to the Port.</p> <p>Worst Credible: Engine room fire caused my machinery malfunction, beyond crew capability to extinguish on vessel containing class 1 or 7 hazardous cargo. Multiple injuries to crew, substantial damage to vessel and disruption to the Port.</p>
1.5	Loss of containment (Oil products)	Collision Grounding Human Error Contact Technical Failure Sinking / Capsizing Fire / Explosion Environmental Conditions	Marine Department scheduling POTLL Bunkering procedure and checklist POTLL Surveys POTLL dredging program POTLL Marine Guidelines and Port information POTLL Emergency plans POTLL OPRC POTLL Ruling Depth document POTLL Tier 2 responder PLA Tosca PLA VTS service PLA Pilotage directions PLA ship towage code of practice PLA NMs PLA Byelaws and General Directions Ship Towage Bridge Simulation T2 Navigational Risk Assessment	4	4	4	4	4	1	5	5	5	8.5	<p>Most Likely: Loss of small amount of fuel during in board bunkering operations, ie mobile generator. Spill fuel contained on deck.</p> <p>Worst Credible: Collision holes fuel tank resulting in large quantity of heavy fuel oil discharged into the Thames. Tier 2 response and interruption to Port business.</p>



FORTH PORTS LIMITED
Risk Assessment

Port of Tilbury - Non Tidal Bunkering Operations

Ref.	Hazard What can go wrong (Event leading to a consequence)	Causes How can it go wrong	Controls Preventative & Reactive (What action & how frequent)	Risk scored at Residual level (Most Likely)					Risk scored at Residual level (Worst Credible)					Hazard Risk Score	
				Likelihood	Overall Risk				Likelihood	Overall Risk					
					People	Property	Environment	Business		People	Property	Environment	Business		
1.1	Collision with bunker vessel and receiving vessel	Technical Failure Bridge Team Error Environmental Conditions	POTLL Permit to Manoeuvre Marine Department scheduling POTLL Bunker procedure and checklist POTLL weather parameters POTLL weather forecasting POTLL NtMs and PNTMs POTLL tug requirements POTLL Mooring manual POTLL Emergency plans POTLL Emergency exercises POTLL OPRC Plan POTLL Tier 2 responders Lock gates POTLL Berthing Advisors PLA Ship Towage Code of Practice Ship Towage	3	3	6	3	3	2	4	8	4	4	4.375	<p>Most Likely: Low speed collision between bunker vessel and receiving vessel, no damage to either vessel.</p> <p>Worst credible: Collision caused by equipment failure, medium speed medium energy collision resulting in damage and hole above the waterline in receiving vessel.</p>
1.2	Contact	Technical Failure Bridge Team Error Environmental Conditions Mooring Failure	POTLL Permit to Manoeuvre POTLL Marine Department scheduling POTLL Bunker procedure and checklist POTLL weather parameters POTLL weather forecasting POTLL NtMs and PNTMs POTLL tug requirements POTLL Mooring manual POTLL Emergency plans POTLL Emergency exercises POTLL OPRC Plan POTLL Tier 2 responders Lock gates POTLL Berthing Advisors PLA Ship Towage Code of Practice Ship Towage	3	3	3	3	3	2	4	6	8	8	4.75	<p>Most Likely: parted mooring line leads to low energy contact with quay during bunkering operations. Bunkers ceased while vessel resecured. No damage.</p> <p>Worst credible: contact with shoreside infrastructure due to failed mooring lines, bunker hose disconnected before fuel shut off leading to in dock pollution and tier 2 response.</p>
1.3	Loss of Conainment (Oil Products)	Technical Failure Human Error Collision Grounding Mooring Failure Sinking Fire/Explosion Contact	POTLL Permit to Manoeuvre Marine Department scheduling and traffic organisation POTLL Bunker procedure and checklist POTLL weather parameters POTLL weather forecasting POTLL NtMs and PNTMs POTLL Mooring manual POTLL Emergency plans POTLL Emergency exercises POTLL OPRC Plan POTLL Tier 2 responders Lock gates POTLL Berthing Advisors PLA Ship Towage Code of Practice Ship Towage	3	3	3	3	3	2	4	6	8	8	4.75	<p>Most likely: failed fitting on bunker hose resulting in small loss of product on deck, scuppers closed, on deck clean up only, no pollution in dock.</p> <p>Worst Credible: Due to communication errors hose disconnected immediately before pumping begins. Volume of oil product lost in dock requiring tier 2 response.</p>
1.4	Fire/Explosion	Technical Failure Human Error Collision Grounding Mooring Failure Sinking Fire/Explosion Contact	POTLL Permit to Manoeuvre POTLL Marine Department scheduling POTLL Bunker procedure and checklist POTLL weather parameters POTLL weather forecasting POTLL NtMs and PNTMs POTLL Mooring manual POTLL Emergency plans POTLL Emergency exercises POTLL OPRC Plan POTLL Tier 2 responders Lock gates POTLL Berthing Advisors PLA Ship Towage Code of Practice Ship Towage	3	3	3	3	3	2	4	6	8	8	4.75	<p>Most likely: small fire on board unconnected to bunkering operation. Fire isolated and dealt with by crew. No damage, no injuries.</p> <p>Worst credible: fire/explosion caused by malfunctioning equipment leading to injuries on crew on board and loss of oil into dock requiring tier 2 response</p>

Most Likely/Worst Credible Scenarios



FORTH PORTS LIMITED
Risk Assessment

Port of Tilbury - Tidal Bunkering Operations

Ref.	Hazard <small>What can go wrong (Event leading to a consequence)</small>	Causes <small>How can it go wrong</small>	Controls <small>Preventative & Reactive (What action & how frequent)</small>	Risk scored at Residual level (Most Likely)				Risk scored at Residual level (Worst Credible)				Hazard Risk Score	Most Likely/Worst Credible Scenarios		
				Likelihood	Overall Risk			Likelihood	Overall Risk						
					People	Property	Environment		Business	People	Property			Environment	Business
1.1	Collision with bunker vessel and receiving vessel	Technical Failure Bridge Team Error Environmental Conditions	POTLL Marine Department scheduling POTLL Bunker procedure and checklist POTLL weather parameters POTLL weather forecasting POTLL NIMs and PNIMs POTLL tug requirements POTLL Mooring manual POTLL Marine Department Emergency plans POTLL OPRC Plan POTLL Tier 2 responder POT11L MOU POT11L byelaws PLA Pilotage Directions PLA VTS service PLA ship towage code of practice Ship Towage Bridge Simulation	3	3	3	3	3	2	4	8	6	6	4.5	<p>Most Likely: Low energy low speed collision between small bunker barge and receiving vessel while manoeuvring alongside leading to very minor damage to one or both vessels, no pollution and no injury</p> <p>Worst credible: Medium energy medium speed collision between bunker barge and receiving vessel caused by equipment malfunction leading to damage at or above the waterline and hooled fuel tank needing tier 2 response.</p>
1.2	Contact	Technical Failure Bridge Team Error Environmental Conditions Mooring Failure	Marine Department scheduling POTLL Bunker procedure and checklist POTLL weather parameters POTLL weather forecasting POTLL NIMs and PNIMs POTLL tug requirements POTLL Mooring manual POT11L MOU POT11L byelaws POTLL Marine Department Emergency plans POTLL OPRC Plan POTLL Tier 2 responders PLA Pilotage Directions PLA VTS service PLA ship towage code of practice Ship Towage Bridge Simulation	3	3	6	3	3	2	4	6	8	8	5.125	<p>Most Likely: arched mooring line leads to low energy contact with quay during bunkering operations. Bunkers ceased while vessel resecured. No damage.</p> <p>Worst Credible: contact with shoreside infrastructure during bunkering operations due to failed mooring lines, bunker hose disconnected before fuel shut off leading to in dock pollution and tier 2 response.</p>
1.3	Loss of Conainment (Oil Products)	Technical Failure Human Error Collision Grounding Mooring Failure Sinking Fire/Explosion Contact	POTLL Permit to Manoeuvre POTLL Marine Department scheduling POTLL Bunker procedure and checklist POTLL weather parameters POTLL weather forecasting POTLL NIMs and PNIMs POTLL Mooring manual POT11L MOU POT11L byelaws POTLL Marine Department Emergency plans POTLL OPRC Plan POTLL Tier 2 responders PLA Pilotage Directions PLA VTS service PLA ship towage code of practice Ship Towage Bridge Simulation	3	3	6	3	3	2	4	2	8	8	4.625	<p>Most likely: failed fitting on bunker hose resulting in small loss of product on deck, scuppers closed, on deck clean up only, no pollution in dock.</p> <p>Worst Credible: Due to communication errors hose disconnected immediately before pumping begins. Volume of oil product lost over the side requiring tier 2 response.</p>
1.4	Fire/Explosion	Technical Failure Human Error Collision Grounding Mooring Failure Sinking Fire/Explosion Contact	POTLL Marine Department scheduling POTLL Bunker procedure and checklist POTLL weather parameters POTLL weather forecasting POTLL NIMs and PNIMs POTLL Mooring manual POT11L MOU POT11L byelaws POTLL Marine Department Emergency plans POTLL OPRC Plan POTLL Tier 2 responders PLA Pilotage Directions PLA VTS service PLA ship towage code of practice Ship Towage Bridge Simulation	3	3	6	3	3	2	6	8	8	8	5.625	<p>Most likely: small fire on board unconnected to bunkering operation. Fire isolated and dealt with by crew. No damage, no injuries.</p> <p>Worst credible: fire/explosion caused by malfunctioning equipment leading to injuries on crew on board and loss of oil into dock requiring tier 2 response</p>



FORTH PORTS LIMITED
Risk Assessment

Port of Tilbury 2 - Tidal Bunkering Operations

Ref.	Hazard <small>What can go wrong (Event leading to a consequence)</small>	Causes <small>How can it go wrong</small>	Controls <small>Preventative & Reactive (What action & how frequent)</small>	Risk scored at Residual level (Most Likely)				Risk scored at Residual level (Worst Credible)				Overall Risk Score	Most Likely/Worst Credible Scenarios		
				Likelihood	Overall Risk			Likelihood	Overall Risk						
					People	Property	Environment		Business	People	Property			Environment	Business
1.1	Collision with bunker vessel and receiving vessel	Technical Failure Bridge Team Error Environmental Conditions	POTLL Marine Department scheduling POT11L Byelaws POT11L and PLA MOU POTLL Bunker procedure and checklist POTLL weather parameters POTLL weather forecasting POTLL NIMs and PNIMs POTLL tug requirements POTLL Mooring manual POTLL Marine Department Emergency plans POTLL OPRC Plan POTLL Tier 2 responder PLA Pilotage Directions PLA VTS service PLA ship towage code of practice Ship Towage Bridge Simulation T2 Navigational Risk Assessment	3	3	3	3	3	2	4	8	6	6	4.5	<p>Most Likely: Low energy low speed collision between small bunker barge and receiving vessel while manoeuvring alongside leading to very minor damage to one or both vessels, no pollution and no injury</p> <p>Worst credible: Medium energy medium speed collision between bunker barge and receiving vessel caused by equipment malfunction leading to damage at or above the waterline and holed fuel tank needing tier 2 response.</p>
1.2	Contact	Technical Failure Bridge Team Error Environmental Conditions Mooring Failure	Marine Department scheduling POT11L Byelaws POT11L and PLA MOU POTLL Bunker procedure and checklist POTLL weather parameters POTLL weather forecasting POTLL NIMs and PNIMs POTLL tug requirements POTLL Mooring manual POTLL Marine Department Emergency plans POTLL OPRC Plan POTLL Tier 2 responders PLA Pilotage Directions PLA VTS service PLA ship towage code of practice Ship Towage Bridge Simulation T2 Navigational Risk Assessment	3	3	6	3	3	2	4	6	8	8	5.125	<p>Most Likely: arched mooring line leads to low energy contact with quay during bunkering operations. Bunkers ceased while vessel resecured. No damage.</p> <p>Worst Credible: contact with shoreside infrastructure during bunkering operations due to failed mooring lines, bunker hose disconnected before fuel shut off leading to in dock pollution and tier 2 response.</p>
1.3	Loss of Conainment (Oil Products)	Technical Failure Human Error Collision Grounding Mooring Failure Sinking Fire/Explosion Contact	POTLL Marine Department scheduling POT11L Byelaws POT11L and PLA MOU POTLL Ruling Depths POTLL Bunker procedure and checklist POTLL weather parameters POTLL weather forecasting POTLL NIMs and PNIMs POTLL Mooring manual POTLL Marine Department Emergency plans POTLL OPRC Plan POTLL Tier 2 responders PLA Pilotage Directions PLA VTS service PLA ship towage code of practice Ship Towage Bridge Simulation T2 Navigational Risk Assessment	3	3	6	3	3	2	4	2	8	8	4.625	<p>Most likely: failed fitting on bunker hose resulting in small loss of product on deck, scuppers closed, on deck clean up only, no pollution in dock.</p> <p>Worst Credible: Due to communication errors hose disconnected immediately before pumping begins. Volume of oil product lost over the side requiring tier 2 response.</p>
1.4	Fire/Explosion	Technical Failure Human Error Collision Grounding Mooring Failure Sinking Fire/Explosion Contact	POTLL Marine Department scheduling POTLL Bunker procedure and checklist POT11L Byelaws POT11L and PLA MOU POTLL Ruling Depths POTLL weather parameters POTLL weather forecasting POTLL NIMs and PNIMs POTLL Mooring manual POTLL Marine Department Emergency plans POTLL OPRC Plan POTLL Tier 2 responders PLA Pilotage Directions PLA VTS service PLA ship towage code of practice Ship Towage Bridge Simulation T2 Navigational Risk Assessment	3	3	6	3	3	2	6	8	8	8	5.625	<p>Most likely: small fire on board unconnected to bunkering operation. Fire isolated and dealt with by crew. No damage, no injuries.</p> <p>Worst credible: fire/explosion caused by malfunctioning equipment leading to injuries on crew on board and loss of oil into dock requiring tier 2 response</p>



FORTH PORTS LIMITED
Risk Assessment

Port of Tilbury Enclosed Dock Marine Pollution															
Ref.	Hazard What can go wrong (Event leading to a consequence)	Causes How can it go wrong	Controls Preventative & Reactive (What action & how frequent)	Risk scored at Residual level (Most Likely)					Risk scored at Residual level (Worst Credible)					Hazard Risk Score	Most Likely/Worst Credible Scenarios
				Likelihood	Overall Risk				Likelihood	Overall Risk					
					People	Property	Environment	Business		People	Property	Environment	Business		
1.1	Loss of Containment (oil product)	Collision Contact Grounding Poor Decision Making Technical Failure	POTLL Marine Department scheduling POTLL Bunkering procedure and checklist POTLL Survey and Dredging program POTLL Marine Guidelines and Port information POTLL Marine Department Emergency plans POTLL OPRC POTLL Ruling Depth document POTLL UKC POTLL Tier 2 responder Lock Gates POTLL Berthing Advisors PLA Ship Towage Code of Practice Ship Towage	3	3	3	6	3	1	1	5	5	5	3.875	<p>Most Likely: Small spill on deck during bunker operations, all product contained on deck and dealt with by the vessel. No injuries, no pollution response, No disruption to the Port</p> <p>Worst credible: Collision between manoeuvring vessel and moored vessel punctures a fuel tank resulting in substantial release of fuel into the dock. Tier 2 response required. Substantial disruption to the Port.</p>



FORTH PORTS LIMITED
Risk Assessment

Port of Tilbury and Tilbury 2 River Berths - Marine Pollution

Ref.	Hazard What can go wrong (Event leading to a consequence)	Causes How can it go wrong	Controls Preventative & Reactive (What action & how frequent)	Risk scored at Residual level (Most Likely)					Risk scored at Residual level (Worst Credible)					Hazard Risk Score	Most Likely/Worst Credible Scenarios
				Overall Risk					Overall Risk						
				Likelihood	People	Property	Environment	Business	Likelihood	People	Property	Environment	Business		
1.1	Loss of Containment (oil product)	Collision Contact Grounding Poor Decision Making Technical Failure	POTLL Marine Department scheduling POTLL Bunkering procedure and checklist POTLL Survey and Dredging program POTLL Marine Guidelines and Port information POTLL Marine Department Emergency plans POTLL OPRC POTLL Ruling Depths POTLL UKC POTLL Tier 2 responder PLA/POT11L MOU PLA Pilotage Directions PLAVTS Service PLA Byelaws and General Directions PLA TOSCA PLA Hydrographic service POTLL Berthing Advisors PLA Ship Towage Code of Practice Ship Towage Bridge Simulation T2 Navigational Risk Assessment	3	3	3	6	3	1	1	5	5	5	3.875	<p>Most Likely: Small spill on deck during bunker operations, all product contained on deck and dealt with by the vessel. No injuries, no pollution response, No disruption to the Port</p> <p>Worst credible: Collision between manoeuvring vessel and moored vessel punctures a fuel tank resulting in substantial release of fuel into the dock. Tier 2 response required. Substantial disruption to the Port.</p>



FORTH PORTS LIMITED
Risk Assessment

Port of Tilbury - Non Tidal Diving Operations

Ref.	Hazard What can go wrong (Event leading to a consequence)	Causes How can it go wrong	Controls Preventative & Reactive (What action & how frequent)	Risk scored at Residual level (Most Likely)					Risk scored at Residual level (Worst Credible)					Hazard Risk Score	Most Likely/Worst Credible Scenarios
				Likelihood	Overall Risk				Likelihood	Overall Risk					
					People	Property	Environment	Business		People	Property	Environment	Business		
1.1	Swamping / turbulence / interaction	Proximity and/or speed of Passing Traffic	Forth Ports Dive Procedure (Permit) Marine Department scheduling Exclusion Zones Speed Restrictions POTLL Notice to Mariners POTLL Marine Guidelines and Port Information Dive Supervisor Local Monitoring	3	3	3	3	3	1	5	3	3	5	3.5	<p>Most Likely: Diving operations interrupted due to wash from passing/manoeuvring traffic. No damage to equipment, diving ops continue</p> <p>Worst Credible: Severe injury caused to diver due to wash from passing/manoeuvring traffic. Rescue operation required, disruption to Port</p>
1.2	Contact / Collision	Proximity and/or Speed of Passing Traffic	Forth Ports Dive Procedure (Permit) Established Communications Marine department scheduling Exclusion Zones POTLL Marine Guidelines and Port Information POTLL Notice to Mariners	2	6	4	2	2	1	5	4	2	5	3.75	<p>Most likely: Vessel manoeuvring for berth has a low speed low energy collision with a dive vessel. Minor injury, minor damage to dive vessel, dive operation delayed, no disruption to Port.</p> <p>Worst Credible: Vessel manoeuvring for berth has a high energy collision with dive vessel. Multiple injuries on board dive boat and to diver, rescue operation, damage to dive boat and disruption to Port.</p>



**FORTH PORTS LIMITED
Risk Assessment**

Ports of Tilbury and Tilbury 2 - Tidal Diving Operations															
Ref.	Hazard What can go wrong (Event leading to a consequence)	Causes How can it go wrong	Controls Preventative & Reactive (What action & how frequent)	Risk scored at Residual level (Most Likely)					Risk scored at Residual level (Worst Credible)					Hazard Risk Score	Most Likely/Worst Credible Scenarios
				Likelihood	Overall Risk				Likelihood	Overall Risk					
					People	Property	Environment	Business		People	Property	Environment	Business		
1.1	Swamping / turbulence / interaction	Proximity and/or speed of Passing Traffic	Forth Ports Dive Procedure (Permit) Marine Department scheduling POTLL Notice to Mariners POTLL Marine Guidelines and Port Information PLA VTS Service PLA byelaws and General Directions PLA Notice to Mariners PIA Dive Permit PIA Pilotage Directions PLA Exclusion Zones PLA Speed Restrictions Bridge Simulation T2 Navigational Risk Assessment Bridge Simulation	3	3	3	3	3	1	4	3	3	5	3.375	<p>Most Likely: Diving operations interrupted due to wash from passing/manoeuvring traffic. No damage to equipment, diving ops continue</p> <p>Worst Credible: Sever injury caused to diver due to wash from passing/manoeuvring traffic. Rescue operation required, disruption to Port</p>
1.2	Contact / Collision	Proximity and/or Speed of Passing Traffic	Forth Ports Dive Procedure (Permit) Marine department scheduling POTLL Marine Guidelines and Port Information POTLL Notice to Mariners PLA VTS Service PLA Notice to Mariners PLA Diver Permit PLA Pilotage Directions PLA Exclusion Zones PLA Speed Restrictions Bridge Simulation T2 Navigational Risk Assessment	3	3	3	3	3	1	4	4	4	5	3.625	<p>Most likely: Vessel manoeuvring for berth has a low speed low energy collision with a dive vessel. Minor injury, minor damage to dive vessel, dive operation delayed, no disruption to Port.</p> <p>Worst Credible: Vessel manoeuvring for berth has a high energy collision with dive vessel. multiple injuries on board dive boat and to diver, rescue operation, damage to dive boat and disruption to Port.</p>



FORTH PORTS LIMITED
Risk Assessment

Port of Tilbury - Non tidal Towing Operations

Ref.	Hazard What can go wrong (Event leading to a consequence)	Causes How can it go wrong	Controls Preventative & Reactive (What action & how frequent)	Risk scored at Residual level (Most Likely)					Risk scored at Residual level (Worst Credible)					Hazard Risk Score	Most Likely/Worst Credible Scenarios
				Overall Risk					Overall Risk						
				Likelihood	People	Property	Environment	Business	Likelihood	People	Property	Environment	Business		
1.1	Capsizing / Flooding	Girting Loss of Stability Grounding Technical Failure Human Error Environmental Conditions Tug Positioning Speed	Marine Department Scheduling POTLL Permit to Manoeuvre POTLL Notice to Mariners POTLL Permanent Notice to Mariners POTLL Emergency Plans POTLL OPRC POTLL Weather Forecasting POTLL Weather parameters PLA Ship Towing Code of Practice PLA Craft Towing Code of Practice Ship Towing POTLL Berthing Advisors	3	3	6	3	3	1	5	5	4	5	4.25	<p>Most Likely: Mechanical failure, ie stern gland, causes vessels engine room to flood and a loss of stability. Bilge pumps are adequate and able to keep vessel afloat until repairs are made. Ni injureds, minor damage o the tug, potential delay to vessel berthing/unberthing</p> <p>Worst Credible: Large deep drafter vessel causes tug girting due to sudden movement away from the tug, capsizes, tier 1 pollution, salvage operation on the tug, potential loss of life</p>
1.2	Fire	Loss of Containment Grounding Technical Failure Human Error Environmental Conditions	Marine Department Scheduling POTLL Permit to Manoeuvre POTLL Notice to Mariners POTLL Permanent Notice to Mariners POTLL Emergency Plans POTLL OPRC POTLL Weather Forecasting POTLL Weather parameters PLA Ship Towing Code of Practice PLA Craft Towing Code of Practice Ship Towing POTLL Berthing Advisors	2	4	4	2	6	1	5	5	5	5	4.5	<p>Most Likely: Small fire due to quipment failure, dealt with by onboard FFE. No injuries, very minor damage, no impact on the Port.</p> <p>Worst Credible: Large engine room fire, cannot be dealt with by on board FFE, major damage to vessel, single major injury, disruption to port services.</p>
1.3	Contact	Technical Failure Loss of Tow / Towline Failure Bridge Team Error Environmental Conditions Change to Shore Infrastructure / Obstruction on the Quay Floating Debris Tug Positioning	Marine Department scheduling POTLL Permit to Manoeuvre POTLL Notice to Mariners POTLL Permanent Notice to Mariners POTLL Emergency Plans POTLL OPRC POTLL Weather Forecasting POTLL Weather parameters PLA Ship Towing Code of Practice PLA Craft Towing Code of Practice Ship Towing POTLL Berthing Advisors	4	4	8	4	4	2	4	8	4	8	5.5	<p>Most Likely: Light contact made with quay during towing operations. Minor/superficial damage to tug, no damage to quayside, towing operation continues, no disruption to Port.</p> <p>Worst Credible: bTow line parts during towing operation leading to heavy contact with quayside. Damage to tug, significant concrete damage to quayside, towing operations aborted, minor disruption to the Port</p>
1.4	Collision	Technical Failure Loss of Tow / Towline Failure Bridge Team Error Environmental Conditions	Marine Department scheduling POTLL Permit to Manoeuvre POTLL Notice to Mariners POTLL Permanent Notice to Mariners POTLL Emergency Plans POTLL OPRC POTLL Weather Forecasting POTLL Weather parameters PLA Ship Towing Code of Practice PLA Craft Towing Code of Practice Ship Towing POTLL Berthing Advisors	3	3	3	3	3	1	4	5	2	5	3.5	<p>Most Likely: Minor collision between tug and towed vessel, superficial damage to one or both vessels. No injuries, towing operation continues, no disruption to the Port.</p> <p>Worst Credible: Tug undertaking towing operations has a mid/high energy impact with another manoeuvring vessel causing significant damage to one or both vessels, multiple minor or single major injury. Disruption to Port..</p>
	Grounding	Technical Failure Bridge Team Error Environmental Conditions	Marine Department Scheduling Byelaws & General Directions Emergency Plans Weather Forecasting / Tidal Predications Marine Guidelines & Port Information Towing Guidelines Notice to Mariners PLA Ship Towing Code of Practice PLA Craft Towing Code of Practice Ship Towing POTLL Berthing Advisors	2	2	2	2	2	1	1	4	4	4	2.625	<p>Most Likely: tug goes aground manoeuvring vessel near berth, clears obstruction with engines and continues manoeuvre. No damage, no injuries, no disruption to the Port.</p> <p>Worst Credible: Tug and deep drafter vessel take to ground during unberthing, cannot rfloat without assistance. No injuries, delays and cancelled arrivals, moderate disruption to the Port</p>
1.5	Man Overboard / Personal Injury	Human Error Technical Failure Environmental Conditions	POTLL LSA POTLL weather forecasting POTLL Wind parameters POTLL Restricted visibility procedures PLA Ship Towing Code of Practice PLA Craft Towing Code of Practice Ship Towing POTLL Berthing Advisors	3	3	3	3	3	1	5	1	1	5	3	<p>Most Likely:</p> <p>Worst Credible:</p>



FORTH PORTS LIMITED
Risk Assessment

Port of Tibury - Tidal Towing Operations

Ref.	Hazard What can go wrong (Event leading to a consequence)	Causes How can it go wrong	Controls Preventative & Reactive (What action & how frequent)	Risk scored at Residual level (Most Likely)				Risk scored at Residual level (Worst Credible)				Hazard Risk Score	Most Likely/Worst Credible Scenarios		
				Overall Risk				Overall Risk							
				Likelihood	People	Property	Environment	Business	Likelihood	People	Property			Environment	Business
1.1	Capsizing / Flooding	Girting Loss of Stability Grounding Technical Failure Human Error Environmental Conditions Tug Positioning Speed	Marine Department Scheduling POTLL Notice to Mariners POTLL Permanent Notice to Mariners POTLL Marine Guidelines and Port Information POTLL Emergency Plans POTLL OPRC POTLL Weather Forecasting POTLL Weather parameters PLA Ship Towing Code of Practice PLA Craft Towing Code of Practice PLA Pictage Directions PLA VTS Service PLA Hydrographic surveys PLA Tidal information PLA Notice to Mariners PLA Byelaws and General Directions Bridge Simulation	3	3	6	3	3	2	8	6	6	8	5.375	<p>Most Likely: Mechanical failure, in stern derrick, causes vessels engine room to flood and a loss of stability, bilge pumps are adequate and able to keep vessel afloat until repairs are made. NI injured, minor damage to the tug, potential delay to vessel berthing/unberthing</p> <p>Worst Credible: Large deep drafter vessel causes tug girting due to straight line speed inbound for London Container Terminal, tug capsizes, tier 1 pollution, salvage operation on the tug, potential loss of life, major disruption to the terminal.</p>
1.2	Fire	Loss of Containment Grounding Technical Failure Human Error Environmental Conditions	Marine Department scheduling POTLL Notice to Mariners POTLL Emergency Plans POTLL OPRC POTLL Weather Forecasting POTLL Marine Guidelines & Port Information PLA Ship Towing Code of Practice PLA Craft Towing Code of Practice PLA Pictage Directions PLA VTS Service PLA Hydrographic surveys PLA Tidal information PLA Notice to Mariners PLA Byelaws and General Directions Bridge Simulation	3	3	6	3	3	2	8	6	6	8	5.375	<p>Most Likely: Small fire due to equipment failure, dealt with by onboard FFE. No injuries, very minor damage, no impact on the Port.</p> <p>Worst Credible: Large engine room fire on board cruise ship berthed at Tibury Landing Stage, cannot be dealt with by onboard FFE, major damage to vessel, single major injury, disruption to Port.</p>
1.3	Contact	Technical Failure Loss of Tow / Towline Failure Bridge Team Error Environmental Conditions Change to Shore Infrastructure / Obstruction on the Quay Floating Debris Tug Positioning	Marine Department Scheduling POTLL Notice to Mariners POTLL Permanent Notice to Mariners POTLL Marine Guidelines and Port Information POTLL Emergency Plans POTLL OPRC POTLL Weather Forecasting POTLL Weather parameters PLA Ship Towing Code of Practice PLA Craft Towing Code of Practice PLA Pictage Directions PLA VTS Service PLA Hydrographic surveys PLA Tidal information PLA Notice to Mariners PLA Byelaws and General Directions	4	4	4	4	4	2	4	8	6	8	5.30	<p>Most Likely: Light contact made with quay during towing operations. Minor/superficial damage to tug, no damage to quayside, towing operation continues, no disruption to Port.</p> <p>Worst Credible: 3Tow line parts during towing operation leading to heavy contact with quayside. Damage to tug, significant concrete damage to quayside, towing operators aborted, minor disruption to the Port.</p>
1.4	Collision	Technical Failure Loss of Tow / Towline Failure Bridge Team Error Environmental Conditions	Marine Department Scheduling POTLL Notice to Mariners POTLL Permanent Notice to Mariners POTLL Marine Guidelines and Port Information POTLL Emergency Plans POTLL OPRC POTLL Weather Forecasting POTLL Weather parameters PLA Ship Towing Code of Practice PLA Craft Towing Code of Practice PLA Pictage Directions PLA VTS Service PLA Hydrographic surveys PLA Tidal information PLA Notice to Mariners PLA Byelaws and General Directions Bridge Simulation	3	3	6	3	3	2	8	6	6	8	5.325	<p>Most Likely: Minor collision between tug and towed vessel, superficial damage to one or both vessels. No injuries, towing operation continues, no disruption to the Port.</p> <p>Worst Credible: Tug undertaking towing operations has a mishap energy impact with another manoeuvring vessel causing significant damage to one or both vessels, multiple minor or single major injury. Disruption to Port.</p>
1.5	Grounding	Technical Failure Bridge Team Error Environmental Conditions	Marine Department Scheduling POTLL Notice to Mariners POTLL Permanent Notice to Mariners POTLL Marine Guidelines and Port Information POTLL Emergency Plans POTLL OPRC POTLL Weather Forecasting POTLL Weather parameters PLA Ship Towing Code of Practice PLA Craft Towing Code of Practice PLA Pictage Directions PLA VTS Service PLA Hydrographic surveys PLA Tidal information PLA Notice to Mariners PLA Byelaws and General Directions Bridge Simulation	3	3	3	3	3	2	2	6	2	8	3.35	<p>Most Likely: tug goes aground manoeuvring vessel near berth, clears obstruction with engines and continues manoeuvre. No damage, no injuries, no disruption to the Port.</p> <p>Worst Credible: Tug and deep drafter vessel take to ground during unberthing, cannot float without assistance. No injuries, delays and cancelled arrivals, moderate disruption to the Port.</p>
1.6	Man Overboard / Personal Injury	Human Error Technical Failure Environmental Conditions	POTLL LSA POTLL weather forecasting POTLL Wind parameters POTLL Restricted visibility procedures PLA Ship Towing Code of Practice PLA Craft Towing Code of Practice PLA Pictage Directions PLA VTS Service PLA Hydrographic surveys PLA Tidal information PLA Notice to Mariners PLA Byelaws and General Directions Ship Towing Bridge Simulation	3	3	3	3	3	2	10	2	2	10	4.6	<p>Most Likely: Minor hand injury whilst working lines. Minor first aid administered on board. No disruption to the Port</p> <p>Worst Credible: Crew member on tug struck by parted tow line, likely fatality. Severe disruption to the port.</p>



FORTH PORTS LIMITED
Risk Assessment

Port of Tilbury 2 - Tidal Towage Operations

Ref.	Hazard What can go wrong (Event leading to a consequence)	Causes How can it go wrong	Controls Preventative & Reactive (What action & how frequent)	Risk scored at Residual level (Most Likely)				Risk scored at Residual level (Worst Credible)				Hazard Risk Score	Most Likely/Worst Credible Scenarios		
				Likelihood	Overall Risk			Likelihood	Overall Risk						
					People	Property	Environment		Business	People	Property			Environment	Business
1.1	Capsizing / Flooding	Girting Loss of Stability Grounding Technical Failure Human Error Environmental Conditions Tug Positioning Speed	Marine Department scheduling POTLL Notice to Mariners POTLL Permanent Notice to Mariners POTLL Marine Department Emergency Plans POTLL Weather Forecasting POTLL Weather parameters POTLL Ship Towage Code of Practice PLA Craft Towage Code of Practice PLA Pilotage Directions PLA VTS Service PLA Hydrographic surveys PLA Tidal information PLA Notice to Mariners PLA Byelaws and General Directions Ship Towage Bridge Simulation T2 Navigational Risk Assessment	2	2	4	4	2	1	3	4	4	5	3.5	<p>Most Likely: Mechanical failure, ie stem gland, causes vessels engine room to flood and a loss of stability. Bilge pumps are adequate and able to keep vessel afloat until repairs are made. No injuries, minor damage to the tug, potential delay to vessel berthing/unberthing</p> <p>Worst Credible: Ship causes tug girting due to straight line speed inbound for T2, tug capsizes, see 1 pollution, salvage operation on the tug, potential loss of life, major disruption to the terminal.</p>
1.2	Fire	Loss of Containment Grounding Technical Failure Human Error Environmental Conditions	Marine Department scheduling POTLL Byelaws & General Directions POTLL Marine Department Emergency Plans POTLL OPRC POTLL Weather Forecasting POTLL Marine Guidelines & Port Information POTLL Notice to Mariners PLA Ship Towage Code of Practice PLA Craft Towage Code of Practice PLA Pilotage Directions PLA VTS Service PLA Hydrographic surveys PLA Tidal information PLA Notice to Mariners PLA Byelaws and General Directions Ship Towage	2	2	4	2	2	1	4	4	4	5	3.75	<p>Most Likely: Small fire due to equipment failure, dealt with by onboard FFE. No injuries, very minor damage, no impact on the Port.</p> <p>Worst Credible: Large engine room fire on board cruise ship berthed at Tilbury Landing Stage, cannot be dealt with by on board FFE, major damage to vessel, single major injury, disruption to Port.</p>
1.3	Contact	Technical Failure Loss of Tow / Towline Failure Bridge Team Error Environmental Conditions Change to Shore Infrastructure / Obstruction on the Quay Floating Debris Tug Positioning	Marine Department scheduling Byelaws & General Directions Emergency Plans Weather Forecasting / Tidal Predictions Marine Guidelines & Port Information Towage Guidelines Notice to Mariners Tug SMS PLA Ship Towage Code of Practice PLA Craft Towage Code of Practice PLA Pilotage Directions PLA VTS Service PLA Hydrographic surveys PLA Tidal information PLA Notice to Mariners PLA Byelaws and General Directions Ship Towage Bridge Simulation T2 Navigational Risk Assessment	3	3	6	3	3	2	4	8	2	8	4.625	<p>Most Likely: Light contact made with dolphin during towage operations. Minor/superficial damage to tug, no damage to quayside, towage operation continues, no disruption to Port.</p> <p>Worst Credible: bTow line parts during towage operation leading to heavy contact with quayside. Damage to tug, significant concrete damage to quayside, towage operations aborted, minor disruption to the Port.</p>
1.4	Collision	Technical Failure Loss of Tow / Towline Failure Bridge Team Error Environmental Conditions	Marine Department scheduling POTLL Emergency Plans POTLL Weather Forecasting POTLL Marine Guidelines & Port Information PLA Ship Towage Code of Practice PLA Craft Towage Code of Practice PLA Pilotage Directions PLA VTS Service PLA Hydrographic surveys PLA Tidal information PLA Notice to Mariners PLA Byelaws and General Directions Ship Towage Bridge Simulation T2 Navigational Risk Assessment	2	2	6	2	2	1	4	8	2	8	3.5	<p>Most Likely: Minor collision between tug and towed vessel, superficial damage to one or both vessels. No injuries, towage operation continues, no disruption to the Port.</p> <p>Worst Credible: Tug undertaking towage operations has a mid/high energy impact with another manoeuvring vessel causing significant damage to one or both vessels, multiple minor or single major injury. Disruption to Port.</p>
1.5	Grounding	Technical Failure Bridge Team Error Environmental Conditions	Marine Department Scheduling POTLL Emergency Plans POTLL Weather Forecasting POTLL Marine Guidelines & Port Information POTLL Notice to Mariners PLA Ship Towage Code of Practice PLA Craft Towage Code of Practice PLA Pilotage Directions PLA VTS Service PLA Hydrographic surveys PLA Tidal information PLA Notice to Mariners PLA Byelaws and General Directions Ship Towage Bridge Simulation T2 Navigational Risk Assessment	2	2	2	2	2	1	1	4	2	5	2.5	<p>Most Likely: tug goes aground manoeuvring vessel near berth, clears obstruction with engines and continues manoeuvre. No damage, no injuries, no disruption to the Port.</p> <p>Worst Credible: Tug and deep drafter vessel take to ground during unberthing, cannot float without assistance. No injuries, delays and cancelled arrivals, moderate disruption to the Port</p>
1.6	Man Overboard / Personal Injury	Human Error Technical Failure Environmental Conditions	POTLL LSA POTLL weather forecasting POTLL Wind parameters POTLL Restricted visibility procedures PLA Ship Towage Code of Practice PLA Craft Towage Code of Practice PLA Pilotage Directions PLA VTS Service PLA Hydrographic surveys PLA Tidal information PLA Notice to Mariners PLA Byelaws and General Directions Ship Towage Bridge Simulation T2 Navigational Risk Assessment	3	6	6	3	3	1	5	2	2	5	4	<p>Most Likely: Minor hand injury whilst working lines. Minor first aid administered on board. No disruption to the Port</p> <p>Worst Credible: Crew member on tug struck by parted tow line, likely fatality. Severe disruption to the port.</p>