Jacobs

DESIGN HAZARD ELIMINATION & RISK REDUCTION REGISTER

Document Number: 7694-CCA6_2-P3-REG-CV-JAC-0004

Project Title: East Coast Railway - Phase 3 - CCA6.2

Project Number: D3658302

Client: Iarnród Éireann Irish Rail

Project Manager: Damian Keneghan

Design Manager Jon Denner

Local HSEiD Advisor Hugh O'Sullivan

Revision	Issue Date	Revision Description	Prepared By	Checked By	Reviewed By	Approved By
A.1	18-Jan-24	Draft	David Thomas	Olwen Rowlands	Jill Gambrill	Jon Denner
A.2	8-Oct-24	Draft- Re-concept design	Emily Marshall	Jill Savory (nee Gambrill)	Jon Denner	Damien Keneghan
A	12-Aug-25	FIRST ISSUE	Emily Jennings	Jill Savory	Jill Savory	Damien Keneghan

Introduction

This provides a means of identifying design hazards and recording design mitigation and risk reduction actions taken.

All foreseeable design hazards for each discipline will be entered into the Design Hazard Elimination & Risk Reduction Register (DHERRR) by the Designers.

A single point of contact will be responsible for coordinating design stakeholder input to the DHERRR to ensure that there are no gaps in design information knowledge exchange.

The discipline lead designer(s) will be responsible for ensuring completeness and consistency of their design discipline across the project.

The full completed DHERRR shall form part of the design record for this project.

Drawings and documents which contain significant risks shall reference this document in the drawings or document notes.

Hazard / Risk Register completion		
Column 1	Risk ID	Enter the Hazard/ Risk number, this should be sequential.
Column 2	Design Hazard Review Activity Description	State what activity the design hazard was identified (from pull down menu): • Design • Interactive Design Safety Session • Hazop Meeting • Hazid Meeting • Routine Design Team Meeting • Design Stage Meeting • Pre-Tender Design Review Meeting • Construction Phase Design Revision • HSE in Design Review
Column 3	Phase	Identify what phase of the project the Hazard applies to (from pull down menu): • P - Pre-construction • C - Construction • M - Maintain / Clean • U - Use as a workplace • D - Demolish/Decommission
Column 4	Activity	Describe the Activity to be undertaken where a Hazard may be present
Column 5	Potential Hazard	Describe the Hazard associated with the described activity
Column 6	Who is at Risk	Identify who is at risk against each associated activity (from pull down menu): • Construction • Commissioning • Operations • Maintenance • Decommissioning • Demolition • Public
Column 7	Probability	Determine the Probability of the **unmitigated** Hazard (from pull down menu). • 1 - Highly Unlikely • 2 - Unlikely • 3 - Possible • 4 - Likely • 5 - Highly Likely
Column 8	Worst Potential Severity (WPS)	Determine the Worst Potential Severity (WPS) of the **unmitigated** Hazard (from pull down menu). • 1 - Nil or slight injury / illness, property damage or environmental issue. • 2 - Minor injury / illness, property damage or environmental issue • 3 - Moderate injury or illness, property damage or environmental issue • 4 -Major injury or illness, property damage or environmental issue. • 5 - Fatal or long term disabling injury or illness. Significant property damage or environmental issue. • 10 - Multiple fatalities and catastrophic event
Column 9 Severity	Initial Risk Rating	Calculates the Initial Risk Rating of the **unmitigated** hazard (Probability x WPS) Automatic RAG for status 1 - 5 - Green 6 - 10 - Amber <10 - Red
Column 10 Risk	Designer	Select the design discipline raising the hazard (amend to suit in the 'Reference' tab) • Architect • Mechanical • Electrical • Civil/Structural • Environmental • Control / Instrumentation • Piping • HVAC • Commissioning • Non Jacobs Designer • Client • User entry • All Disciplines
Column 11	Design Measures To Eliminate Hazard	Describe the Design Measures to be implemented to Eliminate the Hazard as a FIRST CHOICE
Column 12	Design Measures To Reduce Risk	Describe the Design Measures to be implemented to Reduce the Risk associated with the Hazard SECOND CHOICE
Column 13	Residual Probability	Determine the Probability of the **residual risk** from the hazard (from pull down menu). Selection per column 7
Column 14	Residual WPS	Determine the Severity of the **residual risk** from the Hazard (from pull down menu). Selection per column 8
Column 15	Residual Risk Rating	Calculates the Residual Risk Rating from the hazard (Probability x WPS) Automatic RAG for status
Column 16	Residual Risk Description	Describe clearly the Residual Risk associated with the Hazard to be managed by those using the Design
Column 17	Included in Drawing No(s)	List the documents where the Residual Risk has been communicated to those using the Design
Column 18	Action By	State who the action is to be taken/completed (Name or Role)
Column 19	Target Date	Insert the initial target completion date here. This date should not be revised
Column 20	Revised Target Date	Insert the latest revised target completion date here.
Column 21	Date Action Complete	Insert the date the Action was completed - or was transferred to a subsequent action
Column 22	Tracker Status	Automatic RAG rating for status. GREEN indicates that the action is ongoing with time in hand. AMBER is imminently due and RED indicates due or overdue
Column 23	Comments	Insert comments here relating to current status, whether the action is fully closed out, or is subsumed into another action etc
Column 24	Primary Legislation	Identify the primary legislation in the country where the design hazard relates to (where applicable).

The HSE in Design Review shall confirm that the Design Hazard Elimination and Risk Reduction process has been completed and that the Residual Risks are acceptable to the Project.

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Project Name:	East Coast Railway - Phase 3 - CCA6.2
Project Number:	D3658302
Client:	Iarnród Éireann Irish Rail

DESIGN HAZARD ELIMINATION & RISK REDUCTION
REGISTER OF DESIGN REVIEWS

DESIGN REVIEW DESCRIPTION	DATE HELD	MINUTES REFERENCE

CRITICAL RISK SUMMARY REPORT

Jacobs

Project Number: D3658302 **Project Title: East Coast Railway - Phase 3 - CCA6.2**

Project Manager: Damian Keneghan

Design Manager Jon Denner

Date of Issue: 12/08/25

OVERVIEW OF CRITICAL RISKS ASSOCIATED WITH THE PROJECT. This identifies the top 20 hazards/risks associated with design, construction, operation, maintenance and demolition of the project.

Comments

. Number of completed Mitigation Actions over latest reporting period

. Number of revised Mitigation Actions over latest reporting period

. Number of new risks over latest reporting period

. Number of closed risks over latest reporting period

. Number of risks with modified scores over latest reporting period

Suggested areas / topics for comment.

. Involvement and competency of project team members with risk management

. Tabling and review of risk register at monthly design team meeting

. Quality and quantity of design mitigation actions in place

Residual Risk Summary

Number of 'High' risks	8
Number of 'Medium' risks	7
Number of 'Low' risks	28

NOTE: Please do not add or remove lines to the table below as this will disable the "Update Critical Risk Table" macro. "Risk ID" is to be retained in Cell B42.

1	4	5	12	16	18	22	23
Risk ID.	Activity	Potential Hazard	design Measures to Reduce Risk	Residual Risk Description	Action By (Name or Role)	Tracker Status	Comments
1	Use of vehicles/plant on site - Public	Transportation over foreshore and access ramps, etc. Potential plant overturning leading to potential for injury/death to members of public with access to the foreshore.	Access points to be identified and to be incorporated during design development.	Transportation over foreshore and access ramps, etc. Potential plant overturning leading to potential for injury/death to members of public with access to the foreshore.	Contractor	ONGOING	Contractor to include appropriate traffic management and works segregation in method statements with mitigation and reduction measures to separate vehicles and public .
2	Use of vehicles/plant on site - Construction Staff	Transportation over foreshore and access ramps, etc. Potentially leading to potential injury/death to Construction staff resulting from vehicles overturning.	Access points and restrictions to be incorporated into design.	Transportation over foreshore and access ramps, etc. Potentially leading to potential injury/death to Construction staff resulting from vehicles overturning.	Contractor	ONGOING	Contractor to include site access routes and working areas with mitigation and reduction measures in method statements. detailed design to consider access restrictions (e.g. ramp loadings)
4	Existing Services	Damage to existing services during construction leading to death or injury to site personnel.	Full services survey to be undertaken during detailed design development.	Damage to existing services during construction leading to death or injury to site personnel.	designer / Contractor	ONGOING	Full services search to be undertaken at detailed design stage. Contractor to survey location prior to excavation works, where reasonable.
5	Unforeseen services present	Striking of live services causing electrocution, explosion, flooding and / or disruption of services.	Full services survey to be undertaken during design development.	Striking of live services causing electrocution, explosion, flooding and / or disruption of services.	Contractor	ONGOING	Full services search to be undertaken at detailed design stage. Contractor to survey location prior to excavation works, where reasonable.
7	Unstable ground conditions	Potential for site operatives or plant to become stuck in pockets of soft or lose ground. Instability of plant working in area of low soil strength. Risk of suffocation, crash injuries from sinking into ground/loss or damage to plant.	Inform contractor of risk of soft ground from GI and geotechnical analysis in detailed design.	Potential for site operatives or plant to become stuck in pockets of soft ground. Instability of plant working in area of low soil strength. Risk of suffocation, crash injuries from sinking into ground/loss or damage to plant.	designer / Contractor	ONGOING	Contractor to prepare method statement and safe systems of work. Risk to be updated following completion GI and geotechnical analysis.
8	In temporary state the elements of the construction will be subject to wave and tidal conditions	Failure of partially completed works leading to damage of surrounding structures. Potential failure in temporary condition leading to injury to workers.	The partially constructed new revetment will be subject to the temporary loading in a transient state. The design transient states will be identified and considered in the detailed design Stage. These are considered to be minimal due to the new works adding to existing structures, with no intentional damage to existing structures.	Damage to existing structures during construction which impacts their performance. Identified and considered in the detailed design. Contractor expected to consider protection measures for the partially constructed new structure.	designer / Contractor	ONGOING	Contractor to have competent experience of working in tidal environment. Contractor to develop safe systems of work in intertidal areas including the provision of appropriate PPE. Contractor to obtain frequent weather reports and be proactive in the assessment of weather conditions and adapt accordingly. Contractor's temporary works design to include storm conditions.
12	Storage of rock	Public climbing on rock piles, being trapped in voids or crushed by falling rock.	Avoid stockpiles of rock in publicly accessible areas as far as possible	Public climbing on rock piles, being trapped in voids or crushed by falling rock.	Contractor	ONGOING	Contractor to identify secure area for storage of rock and in accordance with the specification and propose method for storage. Experienced Contractor and subcontractors to be appointed.
15	Delivery of rock	Risk of barge being grounded.	Stockpiling of rock close to the shoreline to plan rock delivery within tidal windows and not work dependent.	Risk of barge being grounded.	Contractor	ONGOING	Contractor to plan rock delivery with tidal restrictions. Contractor to prepare method statement and safe system of work. Experienced Contractor and subcontractors to be appointed.
17	Handling and placement of rock armour	Death/injury to site personnel from loss of control of rocks (movement due to soft ground conditions/dropped by construction plant).	design has minimised quantity of rock required by increasing the revetment slope within possible. Early design of the rock structures & grading to allow delivery rock delivery to commence early in programme.	Death/injury to site personnel from loss of control of rocks. (movement due to soft ground conditions/dropped by construction plant). Risk of injury to eye as a result of rock splinters.	Contractor	ONGOING	Contractor to prepare method statement and safe system of work. Experienced Contractor and subcontractors to be appointed.
18	Delivery and storage of geotextile material	Risk of falling rolls of geotextile resulting in injury to construction personnel.	Safe delivery and storage methods will be defined in the geotextile specification during detailed design.	Risk of falling rolls of geotextile resulting in injury to construction personnel and public.	designer / Contractor	ONGOING	Contractor to identify secure area for storage of geotextile material and in accordance with the specification and propose method for storage. Experienced Contractor and subcontractors to be appointed.
19	Delivery and storage of geotextile material	Risk of falling rolls of geotextile resulting in injury to public.	Safe delivery and storage methods will be defined in the geotextile specification during detailed design. Ensure storage of geotextile is in areas not accessible to the public where possible.	Risk of falling rolls of geotextile resulting in injury to construction personnel and public.	designer / Contractor	ONGOING	Contractor to identify secure area for storage of geotextile material and in accordance with the specification and propose method for storage. Experienced Contractor and subcontractors to be appointed.
21	Use of concrete or other potentially contaminating materials	Injury to site operatives.	Minimise the volume of insitu concrete. During detailed design, where required, joints to be spaced closely spaced to allow for preparation, casting and adequate curing within tides.	Injury to site personnel.	Contractor	ONGOING	designer to minimise concrete insitu works. Contractor to insure experienced and trained personnel to handle potentially contaminating materials. Contractor to provide thorough method statement and safe system of work.
22	Use of concrete or other potentially contaminating materials	Contamination of the environment. Injury to site operatives.	Minimise the volume of insitu concrete. During detailed design, where required, joints to be spaced closely spaced to allow for preparation, casting and adequate curing within tides.	Contamination of the environment.	Contractor	ONGOING	designer to minimise concrete insitu works. Contractor to insure experienced and trained personnel to handle potentially contaminating materials. Contractor to provide thorough method statement and safe system of work.
23	Use of concrete or other potentially contaminating materials	Injury of operatives (burns,...)	Minimise the volume of insitu concrete. During detailed design, where required, insitu works to be simplified to minimise exposure.	Injury of operatives (burns,...)	Contractor	ONGOING	designer to minimise concrete insitu works. Contractor to insure experienced and trained personnel to handle potentially hazardous materials and provide adequate PPE. Contractor to provide thorough method statement and safe system of work.
25	Works between construction phases	Risk of cutting, trip hazard. The precast construction may involve dowel bars on the ground or starter bar protruding out from concrete.	Minimise insitu rebar connections by using precast.	Risk of cutting, trip hazard. The precast construction may involve dowel bars on the ground or starter bar protruding out from concrete.	designer / Contractor	ONGOING	designer to design and minimise dowel connections during detailed design stage. Contractor to provide coloured plastic caps to every protruding bar.
27	Lifting operations	Risk of plant overturning during moving or lifting on slope.	The proposed Concept design solutions can be adjusted to reduce the risk following results of the GI and geotechnical analysis. Allowable bearing capacity of slope revetment to be checked and shared with Contractor for temporary works design.	Risk of plant overturning on slope or temporary working platform - Contractor to undertake safe working practices	designer / Contractor	ONGOING	designer to assess the bearing capacity of the existing concrete structures. Contractor to prepare method statement of lifting and safe temporary working platform.
30	Working within a designated site	The risk of environmental damage through movement of material, placement of rocks etc.	Correct permissions etc obtained in order to complete works. Conditions of permit will allow for protection of habitat/wildlife if required.	Environmental damage.	designer / Contractor	ONGOING	Contractor to provide thorough method statement and safe system of work. EIA provided at detailed design stage.
31	Noise/vibration impacts on marine habitat	Disruption to wildlife due to site/plant activities, in relation to noise and vibration caused.	Correct permissions etc obtained in order to complete works. Conditions of permit will allow for protection of habitat/wildlife if required. Works are generally high up the beach and therefore present less of a concern for marine life.	Disruption to marine life.	designer / Contractor	ONGOING	Contractor to provide thorough method statement and safe system of work. EIA provided at detailed design stage.
32	Managing public access to works	Potential for public to become injured if gaining access to site works while heavy plant etc are working.	At detailed design stage, contractor to address public access concerns as part of method statement.	Risk of injury to public due to access gained to site.	designer / Contractor	ONGOING	Contractor to prepare method statement and safe systems of work. These will ensure that the chance of public access to the site is limited as much as practically possible.

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design HAZARD ELIMINATION AND RISK REDUCTION REGISTER

Latest Meeting Date

Update Critical Risk Summary Tab

Phase	
P	Pre-construction
C	Construction
M	Maintain/Clean
U	Use as a Workplace

Project Name:	East Coast Railway – Phase 3 - CCA6.2
Project Number:	D3658302
Client:	Iarnród Éireann Irish Rail

Probability

1: Highly Unlikely
2: Unlikely
3: Possible
4: Likely
5: Highly Likely

Worst Potential Severity (WPS) of Impact

1: Nil or slight injury / illness, property damage or environmental issue.

2: Minor injury / illness, property damage or environmental issue.

3: Moderate injury or illness, property damage or environmental issue.

4: Major injury or illness, property damage or environmental issue.

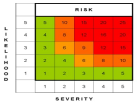
Risk Rating

NOTE: The purpose of Risk Rating is to determine which risks are significant. It is a subjective assessment and not an absolute or precise determination

High HSEID risk resulting from design is unacceptably high.

Medium HSEID risk resulting from design is permitted with

Low HSEID risk resulting from design is permitted.



8 Total high risks

7 Total med risks

28 Total low risks

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		24
Risk ID.	design Hazard Review Stage Description	Phase	Activity	Potential Hazard	Person(s) Most at Risk	Prob	WPS	Initial Risk Rating	designer	design Measures to Eliminate Hazards	design Measures to Reduce Risk	Residual Prob	Residual WPS	Residual Risk Rating	Residual Risk Description	Included on Drawing No(s) or other doc. (give ref.)	Action By (Name or Role)	Target Date	Revised Target Date	Date Action Complete	Tracker Status		Primary Legislation
1	S: design Stage Review	C	Use of vehicles/plant on site - Public	Transportation over foreshore and access ramps, etc. Potential plant overturning leading to potential for injury/death to members of public with access to the foreshore.	Public	2	5	10	Civil / Structural	Risk not eliminated at Phase 3 design Stage.	Clear pedestrian routes within the site and fencing off of working areas to be considered during design development.	2	5	10	Transportation over foreshore and access ramps, etc. Potential plant overturning leading to potential for injury/death to members of public with access to the foreshore.	Contractor Buildability/Method Statement [this is not a Jacobs document]	Contractor	Phase 3			ONGOING	Contractor to include appropriate traffic management and works segregation in method statements with mitigation and reduction measures to separate vehicles and public .	HSA
2	S: design Stage Review	C	Use of vehicles/plant on site - Construction Staff	Transportation over foreshore and access ramps, etc. Potentially leading to potential injury/death to Construction staff resulting from vehicles overturning.	Staff	2	5	10	Civil / Structural	Risk not eliminated at Phase 3 design Stage.	Clear pedestrian routes within the site and fencing off of working areas to be considered during design development.	2	5	10	Transportation over foreshore and access ramps, etc. Potentially leading to potential injury/death to Construction staff resulting from vehicles overturning.	Contractor Buildability/Method Statement [this is not a Jacobs document]	Contractor	Phase 3			ONGOING	Contractor to include site access routes and working areas with mitigation and reduction measures in method statements. detailed design to consider access restrictions (e.g. ramp loadings)	HSA
3	S: design Stage Review	C	Risk of discovery of Unexploded Ordnance (UXO)	Possible presence on site of unexploded ordnance. Loss of life, injury (including hearing damage) due to explosion.	Staff	1	5	5	Civil / Structural	Risk not eliminated at Phase 3 design Stage.	UXO Desk study to be undertaken during detailed design development	1	5	5	Possible presence on site of unexploded ordnance. Loss of life, injury (including hearing damage) due to explosion.	Drawings & Documents [to be prepared at DD stage] Contractor Buildability/Method Statement [this is not a Jacobs document]	designer / Contractor	Phase 3			ONGOING	Risk Assessment to be updated after undertaking UXO survey.	HSA
4	S: design Stage Review	C	Existing Services	Damage to existing services during construction leading to death or injury to site personnel.	Staff	2	5	10	Civil / Structural	Risk not eliminated at Phase 3 design Stage.	Phase 3: Preliminary identification of services included on Plan drawings. Very little services present in this frontage. Full services survey to be undertaken during detailed design development.	1	5	5	Damage to existing services during construction leading to death or injury to site personnel.	Drawings & Documents [to be prepared at DD stage] Contractor Buildability/Method Statement [this is not a Jacobs document]	designer / Contractor	Phase 3			ONGOING	Full services search to be undertaken at detailed design stage. Contractor to survey location prior to excavation works, where reasonable.	HSA
5	S: design Stage Review	C	Unforeseen services present	Striking of live services causing electrocution, explosion, flooding and / or disruption of services.	Staff	2	5	10	Civil / Structural	Risk not eliminated at Phase 3 design Stage.	Phase 3: Due to remote nature of the frontage, very limited services present in this frontage. Excavations expected to be in natural beach deposits where no services are expected to be present. Full services survey to be undertaken during design development.	1	5	5	Striking of live services causing electrocution, explosion, flooding and / or disruption of services.	Contractor Buildability/Method Statement [this is not a Jacobs document]	Contractor	Phase 3			ONGOING	Full services search to be undertaken at detailed design stage. Contractor to survey location prior to excavation works, where reasonable.	HSA
6	S: design Stage Review	C	Working on the coast. Working in the tidal range. Incoming tide level can rise rapidly.	Tidal working on an exposed coast has a heightened risk of drowning and loss of equipment due to un-expected storms or wave/current regime.	Staff	3	5	15	Civil / Structural	Risk not eliminated at Phase 3 design Stage.	Construction in tidal zone unavoidable, but minimized and simplified as far as possible.	1	5	5	Tidal working on an exposed coast has a heightened risk of drowning and loss of equipment due to un-expected storms or wave/current regime.	Contractor Buildability/Method Statement [this is not a Jacobs document]	Contractor	Phase 3			ONGOING	Contractor to obtain tidal information to be able to plan work accordingly. Contractor to have competent experience of working in tidal environment. Contractor to develop safe systems of work in intertidal areas including the provision of appropriate PPE and identification of access points. Obtain frequent weather reports to predict tidal conditions. Tidal monitoring to be undertaken.	HSA
7	S: design Stage Review	C	Unstable ground conditions	Potential for site operatives or plant to become stuck in pockets of soft or lose ground. Instability of plant working in area of low soil strength. Risk of suffocation, crash injuries from sinking into groundloss or damage to plant.	Staff	3	5	15	Civil / Structural	Risk not eliminated at Phase 3 design Stage.	Inform contractor of risk of soft ground from GI and geotechnical analysis in detailed design.	2	5	10	Potential for site operatives or plant to become stuck in pockets of soft ground. Instability of plant working in area of low soil strength. Risk of suffocation, crash injuries from sinking into groundloss or damage to plant.	Drawings & Documents [to be prepared at DD stage] Contractor Buildability/Method Statement [this is not a Jacobs document]	designer / Contractor	Phase 3			ONGOING	Contractor to prepare method statement and safe systems of work. Risk to be updated following completion GI and geotechnical analysis.	HSA
8	S: design Stage Review	C	In temporary state the elements of the construction will be subject to wave and tidal conditions	Failure of partially completed works leading to damage of surrounding structures. Potential failure in temporary condition leading to injury to workers.	Construction	3	4	12	Civil / Structural	Risk not eliminated at Phase 3 design Stage.	Phase 3: Design does not require removal of any of the existing defences but works are required adjacent to the bridge at the Breaches; further consideration at detailed design The partially constructed new revetment will be subject to the temporary loading in a transient state. The design transient states will be identified and considered in the detailed design Stage. These are considered to be minimal due to the new works adding to existing structures, with no intentional damage to existing structures.	2	4	8	Damage to existing structures during construction which impacts their performance. Identified and considered in the detailed design. Contractor expected to consider protection measures for the partially constructed new structure.	Drawings & Documents [to be prepared at DD stage] Contractor Buildability/Method Statement [this is not a Jacobs document]	designer / Contractor	Phase 3			ONGOING	Contractor to have competent experience of working in tidal environment. Contractor to develop safe systems of work in intertidal areas including the provision of appropriate PPE. Contractor to obtain frequent weather reports and be proactive in the assessment of weather conditions and adapt accordingly. Contractor's temporary works design to include storm conditions.	HSA
9	S: design Stage Review	C	Undermining/stability of existing structures leading to collapse	Collapse of existing structures and or crushing/injury to personnel and plant.	Staff	2	5	10	Civil / Structural	Risk not eliminated at Phase 3 design Stage.	Phase 3: Considered to be very unlikely given very limited works adjacent to existing structures. The proposed Concept design solutions can be adjusted to reduce the risk following results of the GI and geotechnical analysis, during detailed design.	1	5	5	Undermining/stability/overloading of existing structures leading to damage/collapse. Assessment of access routes and temporary works (by Contractor).	Drawings & Documents [to be prepared at DD stage] Contractor Buildability/Method Statement [this is not a Jacobs document]	designer / Contractor	Phase 3			ONGOING	Risk to be updated following completion GI and geotechnical analysis. These data and visual dilapidation combined will support the determination of the tolerable loading.	HSA
10	S: design Stage Review	C	Falls from revetment	Injury to site personnel.	Staff	2	4	8	Civil / Structural	Risk not eliminated at Phase 3 design Stage.	Design minimises need for personnel working on revetment. Rock extent enables placement of majority of works by use of long-reach excavator working from beach.	1	4	4	Injury to site personnel.	Contractor Buildability/Method Statement [this is not a Jacobs document]	designer / Contractor	Phase 3			ONGOING	Contractor to prepare method statement and safe systems of work	HSA

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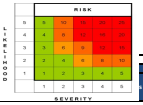

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Risk ID.	design Hazard Review Stage Description	Phase	Activity	Potential Hazard	Person(s) Most at Risk	Prob	WPS	Initial Risk Rating	designer	design Measures to Eliminate Hazards	design Measures to Reduce Risk	Residual Prob	Residual WPS	Residual Risk Rating	Residual Risk Description	Included on Drawing No(s) or other doc. (give ref.)	Action By (Name or Role)	Target Date	Revised Target Date	Date Action Complete	Tracker Status		Primary Legislation
11	S: design Stage Review	C	Excavations and Foundations	Rapid ingress of water, causing possible entrapment leading to injury/drowning of site personnel.	Staff	2	5	10	Civil / Structural	Risk not eliminated at Phase 3 design Stage.	Phase 3 Limited excavations needed to construct proposed defences, majority of works in shallow excavations within the tidal range; rapid ingress of water unlikely to occur. The toe excavation has been minimised within the required structure stability. The proposed Concept design solutions can be adjusted to reduce the risk following results of the GI and geotechnical analysis, during detailed design.	1	5	5	Rapid ingress of water, causing possible entrapment leading to injury/drowning of site personnel.	Drawings [to be prepared at DD stage] Contractor Buildability/Method Statement [this is not a Jacobs document]	designer / Contractor	Phase 3			ONGOING	Contractor to prepare method statement and safe systems of work and plan works to minimise access to the excavated area.	HSA
12	S: design Stage Review	C	Storage of rock	Public climbing on rock piles, being trapped in voids or crushed by falling rock.	Public	2	5	10	Civil / Structural	Risk not eliminated at Phase 3 design Stage.	Rock stockpiles to be fenced off to prevent public access	1	5	5	Public climbing on rock piles, being trapped in voids or crushed by falling rock.	Contractor Buildability/Method Statement [this is not a Jacobs document]	Contractor	Phase 3			ONGOING	Contractor to identify secure area for storage of rock and in accordance with the specification and propose method for storage. Experienced Contractor and subcontractors to be appointed. Main stockpile within secure and segregated from public.	HSA
13	S: design Stage Review	C	Delivery of rock	Grounding of barge leading to oil spill	Environment	2	5	10	Civil / Structural	Risk not eliminated at Phase 3 design Stage.	Barge is designed to be partially beached. Sensible use at correct tide times can limit the likelihood of grounding significantly.	1	3	3	Risk of barge being grounded.	Contractor Buildability/Method Statement [this is not a Jacobs document]	Contractor	Phase 3			ONGOING	Contractor to plan rock delivery with tidal restrictions. Contractor to prepare method statement and safe system of work. Experienced Contractor and subcontractors to be appointed.	HSA
14	S: design Stage Review	C	Delivery of rock	Risk of barge being grounded.	Staff	3	3	9	Civil / Structural	Risk not eliminated at Phase 3 design Stage.	Stockpiling of rock close to the shoreline to plan rock delivery within tidal windows and not work dependent.	3	3	9	Risk of barge being grounded.	Contractor Buildability/Method Statement [this is not a Jacobs document]	Contractor	Phase 3			ONGOING	Contractor to plan rock delivery with tidal restrictions. Contractor to prepare method statement and safe system of work. Experienced Contractor and subcontractors to be appointed.	HSA
15	S: design Stage Review	C	Delivery of rock	Falling rocks leading to injury/death of site personnel. Risk of injury to eye as a result of rock splinters.	Staff	2	5	10	Civil / Structural	Risk not eliminated at Phase 3 design Stage.	Early design of the rock structures & grading to allow delivery rock delivery to commence early in programme.	1	5	5	Falling objects leading to injury/death of site personnel. Risk of injury to eye as a result of rock splinters.	Contractor Buildability/Method Statement [this is not a Jacobs document]	Contractor	Phase 3			ONGOING	Contractor to prepare method statement and safe system of work. Experienced Contractor and subcontractors to be appointed.	HSA
16	S: design Stage Review	C	Handling and placement of rock armour	Death/injury to site personnel from loss of control of rocks (movement due to soft ground conditions/dropped by construction plant).	Staff	2	5	10	Civil / Structural	Risk not eliminated at Phase 3 design Stage.	Early design of the rock structures & grading to allow delivery rock delivery to commence early in programme.	2	5	10	Death/injury to site personnel from loss of control of rocks (movement due to soft ground conditions/dropped by construction plant). Risk of injury to eye as a result of rock splinters.	Contractor Buildability/Method Statement [this is not a Jacobs document]	Contractor	Phase 3			ONGOING	Contractor to prepare method statement and safe system of work. Experienced Contractor and subcontractors to be appointed.	HSA
17	S: design Stage Review	C	Delivery and storage of geotextile material	Risk of falling rolls of geotextile resulting in injury to construction personnel.	Staff	3	3	9	Civil / Structural	Risk not eliminated at Phase 3 design Stage.	Safe delivery and storage methods will be defined in the geotextile specification during detailed design.	2	3	6	Risk of falling rolls of geotextile resulting in injury to construction personnel and public.	Specifications [to be prepared at DD stage] Contractor Buildability/Method Statement [this is not a Jacobs document]	designer / Contractor	Phase 3			ONGOING	Contractor to identify secure area for storage of geotextile material and in accordance with the specification and propose method for storage. Experienced Contractor and subcontractors to be appointed.	HSA
18	S: design Stage Review	C	Delivery and storage of geotextile material	Risk of falling rolls of geotextile resulting in injury to public.	Public	3	3	9	Civil / Structural	Risk not eliminated at Phase 3 design Stage.	Safe delivery and storage methods will be defined in the geotextile specification during detailed design. Ensure storage of geotextile is in areas not accessible to the public where possible.	1	3	3	Risk of falling rolls of geotextile resulting in injury to construction personnel and public.	Specifications [to be prepared at DD stage] Contractor Buildability/Method Statement [this is not a Jacobs document]	designer / Contractor	Phase 3			ONGOING	Contractor to identify secure area for storage of geotextile material and in accordance with the specification and propose method for storage. Experienced Contractor and subcontractors to be appointed.	HSA
19	S: design Stage Review	C	Handling and placement of geotextile	Risk of overturning of plant and entrapment of personnel in the intertidal/ sub-tidal zone resulting in risk of injury or drowning.	Staff	2	5	10	Civil / Structural	Risk not eliminated at Phase 3 design Stage.	Use of geotextile minimised where possible. Specifications in detailed design to include details of safe placement of geotextile.	1	5	5	Risk of overturning of plant and entrapment of personnel in the intertidal/ sub-tidal zone resulting in risk of injury or drowning.	Specifications [to be prepared at DD stage] Contractor Buildability/Method Statement [this is not a Jacobs document]	designer / Contractor	Phase 3			ONGOING	Contractor to provide thorough method statement and safe system of work. Experienced Contractor and subcontractors to be appointed. Specification to include details of safe placement of geotextile	HSA
20	S: design Stage Review	C	Use of concrete or other potentially contaminating materials	Injury to site operatives.	Staff	3	4	12	Civil / Structural	Risk is eliminated at Phase 3 design Stage.	No insitu concrete is proposed in the cross section. During detailed design, where required, insitu works to be simplified to minimise exposure.	1	1	1	Injury to site personnel.	Contractor Buildability/Method Statement [this is not a Jacobs document]	Contractor	Phase 3			ONGOING	designer to minimise concrete insitu works. Contractor to insure experienced and trained personnel to handle potentially contaminating materials. Contractor to provide thorough method statement and safe system of work.	HSA
21	S: design Stage Review	C	Use of concrete or other potentially contaminating materials	Contamination of the environment. Injury to site operatives.	Environment	3	4	12	Civil / Structural	Risk not eliminated at Phase 3 design Stage.	No insitu concrete is proposed in the cross section. During detailed design, where required, insitu works to be simplified to minimise exposure.	2	4	8	Contamination of the environment.	Contractor Buildability/Method Statement [this is not a Jacobs document]	Contractor	Phase 3			ONGOING	designer to minimise concrete insitu works. Contractor to insure experienced and trained personnel to handle potentially contaminating materials. Contractor to provide thorough method statement and safe system of work.	HSA

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design HAZARD ELIMINATION AND RISK REDUCTION REGISTER

Latest Meeting Date

Update Critical Risk Summary Tab

Phase	
P	Pre-construction
C	Construction
M	Maintain/Clean
U	Use as a Workplace

Project Name:	East Coast Railway – Phase 3 - CCA6.2
Project Number:	D3658302
Client:	Iarnród Éireann Irish Rail

Probability

1: Highly Unlikely
2: Unlikely
3: Possible
4: Likely
5: Highly Likely

Worst Potential Severity (WPS) of Impact

1: Nil or slight injury / illness, property damage or environmental issue.

2: Minor injury / illness, property damage or environmental issue.

3: Moderate injury or illness, property damage or environmental issue.

4: Major injury or illness, property damage or environmental issue.

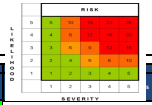
Risk Rating

NOTE: The purpose of Risk Rating is to determine which risks are significant. It is a subjective assessment and not an absolute or precise determination

High HSEID risk resulting from design is unacceptably high.

Medium HSEID risk resulting from design is permitted with

Low HSEID risk resulting from design is permitted.



8 Total high risks

7 Total med risks

28 Total low risks

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		24
Risk ID.	design Hazard Review Stage Description	Phase	Activity	Potential Hazard	Person(s) Most at Risk	Prob	WPS	Initial Risk Rating	designer	design Measures to Eliminate Hazards	design Measures to Reduce Risk	Residual Prob	Residual WPS	Residual Risk Rating	Residual Risk Description	Included on Drawing No(s) or other doc. (give ref.)	Action By (Name or Role)	Target Date	Revised Target Date	Date Action Complete	Tracker Status		Primary Legislation
22	5: design Stage Review	C	Use of concrete or other potentially contaminating materials	Injury of operatives (burns,...)	Staff	3	4	12	Civil / Structural	Risk not eliminated at Phase 3 design Stage.	No insitu concrete is proposed in the cross section. During detailed design, where required, insitu works to be simplified to minimise exposure.	2	4	8	Injury of operatives (burns,...)	Contractor Buildability/Method Statement [this is not a Jacobs document]	Contractor	Phase 3			ONGOING	designer to minimise concrete insitu works. Contractor to insure experienced and trained personnel to handle potentially hazardous materials and provide adequate PPE. Contractor to provide thorough method statement and safe system of work.	HSA
23	5: design Stage Review	C	Insitu concrete pouring	Risk of unstable formwork and falsework on existing sloping concrete revetment.	Staff	2	4	8	Civil / Structural	Risk is eliminated at Phase 3 design Stage.	Concrete has been designed out of the cross sections required for CCA6.2	1	1	1	Risk of unstable formwork remains. Contractor to undertake temp works design and consider staging the concrete pours at detailed design stage.	Contractor Buildability/Method Statement [this is not a Jacobs document] & Temporary works design	designer	Phase 3			ONGOING	designer to minimise volume of insitu concrete during detailed design. Contractor to provide thorough method statement and safe system of work.	HSA
24	5: design Stage Review	C	Works between construction phases	Risk of cutting, trip hazard. The precast construction may involve dowel bars on the ground or starter bar protruding out from concrete.	Staff	3	2	6	Civil / Structural	Risk is eliminated at Phase 3 design Stage.	Concrete has been designed out of the cross sections required for CCA6.2	1	1	1	Risk of cutting, trip hazard. The precast construction may involve dowel bars on the ground or starter bar protruding out from concrete.	Contractor Buildability/Method Statement [this is not a Jacobs document]	designer / Contractor	Phase 3			ONGOING	designer to design and minimise dowel connections during detailed design stage. Contractor to provide coloured plastic caps to every protruding bar.	HSA
25	5: design Stage Review	C	Use of Hazardous Materials (cements, grouts,...) for works preparation	Health problems and Environmental damage due to contact with / exposure to cements, grouts etc.	Staff	3	3	9	Civil / Structural	Risk is eliminated at Phase 3 design Stage.	Concrete has been designed out of the cross sections required for CCA6.2	1	1	1	Health problems and Environmental damage due to contact with / exposure to cements, grouts etc.	Contractor Buildability/Method Statement [this is not a Jacobs document]	Contractor	Phase 3			ONGOING	Contractor to insure experienced and trained personnel to handle potentially hazardous materials and provide adequate PPE. Contractor to provide thorough method statement and safe system of work.	HSA
26	5: design Stage Review	C	Use of Hazardous Materials (cements, grouts,...) for works preparation	Environmental damage due to contact with / exposure to cements, grouts etc.	Environment	3	3	9	Civil / Structural	Risk is eliminated at Phase 3 design Stage.	Concrete has been designed out of the cross sections required for CCA6.2	1	1	3	Health problems and Environmental damage due to contact with / exposure to cements, grouts etc.	Contractor Buildability/Method Statement [this is not a Jacobs document]	Contractor	Phase 5			ONGOING	Contractor to insure experienced and trained personnel to handle potentially hazardous materials and provide adequate PPE. Contractor to provide thorough method statement and safe system of work.	HSA
27	5: design Stage Review	C	Lifting operations	Risk of plant overturning during moving or lifting on slope.	Staff	3	5	15	Civil / Structural	Risk not eliminated at Phase 3 design Stage.	The proposed Concept design solutions can be adjusted to reduce the risk following results of the GI and geotechnical analysis. Allowable bearing capacity of slope revetment to be checked and shared with Contractor for temporary works design.	2	5	10	Risk of plant overturning on slope or temporary working platform - Contractor to undertake safe working practices	Contractor Buildability/Method Statement [this is not a Jacobs document]	designer / Contractor	Phase 3			ONGOING	designer to assess the bearing capacity of the existing concrete structures. Contractor to prepare method statement of lifting and safe temporary working platform.	HSA
28	5: design Stage Review	C	Lifting operations. Lifting of plant or materials (i.e. precast units) may be carried out in gusty winds	There is a risk of the lifted item becoming out of control with the risk of crushing of personnel. Damage to property and injury to / death of personnel from overhead loads and falling objects.	Staff	3	5	15	Civil / Structural	Hazard not eliminated at this Concept design Stage.	Approximate weights and approximate centre of gravity of precast units to be shown in detailed design drawings.	1	5	5	There is a risk of the lifted item becoming out of control with the risk of crushing of personnel. Damage to property and injury to / death of personnel from overhead loads and falling objects.	Drawings [to be prepared at DD stage] Contractor Buildability/Method Statement [this is not a Jacobs document]	designer / Contractor	Phase 3			ONGOING	Contractor to prepare method statement of lifting and safe temporary working platform. Contractor to check the unit weight and centre of gravity before any lifting is carried out. Contractor to obtain frequent weather reports and be proactive in the assessment of weather conditions and adapt accordingly.	HSA
29	5: design Stage Review	C	Brittle failure of precast units/ rock	Damage to property and injury to / death of personnel from overhead loads and falling objects.	Staff	2	5	10	Civil / Structural	Hazard not eliminated at this Concept design Stage.	Approximate weights and approximate centre of gravity of precast units to be shown in detailed design drawings.	1	5	5	Damage to property and injury to / death of personnel from overhead loads and falling objects.	Drawings [to be prepared at DD stage] Contractor Buildability/Method Statement [this is not a Jacobs document]	designer / Contractor	Phase 3			ONGOING	Contractor to undertake lifting anchor design and include additional anchor point strengthening requirements, if required. It is normal practice for the contractor to undertake temporary works design. Contractor to check the unit weight and centre of gravity before any lifting is carried out. Contractor to provide thorough method statement and safe system of work.	HSA
30	5: design Stage Review	C	Working within a designated site	The risk of environmental damage through movement of material, placement of rocks etc.	Environment	3	3	9	Civil / Structural	Hazard not eliminated at this design Stage.	Correct permissions etc obtained in order to complete works. Conditions of permit will allow for protection of habitat/wildlife if required.	2	3	6	Environmental damage.	To be covered in EIA and Contractor Buildability/Method Statement [this is not a Jacobs document]	designer / Contractor	Phase 3			ONGOING	Contractor to provide thorough method statement and safe system of work. EIA provided at detailed design stage.	HSA
31	5: design Stage Review	C	Noise/vibration impacts on marine habitat	Disruption to wildlife due to site/plant activities, in relation to noise and vibration caused.	Environment	3	3	9	Civil / Structural	Hazard not eliminated at this design Stage.	Correct permissions etc obtained in order to complete works. Conditions of permit will allow for protection of habitat/wildlife if required. Works are generally high up the beach and therefore present less of a concern for marine life.	2	3	6	Disruption to marine life.	To be covered in EIA and Contractor Buildability/Method Statement [this is not a Jacobs document]	designer / Contractor	Phase 3			ONGOING	Contractor to provide thorough method statement and safe system of work. EIA provided at detailed design stage.	HSA
32	5: design Stage Review	C	Managing public access to works	Potential for public to become injured if gaining access to site works while heavy plant etc are working.	Public	2	5	10	Civil / Structural	Risk not eliminated at Phase 3 design Stage.	At detailed design stage, contractor to address public access concerns as part of method statement.	2	5	10	Risk of injury to public due to access gained to site.	Drawings [to be prepared at DD stage] Contractor Buildability/Method Statement [this is not a Jacobs document]	designer / Contractor	Phase 3			ONGOING	Contractor to prepare method statement and safe systems of work. These will ensure that the chance of public access to the site is limited as much as practically possible.	HSA

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design HAZARD ELIMINATION AND RISK REDUCTION REGISTER

Latest Meeting Date

Update Critical Risk Summary Tab

Phase	
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C	Construction
M	Maintain/Clean
U	Use as a Workplace

Project Name:	East Coast Railway – Phase 3 - CCA6.2
Project Number:	D3658302
Client:	Iarnród Éireann Irish Rail

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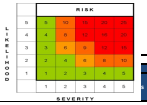

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28 Total low risks

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Risk ID.	design Hazard Review Stage Description	Phase	Activity	Potential Hazard	Person(s) Most at Risk	Prob	WPS	Initial Risk Rating	designer	design Measures to Eliminate Hazards	design Measures to Reduce Risk	Residual Prob	Residual WPS	Residual Risk Rating	Residual Risk Description	Included on Drawing No(s) or other doc. (give ref.)	Action By (Name or Role)	Target Date	Revised Target Date	Date Action Complete	Tracker Status		Primary Legislation
33	5: design Stage Review	U	Voids in rock armour	Risk of falling/entrapment to the general public.	Public	3	5	15	Civil / Structural	Hazard not eliminated at this design Stage.	10 no. sets of pedestrian access steps proposed reducing distance someone on the beach needs to walk for safe egress to approx 300m. Further design of beach access points etc to be considered in the detailed design Stage.	1	5	5	Risk that public could still fall onto / into rock revetment, but this would likely only occur if purposely climbing onto / over the flood walls.	Drawings & Documents [to be prepared at DD stage]	Contractor / Client	Phase 3			ONGOING	Contractor to individually place rocks to minimise deep rock chimneys (voids) as per rock Specifications. Client to plan and undertake maintenance activities to reposition rocks if they become non-interlocked. Client to ensure signage is installed.	HSA
34	5: design Stage Review	U	Voids in rock armour	Risk of falling/entrapment to the maintenance staff.	Staff	3	5	15	Civil / Structural	Hazard not eliminated at this design Stage.	10 no. sets of pedestrian access steps proposed reducing distance someone on the beach needs to walk for safe egress to approx 30mm. Further design of beach access points etc to be considered in the detailed design Stage.	1	5	5	Maintenance staff to take care to not climb onto rock revetment. Consider use of alternative survey methods, e.g. drone to monitor structure	Drawings & Documents [to be prepared at DD stage]	Contractor / Client	Phase 3			ONGOING	Contractor to individually place rocks to minimise deep rock chimneys (voids) as per rock Specifications. Client to plan and undertake maintenance activities to reposition rocks if they become non-interlocked. Client to ensure signage is installed.	HSA
35	5: design Stage Review	U	Unstable/soft ground conditions in front of revetment	Risk of entrapment in unstable soft saturated ground in front of revetment - minimal egress points.	Public	2	4	8	Civil / Structural	Hazard not eliminated at this design Stage.	Rock armour at toe reduces the potential for scour and subsequent impact on ground conditions	1	4	4	Risk of entrapment in unstable soft saturated ground in front of revetment - minimal egress points.	Documents [to be prepared at DD stage]	Client	Phase 3			ONGOING	Appropriate signage on promenade warning of risks of accessing beach area.	HSA
36	5: design Stage Review	U	Settlement of the ground	Excessive settlement of the structures resulting in unsafe conditions (e.g. uneven ramp, uneven step heights), or structural failure of the structures. Slips, trips, falls.	Public	2	4	8	Civil / Structural	Hazard not eliminated at this design Stage.	The proposed Concept design solutions can be adjusted to reduce the risk following results of the GI and geotechnical analysis. Settlement values to be estimated at detailed design stage.	1	4	4	Risk that design measures limitation mean that settlement could still result in unsafe conditions. Consider pre loading the ground prior to installation of the top surface structures to mitigate if required.	Drawings [to be prepared at DD stage]	designer	Phase 3			ONGOING	Risk to be updated following completion GI and geotechnical analysis. designer to quantify settlement and consider the settlement in the design detailing.	HSA
37	5: design Stage Review	U	Public access to the beach restricted	The rock revetments will have a larger footprint on the beach than the existing revetments, thereby reducing the useable area of the beach. This could lead to people becoming trapped during changing tides	Public	3	5	15	Civil / Structural	Risk not eliminated at Phase 3 design Stage.	10 no. sets of pedestrian access steps proposed reducing distance someone on the beach needs to walk for safe egress to approx 300m. The footprint of the revetments has been minimised as much as possible at this stage, including burying the toe rather than an exposed toe.	2	5	10	People becoming trapped during changing tides	Documents [to be prepared at DD stage]	designer / Client	Phase 3			ONGOING	designer to review beach access points during detailed design development. Consider installing warning signs at access points to highlight risk to the public	HSA
38	5: design Stage Review	U	Erosion / Beach lowering	Toe of the rock revetment could become partially exposed leading to slip hazard, or people falling between the rock voids through a very thin beach layer.	Public	3	5	15	Civil / Structural	Risk not eliminated at Phase 3 design Stage.	The revetment toe has been designed to account for future beach lowering. Rock specifications during detailed design will specify rock placement to reduce deep rock chimneys (voids).	1	5	5	Slips, trips and fall or people becoming trapped	Documents [to be prepared at DD stage]	designer	Phase 3			ONGOING	Risk to be addressed throughout design development and toe detail updates as required to reduce risk. Contractor to individually place rocks to minimise deep rock chimneys (voids) as per rock Specifications.	HSA
39	5: design Stage Review	U	Wave overtopping onto the footpath	Injury from large wave discharges overtopping the revetment and knocking over a pedestrian	Public	2	4	8	Civil / Structural	Risk not eliminated at Phase 3 design Stage.	Hazard is reduced due to the increase in the revetment crest width and refinement of the revetment cross section.	1	4	4	Injury due to waves	Drawings & Documents [to be prepared at DD stage]	designer	Phase 3			ONGOING	designer to undertake further analysis of wave overtopping and geometry of structures during design development	HSA
40	5: design Stage Review	U	Falls from height	Public falling from wave walls	Public	2	5	10	Civil / Structural	Hazard eliminated at this design Stage.	No wave walls have been proposed as part of CCA6.2	1	1	1	Falls from height	Documents [to be prepared at DD stage]	designer	Phase 3			ONGOING	designer to undertake further design of walls and stepped revetments during design development to deter people climbing to wall.	HSA
41	5: design Stage Review	U	Change to swimming conditions	Structures within the coastal zone can change currents and swimming conditions which could lead to drowning	Public	2	5	10	Civil / Structural	Risk not eliminated at Phase 3 design Stage.	The proposed structures for the preferred option are all shoreline structures and should not impact the sea conditions. Rock toes have been included to reduce reflections at the toe of concrete structures, and no breakwaters or groynes are proposed which could lead to changes in currents	1	5	5	Minor risk of change in swimming conditions	Documents [to be prepared at DD stage]	designer / Client	Phase 3			ONGOING	designer to consider further consider this risk through detailed design.	HSA
42	5: design Stage Review	U	Public accessing beach areas during storm conditions	Risk of drowning	Public	3	5	15	Civil / Structural	Risk not eliminated at Phase 3 design Stage.	10 no. sets of pedestrian access steps proposed reducing distance someone on the beach needs to walk for safe egress to approx 300mm. Designer to advise Client that warning signs should be installed at the access points to the coastal defence (i.e. at access points through the flood wall onto the promenade)	3	5	15	Risk of drowning	Documents [to be prepared at DD stage]	designer / Client	Phase 3			ONGOING	Client to ensure signage is installed at visible locations along the access points. Signs should also be provided to warn pedestrians of presence of maintenance vehicles	HSA
43	5: design Stage Review	C	Proximity to Trainline	Risk of construction next to trainline - collisions, vibrations, noise	Staff	2	5	10	Civil / Structural	Risk not eliminated at Phase 3 design Stage.	Strict regulatory guidelines must be followed. Worker training provision required to advise on hazards of working near trainlines. The design has been aligned so the cross sections shall be placed fairly far away from the trainline.	1	5	5	Collision with train, vibrations from train causing rock fall	Documents [to be prepared at DD stage]	designer / Client	Phase 3			ONGOING	Client to ensure signage is installed at visible locations along the access points. Signs should also be provided to warn pedestrians of presence of maintenance vehicles	HSA

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Project Name:	East Coast Railway - Phase 3 - CCA6.2
Project Number:	D3658302
Client:	Iarnród Éireann Irish Rail

DESIGN HAZARD ELIMINATION & RISK REDUCTION
SET UP PAGE

PERSON AT RISK	DESIGNER (Amend to suit)
Construction	Architect
Commissioning	Mechanical/ Electrical
Operations	Process
Maintenance	Civil / Structural
Decommissioning	Environmental
Demolition	Control & Instrumentation
Public	Piping
User Entry	HVAC
User Entry	Commissioning
	Non Jacobs Designer
	Client
	User entry
	User entry
	User entry
	All Disciplines

Review List
1: Design
2: Interactive Design Safety Session
3: HAZOP Meeting
4: HAZID Meeting
5: Routine Design Team Meeting
6: Design Stage Review
7: Pre-Tender Design Review
8: Construction Phase Design Revision
9: HSE in Design Review

Phase List	
P	Pre-construction
C	Construction
M	Maintain / Clean
U	Use as a workplace
D	Demolish/Decommission

Severity of Injury	
1	Nil or slight injury / illness, property damage or environmental issue.
2	Minor injury / illness, property damage or environmental issue.
3	Moderate injury or illness, property damage or environmental issue.
4	Major injury or illness, property damage or environmental issue.
5	Fatal or long term disabling injury or illness. Massive property damage or environmental issue.
10	Multiple fatality and catastrophic event

Probability	
1	Highly Unlikely
2	Unlikely
3	Possible
4	Likely
5	Highly Likely

Residual Risk
Yes
No

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DE5IGN HAZARD WHEEL

The de5ign Hazard Wheel has been developed to assist technical design teams identify health, safety and environment in design hazards, considering the asset's whole lifecycle.

Refer to the de5ign Manual to download the most up to date interactive version of this tool.