

Project Detail



Project:	Stranraer Marina Expansion Environmental Impact Assessment - Chapter 8 Navigation & Safety
Client:	Fairhurst
Location / Facility:	Stranraer Marina
NRA Methodology:	Based on the Principles of the Simplified IALA Risk Assessment Method (SIRA)
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1. Risk Matrix



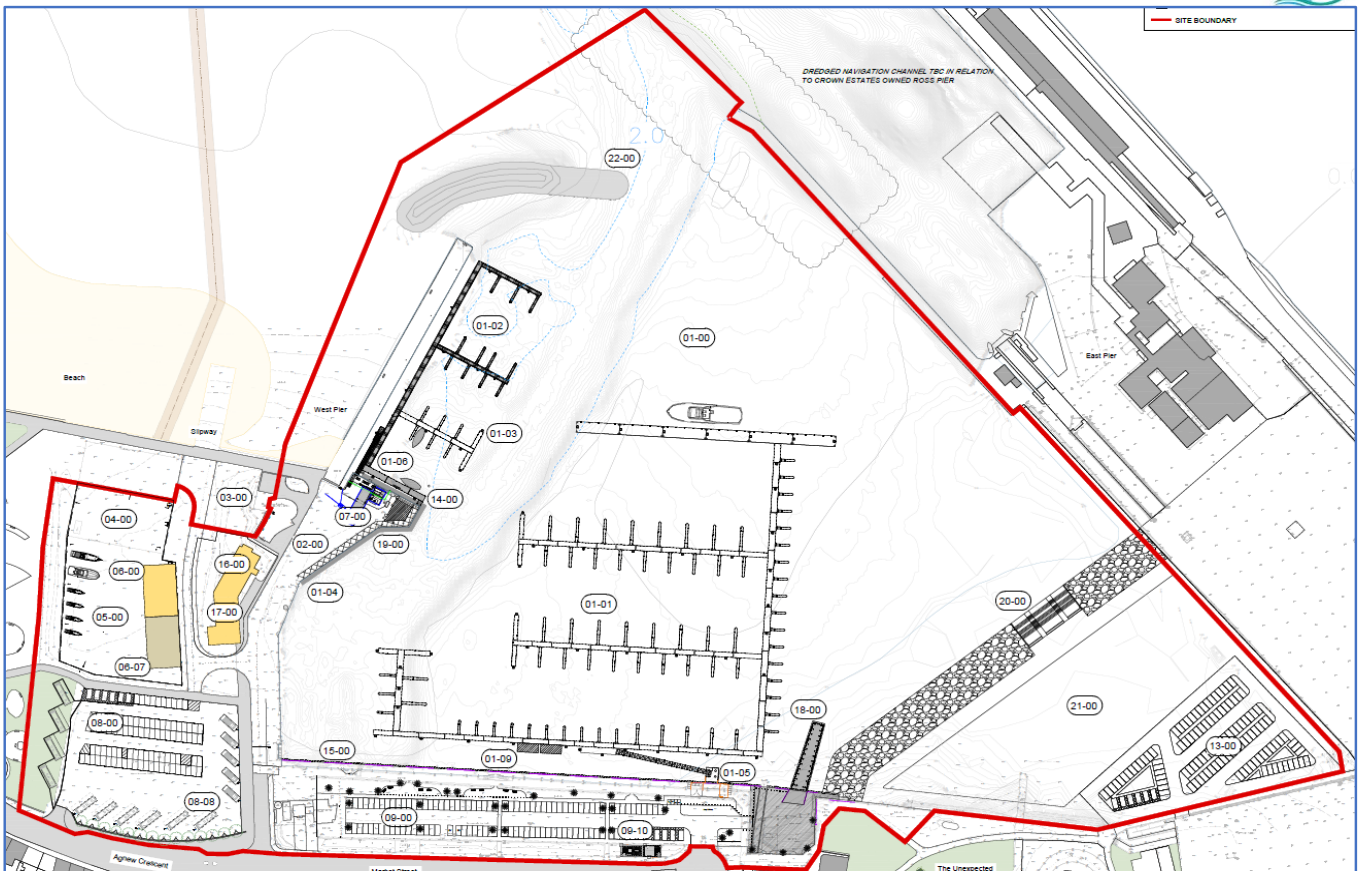
'Likelihood' of Incident Occurring		
L1	VERY RARE	Will occur only in exceptional circumstances and not more than once every 100 years
L2	RARE	May occur every 50 to 100 years
L3	OCCASIONAL	May occur every 10 to 50 years
L4	FREQUENT	May occur every 1 to 10 years
L5	VERY FREQUENT	May occur once a year

'Consequence' of Incident Occurring			
C1	INSIGNIFICANT	Environment	Near Miss, no effect of note
		People	Near Miss, no injury incident or minor injuries requiring first aid on site
		Property	Near Miss, only minor damage which can be addressed on site
		Business	No disruption to services
C2	MINOR	Environment	Minor impact, eg Category 1 local response
		People	Several minor injuries, some may require medical attention
		Property	Minor damage, less than £10,000
		Business	Disruption to services, up to a few hours
C3	SEVERE	Environment	Moderate impact, eg Category 2 regional response
		People	Multiple minor injuries or Single serious injury (<7 days)
		Property	Moderate damage, between £10,000 & £100,000
		Business	Temporary suspension or restrictions to services, up to a few days
C4	MAJOR	Environment	Major impact, eg Category 3 national response
		People	Multiple serious injuries, Single fatality (or >7days)
		Property	Major damage, between £100,000 and £1M
		Business	Indefinite suspension of services, up to a few months
C5	CATASTROPHIC	Environment	Catastrophic impact, eg UK wide response
		People	Multiple fatalities, immediate or up to 5 years after incident
		Property	Catastrophic damage, over £1M
		Business	Total loss of services, for multiple months to permanent

Risk Matrix						
Consequence 'C'	C5	5	10	15	20	25
	C4	4	8	12	16	20
	C3	3	6	9	12	15
	C2	2	4	6	8	10
	C1	1	2	3	4	5
		L1	L2	L3	L4	L5
Likelihood 'L'						

Risk Scoring		
20.0 - 25.0	Very High	Very high and unacceptable risk for which substantial and immediate improvements are necessary. Major funding may be required, and ports and waterways are likely to be forced to close until the risk has been reduced to an acceptable level.
12.0 - 19.9	High	High risk for which substantial and urgent efforts must be made to reduce it to ALARP levels within a defined period. Significant funding is likely to be required and services may need to be suspended or restricted until risk control options have been actioned.
8.0 - 11.9	Moderate	Moderate risk must be reduced to the ALARP level, through the implementation of additional risk control options that are likely to require additional funding.
0 - 7.9	Low	Low risk not requiring additional risk control options unless they can be implemented at low cost in terms of time, money and effort.

2. Assessment Zones



Single Zone: This Zone includes the marina harbour area above and its immediate approaches over an area up to 1 nautical mile from the existing marina as shown below



3. Hazards



Ref	(E) Hazards Identified Through Consultation - Existing Situation	Hazard Classification
E1	Harbour Entrance not well lit, hard to see from distance	Infrastructure / AtoN
E2	No approach channel marks (buoys removed)	Infrastructure / AtoN
E3	Marina is tight for space and craft passing, fairways are tight for movement	Human Error
E4	Harbour gets lost against the backdrop of Stranraer town - red car lights, blue (or green) EV charging lights confuse	Infrastructure / AtoN
E5	Sewer outfall (marked on charts)	Human Error
E6	Local community has to work together to police use of the marina outwith hours	Human Error
E7	Craft passing in approach - not easy to see where channel is.	Infrastructure / AtoN
E8	Shortage of steps and ladders on pontoon facilities, and signage to find them	Infrastructure / AtoN
E9	NNE, NE strong (F9-F10) winds are becoming more frequent and the harbour is not protected against this type of event (breakwater not long or tall enough) nor steady build up of swell over many days. Lasts around 10 days each year, marina is untenable with infrastructure damage	Adverse environmental / weather conditions
E10	Heavy swell can carry on right into the harbour as the breakwaters are insufficient, reflective waves coming in towards the knuckle and the breastworks. Movement in the pontoons at these times is ridiculous.	Adverse environmental / weather conditions
E11	Waves crashing against the harbour wall	Adverse environmental / weather conditions
E12	From NE to NW cases issues with heavy swell, as does prevailing over flat land, impacting arriving and leaving the marina.	Adverse environmental / weather conditions
E13	Annual Harbour User forum exists / has been restarted, but not open to all, although representation from some bodies. 50% mixed whether users were aware or not	Human Error
E14	Marina not manned outwith Mon-Fri, 9-5 which is not useful for visiting sailors outwith these hours	Human Error
E15	Out of Hours number does not work	Human Error
E16	Signage on pontoons is poor, not easy to see which is your berth	Infrastructure / AtoN
E17	Communication with Council is difficult, although local engagement with marina staff is effective when possible	Human Error
E18	Code of Practice exists for sailing at ferry ports at Loch Ryan and Cairnryan not known about or enforced	Human Error
E19	Youths jumping in off the West Pier is a serious issue, shallow or no water there a times. Access to pier block by fence after fatality circa 50yrs ago when car reversed into the pier. Since installing gates, 2 unwitnessed fatalities.	Infrastructure / AtoN
E20	Youths jump in at the fuel berth, swim round to pontoon then go an open the gate for others	Infrastructure / AtoN
E21	Angling hooks and lines getting stuck in craft mooring ropes	n/a - health & safety risk only

Ref	(F) Hazards Identified Through Consultation - Future Operations	Hazard Classification
F1	Difficult to manoeuvre larger craft in some positions of the harbour and marina - tight around some corners, increasing conflict between small and larger craft too, especially at NE corner of new pontoons	Infrastructure / AtoN
F2	Fuel berth on and alongside the existing stone wall, requires 2nd pipe onto pontoon fingers to be suitable for small craft	n/a - pollution / manual handling risk only
F3	Suggest revisiting access gates to the West Pier and having restricted, not totally closed access to pier.	Infrastructure / AtoN
F4	Infilling the area to the SE is not appreciated as it removes a safe area for safe beginner sailing classes (although dries)	n/a - not considered a navigational issue
F5	A long walk from new pontoons to HMs office, so most might row/tender. Puts more craft in the fairway	Human error
F6	Proposed floating breakwater is not big enough and is not far enough out, it wont provide shelter from increased northerly winds	Infrastructure / AtoN
F7	The entrance will fill up again	n/a - observation
F8	If only the existing breakwater is extended, the risk of large waves coming into the harbour remains	Adverse environmental / weather conditions
F9	The angle of the infill area will refract large waves back into the harbours	Adverse environmental / weather conditions
F10	Port hand marks in harbour to mark the shallowing area are on large swing arms which means not accurate. Consider permanent piled marks when the piling equipment is on site.	Infrastructure / AtoN
F11	Position and layout of fuel berth should be planned to reduce conflict between vessels fuelling and transiting the area	Infrastructure / AtoN
F12	Redevelopment of existing slipway will introduce additional traffic, most likely low draft, fast craft including PWC. This may include conflict with other users, eg craft using east-most berths and also people using the nearby revetment steps	Infrastructure / AtoN
F13	Introduction of steps as part of the revetment design may introduce people accessing the water in the shallower areas which might conflict with fast craft from the nearby slipway	Infrastructure / AtoN
F14	No available information describing need nor delivery of maintenance dredging programme, and existing maintenance licence has elapsed	Infrastructure / AtoN
F15	-3.5m CD channel access to -4.5m CD at floating breakwater / superyacht berth introduces risk of grounding for larger craft at certain states of tide	Infrastructure / AtoN
F16	Shore floodlighting and other (eg EV station) lights planned as part of this and other associated projects may impact efficacy of marine navigation lighting	Infrastructure / AtoN
F17	Whilst situated outside the marina entrance, proposed developments by SWSA for watersports centre and associated moorings and pontoons may introduce or increase potential for vessel conflict in this area	Infrastructure / AtoN

Ref	(C) Hazards Identified Through Consultation - Construction	Hazard Classification
C1	Comms with users re availability of berths, when craft can/can't come in, etc. Early engagement would make this easy. Consider speed limit if appropriate	Human error
C2	Staffing/manning hours / resources to help management conflicts during construction phase	Human error
C3	Temporary moorings outside the harbour during construction - suggestion could use the Stena basin which is circa 8m depth	n/a - observation
C4	Manage fishing vessels departures and arrivals as well, as they tend to do their own thing.	Human error
C5	Working around busy times and events times, planning	Human error
C6	Concerns with dredging undermining quay walls	n/a - observation
C7	Rock Armour - works	Human error
C8	Piling - works	Human error
C9	Dredging - works and transportation	Human error
C10	Quay wall improvements - works	Human error
C11	Floating breakwater and pontoons - works and transportation	Human error

Ref	(G) Other Hazards Identified - General	Hazard Classification
G1	Mechanical failure aboard craft causing loss of control and navigation	Equipment / Mechanical failure
G2	Equipment failure aboard craft causing loss of control and navigation	Equipment / Mechanical failure

4. Undesirable Scenarios



Ref	Hazard Type	Description
1	Collision	One moving vessel or object striking violently against another moving vessel or object (including persons)
2	Contact / Allision	A moving vessel or object striking a stationary object, such as a dock, bridge, or anchored ship
3	Mooring Breakout	A vessel breaks away from a securely moored position including from a quay or anchored position
4	Loss of Vessel Control	A vessel loses control for any reason including mechanical or equipment failure, loss of helm control or inability to control its movement
5	Swamping / Foundering	A vessel which fills with water and which is at risk of or actually sinks
6	Grounding	A vessel or its equipment comes into contact with the seabed, fairway edges, underwater structures or the shoreline
7	Fire / Explosion	Fire or explosion aboard a vessel or somewhere else within the harbour navigable areas, regardless of cause
8	Diving Activities	Any planned activities involving people or equipment diving below or on the water surface
9	Other	Any other hazard not covered which presents a risk to safe navigation

5. Vessel Types



Ref	Vessel Category Description	Vessel Type Description
1	Large Commercial Vessel	Large (>24m LOA) vessels engaged in commercial activities, including fishing and cruise
2	Small Commercial Vessel	Small (<24m LOA) vessels engaged in commercial activities, including diving and tour operators but excluding fishing
3	Small Fishing Vessel	Small (<24m LOA) vessels engaged in fishing
4	Superyacht	Super yachts and mega yachts (> 24m LOA)
5	Large Recreational Vessel	Motor yachts, sailing vessels and privately owned recreational craft (>8m LOA) including fast fin and foil craft
6	Small Recreational Vessel	Motor yachts, sailing vessels and privately owned recreational craft (<8m LOA) including fast fin and foil craft
7	Small Personal Watercraft (PWC)	Jet skis and other small powered and some non-powered water craft
8	Large Construction Vessels / Marine Equipment	Large (>24m LOA) construction vessels and equipment used in the marine environment, including Suction Dredger, Towed and jack-up barges
9	Small Construction Vessels / Marine Equipment	Small (<24m LOA) construction vessels and equipment used in the marine environment, including Suction Dredger, Towed and jack-up barges

The list of vessel types is based on an assessment of inputs from the following sources only:

- (a) Consultation with the statutory harbour authority leading proposed changes
- (b) Consultation with harbour users
- (c) Consultation with other parties with relevant local knowledge
- (d) Analysis of HRO documentation
- (e) Analysis of available project documentation

Vessel Type Collision Matrix - Future Operations									
	1	2	3	4	5	6	7	8	9
1	Yes								
2	Yes	Yes							
3	Yes	Yes	Yes						
4	Yes	Yes	Yes	Yes					
5	Yes	Yes	Yes	Yes	Yes				
6	Yes	Yes	Yes	Yes	Yes	Yes			
7	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Scenarios	7	6	5	4	3	2	1	0	0

Vessel Type Collision Matrix - Construction Stage									
	1	2	3	4	5	6	7	8	9
1	Yes								
2	Yes	Yes							
3	Yes	Yes	Yes						
4	Yes	Yes	Yes	Yes					
5	Yes	Yes	Yes	Yes	Yes				
6	Yes	Yes	Yes	Yes	Yes	Yes			
7	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
8	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
9	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Scenarios	9	8	7	6	5	4	3	2	1

6. Existing Controls



NRA existing control measures (embedded mitigation) considered as part of this assessment for future operations phase:		
Ref	Existing Operations Control Measure	Detailed Description
EO01	Enabling Legislation	National and local legislation, including Powers of Directions and Byelaws
EO02	Harbour Order	New Harbour Order for the Statutory Authority (HRO 2024)
EO03	Aids to Navigation	Aids to Navigation established as identified by suitable assessment and maintained
EO04	Code of Practice	CoP established for all types of activities within the harbour or facility
EO05	Assessment of Navigational Risk	A suitable assessment of navigational risks has been conducted and maintained and forms the basis of MSMS
EO06	MSMS	Marine Safety Management System in place
EO07	Operating Manuals & Procedures	Operating manuals & procedures
EO08	Charts & Bathymetric Programme and Data	Hydrographic survey program in place with charts and bathymetry data available to provide information to users
EO09	Notices and Signage	Localised informational and instructional signage
EO10	Emergency Plans	Contingency and emergency response plans in place to cover key unforeseen events
EO11	Mooring Equipment	Mooring equipment provided for activities, including checks and maintenance
EO12	Permits	Permit system in place providing control over key and significant permissible works
EO13	Competent Staffing	Competent staff in place as necessary, including for competence to undertake required activities
EO14	Incident Reporting	Systems to permit reporting and investigation of incidents, accidents and near misses
EO15	Audit and Reporting	Periodic audit of MSMS and functions, internally and to confirm PMSC compliance
EO16	Marine Safety Plan	A safety plan for marine operations is published at least once every three years
EO17	Harbour User Consultation	Consultation with harbour or facility users, allowing sharing of information including risks to navigation and control measures
EO18	Navigational Safety Policy	Policy in place, enforced and available relating to all matters of navigational safety
EO19	Marine Conservancy Policy	Policy in place, enforced and available relating to all relevant matters of conservancy
EO20	Enforcement Policy	Policy in place and available relating to how the statutory body will enforce its various policies
EO21	Industry Standards for Marina Build	The new marina is designed and constructed with reference to appropriate technical standards, including (but not limited to) the latest version of the TYHA Code of Practice for the Design and Construction of Marinas and Yacht Harbours

NRA existing control measures (embedded mitigation) considered as part of this assessment for construction phase:		
Ref	Existing Construction Control Measure	Detailed Description
EC01	Competent Contract Management	Contract Management with appropriate levels of experience relating to the safe and efficient delivery of the type of marine works being constructed
EC02	Competent Sub Contract Management	Sub contractors with appropriate levels of experience relating to the safe and efficient undertaking of the type of specialist marine works being constructed
EC03	Construction Phase H&S Plan	Fully developed and approved Construction Health & Safety Plan in line with CDM 2015 requirements, which includes works risk assessments and safe methods of work
EC04	Construction Environmental Management Plan (CEMP)	Approved plan describing how construction will be managed to avoid, minimise and mitigate any potential construction effects on the environment and existing surrounding receptors
EC05	Environmental Clerk of Works (ECoW)	Employment of an ECOW to help ensure mitigation measures identified through the EIA process, alongside marine and planning conditions, are appropriately implemented and monitored on site during construction
EC06	Waste Hierarchy	Throughout the construction phase a Waste Hierarchy will be fully implemented to prioritise the prevention, reuse and recycling of waste
EC07	Staffing	The number of construction staff required on site during the construction phase will fluctuate according to the different stages of works and associated specific construction activities or elements
EC08	Site Induction	Appropriately detailed site induction for all personnel attending or undertaking works on site
EC09	Site Fire Safety Plan	Plan produced and managed by a site Fire Safety Coordinator to manage the risk of fire on the site
EC10	User Engagement	All users will be kept up to date with developments and advised of emergency procedures
EC11	Compliant Marine Plans	Construction and dredging activities undertaken with respect to Marine Plans prepared in compliance with the UK Marine Policy Statement and associated requirements
EC12	Work Phased Planning	Work undertaken and phased to take allowance for adverse weather whilst also seeking to conduct work around the operations and activities of the marina, as far as reasonably practicable, to minimise closure or restrictions on the marina function
EC13	Industry Standards for Marina Build	The new marina is designed and constructed with reference to appropriate technical standards, including (but not limited to) the latest version of the TYHA Code of Practice for the Design and Construction of Marinas and Yacht Harbours

NRA additional control measures (additional mitigation) considered as part of this assessment for future operations phase:		
Ref	Future Operations Control Measure	Detailed Description
FO01	Aids to Navigation Review, Consultation & Improvements	Undertake a detailed review of the provision of Aids to Navigation (AtoN) at the marina, within the enclosed harbour area and as impacts the approaches to the marina from the SHA boundary to the North, including for consultation with all users relating to adequate provision. This should include consideration of lights, day marks, wind and tide aids and consultation with the National Lighthouse Authority.
FO02	Marina and Harbour Staffing & Availability	Conduct a detailed review of the staffing and resourcing of the marina, taking into consideration increases in traffic, availability of resources when the marina is busier, to ensure that users and visitors are able to make suitable contact with marina staff as and when necessary.
FO03	Communications & Monitoring	Review means of communication between all parties at the harbour, including VHF, Mobile connectivity, website information, e-mail, etc. Review also the means to monitor, review and record operations activities to ensure safety of navigation to support staff, including CCTV, out of hours contacts, etc
FO04	Improved provision and promulgation of information	Whilst the Stranraer Harbour website contains useful information currently, it is not widely accessed by users or visitors. Undertake a review of information which is available, update this to include new information and conduct an exercise to ascertain the most effective way of promulgating this information, and all future updates, to users and visitors.
FO05	Local signage and notices	Review the provision of local signage on the marina and notices at the harbour and ensure they are suitable to provide relevant information to users and visitors. Consider how visitors arriving outwith hours or during inclement weather / darkness might find their way to their allocated berth.
FO06	Notices to Mariners	Review and consider improvements to the promulgation of Harbour information using Notices to Mariners or other provision of Marine Safety Information
FO07	Improved breakwater protection	Breakwater(s) or similar protective measures designed and provided to ensure suitable protection of the harbour area and marina from environmental events including storm surges caused by winds from the northern sphere, which otherwise could cause significant damage within the harbour and proposed marina areas.
FO08	Harbour User Engagement	Review the methods of engagement with harbour and marina users to ensure that the provision is fit for purpose and meets with the Statutory Harbour Authority's obligations. User engagement should seek to involve all relevant sectors of the user profile, represented by appointed individuals where appropriate. User engagement should seek to consult on matters of the marina function and matters of navigation and safety and the outputs should be used to inform SHA policy.
FO09	Update & Promulgate Codes of Practice	The document "Guide to Vessels Entering Loch Ryan" and associated Code of Practice, which was created by the Loch Ryan Statutory Harbour Authorities Committee for the management of safe navigation on the northern section of Loch Ryan, remains in existence but is not understood or actively utilised locally. The relevant Statutory Harbour Authorities should seek to reconvene the Committee, undertake a review and update to the Guide and Code of Practice, including agreement as to how and by what means the Guide and Code of Practice will be promulgated to all users.
FO10	Consult on and implement General Directions	Conduct appropriate consultation with users and other stakeholders in relation to General Directions and implement such that will support and underpin the safety of navigation within the recently constituted Stranraer Harbour area, taking into consideration all navigational safety matters and the variety of traffic and users expected to use the harbour area and marina in the future.
FO11	Fuel Berth Position to Limit Navigational Impact	Ensure that the position of a new fuel berth within the marina does is designed to minimise navigational risks to users, in particular that of collision between different vessels as they move in and out of the fuel berth or are transiting past the fuel berth area.
FO12	Review Provision of Pillar Crane	Review the provision of the pillar crane to ascertain whether the current navigational challenges in its use could be alleviated or removed by being repositioned to a more accessible location, suitable for the craft seeking to make use of the facility.
FO13	Expanded Dredge Area - Width at Entrance	Consider the expansion of dredge width and route at the Marina entrance to maximise space for passing vessels and avoid complex channels.
FO14	Expanded Dredge Area - Space around Marina	Consider the expansion of dredge width and route at parts of the Marina which are constrained, to maximise space for passing vessels and allow adequate manoeuvring space for larger vessels.
FO15	Simplified Single Dredge Depth & Dredge Area	Consider the application of a single depth of dredge which suits all potential or permitted vessels and a simplified dredge footprint which removes the need for marking of dredge depths in the sheltered marina area, thereby making navigation throughout the marina easier and safer for all.
FO16	Maintenance of Dredged Area	Conduct surveys of the harbour and facility, undertaken at periods defined by risk assessment, including any maintenance requirements such as dredging to conserve the harbour or facility as fit for use
FO17	Marina Vessel Traffic Management Process	Consider the use of a VTM and/or berth management process to support the LPS provisions at the harbour and marina and improve berth allocations for berth holders and visitors on an ongoing basis. This has the potential to improve safety of navigation whilst also making berth use efficient.
FO18	Implementation of Event Management Plans	Implement Event Management Plans for all events planned for Loch Ryan, including for early engagement between D&GC and the organisers of events to establish how such events will be managed, what resourced are required and how such events will be delivered safely with due regard to safe navigation of the waters by all users, whether resident, visiting or taking part.
FO19	Engagement with Commercial Users	Seek to engage with commercial users of the marina, whether resident or visiting, in a bid to ensure that their needs and views are considered and catered for within the operations and marina design. This should both ensure that the needs of the commercial users is considered but also ensure that commercial users are aware of other activities and that they continue to take cognisance of other users and the requirements placed on them in terms of safety of navigation by the Statutory Harbour Authority.
FO20	Contingency / Emergency Planning	Contingency and Emergency Plans are in place as necessary and relevant to the size and scope of the harbour or facility

7. Additional Controls



FO21	Operating Limits	Appropriate limits placed on operations, including weather limits, speed limits, vessel size limits, etc. By example, based on latest proposed development designs and NRA, a maximum Length Overall (LOA) for vessels entering/ departing the marina at Stranraer would be 60m LOA, with a suggested maximum beam of 10m (allowing Superyachts and Crew Transfer Vessels (CTVs) to berth on the new floating breakwater pontoon whilst providing a safe navigational passage for other users to the inner marina). Vessels over this maximum LOA to be risk assessed by the harbour on a case-by-case basis. Also, the NRA identified an Under Keel Clearance (UKC) is set for all commercial vessels over 24m, unless there is an intention to designate 'Not Always Afloat But Safely Aground' (NAABSA) berths within the marina. These suggested operating parameters should be risk assessed, by the operator, prior to introducing guidelines.
FO22	Zoning within Marina	Implementation of zoning to support operating limits to protect users within certain areas of the marina, with particular reference to (but not limited to): separation of small sailing craft and personal water craft that are using the new pontoon leg E and the proposed new slipway; prevention of craft accessing the south of the main pontoon walkway leg beneath the access bridge; segregation of small craft and personal water craft from people using the revetment steps and water in that area
FO23	Water Sports Management Plan	Consider implementation of a management plan to support safe water sports activities being undertaken within and in the vicinity of and approaches to the marina
FO24	Liaison with Associated Projects - Lighting	Early liaison with other associated projects in the area to ensure that shore lighting such as floodlights, EV charging point lights, are planned and installed such that they do not adversely affect the required harbour and marina navigational lighting.
FO25	Liaison with Associated Projects - General	Early liaison with other associated projects in the area to ensure that projects do not adversely impact the planned development.

NRA additional control measures (additional mitigation) considered as part of this assessment for construction phase:		
Ref	Proposed Construction Control Measure	Detailed Description
PC01	Communications & Engagement	Establish appropriate means of communication and engagement between the harbour, contractor and all users, including VHF, Mobile connectivity, website information, e-mail, etc. This should include periodic consultation meetings to permit planning and project updates and reviews of navigational risk assessments and control measures
PC02	Temporary Aids to Navigation	Undertake a review of the provision of temporary Aids to Navigation (AtoN) at the marina, and its approaches, including for consultation with all users and National Lighthouse Authority relating to adequate provision. This should include consideration of temporary lights, marks, wind or tide aids and reviewed often as the project progresses.
PC03	Marina, Harbour & Contractor Staffing	Ensure that staffing and resourcing of the marina by D&GC and the Principal Contractor is appropriate to the works programme
PC04	Information, Signage and Notices	Ensure appropriate promulgation of information and updates regarding the project by all means, including website, local signage and Notices to Mariners.
PC05	Implementation of Event Management Plans	Where necessary, implement Event Management Plans for all events planned for Loch Ryan during the marina construction period, including for early engagement between D&GC, the contractor and the organisers of events to establish how such events delivered safely with due regard to safe navigation during the construction phase
PC06	Temporary Vessel Traffic Management Process	Consider the use of a temporary VTM and/or berth management process to assist with the management of berth allocations during the construction phase, as berth availability changes according to the progress of the works.
PC07	Engagement with Commercial Users	Seek to engage with commercial users of the marina to ensure that their needs and views are considered and catered for during the construction phase.
PC08	Restricted Areas, Closed Areas and Permit Process	A plan showing any areas which are restricted or closed, a permit process where deemed appropriate, and this plan promulgated and available to all users and regularly updated by D&GC and the contractor to ensure it is up to date.

8. NRA - Future Operations



Haz. ID	Undesirable Scenario Type	Undesirable Scenario Details Future Operations	Risks with Existing Control Measures										RISK RATING with Existing Control Measures	Additional Control Measures Future Operations	Risks after Additional Control Measures										RISK RATING After Additional Control Measures Applied	Risk Rating Rank
			Most Likely (ML)					Worst Credible (WC)							Most Likely (ML)					Worst Credible (WC)						
			Likelihood	Environment	People	Property	Business	Likelihood	Environment	People	Property	Business			Likelihood	Environment	People	Property	Business	Likelihood	Environment	People	Property	Business		
F40	Mooring Breakout	Large Recreational Vessel breaks away from a securely moored or anchored position	4	3	1	2	2	2	4	2	3	3	8.5	Improved breakwater protection (FO07); Marina Vessel Traffic Management Process (FO17)	3	3	1	2	2	2	2	2	3	3	6.5	1
F41	Mooring Breakout	Small Recreational Vessel breaks away from a securely moored or anchored position	4	3	1	2	2	2	4	2	2	3	8.4	Improved breakwater protection (FO07); Marina Vessel Traffic Management Process (FO17)	3	3	1	2	2	2	2	2	2	3	6.4	2
F28	Collision	PWC collides with another PWC	4	1	2	1	2	4	2	3	2	3	9.0	Marina and Harbour Staffing & Availability (FO02); Communications & Monitoring (FO03); Improved provision and promulgation of information (FO04); Harbour User Engagement (FO08); Consult on and implement General Directions (FO10); Marina Vessel Traffic Management Process (FO17); Zoning within Marina (FO22); Water Sports Management Plan (FO23);	2	1	2	1	2	3	2	3	2	3	5.9	3
F23	Collision	Large Recreational Vessel collides with another Large Recreational Vessel	3	2	2	3	2	2	2	3	3	3	6.8	Communications & Monitoring (FO03); Improved provision and promulgation of information (FO04); Harbour User Engagement (FO08); Update & Promulgate Codes of Practice (FO09); Consult on and implement General Directions (FO10); Fuel Berth Position to Limit Navigational Impact (FO11); Expanded Dredge Area - Width at Entrance (FO13); Marina Vessel Traffic Management Process (FO17); Water Sports Management Plan (FO23);	2	2	2	3	2	2	2	3	3	3	5.5	4
F24	Collision	Large Recreational Vessel collides with a Small Recreational Vessel	3	2	2	3	2	2	2	3	3	3	6.8	Communications & Monitoring (FO03); Improved provision and promulgation of information (FO04); Harbour User Engagement (FO08); Update & Promulgate Codes of Practice (FO09); Consult on and implement General Directions (FO10); Fuel Berth Position to Limit Navigational Impact (FO11); Marina Vessel Traffic Management Process (FO17); Water Sports Management Plan (FO23);	2	2	2	3	2	2	2	3	3	3	5.5	4
F04	Collision	Large Commercial Vessel collides with a Superyacht	2	3	2	3	2	1	3	4	5	3	4.9	[Considered ALARP - Reassessment with additional controls not conducted]											4.9	6
F16	Collision	Small Fishing Vessel collides with a Large Recreational Vessel	2	2	2	2	2	2	3	3	2	3	4.9	[Considered ALARP - Reassessment with additional controls not conducted]											4.9	7
F32	Contact/Allision	Superyacht making contact with a stationary or fixed object	2	2	3	3	3	1	3	4	4	4	4.8	[Considered ALARP - Reassessment with additional controls not conducted]											4.8	8
F34	Contact/Allision	Small Recreational Vessel making contact with a stationary or fixed object	3	2	2	2	2	2	2	3	2	3	5.8	Marina and Harbour Staffing & Availability (FO02); Improved provision and promulgation of information (FO04); Consult on and implement General Directions (FO10); Liaison with Associated Projects - Lighting (FO24);	2	2	2	2	2	2	2	3	2	3	4.8	9
F47	Loss of Vessel Control	Large Recreational Vessel suffers loss of control	2	2	2	2	2	2	2	3	3	2	4.8	[Considered ALARP - Reassessment with additional controls not conducted]											4.8	9
F29	Contact/Allision	Large Commercial Vessel making contact with a stationary or fixed object	2	2	2	3	3	1	3	4	4	4	4.7	[Considered ALARP - Reassessment with additional controls not conducted]											4.7	11
F63	Fire / Explosion	Fire or explosion aboard a Large Commercial Vessel	2	2	2	3	3	1	4	4	4	3	4.7	[Considered ALARP - Reassessment with additional controls not conducted]											4.7	11
F33	Contact/Allision	Large Recreational Vessel making contact with a stationary or fixed object	3	2	3	2	3	2	3	4	3	4	7.9	AtoN Review, Consultation & Improvements (FO01); Expanded Dredge Area - Width at Entrance (FO13); Marina and Harbour Staffing & Availability (FO02); Improved provision and promulgation of information (FO04); Consult on and implement General Directions (FO10); Liaison with Associated Projects - Lighting (FO24);	2	2	3	2	3	1	3	4	3	4	4.6	13

8. NRA - Future Operations



Haz. ID	Undesirable Scenario Type	Undesirable Scenario Details Future Operations	Risks with Existing Control Measures										RISK RATING with Existing Control Measures	Additional Control Measures Future Operations	Risks after Additional Control Measures										RISK RATING After Additional Control Measures Applied	Risk Rating Rank
			Most Likely (ML)					Worst Credible (WC)							Most Likely (ML)					Worst Credible (WC)						
			Likelihood	Environment	People	Property	Business	Likelihood	Environment	People	Property	Business			Likelihood	Environment	People	Property	Business	Likelihood	Environment	People	Property	Business		
F27	Collision	Small Recreational Vessel collides with PWC	3	1	2	2	2	2	2	3	2	3	5.6	Marina and Harbour Staffing & Availability (FO02); Communications & Monitoring (FO03); Improved provision and promulgation of information (FO04); Harbour User Engagement (FO08); Consult on and implement General Directions (FO10); Marina Vessel Traffic Management Process (FO17); Zoning within Marina (FO22); Water Sports Management Plan (FO23);	2	1	2	2	2	2	2	3	2	3	4.6	13
F06	Collision	Large Commercial Vessel collides with a Small Recreational Vessel	2	2	1	2	2	2	2	3	2	3	4.6	[Considered ALARP - Reassessment with additional controls not conducted]											4.6	13
F07	Collision	Large Commercial Vessel collides with PWC	2	2	2	1	2	2	2	3	2	3	4.6	[Considered ALARP - Reassessment with additional controls not conducted]											4.6	13
F18	Collision	Small Fishing Vessel collides with PWC	2	2	2	1	2	2	2	3	2	3	4.6	[Considered ALARP - Reassessment with additional controls not conducted]											4.6	13
F25	Collision	Large Recreational Vessel collides with PWC	2	1	2	2	2	2	2	3	2	3	4.6	[Considered ALARP - Reassessment with additional controls not conducted]											4.6	13
F65	Fire / Explosion	Fire or explosion aboard a Small Fishing Vessel	2	2	2	3	3	1	3	3	4	3	4.6	[Considered ALARP - Reassessment with additional controls not conducted]											4.6	19
F46	Loss of Vessel Control	Superyacht suffers loss of control	2	2	2	3	2	1	3	4	4	3	4.5	[Considered ALARP - Reassessment with additional controls not conducted]											4.5	20
F59	Grounding	Superyacht comes into contact with the seabed, fairway edges, underwater structures or the shoreline	2	3	1	3	3	1	4	2	3	3	4.5	[Considered ALARP - Reassessment with additional controls not conducted]											4.5	20
F09	Collision	Small Commercial Vessel collides with a Small Fishing Vessel	3	2	2	2	2	1	2	3	3	3	4.4	[Considered ALARP - Reassessment with additional controls not conducted]											4.4	22
F43	Loss of Vessel Control	Large Commercial Vessel suffers loss of control	2	2	2	3	2	1	3	4	3	3	4.4	[Considered ALARP - Reassessment with additional controls not conducted]											4.4	22
F49	Loss of Vessel Control	PWC suffers loss of control	3	2	1	1	1	2	2	2	2	2	4.4	[Considered ALARP - Reassessment with additional controls not conducted]											4.4	22
F52	Swamping / Foundering	Small Fishing Vessel fills with water and which is at risk of or actually sinks	3	3	2	2	2	2	3	2	4	3	7.4	Improved breakwater protection (FO07); Marina Vessel Traffic Management Process (FO17); Engagement with Commercial Users (FO19)	2	3	2	2	2	1	3	2	4	3	4.4	25
F13	Collision	Small Commercial Vessel collides with PWC	2	2	1	1	2	2	2	2	2	3	4.4	[Considered ALARP - Reassessment with additional controls not conducted]											4.4	25
F42	Mooring Breakout	PWC breaks away from a securely moored or anchored position	3	2	1	1	2	2	2	1	1	2	4.4	[Considered ALARP - Reassessment with additional controls not conducted]											4.4	25
F39	Mooring Breakout	Superyacht breaks away from a securely moored or anchored position	2	2	1	3	2	1	4	2	4	3	4.3	[Considered ALARP - Reassessment with additional controls not conducted]											4.3	28
F57	Grounding	Small Commercial Vessel comes into contact with the seabed, fairway edges, underwater structures or the shoreline	2	2	1	2	3	1	4	3	3	3	4.3	[Considered ALARP - Reassessment with additional controls not conducted]											4.3	28
F36	Mooring Breakout	Large Commercial Vessel breaks away from a securely moored or anchored position	2	2	1	3	2	1	3	2	4	3	4.3	[Considered ALARP - Reassessment with additional controls not conducted]											4.3	30
F20	Collision	Superyacht collides with a Large Recreational Vessel	2	2	2	3	2	1	3	3	3	3	4.1	[Considered ALARP - Reassessment with additional controls not conducted]											4.1	31
F21	Collision	Superyacht collides with a Small Recreational Vessel	2	1	2	3	2	1	3	3	3	3	4.0	[Considered ALARP - Reassessment with additional controls not conducted]											4.0	32
F37	Mooring Breakout	Small Commercial Vessel breaks away from a securely moored or anchored position	3	2	1	3	2	1	3	2	3	3	5.2	Improved breakwater protection (FO07); Marina Vessel Traffic Management Process (FO17)	2	2	1	3	2	1	3	2	3	3	3.9	33
F38	Mooring Breakout	Small Fishing Vessel breaks away from a securely moored or anchored position	3	2	1	3	2	1	3	2	3	3	5.2	Improved breakwater protection (FO07); Marina Vessel Traffic Management Process (FO17)	2	2	1	3	2	1	3	2	3	3	3.9	33
F60	Grounding	Large Recreational Vessel comes into contact with the seabed, fairway edges, underwater structures or the shoreline	2	2	1	3	2	2	3	2	2	3	5.3	Expanded Dredge Area - Space around Marina (FO14); Simplified Single Dredge Depth & Dredge Area (FO15); Maintenance of Dredged Area (FO16); Improved provision and promulgation of information (FO04); Consult on and implement General Directions (FO10); Consult on and implement General Directions (FO10)	2	2	1	3	2	1	3	2	2	3	3.9	35

8. NRA - Future Operations



Haz. ID	Undesirable Scenario Type	Undesirable Scenario Details Future Operations	Risks with Existing Control Measures										RISK RATING with Existing Control Measures	Additional Control Measures Future Operations	Risks after Additional Control Measures										RISK RATING After Additional Control Measures Applied	Risk Rating Rank							
			Most Likely (ML)					Worst Credible (WC)							Most Likely (ML)					Worst Credible (WC)													
			Likelihood	Environment	People	Property	Business	Likelihood	Environment	People	Property	Business			Likelihood	Environment	People	Property	Business	Likelihood	Environment	People	Property	Business									
F03	Collision	Large Commercial Vessel collides with a Small Fishing Vessel	2	2	1	2	2	1	2	2	3	3	3.3	[Considered ALARP - Reassessment with additional controls not conducted]																	3.3	50	
F14	Collision	Small Fishing Vessel collides with another Small Fishing Vessel	2	2	1	2	2	1	2	2	3	3	3.3	[Considered ALARP - Reassessment with additional controls not conducted]																		3.3	50
F35	Contact/Allision	PWC making contact with a stationary or fixed object	2	2	1	2	2	1	2	3	2	3	3.3	[Considered ALARP - Reassessment with additional controls not conducted]																		3.3	50
F50	Swamping / Foundering	Large Commercial Vessel fills with water and which is at risk of or actually sinks	1	3	2	2	3	1	3	3	4	4	3.3	[Considered ALARP - Reassessment with additional controls not conducted]																		3.3	50
F12	Collision	Small Commercial Vessel collides with a Small Recreational Vessel	3	2	1	2	2	2	2	2	2	3	5.4	Communications & Monitoring (FO03); Improved provision and promulgation of information (FO04); Harbour User Engagement (FO08); Update & Promulgate Codes of Practice (FO09); Consult on and implement General Directions (FO10); Fuel Berth Position to Limit Navigational Impact (FO11); Marina Vessel Traffic Management Process (FO17); Engagement with Commercial Users (FO19); Water Sports Management Plan (FO23);	2	2	1	2	2	1	2	2	2	3	3.2	55							
F61	Grounding	Small Recreational Vessel comes into contact with the seabed, fairway edges, underwater structures or the shoreline	3	2	1	2	2	2	3	2	2	2	5.4	Expanded Dredge Area - Space around Marina (FO14); Simplified Single Dredge Depth & Dredge Area (FO15); Maintenance of Dredged Area (FO16); Improved provision and promulgation of information (FO04); Consult on and implement General Directions (FO10); Consult on and implement General Directions (FO10)	2	2	1	2	2	1	3	2	2	2	3.2	55							
F56	Grounding	Large Commercial Vessel comes into contact with the seabed, fairway edges, underwater structures or the shoreline	1	3	1	3	3	1	4	3	3	3	3.2	[Considered ALARP - Reassessment with additional controls not conducted]																		3.2	55
F64	Fire / Explosion	Fire or explosion aboard a Small Commercial Vessel	1	2	2	3	3	1	3	3	4	3	3.2	[Considered ALARP - Reassessment with additional controls not conducted]																		3.2	55
F67	Fire / Explosion	Fire or explosion aboard a Large Recreational Vessel	1	2	2	3	3	1	3	3	4	3	3.2	[Considered ALARP - Reassessment with additional controls not conducted]																		3.2	55
F72	Collision	PWC collides with People in the water (Rev.1)	3	1	2	1	2	2	2	3	2	3	5.4	Marina and Harbour Staffing & Availability (FO02); Communications & Monitoring (FO03); Improved provision and promulgation of information (FO04); Harbour User Engagement (FO08); Consult on and implement General Directions (FO10); Marina Vessel Traffic Management Process (FO17); Zoning within Marina (FO22); Water Sports Management Plan (FO23);	2	1	2	1	2	1	2	3	2	3	3.1	60							
F01	Collision	Large Commercial Vessel collides with another Large Commercial Vessel	1	2	2	3	2	1	3	3	4	3	3.1	[Considered ALARP - Reassessment with additional controls not conducted]																		3.1	60
F51	Swamping / Foundering	Small Commercial Vessel fills with water and which is at risk of or actually sinks	1	3	2	2	2	1	3	3	4	3	3.1	[Considered ALARP - Reassessment with additional controls not conducted]																		3.1	60
F70	Diving Activities	Navigational issues caused by any planned activities involving people or equipment diving below or on the water surface	2	1	2	1	2	1	2	3	2	3	3.1	[Considered ALARP - Reassessment with additional controls not conducted]																		3.1	60
F05	Collision	Large Commercial Vessel collides with a Large Recreational Vessel	2	2	2	2	2	2	3	4	3	3	5.6	Communications & Monitoring (FO03); Improved provision and promulgation of information (FO04); Harbour User Engagement (FO08); Update & Promulgate Codes of Practice (FO09); Consult on and implement General Directions (FO10); Fuel Berth Position to Limit Navigational Impact (FO11); Expanded Dredge Area - Width at Entrance (FO13); Marina Vessel Traffic Management Process (FO17); Engagement with Commercial Users (FO19); Water Sports Management Plan (FO23);	1	2	2	2	2	1	3	4	3	3	2.8	64							
F02	Collision	Large Commercial Vessel collides with a Small Commercial Vessel	1	2	2	3	2	1	3	3	3	3	2.8	[Considered ALARP - Reassessment with additional controls not conducted]																		2.8	64

9. NRA - Construction Phase



Haz. ID	Undesirable Scenario Type	Undesirable Scenario Details Construction Phase	Risks with Existing Control Measures										RISK RATING with Existing Control Measures	Additional Control Measures Construction Phase	Risks after Additional Control Measures										RISK RATING After Additional Control Measures Applied	Risk Rating Rank
			Most Likely (ML)					Worst Credible (WC)							Most Likely (ML)					Worst Credible (WC)						
			Likelihood	Environment	People	Property	Business	Likelihood	Environment	People	Property	Business			Likelihood	Environment	People	Property	Business	Likelihood	Environment	People	Property	Business		
C59	Mooring Breakout	Large Recreational Vessel breaks away from a securely moored or anchored position	3	3	1	2	2	3	4	2	3	3	9.0	Marina, Harbour & Contractor Staffing (PC03); Temporary Vessel Traffic Management Process (PC06); Restricted Areas, Closed Areas and Permit Process (PC08)	2	3	1	3	2	2	3	2	3	3	5.5	1
C60	Mooring Breakout	Small Recreational Vessel breaks away from a securely moored or anchored position	3	3	1	2	2	3	4	2	2	3	8.8	Marina, Harbour & Contractor Staffing (PC03); Temporary Vessel Traffic Management Process (PC06); Restricted Areas, Closed Areas and Permit Process (PC08)	2	3	1	2	2	2	3	2	2	3	5.3	2
C33	Collision	Large Construction Vessels / Marine Equipment collides with a Small Fishing Vessel	2	2	2	2	2	2	2	3	3	3	4.9	[Considered ALARP - Reassessment with additional controls not conducted]											4.9	3
C41	Collision	Small Construction Vessels / Marine Equipment collides with a Small Fishing Vessel	2	2	2	2	2	2	2	3	3	3	4.9	[Considered ALARP - Reassessment with additional controls not conducted]											4.9	3
C11	Collision	Small Commercial Vessel collides with a Large Recreational Vessel	2	2	2	2	2	2	2	3	3	3	4.9	[Considered ALARP - Reassessment with additional controls not conducted]											4.9	3
C16	Collision	Small Fishing Vessel collides with a Large Recreational Vessel	2	2	2	2	2	2	3	3	2	3	4.9	[Considered ALARP - Reassessment with additional controls not conducted]											4.9	3
C23	Collision	Large Recreational Vessel collides with another Large Recreational Vessel	2	2	2	2	2	2	2	3	3	3	4.9	[Considered ALARP - Reassessment with additional controls not conducted]											4.9	3
C24	Collision	Large Recreational Vessel collides with a Small Recreational Vessel	2	2	2	2	2	2	2	3	3	3	4.9	[Considered ALARP - Reassessment with additional controls not conducted]											4.9	3
C26	Collision	Small Recreational Vessel collides with another Small Recreational Vessel	2	2	2	2	2	2	2	3	3	3	4.9	[Considered ALARP - Reassessment with additional controls not conducted]											4.9	3
C50	Contact/Allision	Large Recreational Vessel making contact with a stationary or fixed object	3	2	3	2	3	2	3	4	3	4	7.9	Communications & Engagement (PC01); Temporary Aids to Navigation (PC02); Marina, Harbour & Contractor Staffing (PC03); Information, Signage and Notices (PC04); Implementation of Event Management Plans (PC05); Temporary Vessel Traffic Management Process (PC06); Restricted Areas, Closed Areas and Permit Process (PC08)	2	2	3	3	3	1	3	4	3	4	4.8	10
C43	Collision	Small Construction Vessels / Marine Equipment collides with a Large Recreational Vessel	2	2	2	2	2	2	2	3	2	3	4.8	[Considered ALARP - Reassessment with additional controls not conducted]											4.8	10
C66	Loss of Vessel Control	Small Fishing Vessel suffers loss of control	2	2	2	2	2	2	2	3	3	2	4.8	[Considered ALARP - Reassessment with additional controls not conducted]											4.8	10
C68	Loss of Vessel Control	Large Recreational Vessel suffers loss of control	2	2	2	2	2	2	2	3	3	2	4.8	[Considered ALARP - Reassessment with additional controls not conducted]											4.8	10
C46	Contact/Allision	Large Commercial Vessel making contact with a stationary or fixed object	3	2	2	3	3	1	3	4	3	4	6.0	Communications & Engagement (PC01); Temporary Aids to Navigation (PC02); Marina, Harbour & Contractor Staffing (PC03); Information, Signage and Notices (PC04); Temporary Vessel Traffic Management Process (PC06); Engagement with Commercial Users (PC07); Restricted Areas, Closed Areas and Permit Process (PC08)	2	2	2	3	3	1	3	4	3	4	4.6	14
C06	Collision	Large Commercial Vessel collides with a Small Recreational Vessel	2	2	1	2	2	2	2	3	2	3	4.6	[Considered ALARP - Reassessment with additional controls not conducted]											4.6	14
C36	Collision	Large Construction Vessels / Marine Equipment collides with a Small Recreational Vessel	2	2	2	2	2	2	2	2	3	2	4.6	[Considered ALARP - Reassessment with additional controls not conducted]											4.6	14
C17	Collision	Small Fishing Vessel collides with a Small Recreational Vessel	2	2	1	2	2	2	2	3	2	3	4.6	[Considered ALARP - Reassessment with additional controls not conducted]											4.6	14
C54	Contact/Allision	Small Construction Vessels / Marine Equipment making contact with a stationary or fixed object	2	2	1	2	2	2	3	2	2	3	4.6	[Considered ALARP - Reassessment with additional controls not conducted]											4.6	14
C81	Grounding	Large Commercial Vessel comes into contact with the seabed, fairway edges, underwater structures or the shoreline	2	3	1	3	3	1	4	3	3	3	4.6	[Considered ALARP - Reassessment with additional controls not conducted]											4.6	19
C98	Fire / Explosion	Fire or explosion aboard a Small Construction Vessels / Marine Equipment	2	2	2	3	3	1	3	2	4	4	4.6	[Considered ALARP - Reassessment with additional controls not conducted]											4.6	19
C12	Collision	Small Commercial Vessel collides with a Small Recreational Vessel	2	2	1	2	2	2	2	2	2	3	4.5	[Considered ALARP - Reassessment with additional controls not conducted]											4.5	21

