

Appendix 1: Risk Register

(Including relevant extracts from PAR)

1.1 Introduction

The risk register compiles the key risks identified with the Clacton and Holland-on-Sea Sea Defence Works. It is intended that the risk register is a live document that all parties involved in the project use and update throughout the life of the project.

Risk is defined as been the potential occurrence of a threat or opportunity, which could affect (positively or negatively) the achievement of the project objectives.

RISK = CONSEQUENCE x LIKELIHOOD

Where likelihood is defined as the chance (or probability) of the risk event occurring within a defined time period. Here the risk event is defined as either the threat occurring or the opportunity being lost. Consequence is defined as the effect of the risk event on one or more objectives if it occurs. The effect could be measured in financial value, project delay in weeks, lost turnover due to damage to reputation etc. (Note: Sometimes the term 'impact' is used instead of consequence).

1.2 Confirm Project Objectives and Risk Assessment Limits

1.2.1 Project Objectives

The objectives of the project were identified in the design brief including technical, economic, social, environmental, strategic and safety. This allowed the team to define the context for the risk assessment which has been split into the following sections:

- Strategic Risks
- Design Risks
- Construction Risks
- Material Risks
- Unexploded Ordnance Risks
- Disturbance Risks
- Environmental Risks
- Financial Risks

1.2.2 Risk Assessment Limits

Prior to considering consequence and likelihood assessments in detail, it was agreed by the project team what the sensitivity or tolerance would be to certain risks. Once the upper and lower limits had been defined the intermediate classes of consequence were agreed. This logic was also used for likelihood (or probability) assessment.

1.2.3 Threat / Opportunity Identification

The most important step is threat/opportunity identification, if this is not carried out in a comprehensive manner then all subsequent stages could be flawed. In order to complete the risk register the team had

- An appropriate technical and/or commercial background
- Determination of the appropriate number of individuals to carry out the process
- Collation of the available background information

1.2.4 Consequence Analysis

Once the threats and opportunities have been identified and entered on the risk register then the associated consequences are considered and then summarised on the risk register. Consequences can be both positive and negative to reflect threats and opportunities (Negative impact scores are presented in Table 1).

Table.1: Negative Consequence Table

Impact		Health and Safety	Time	Cost	Reputation	Environment
very low	negligible	negligible	negligible effect on programme	Negligible	negligible	negligible
low	minor	minor injury	5% effect on programme	1% budget	minor effect on local company image/ business relationship mildly affected	minor environmental incident
medium	serious	major injury	12% effect on programme	10% budget	local media exposure/ business relationship affected	environmental incident requiring management input
high	threat to future work and client relations	fatality	25% effect on programme	20% budget	nationwide media exposure / business relationship greatly affected	environmental incident leading to prosecution or protestor action
very high	threat to business survival and credibility	multiple fatalities	50% effect on programme	50% budget	permanent nationwide effect on company image/ significant impact on business relationship	major environmental incident with irreversible effects and threat to public health or protected natural resource

1.2.5 Threats

The threats that were used within the PAR fell into the following broad categories (see Risk Register attached):

- Cost
- Time
- Reputation, business relations, impact on local community
- Environment
- Health and Safety

The main focus was on cost and time but these are often affected by the other three categories.

1.2.6 Likelihood Evaluation

Following the consequence assessment, the likelihood of each threat or opportunity occurring was assessed. The likelihood scoring system used in the PAR is given in Table 2.

Table 2: Likelihood Scoring System

Likelihood		Probability	
1	very low	negligible / improbable	0%
2	low	unlikely / remote	1%
3	medium	likely / possible	10%
4	high	probable	50%
5	very high	very likely / almost certain	90%

In the table likelihood is shown as ranging from negligible / improbable (probability <1%) to very likely/almost certain (probability >90%). The impacts for each threat have been assessed against the cash cost of the capital works of £29,335 (i.e. EA FSoD Approval before risk contingency is applied).

1.2.7 Risk Evaluation

The risk score is determined by combining the consequence and likelihood scores (Table 2) giving a risk level varying from trivial to intolerable.

Table 3: Risk Score Table

		Score	Likelihood				
			Very Low	Low	Medium	High	Very High
Negative Consequence	Very Low	1	n	n	n	n	t
	Low	2	n	n	t	t	s
	Medium	3	n	t	t	s	s
	High	4	n	t	s	s	i
	Very High	5	t	s	s	i	i

Risk Key

intolerable	RED	i	20 to 25
significant	AMBER	s	10 to 16
tolerable	YELLOW	t	5 to 9
negligible / trivial	GREEN	n	1 to 4

The main objective for using this table is to identify the most significant threats and opportunities to the works

1.2.8 Risk Control

Ultimately the success of a project depends on how well the risks are controlled, in terms of:

- avoiding
- transferring

- reducing
- appropriately allocating and sharing risks
- accepting (i.e. risk owner is not unduly concerned by risk)

Following the risk assessment the optimum risk control measures, who 'owns' the risks, and who will take actions to manage the risk on behalf of the risk owner were identified.

4.1 Sensitivity of Risk Values

To provide a sensitivity check on the risk values used within the Monte Carlo risk assessment, the values calculated within the Monte Carlo Risk assessment were compared with values from previous experience and different methods for risk calculation.

The additional £2 million risk allocation from TDC and ECC has been included in the PF calculator and in the appropriate tables in the PAR document. The Project Team do not consider it appropriate to include the £2 million risk in the 95% contingency.

4.1.1 Severe Weather – Calculating risk value through assessment of potential delay to the programme

The value of risk associated with severe weather causing a delay to the programme has been calculated with respect to the deliver and placement of rock. The following method has been followed:

- Wave data (obtained for modelling in the PAR) has been used to calculate the number of days over which the significant wave height is likely to be greater than 0.8m (Rock Manual, CIRIA 2007).
- From the 3 year wave data, this value has been calculated as 32 days.
- The distribution of likely number of days over the 6 month period when the waves are likely to be greater than 0.8m has been worked out using a Poisson distribution
- This gave the 95th %ile as 42 days delay to the programme
- Using figures from Felixstowe Coastal Defence Construction Works, it has been estimated that this could cost £54,600 per construction phase in programme delay
- Therefore over the entire construction period the 95th %ile would give a risk value of £163,800

Although this calculation has only taken into account programme delay associated with rock delivery and placement, the suggested risk value is smaller than the value quoted in the Monte Carlo assessment (which is £634,120) and therefore it is suggested that the current risk included within the Monte Carlo risk assessment is adequate to account for the changes due to weather conditions.

4.1.2 Benchmarking costs against previous schemes

The costs within the PAR have been benchmarked against previous schemes (PAR Appendix H), notably the recent coastal defence works at Central Felixstowe. These costs include some downtime within the rates as a contingency.

Project Budget £29,355,000

Threat	Residual Impact	Residual Likelihood	Impact (%)		Likelihood (%)		Quantitative Risk Envelope					
			Min	Max	Min	Max	Min		Most Likely		Max	
							(%)	£	(%)	£	(%)	£
Strategic Level Risks												
Inadequate money / funding.	H	VL	10%	20%	0%	0%	0.00%	£0.00	0.00%	£29.36	0.00%	£58.71
Political uncertainty.	M	VL	1%	10%	0%	0%	0.00%	£0.00	0.00%	£14.68	0.00%	£29.36
LPRG date not met in early 2013.	M	VL	1%	10%	0%	0%	0.00%	£0.00	0.00%	£14.68	0.00%	£29.36
Public objection to plans - could go to public enquiry.	M	L	1%	10%	0%	1%	0.00%	£2.94	0.05%	£14,678.97	0.10%	£29,355.00
Public objection to plans - Planning not obtained owing to public opinion..	H	L	10%	20%	0%	1%	0.00%	£29.36	0.10%	£29,369.68	0.20%	£58,710.00
Public objection to plans - Licenses/consent not obtained owing to public objection..	H	L	10%	20%	0%	1%	0.00%	£29.36	0.10%	£29,369.68	0.20%	£58,710.00
Inadequate regeneration.	L	VL	0%	1%	0%	0%	0.00%	£0.00	0.00%	£1.47	0.00%	£2.94
Change of Project Team / Council.	M	VL	1%	10%	0%	0%	0.00%	£0.00	0.00%	£14.68	0.00%	£29.36
Change in EA processes in funding.	L	L	0%	1%	0%	1%	0.00%	£0.00	0.01%	£1,467.75	0.01%	£2,935.50
Failure of defences K / N.	M	M	1%	10%	1%	10%	0.01%	£2,935.50	0.51%	£148,242.75	1.00%	£293,550.00
Failure of the sea wall at Holland-on-Sea between now and 2015.	M	H	1%	10%	10%	50%	0.10%	£29,355.00	2.55%	£748,552.50	5.00%	£1,467,750.00
EIA process.	M	H	1%	10%	10%	50%	0.10%	£29,355.00	2.55%	£748,552.50	5.00%	£1,467,750.00
LPRG don't approve PAR.	VH	VL	20%	50%	0%	0%	0.00%	£0.00	0.00%	£73.39	0.00%	£146.78
LPRG require significantly more information prior of PAR approval.	H	M	10%	20%	1%	10%	0.10%	£29,355.00	1.05%	£308,227.50	2.00%	£587,100.00
Design Risks												
Variations in volumes or rates of beach recharge material	M	H	1%	10%	10%	50%	0.10%	£29,355.00	2.55%	£748,552.50	5.00%	£1,467,750.00
Failure of Clacton and Holland-on-Sea Scheme.	M	VL	1%	10%	0%	0%	0.00%	£0.00	0.00%	£14.68	0.00%	£29.36
Public dislike for final scheme proposed.	L	L	0%	1%	0%	1%	0.00%	£0.00	0.01%	£1,467.75	0.01%	£2,935.50
Not implementing survey works to update design.	M	VL	1%	10%	0%	0%	0.00%	£0.00	0.00%	£14.68	0.00%	£29.36
Design programme not being met.	M	L	1%	10%	0%	1%	0.00%	£2.94	0.05%	£14,678.97	0.10%	£29,355.00
Design basis changes during design period.	H	M	10%	20%	1%	10%	0.10%	£29,355.00	1.05%	£308,227.50	2.00%	£587,100.00
ECI / ESE not implemented to support buildability issues.	M	L	1%	10%	0%	1%	0.00%	£2.94	0.05%	£14,678.97	0.10%	£29,355.00
Availability of the rock supply.	M	L	1%	10%	0%	1%	0.00%	£2.94	0.05%	£14,678.97	0.10%	£29,355.00
Availability of the beach recharge material.	M	L	1%	10%	0%	1%	0.00%	£2.94	0.05%	£14,678.97	0.10%	£29,355.00
Design does not include regeneration aspects - Zone B.	L	L	0%	1%	0%	1%	0.00%	£0.00	0.01%	£1,467.75	0.01%	£2,935.50
Design does not include regeneration aspects - Zone C2.	L	L	0%	1%	0%	1%	0.00%	£0.00	0.01%	£1,467.75	0.01%	£2,935.50
Procurement processes of the main works contractor are not defined.	L	VL	0%	1%	0%	0%	0.00%	£0.00	0.00%	£1.47	0.00%	£2.94
Tender prices don't meet Engineer's estimates.	H	L	10%	20%	0%	1%	0.00%	£29.36	0.10%	£29,369.68	0.20%	£58,710.00
Objection of works from Café owners.	M	L	1%	10%	0%	1%	0.00%	£2.94	0.05%	£14,678.97	0.10%	£29,355.00
Restricted access to amenities if works are delayed. Particularly restricted access to beach.	L	L	0%	1%	0%	1%	0.00%	£0.00	0.01%	£1,467.75	0.01%	£2,935.50
Construction Risks												
Failure to prevent public access to the construction site.	M	L	1%	10%	0%	1%	0.00%	£2.94	0.05%	£14,678.97	0.10%	£29,355.00
Adverse weather conditions.	H	M	10%	20%	1%	10%	0.10%	£29,355.00	1.05%	£308,227.50	2.00%	£587,100.00
Problem with rock supply.	M	L	1%	10%	0%	1%	0.00%	£2.94	0.05%	£14,678.97	0.10%	£29,355.00
Problem with recharge supply.	M	M	1%	10%	1%	10%	0.01%	£2,935.50	0.51%	£148,242.75	1.00%	£293,550.00
Change in exchange rates.	M	L	1%	10%	0%	1%	0.00%	£2.94	0.05%	£14,678.97	0.10%	£29,355.00
Clay material removal not priced in tenders.	M	L	1%	10%	0%	1%	0.00%	£2.94	0.05%	£14,678.97	0.10%	£29,355.00
Wall collapses when rock removed - unable to reuse existing rock on frontage.	H	L	10%	20%	0%	1%	0.00%	£29.36	0.10%	£29,369.68	0.20%	£58,710.00
Fishermen oppose construction methods/programme.	L	L	0%	1%	0%	1%	0.00%	£0.00	0.01%	£1,467.75	0.01%	£2,935.50
Complaints or objections to works by beach hut owners.	L	M	0%	1%	1%	10%	0.00%	£2.94	0.05%	£14,678.97	0.10%	£29,355.00
Noise and vibration issues - changes to agreed working practices.	L	L	0%	1%	0%	1%	0.00%	£0.00	0.01%	£1,467.75	0.01%	£2,935.50
Lack of public access to area.	L	L	0%	1%	0%	1%	0.00%	£0.00	0.01%	£1,467.75	0.01%	£2,935.50
Lack of access for contractor / emergency services / marine operations.	M	VL	1%	10%	0%	0%	0.00%	£0.00	0.00%	£14.68	0.00%	£29.36
Contractor going bust.	VH	L	20%	50%	0%	1%	0.00%	£58.71	0.25%	£73,416.86	0.50%	£146,775.00
key suppliers going bust	VH	L	20%	50%	0%	1%	0.00%	£58.71	0.25%	£73,416.86	0.50%	£146,775.00
Services affected during works.	H	L	10%	20%	0%	1%	0.00%	£29.36	0.10%	£29,369.68	0.20%	£58,710.00
Tidal working.	H	L	10%	20%	0%	1%	0.00%	£29.36	0.10%	£29,369.68	0.20%	£58,710.00
Materials Risk												
Shingle and rock cannot be sourced from the currently considered location.	H	L	10%	20%	0%	1%	0.00%	£29.36	0.10%	£29,369.68	0.20%	£58,710.00
Shingle and rock cannot be delivered from the planned location.	M	L	1%	10%	0%	1%	0.00%	£2.94	0.05%	£14,678.97	0.10%	£29,355.00
Material not up to quality standards.	VH	L	20%	50%	0%	1%	0.00%	£58.71	0.25%	£73,416.86	0.50%	£146,775.00
Issues arise relating to access to site and additional risks not considered.	L	L	0%	1%	0%	1%	0.00%	£0.00	0.01%	£1,467.75	0.01%	£2,935.50
Barge / lorries not available or operational when required.	M	L	1%	10%	0%	1%	0.00%	£2.94	0.05%	£14,678.97	0.10%	£29,355.00
Unexploded Ordnance												
Discovery of unexploded ordnance on beach.	M	L	1%	10%	0%	1%	0.00%	£2.94	0.05%	£14,678.97	0.10%	£29,355.00
Disturbance												
Loss of parking, public rights of way etc during the construction phase.	L	L	0%	1%	0%	1%	0.00%	£0.00	0.01%	£1,467.75	0.01%	£2,935.50
Item of archaeological significance found during excavations.	M	L	1%	10%	0%	1%	0.00%	£2.94	0.05%	£14,678.97	0.10%	£29,355.00
Proximity of construction to people, particularly on the beach.	L	L	0%	1%	0%	1%	0.00%	£0.00	0.01%	£1,467.75	0.01%	£2,935.50
Environmental Risks												
Water quality.	L	VL	0%	1%	0%	0%	0.00%	£0.00	0.00%	£1.47	0.00%	£2.94
Bird nesting season.	M	VL	1%	10%	0%	0%	0.00%	£0.00	0.00%	£14.68	0.00%	£29.36
Air quality.	VL	VL	0%	0%	0%	0%	0.00%	£0.00	0.00%	£0.00	0.00%	£0.00
Pollution.	M	L	1%	10%	0%	1%	0.00%	£2.94	0.05%	£14,678.97	0.10%	£29,355.00
Visual impact.	M	L	1%	10%	0%	1%	0.00%	£2.94	0.05%	£14,678.97	0.10%	£29,355.00
Financial Risks												
Alterations to the exchange rate.	M	M	1%	10%	1%	10%	0.01%	£2,935.50	0.51%	£148,242.75	1.00%	£293,550.00
Benefit / cost does not equate to previous Strategy Study.	M	L	1%	10%	0%	1%	0.00%	£2.94	0.05%	£14,678.97	0.10%	£29,355.00
Loss of income to café owners / compensation events	L	M	0%	1%	1%	10%	0.00%	£2.94	0.05%	£14,678.97	0.10%	£29,355.00

95% Confidence £5,599,901.45

RISK REGISTER

Date: 10/10/2013

Project Phase: Design

Project: Clacton and Holland-on-Sea Sea Defences

NOTE: RISK TYPES; HS = Health & Safety, T = Time, C = Cost, R = Reputation, E = Environment
Risk: I = Intolerable, S = Significant, T = Tolerable, N = Negligible

Risk Assessment carried out by:

Project Team

Threat	Consequences	IMPACT	LIKELIHOOD	RISK	RISK TYPE	Potential Risk Control Measures / Actions	IMPACT	LIKELIHOOD	RESIDUAL RISK	OWNER	Action (by whom and when)
Strategic Level Risks											
Inadequate money / funding.	No / smaller scheme	VH	VL	T	T, C, R	Design to meet available funding.	H	VL	N	MM / TDC	TDC to confirm available funds, MM to consider this in the design process.
Public objection to plans.	Could go to public enquiry.	M	L	T	T, C	Ensure early stakeholder engagement and consultation to ensure no objections arise resulting in public enquiry, show clear options development process and detailed reasoning for the scheme.	M	L	T	MM / TDC	Engage relevant stakeholders early on and keep them informed of progress and developments addressing their concerns.
Public objection to plans.	Planning not obtained owing to public opinion.	M	L	T	T, C	Provide local engagement during design process to enhance understanding.	M	L	T	MM / TDC	Ensure local councillors are aware of the scheme and can provide information where required.
Public objection to plans.	Licenses/consent not obtained owing to public objection.	H	M	S	T, C	Provide local engagement during design process to enhance understanding.	H	L	T	MM / TDC	Ensure local councillors are aware of the scheme and can provide information where required.
Inadequate regeneration.	Client aspirations not met.	M	M	T	T, C, R	Early discussions with client and ECI to maximise scope to identify areas for regeneration.	M	L	T	MM / TDC / Contractor	Meeting to discuss scope for regeneration at start, review meeting during design process.
Change of Project Team / Council.	Loss of knowledge / motivation.	M	L	T	T, C	Detailed records of correspondence and project developments to be maintained for ease of transition.	M	L	T	MM / TDC	Maintain communication / information trail.
Change in EA processes in funding.	Change in funding amount.	H	L	T	T, C	Secure confirmation from EA on route to proceed to funding and keep informed on guidance revisions and enforcement dates.	H	L	T	MM	Liaise with EA representative.
Failure of defences K / N.	Funding from TDC used.	H	H	S	T, C	Swift project development and turn around.	M	M	T	MM / TDC	Programme adhered to and clear task deadlines and review periods to secure funding application etc.
Failure of the sea wall at Holland-on-Sea between now and 2015.	Reduced funding from EA on whole scheme as money already allocated.	M	VH	S	T, C	Swift project development and turn around.	M	H	S	MM / TDC	Programme adhered to and clear task deadlines and review periods to secure funding application etc.
Design											
Variations in volumes or rates of beach recharge material	Small changes in design specification could significantly increase volumes and therefore costs of beach recharge needed over the 5km frontage	H	M	S	T, C, R, E	Ground investigation and bathymetry works during design process undertaken to help inform designs.	M	M	T	MM / TDC	MM to incorporate ground investigation works into designs
Failure of Clacton and Holland-on-Sea Scheme.	Massive loss of face and reputation for all parties. Cost impacts in relation to providing further works. Impacts on adjacent frontages	H	L	T	T, C, R, E	Review modelling results. Implement robust solution.	M	VL	N	MM / TDC	MM to finalise reviews, modelling and outline design
Public dislike for final scheme.	Poor PR. Council issues.	M	L	T	T, C, R, E	Utilise the stakeholder engagement and public meetings. Generally maintain openness to change within context of project timescale.	L	L	N	TDC / MM	All parties to maintain profile and be receptive of comments whilst driving forward programme for delivery of viable scheme
Design programme not being met.	Full design not done before contractor tender.	H	L	T	T, C	Regular progress updates to PM during design process, issues identified early on, design deadlines clearly identified and fed back to project teams.	H	L	T	MM	All design teams to keep PM's informed and ensure they have all relevant information prior to issues arising.
Design basis changes during design period.	Changes to design.	H	H	S	T, C	Ongoing communication and clarity of Client expectations.	H	M	S	MM / TDC	MM to arrange meeting with Client prior to design to understand outputs and requirements.

RISK REGISTER

Date: 10/10/2013

Project Phase: Design

Project: Clacton and Holland-on-Sea Sea Defences

NOTE: RISK TYPES; HS = Health & Safety, T = Time, C = Cost, R = Reputation, E = Environment
Risk: I = Intolerable, S = Significant, T = Tolerable, N = Negligible

Risk Assessment carried out by:

Project Team

Threat	Consequences	IMPACT	LIKELIHOOD	RISK	RISK TYPE	Potential Risk Control Measures / Actions	IMPACT	LIKELIHOOD	RESIDUAL RISK	OWNER	Action (by whom and when)
ECI / ESE not implemented to support buildability issues.	Delays to programme through issues arising on site, additional costs for design development and Contractor down time.	M	L	T	T, C	Ongoing communication with contractors	L	L	N	MM / TDC	MM / TDC to select Contractor and engage in design process.
Problem with rock supply and availability.	Delay to programme.	H	M	S	T	Liaise with suppliers at design stage to confirm size availability and production rate to consider during design process.	M	L	T	MM	Determine local quarries and suppliers and contact prior to commencing design.
Problem with recharge supply and availability.	Delay to programme.	H	M	S	T	Source material, quantities and programme to be confirmed with supplier to ensure sufficient stock pile of material available at construction.	M	M	T	MM / TDC	TDC to confirm supply source early on. MM to confirm availability and programme for sufficient supply and delivery.
Tender prices don't meet Engineer's estimates.	Additional costs and delay to programme and appointment of works.	H	M	S	T, C	Clear design specification with minimal uncertainties and early contractor involvement and liaison with suppliers	M	L	T	MM	Tender design to be informed and detailed with minimal uncertainties.
Objection of works from Café owners.	Programme and cost implications.	VL	M	N	T, C	Maintain public access along rear of frontage during works. Clearly explain plans to the public and local stakeholders	VL	L	N	MM / TDC	MM to consider access and working restraints during design process and specification, TDC to inform public of works.
Restricted access to amenities if works are delayed. Particularly restricted access to beach.	Poor public image, loss in tourism, programme delay.	VL	M	N	T, C, R	Monthly progress reports and maintain a good relationship with Contractor to point out and resolve any issues early on.	VL	L	N	Contractor	Provide regular progress reports and highlight issues early on to avoid delays and facilitate swift responses.
CONSTRUCTION											
Failure to prevent public access to the construction site.	Accidents.	H	M	S	R, HS	Ensure best practice method of working is observed. Public information provided. Site security to be implemented.	M	L	T	TDC / MM / Contractor	Ensure best practice method of working is observed. Public information provided. Site security to be implemented.
Adverse weather conditions.	Adverse weather conditions including storms and high tide levels leading to delays in programme and possible damage to plant.	VH	H	I	T, HS	Use suitable method of working. Careful planning and timing of works. Emergency action plan and contract provision.	H	M	S	MM / Contractor	Use suitable method of working. Careful planning and timing of works. Emergency action plan and contract provision.
Clay material removal not priced in tenders.	Claim for additional works and slight delay in construction programme.	M	M	T	T, C, E	ensure works information document contains requirement	M	L	T	MM	Ensure tender or specification documents allow for removal of unsuitable material during excavations.
Wall collapses when rock removed - unable to reuse existing rock on frontage.	Additional cost for more material or emergency works to repair wall, delay to programme.	VH	M	S	T, C, HS	Provide temporary support for the wall when rock is removed. Arrange for a test of the existing rock units once funding has been approved. Review construction method to ensure wall is not left exposed	H	L	T	Contractor	Ensure temporary works are priced and arrange for testing existing rock armour units prior to ordering materials.
Fishermen oppose works	Delay to programme.	M	L	T	T, C, R	Detail the construction method to minimise impacting on local marine environment, maintain access for launching boats during works. FLO to be appointed	L	L	N	Contractor	Liaise with local fishermen and ensure access is not restricted during the works.
Complaints or objections to works by beach hut owners.	Delay to programme.	L	H	T	T, C, R	Provide good local engagement during construction process to maintain public image and concern.	L	M	T	Contractor	Ensure local councillors are aware of the scheme and can provide information where required.
Noise and vibration issues - changes to agreed working practices.	Complaints from members of the public, additional costs and potential delay to programmes.	VH	M	S	T, C, R	Leaflet drop to immediate residences, measures to reduce noise adopted outside acceptable working hours (where measure inadequate to resolve issues restrict working hours).	L	L	N	Contractor	Inform and keep members of the public engaged, liaise with client representative prior to adoption of mitigation measures.
Lack of public access to area.	Complaints or objections to work.	L	H	T	T, C, R	Ensure restricted access to immediate working area, use of banksmen and maintenance of access to other areas of foreshore.	L	L	N	Contractor	Consider public impact from working methods.

RISK REGISTER

Date: 10/10/2013

Project Phase: Design

Project: Clacton and Holland-on-Sea Sea Defences

NOTE: RISK TYPES; HS = Health & Safety, T = Time, C = Cost, R = Reputation, E = Environment
Risk: I = Intolerable, S = Significant, T = Tolerable, N = Negligible

Risk Assessment carried out by:

Project Team

Threat	Consequences	IMPACT	LIKELIHOOD	RISK	RISK TYPE	Potential Risk Control Measures / Actions	IMPACT	LIKELIHOOD	RESIDUAL RISK	OWNER	Action (by whom and when)
Lack of access for contractor / emergency services / marine operations.	Altered working methodology, additional temporary access required, complaints from local stakeholders.	M	H	S	T, C, HS, R	ECI to discuss access requirements and working methods, stakeholder engagement to confirm emergency access requirements and extent of marine operations to mitigate impacts early on.	M	VL	N	MM	Consider aspects during detailed design stage to provide mitigation measures and minimise impacts.
Contractor going bust.	Severe delays and additional cost to procure new contractor.	H	L	T	T, C	Ensure Contractor has necessary insurances and meets requirements of quality and experience during tender assessment.	VH	L	S	TDC / MM	Ensure tender assessment conducted thoroughly.
Key suppliers going bust	Severe delays and additional cost to source new supplier	VH	M	S	T, C	Ensure suppliers are aware and capable of delivery for this type of work.	VH	L	S	Contractor	Liaise with supplier initially to check they can cope with scope of work.
Services affected during works.	Additional costs and delay to programme.	L	L	N	T, C, R	work done to verify services	H	L	T	MM / Contractor	MM to conduct service search and provide necessary plans in construction doc, Contractor to take care when working in areas of potential services.
Tidal working.	Reduced working hours, delay to programme.	H	M	S	T, C	Ensure tidal working clearly identified in tender document and specification.	H	L	T	MM / Contractor	MM to ensure tidal working clearly identified, Contractor to have prepared for tidal working taking into account available tides when producing programme of works.
MATERIALS											
Material not up to quality standards when arrives at site.	Return unsuitable materials, compromise integrity of design standard.	VH	M	S	T, C	Samples tested at quarry prior to large scale supply of material and intermittently as per contract specification.	VH	L	S	MM / Contractor / Supplier	Supplier to be able to test materials, Contractor to obtain test certificates, MM to ensure certificates meet specifications.
Issues arise relating to access to site and additional risks not considered.	Alteration in the method of delivery of the material.	M	L	T	T,C	Ensure method of delivery is confirmed before transportation of materials begin.	L	L	N	MM / Contractor	MM to advise on delivery of materials, Contractor to confirm delivery with suppliers and consultant engineer.
UNEXPLODED ORDNANCE											
Discovery of unexploded ordnance on beach.	Could result in time delay and risk to local population.	H	L	T	T,C	Ensure best practice method of working is observed . Desk study already undertaken	M	L	T	TDC / Contractor	TDC to have suitable emergency plans in place, Contractor to follow best practice of working.
DISTURBANCE											
Loss of parking etc during the construction phase.	Objections from the public, poor PR.	VL	H	N	R	Utilised section working, ensure there is ongoing consultation and PR, find alternative parking.	L	L	N	TDC / MM / Contractor	TDC / MM to provide ongoing PR and consultation, Contractor to follow best method of working.
Item of archaeological significance found during excavations.	Delay to works and cost of archaeologist during excavation works.	M	L	T	T, C, E	English heritage contacted to determine significance of the area, excavations minimised to reduce risk. Subject to planning watching brief required and archaeologist on site	M	VL	N	MM / Contractor	MM to identify potential for archaeology in the area, Contractor to adopt best working practise.
Proximity of construction to people, particularly on the beach and prom.	Accidents.	H	H	S	HS, R	Ensure ongoing consultation and PR through detailed design and on-site during construction.	L	L	N	TDC / MM / Contractor	Maintain professional work attitudes and best working practises, good public liaison and availability.
ENVIRONMENT											
Water quality.	Construction of scheme affects the water quality as a result of plant used and sediment from the recharge.	L	L	N	E	Monitor and liaise with relevant organisations, ensure biodegradable fluids used in plant (fuel, hydraulics etc).	VL	L	N	Contractor	Ensure drip trays used where required and biodegradable fluids in all plant accessing / working around the foreshore.
Bird nesting season.	Delay in works, additional cost of static plant.	H	L	T	T, C, E	Environmental impact considered at design stage together with identification of local wild fowl and designated areas.	H	VL	N	MM	Undertake initial environmental assessment and inform client of any potential issues.

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Air quality.	Construction works have an impact on the air quality.	L	L	N	E	Use of modern plant. Minimal use of air-bourne material.	VL	VL	N	Contractor	Use best working practises.
Pollution.	Delivery method and machinery emits pollution.	M	M	T	E,R	Ensure best practice method of working is observed. Pollution control measures in place.	M	L	T	Contractor	Use best working practises.
Visual impact.	The scheme has a negative visual impact.	L	L	N	E,R	Agree through stakeholder engagement and planning application.	L	L	N	TDC / MM / Contractor	Early stakeholder involvement.
FINANCIAL											
Change in exchange rates.	Increase in material prices.	M	M	T	C		M	M	T	Contractor	Contractor to determine supplier for construction materials.