



PA 04905/10

**DEVELOPMENT OF COASTAL DEFENCES AGAINST WAVE
INCIDENCE ON SHORE FOR MARSALFORN BAY INCLUDING:
BEACH NOURISHMENT; CONSTRUCTION OF GROUYNE;
UPGRADE OF STORM WATER CHANNEL AND
CONSTRUCTION OF SUBMERGED BREAKWATER.**

AT

MARSALFORN BAY, MARSALFORN, ŻEBBUĠ (GOZO), GOZO.

TERMS OF REFERENCE

FOR THE PREPARATION OF AN

ENVIRONMENTAL IMPACT STATEMENT

September 2011

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TERMS OF REFERENCE FOR THE PREPARATION OF AN
ENVIRONMENTAL IMPACT STATEMENT FOR THE PROPOSED

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SITE AT, MARSALFORN BAY, MARSALFORN, ŻEBBUĠ (GOZO), GOZO.

Note 1:	“Environmental Impact Assessment is the process of identifying, predicting, evaluating and mitigating the biophysical, social and other relevant effects of development proposals prior to major decisions being taken and commitments made” (IAIA, 1999) ¹ . The EIS is to document clearly and impartially the impacts of the proposal, the proposed mitigation measures and impact significance. In accordance with best practice, this shall be carried with professionalism, rigour, fairness, objectivity, impartiality and balance.
Note 2:	<p>The Malta Environment and Planning Authority (MEPA) reserves the right to request additional studies should the findings of the EIA not be sufficient to adequately inform the decision making process or if the EIA identifies matters which should be subject to further (or new) studies.</p> <p>All requirements set out in these terms of reference must be complied with. If there are any sections that the consultant deems that they are not relevant to this study, the consultant shall inform MEPA accordingly fully justifying his/her reasoning. Should, during the process of the EIA the consultant discover that any environmental feature, not included in these Terms of Reference needs to be studied, the consultant shall inform MEPA immediately, justifying his/her reasoning.</p>
Note 3:	Difficulties, including technical difficulties and lack of information, encountered by the consultants in compiling the required information shall be made clear. All references to published works and sources of information shall be duly acknowledged. No material may be incorporated by reference unless it is reasonably available for inspection by potentially interested persons within the consultation period. Any material which is based on proprietary data which is not available shall not be incorporated by reference.
Note 4:	Experts contributing to the EIA should be specifically asked to consider impact interactions and to communicate information between each other.
Note 5:	The relevance of Maltese Legislation and Maltese Planning Policy (notably the Structure Plan for the Maltese Islands and Local Plans for the surrounding areas), other policies and international policies and conventions shall be discussed and the compatibility (or otherwise) of the proposal with these laws and policies should be described and analysed in the relevant chapters. Policies on the following should also be discussed: conservation areas and zones, marine protection, protected buildings and sites, areas of natural beauty (including localized scenic spots/coves), areas of scientific, ecological, archaeological, agricultural, architectural, historical, antiquarian or artistic value, aquifer protection and run-off.
Note 6:	A list of all permits, licenses and other forms of authorisation (other than the development planning permit) which must be obtained by the applicant in terms of any other law in implementing the development if permission is granted must be included in the EIS. If consultants are uncertain whether an authorisation is necessary, they shall so indicate in the EPS.

¹ International Association for Impact Assessment (IAIA). (1999). *Principles of Environmental Impact Assessment Best Practice*. Document published by the IAIA in cooperation with the Institute of Environmental Assessment, UK.

Note 7: Following the review of the EIS, MEPA submits comments to the EIA consultants for further clarifications. Once the consultants respond to these comments to the satisfaction of MEPA, a second draft of the EIS, that includes these clarifications, must be prepared. MEPA will only accept an Addendum containing these clarifications if the clarifications are few or where the EIS is still easy to follow with the Addendum.

Note 8: Any requirement for confidentiality of any section of the EIS must be justified and a formal request in this regard must be submitted to MEPA. Should MEPA grant confidentiality for specified sections, alternate material that excludes confidential details must be provided for public consultation.

An Environmental Impact Statement (EIS) is to be prepared for the proposed *development of coastal defences against wave incidence on shore for Marsalforn Bay including: beach nourishment; construction of groyne; upgrade of storm water channel and construction of submerged breakwater*, at Marsalforn Bay, Żebbuġ, Gozo (PA 4905/10) required by Schedule IA of the Environmental Impact Assessment Regulations 2007 (L.N. 114 of 2007, Schedule IA, Category I Sections 2.3.1.3). The components of the EIS are to be:

- i. A **Coordinated Assessment Report**, in conformity with Sections 1 - 4 and their contents as outlined below. This report should describe the project in its totality; and
- ii. A **Separate Appendix** containing all original survey reports as prepared by individual consultants for specific topics.
- iii. A separate **Non-Technical Summary** of all sections of the technical report (to be also provided in digital format and in both the Maltese and English languages). This summary should include any assumptions made in the report; key features of the site (including surroundings) and proposed development; key impacts and any proposed mitigation measures to minimise costs (externalities) and maximise benefits arising from the proposed development. Technical terms, lists of data and detailed explanations of scientific reasoning should, where possible, be avoided.
- iv. Two **hard copies** and two **printable digital copies of the first draft** of all elements of the EIS, which includes all the above, including any plans, maps, photographs, graphs, and any other contents of graphical/visual nature contained within the EIS. Once the EIS has been certified two **digital copies of the certified document** are to be submitted to MEPA.
- v. Conformity with sub-Regulations 28 and 29 of the EIA Regulations (refer to Appendix 1 to these Terms of Reference).

1.0 Description of the Proposed Development

Note 9: The description of the proposed development is to include consideration of the aspects outlined below. This description must take into account the entire proposal and any landside/ancillary facilities connected with, or arising due to, the project (such as any infrastructure required). Where relevant this section should include maps, plans and diagrams.

1.1 Justification for the Proposal

1.1.1 Objectives

A description of the environmental, social and economic objectives which the development will seek to address, and whether such objectives stem from current international obligations and national, regional or local policy, plans and guidance.

1.1.2 Demand

A description of the current and expected demand for the proposed coastal defences including any landside/ancillary facilities; explaining how the proposals (their size and nature) will address this demand.

1.1.3 Future developments

Future developments/needs, if any, of the development shall also be addressed.

1.2 A Description of the Physical Characteristics and Features of the Project including Constructional Features

1.2.1 Description of the physical characteristics of the proposed development during both construction and operation:

(a) A description of the project including location and structure of all the proposed coastal defences, showing the design (size, area, height, volume [*scale 1:2500*]) layout [to include hard and soft landscaping (*scale 1:2500*)], method/s of construction, location of all landside facilities (if any are required) and proposed access arrangements, as well as any works involved in the removal or displacement of existing structures or land uses.

(b) Details of the methods used in the construction of the coastal defences. Detailed layout plans and sections are to be submitted including dimensions. This description should include a discussion of alternative methods of construction of the coastal defences considered for the proposal.

(c) A detailed description of the proposed phases of construction including details regarding:

- The provisions of services on land;
- The beach nourishment process; and,
- The construction of the beach facilities, such as the submerged breakwater and groyne.

(d) Technical studies, including modelling, adopted for the determination of the best design for the proposed project.

(e) Details vis-à-vis the volume of beach fill required and its grain size. An indication of any relevant properties of the material to be used, e.g. geo-chemical composition, physical properties, pollutants/radioactivity, shall also be provided.

1.2.2 Land use requirements for the construction and operation, and site details, including land and sea take required for the proposed coastal defences, site preparation works, dredging, excavations and disposal of surplus material. Proposed facilities (including infrastructure, storage, servicing facilities, security etc.) in terms of size, area, height and volume, proposed elevations, layout, method of construction, etc. are to be provided.

- 1.2.3 Proposed project management arrangements during all phases of the development. These should include a description of:
- (a) Expected duration of all phases;
 - (b) Types and quantities of raw materials and primary resources including water, energy, stone and other resources to be consumed;
 - (c) Measures to reduce consumption of primary resources; and,
 - (d) Season, frequency and duration of interventions on the land.
- 1.2.4 The depth and levels of excavation, if any, volume and type of excavated material required for the proposal and any ancillary/landside facilities, are to be quantified, clearly identifying the types of material envisaged to be excavated.
- 1.2.5 In view of the proposed dredging activities the following are required:
- Details of the methodologies to be applied (including rate of dredging), the volumes of the material to be dredged and foreseen duration of the operations;
 - Further information is required on whether the dredging envisaged is a one time capital dredging project only, or whether any maintenance dredging is also required. If maintenance dredging is also required further information on the methodologies and mitigation measures expected to be put in place to limit damage to the marine environment; and,
 - To consider alternative methods of dredging, together with the environmental impacts of each of the methods outlined.
- 1.2.6 Identification of the routes that construction vehicles will use to and from the site, the number and size of construction vehicles and their respective frequency of use, and the time of day when construction traffic is likely to be heaviest.
- 1.2.7 Facilities for the on site servicing of equipment, vehicles and other machinery.
- 1.2.8 Water storage, runoff and water management including reservoirs. Proposals for the collection/treatment/re-use of rain water runoff.

1.3 A Description of the Operational Features of the Project

- 1.3.1 Residues and emissions by source, type, quantity, composition and concentration. These should include estimated light and noise levels and particulate emissions to the atmosphere within the development and at the site boundary clearly indicating the time during which light, air and noise sources will be active; distribution of dust, if any and construction of the development, on site disposals and from waste transport, discharges to water and emissions to air, if any, vibration and light sources.
- Emissions to air shall include dust and chemical emissions due to machinery, traffic, heavy vehicles and/or associated activities during both construction and operation of the proposed development.
- 1.3.2 Estimates of the various water consumption requirements of the development and the identification of the sources of water to be used and reuse of grey water/ sewage, etc, storm water management, landscaping schemes, etc.
- 1.3.3 Power (including the connected load in MW or MVA and the overall power factor). Estimates of the energy consumption requirements (annual MWh), split in terms of end-use (e.g. street lighting etc.) and which reflects the expected use. An estimate of the level of energy consumption that the development could entail should be provided.
- 1.3.4 Details regarding energy and water issues during operation.

1.4 Waste Management

This section is aimed at assessing the waste management implications that are likely to arise from the proposal, as well as proposing solutions how such waste shall be managed using the Best Practicable Environmental Options available. Every possible effort shall be made to minimise the waste generated and to divert waste to reuse or recycling rather than disposal. This section shall address the following requirements:

- 1.4.1 The assessment is to cover all wastes generated, including hazardous wastes, wastes generated from ancillary/landside facilities required on site and wastes which may arise from accidental spillages and leakages, and shall be subdivided into the following project phases:
- Construction (including site clearance, dredging, demolition and excavation); and,
 - Operation: waste management infrastructure required during the operational phase.
- 1.4.2 The following information to be provided for each waste stream and shall be presented **separately** for the different phases listed above:
- Identification of processes or activities, resulting from the proposal that would result in waste generation;
 - The European Waste Catalogue Code for each waste stream, as per Schedule 1 and the corresponding H code (if applicable) as per Schedule 2 of the Waste Management (Permit and Control) Regulations, L.N. 337 of 2001;
 - The projected quantities for each type of waste (details of assumptions made and the methodologies adopted for achieving such estimates should also be included);
 - Information on waste handling and storage on site as well as offsite management; and,
 - The frequency and method of transportation offsite.

This information shall be presented in table format as follows:

PHASE							
Activity	Waste Description	EWC Code	H code	Quantity Projected	Internal handling and storage	Frequency and Method of Transport to the disposal site	Offsite waste disposal site/waste management company

- 1.4.3 Inclusion of layout plans (to scale) clearly showing all relevant waste management infrastructure required (e.g. bunded areas for storage of waste fuels, wheel-wash facilities, etc.), clearly distinguishing between temporary and permanent structures for each phase.

1.5 Consideration of Alternatives

1.5.1 *Alternative Layouts/Locations*

An identification of **all** possible layouts/locations of the proposed coastal defences (including all possible alternatives such as beach nourishment and the submerged breakwater, amongst others), based upon the possibilities and constraints posed by the physical characteristics and features of the projects, its operational features and land/sea-use requirements. A detailed description of these layouts and site-specific environmental impacts shall be provided. This section should also include the zero

option, that is, an assessment of the way the site would develop if it were left in its natural state.

The EIS should give a clear conclusion of the Best Practicable Environmental Option whereby the environmental benefits and loss for each option are weighed against each other, taking into consideration the likelihood, scale and permanence of the each of the effects mentioned in the assessment.

1.5.2 *Alternative Technologies*

An assessment of the alternative technologies (including both construction and operational phases) should be considered. This section should contain a detailed explanation of the proposed technology to be used (including that for reducing emissions) and an assessment of alternative technologies which can be used to achieve the objectives of the proposed development. The information shall be presented in tabular format indicating technologies and associated environmental impacts, in sufficient detail.

- 1.5.3 The findings on the environmental impacts of alternative layouts shall be combined with those on the environmental characteristics and environmental impacts in the alternative layouts. This will enable the identification of best technology combinations. The technical and planning reasons why a particular technology and route was selected in preference to all the others must be clearly explained. The discussion should cover demolition, construction, operation and distribution aspects. The findings of the assessment of alternatives shall also be summarized in a tabular matrix for ease of comparison.

2.0 A description of the Proposed Site and its Surroundings

Note 10: This description is identified by the area of influence for each relevant parameter. The area of influence for each parameter shall be determined by the consultants who shall also justify the extent of the chosen area of influence. This must be **APPROVED** by the Malta Environment and Planning Authority prior to commencement of the EIA.

The following section shall comprise the baseline studies for a number of issues with respect to the proposed development. The studies shall be carried out on the following:

2.1 Land and Sea Uses

A description of the present uses of the proposed site together with a description of settlements, workplaces, places of worship, commercial, recreational and other uses located within an area of influence from the site. Details including nature, magnitude, proximity to site etc. should be included. This shall also include a description of any protected/scheduled areas.

This shall also include details and cross-section of existing coastal structures within the entire bay, including but not limited to quays, promenades, roads, slipways, outfalls etc.

Present land and sea uses, including estimates, if possible, of the number of bathers, the number of boats etc. shall also be included.

2.2 Hydrodynamic Modelling

A detailed wave and hydrodynamic model that includes mathematical modelling adopted for the determination of the best design for all the components of the proposed project (which also includes a sediment transport study), shall be undertaken.

2.3 Description of Marine/Terrestrial Environment

This shall include the following:

- (a) Onshore topographic maps;
- (b) Offshore bathymetric maps;

- (c) Description of the coastal configuration of the area;
- (d) Description of the sea bed morphology and of the sediment characteristics of the site;
- (e) Aerial imagery of the area;
- (f) Wave statistical characteristics (including probability tables for extreme conditions);
- (g) Details of services/utilities (slipways, outfalls, etc.), location maps of any type of activity discharging, directly or indirectly, effluent in relation to the marine environment; and,
- (h) Other relevant environmental features.

An assessment of the current water quality and ecological status within the Marsalforn Bay based on the following quality elements as given in Annex V of the Water Framework Directive (WFD) - (2000/60/EC):

- (a) Biological elements (phytoplankton, macrobenthic invertebrates, angiosperms and macroalgae);
- (b) Hydromorphological elements supporting the biological elements (depth variation, structure and substrate of the coastal zone); and,
- (c) Chemical and physico-chemicals supporting the biological elements (transparency, thermal conditions, oxygenation conditions, salinity and nutrient conditions).

Such environmental studies will be used to assess potential impacts of the development and provide a baseline assessment of current chemical and ecological statuses at the site. The description of status should be based on scientific data collected from the site as well as data published in the scientific or other literature. All sources of information must be quoted acknowledged. This data should then be used to qualitatively describe the status of the water quality and ecology within the area as compared to the normative definitions for high, good and moderate status given in Annex V of the WFD (2000/60/EC).

2.4 Landscape Character and Visual Amenity

Landscape Character

A description of the landscape area of influence or landscape setting of the proposed site (to be approved by MEPA), identifying the component Character Areas/ Local Landscape Tracts and the landscape elements and characteristics thereof. In defining these, reference shall be made to MEPA's 'Draft Landscape Assessment Study'.

The degree of sensitivity of each Character Area and Local Landscape Tract shall be indicated and justified.

Visual Amenity

The Zone of Visual Influence (ZVI) of the proposed site without and including the proposed development shall be identified and the methodology used to ascertain same shall be described. Viewpoints within the ZVI shall be identified that are representative of short, medium and long distance views towards the Application Site. The ZVI and viewpoints shall be subject to the approval of MEPA. To assist in this approval process MEPA will require a base photo from each of the proposed viewpoints. Such photos shall be in compliance with the criteria set out in Section 3 below.

The visual amenity of each view shall be described and the numbers and sensitivity of the receptors likely to partake of the view from each viewpoint shall be identified and the degree of sensitivity of each shall be indicated and justified.

Reference should be made to the *Guidelines for Landscape and Visual Impact Assessment*, 2nd Edition (*The Landscape Institute and IEMA*, 2002).

2.5 Geology, Geomorphology, Hydrogeology and Hydrology

A baseline covering the geology, geomorphology, hydrogeology and hydrology of the bay including a description of any important features found on site and in the surrounding area.

Details, baseline surveys and characterisation of sites' hydrological conditions including catchment areas, drainage patterns, runoff including volume and route taken by run-off. Environmental characteristics of the bay, including discharges of storm water, shall also be taken into consideration.

Furthermore, in view of the fact that the proposal incorporates beach nourishment, details related to the preferred beach fill material is required. An indication of any relevant properties of the material to be used is to be provided as follows:

- Geo-chemical composition;
- Physical properties – a comparison of indigenous and proposed grain is suggested with respect to grain size, geology (Mohs hardness scale) and texture. Impacts from erosion and abrasion on the material would also need to be assessed; and,
- Pollutants/radioactivity.

2.6 Marine Ecology

A full benthic survey shall be undertaken for areas to be affected. The study shall include:

- (a) A survey of the existing benthic environment on and around the area to be affected. This is to consist of a survey along a transect system to characterise the benthic communities in the area. The communities are to be characterised according to the system given in Borg & Schembri (2002)², and mapped.
- (b) Identification and description of indicator species relevant to characterisation of the ecological quality and conservation status of the marine area.
- (c) Identification and description of existing species and habitat types, found in the area under study, including nektonic species; with particular reference to those species or biotopes/habitat types listed in relevant nature protection³ legislation, international nature protection treaties and the EU Nature Protection Acquis. Identification and presence of particular habitats listed in Annex I of Directive 92/43 and species listed under Annex II of the same Directive.
- (d) A description of the areas likely to be affected by the proposal, including worst-case scenarios. Biodiversity of areas that may be affected by the proposal shall be identified.

2.7 Archaeological Sites and Cultural/Historical Features

A survey to determine the presence of any underwater archaeological and cultural heritage features in the area shall be carried out (Refer to Appendix 2 for more detailed Terms of Reference).

2.8 Noise and Vibration

Information on the prevailing background noise levels both in terms of frequency and intensity should be given. This baseline survey should follow parameters given in BS4142:1997. Locations for monitoring background noise should be chosen bearing in mind the following:

- Other existing noise sources in the area, including increase in traffic and congestion in the area;
- Other potential noise sources in the area, including new developments;
- Sensitive receptors, residential areas, schools, hospitals, etc.;
- Sensitive recreational areas in the vicinity; and,
- Features that might shield noise, topographical, vegetation, etc.

These locations must be approved by the MEPA prior to commencement of the EIS studies.

² Borg, J.A. & Schembri, P.J. (2003) Alignment of marine habitat data of the Maltese Islands to conform to the requirements of the EU habitats directive. In: Sant, M. (Editor) *Marine habitats data of the Maltese Islands*. Interactive CD. Floriana, Malta: Malta Environment and Planning Authority.

³ Nature Protection regulations include, amongst others, the Environment Protection Act [Act XX of 2001], the Development Planning Act [Act I of 1992 as amended], the Sand Preservation Act [Act XVI of 1949 as amended; various Legal Notices, including LN 19/92 as amended, 22/92, 76/92, 25/93, 49/93 as amended, 146/93 as amended, 66/97, 160/97, 196/97, 161/99, 12/01, 335/01, 160/02, 167/02, 169/02, 170/02, 194/02, 290/02, 203/03, 257/03, 194/04 and 311/06, as well as various Government Notices, including GN 85/32, 269/33, 328/49, 877/03 and the GNs declaring scheduled property of ecological and scientific importance.

2.9 Characteristics of Human Populations

A description of the resident and visiting populations/ communities on site and within the area of influence (including residents, foreign and domestic tourists and people visiting the area for its environmental/ cultural heritage features, amongst others) a description of their lifestyles and social activities with respect to the area.

2.10 Existing infrastructure and utilities

Description of the current infrastructure and utilities available on site (including water supply, energy supply, sewerage, access routes, etc.)

2.11 Any other relevant environmental features

3.0 Assessment of environmental impacts and risks of the proposed development

Note 10: All significant impacts of and risks posed by the proposed project **during construction and operation**, should be assessed, given the environmental characteristics of the site outlined in Section 1 and 2 and the policies outlined in Section 3. A descriptive and quantitative analysis (including magnitudes and timing) of the impacts of the proposed development should be made, and presented in summary chart format. The various techniques, methods and assumptions used in the analysis and predictions should be outlined.

The impact assessment should include:

- i. Description of the impact;
- ii. Magnitude and significance;
- iii. Duration (temporary or permanent);
- iv. Extent (in relation to site coverage and surroundings and associated features);
- v. Direct or indirect impact;
- vi. Adverse or beneficial;
- vii. Reversible or irreversible effects of the impact and extent or irreversibility as well as description of any associated conditions/assumptions for irreversibility;
- viii. Sensitivity of resources to impacts;
- ix. Probability of impact occurring;
- x. Confidence level/limits to impact prediction;
- xi. Scope of mitigation/enhancement; and
- xii. Residual impacts.

Worst case scenarios should be assessed where relevant.

3.1 Impacts on Land and Sea Uses

The impact on land and sea uses including impacts on local topography.

This assessment shall first consider the proposed development in isolation and assess the impacts arising from the proposed development. These include impacts of the proposal on the adjacent land and sea uses including residential communities and other sensitive receptors/uses (e.g. places of worship, marine environment etc.) during construction and operation.

This assessment shall then consider the proposed development in a wider context and assess the effects of the proposed development upon the surrounding land uses and the effects of the surrounding land uses upon the proposed development. Specific reference to sensitive receptors should be made.

3.2 Effects on Coastal Configuration and Sea Bed

Effects of the changes in the local bathymetry and as a result of the proposal. This shall include an assessment of the effects of the proposal on water circulation inside the bay, the expected impact on water quality and sediments in the bay, among others.

3.3 Effects of/on Water Quality/Hydrology

This shall include impacts of the drainage patterns, including surface hydrology and run-off on the proposed development. Water currents, circulation and water quality resulting from suspension of sediments, into the marine environment and its effect on habitats shall also be taken into consideration.

The effects of sediments and water quality during the construction and operational stage especially in view of any possible transport of dredging waste by sea during construction and increase water vehicle traffic during the operational stage.

An assessment of sea pollution by uncontrolled sewage, polluted surface run-off, oil, lubricants, gasoline, paints and anti-fouling materials and any other discharge to the marine environment shall be assessed.

Furthermore, the assessment of the environmental impacts and risks shall include the following:

- Change to the dynamics of water circulation in the area as a result of the proposal that could lead to indirect impacts including reduced oxygenation conditions and consequent altering of the existing marine communities and habitats;
- Risks that any material transported with the water flow from the valley into the bay, will become trapped within the inner part and will deposit on the bottom. This may lead to the accumulation of mud at the bottom with detriment impact on the marine communities; and,
- Increased turbidity during construction and potential accidental chemical contamination to sea from the proposed construction activities.

3.4 Effects on Landscape and Visual Amenity Impact Assessment

The assessments shall have regard to the entire proposed development including all landside/ancillary development associated with it. The basis for the assessment of the significance of the impact of the proposed development shall be described.

The Landscape and Visual Amenity Impact Assessments must also have regard to committed development within the Area of Influence or Viewshed that is likely to affect the quality of the landscape or the visual amenity of the Application Site (without and with the proposed development).

1. Assessment of the Impact on the Landscape

This shall comprise the identification and description of the predicted changes in the landscape attributable to the proposed development. The effects of the changes on the quality of the landscape / elements in each of the identified landscape character areas / local landscape tracts, and an assessment of the effects of such changes on the previously identified sensitive receptors of the landscape shall be submitted. The predicted magnitude of the effects on the sensitive receptors shall be justified.

2. Assessment of the Impact on the Visual Amenity

This shall comprise the identification and description of the predicted changes to the visual amenity of the proposed site attributable to the proposed development. The effects of the changes on the quality of the visual amenity of the proposed site as viewed from each of the approved viewpoints and an assessment of the effects of such changes on the previously identified sensitive receptors of the visual amenity shall be submitted. The predicted magnitude of the effects on the sensitive receptors shall be justified.

The base photos / photomontages to be submitted shall comply with the following:

- a) The location of each viewpoint shall be shown on a map that also depicts the Viewshed for the proposed site as described above. The visual angle of the photograph shall also be depicted. In this regard, it is recommended that the visual angle should not be greater than 50 degrees. However, the use of stitched photos that illustrate the field of vision towards the Application Site from each viewpoint is acceptable on the proviso that such photos are additional to the 50 degree photo

- b) Each photo / photomontage submitted shall:
- Be at least A3 in size. Strips which are A3 in width but not in length will not be accepted except for additional illustrative material;
 - identify the date and time at which it was taken;
 - Be of good quality, with faithful colour reproduction. The photos shall be taken in good weather and, unless otherwise directed by MEPA, shall be taken at least 2 hours after sunrise and 2 hours before sunset. Colours should not be digitally or otherwise manipulated. The image should have a printing density of 200 dots per inch or better. In some instances, digital images having a resolution of 1024 x 728 or better should be requested for multimedia presentation purposes;
 - Be taken in such a manner that near field objects do not overpower or dominate features near the image plane passing through the project area;
 - Be taken from a height above ground level that is representative of the eye level of the viewer and such height shall be documented;
 - Shall ensure that any additional/replacement structures or features depicted in the photomontages shall have a scale which proportionately tallies with the existing nearby features; and
 - Show in the photomontage(s), if applicable, the landscaping scheme proposed for the development. The maturity of the landscaping scheme as shown (which shall not be less than 5 years after planting) shall be indicated. The photomontages should also be submitted that do not include landscaping scheme.

3.5 Effects on Geology, Hydrogeology and Hydrology

This study shall assess the impacts arising from the proposed development with respect to the geology, hydrogeology and hydrology of the site. It shall assess the significance of impacts on soil, aquifers and water resources, permanent and/or temporary changes to the hydrologic regime of watercourses which may traverse the site, permanent and/or temporary changes to the hydro-geologic regime of site including changes to the mean sea level aquifer and its recharge.

The impact on the surface water drainage pattern shall also be mapped and illustrated if the proposed development is constructed. The impacts on the surrounding area and property due to the resulting change in surface water drainage pattern shall be clearly described.

Impacts on groundwater and surface water in terms of water quality shall also be assessed, if relevant.

3.6 Effects on Marine Ecology

Impacts of the proposed development on benthic habitats, including biodiversity, during construction and operation. Emphasis on protected species and habitats under any legislation or Convention should be made, if any. Impacts due to loss of, damage to and alteration of habitats shall be assessed.

3.7 Effects on Archaeological Sites and Cultural/Historical Features

Impacts of the proposal on the archaeology and cultural heritage features of the area including preservation within the proper landscape context. Refer to Appendix 2 for detailed Terms of Reference.

3.8 Impacts of Noise and Vibrations

This shall include an assessment of maximum noise levels expected to be generated, variations during the day and night and noise attenuation (the reduction in noise levels as a result of 'environmental' factors, e.g. mufflers at source, insulation of a building). The effects of noise and vibrations on the surrounding community should also be assessed.

Noise sensitive receptors should be identified and agreed with MEPA. It is recommended that BS4142:97 is used for the noise assessment and BS6472 (relating to human exposure to vibration) and BS7385 (covering the effects on buildings) is used when studying vibration.

3.9 Impacts on Human Populations and Public Health

This shall assess the impacts of the development on the surrounding and visiting population and their social activities including impacts due to potential improvement or impairment of amenity, impacts on the swimmers at Marsalforn Bay, public access, etc.

The EIS shall also include a detailed description of the measures envisaged to prevent, minimize and where possible, offset any significant adverse health effects, including cumulative impacts of the development on the general public and on the areas affected by the proposed development. This should include details of the monitoring programmes that may be proposed. The EIS shall also identify, describe and discuss in detail the possible health effects of any residual impacts that cannot be mitigated. This shall be presented as a separate Section/Chapter in the EIS.

3.10 Secondary Impacts

Mainly arising from the extraction and consumption of resources necessary to implement the project, as well as from developments supporting the project (e.g. new, sewers, power lines, pipelines, telecommunications), such as water, energy, construction materials, and the resultant need (if any) of development of new supplies.

3.11 Other Environmental Effects

Other environmental effects other than those identified in Sections 3.1 – 3.12 shall be described and their impacts assessed.

3.12 Cumulative Effects

This section shall refer to all the impacts of all the aspects of the development and shall assess:

- The effects resulting from the **interaction of separate effects** listed above as well as any other relevant impacts; and,
- The impacts of the project viewed in terms of other projects (i.e., not in isolation), including existing and proposed, including all the existing and proposed marina developments in the area.

3.13 Interaction between any of the foregoing

Experts contributing to the EIA should be specifically asked to consider impact interactions and to communicate information between each other. In addition, any environmental components not listed in the Directive or Regulations that are likely to be affected should not be discounted.

Predictions of impact interaction will nearly always involve a greater degree of uncertainty than prediction of impacts on individual components. This should be referred to in the EIA rather than ignored.

4.0 Design of Mitigation Measures, Identification of Residual Impacts and Monitoring Framework

4.1 Mitigation Measures

This should include a description of the measures envisaged to prevent, minimise and where possible, offset any significant adverse effects on the environment of the project. Such measures could include technological features; operational management techniques; enhanced site-planning and management; aesthetic measures; conservation measures; reduction of magnitude of project; and health and safety measures.

4.2 Residual Impacts

Any residual impacts, that is those impacts that cannot be mitigated or those remaining impacts following implementation of mitigation measures, should also be described, quantified and presented in a tabular format.

4.3 Monitoring

The consultants must propose a monitoring framework which should take into account monitoring of those features that are considered to be impacted negatively or the impact on which is uncertain. The framework must be proposed at different stages: before, during and after construction. Details regarding type of and frequency of monitoring must also be given.

FINAL

**Environmental Impact Assessment Regulations, 2007
Regulation 28 and Regulation 29 of the EIA Regulations, 2007**

Regulation 28

List of Consultants (Extract from the EIA Regulations)

28. (1) The environmental impact statement shall list the registration number and the names of the consultants and contributors responsible for the preparation of the environmental impact statement, environmental survey reports, appendices, non-technical summary and other components of the statement.

(2) The consultants who are responsible for a particular analysis, including analysis in the environmental survey reports, shall be identified.

(3) All consultants and contributors employed in the environmental impact assessment shall sign a declaration stating that the particular study (or part thereof) was solely carried out by them. This signed declaration shall be included with each environmental survey report included with the environmental impact statement.

Signed declaration in accordance with Regulation 28 (3)

Director of Environment Protection
MEPA

I _____, who carried out the study (or part thereof) on _____ for the EIS of PA 4905/10 for the *development of coastal defences against wave incidence on shore for Marsalforn Bay including: beach nourishment; construction of groyne; upgrade of storm water channel and construction of submerged breakwater*, at Marsalforn Bay, Żebbuġ, Gozo, hereby declare that such study was solely carried out by me.

Date

Signature

This declaration is to be included with each environmental survey report included with the EIS.

Regulation 29

Conflict of Interest (extract from the EIA Regulations)

29. (1) In the interest of fairness, objectivity and the avoidance of bias, all consultants shall be required to sign and abide by a declaration that they have no personal or financial interest in the proposed development.

(2) The Director of Planning and the Director of the Department shall not approve consultants or consultancy firms that are in any way associated with any company, association or grouping that has any direct or indirect personal, association or grouping that has any direct or indirect personal, professional or financial interest in the proposed development.

(3) The Director of Planning and the Director of the Department shall not approve any environmental impact statement or environmental planning statement produced by a consultant or group of consultants, one or more of whom does not comply with the provisions of sub-regulations (1) or (2) of this regulation.

Signed Declaration in accordance with Regulation 29 (1)

Director of Environment Protection
MEPA

I _____, hereby declare that I have no personal or financial interest in the proposed development, namely the *development of coastal defences against wave incidence on shore for Marsalforn Bay including: beach nourishment; construction of groyne; upgrade of storm water channel and construction of submerged breakwater*, at Marsalforn Bay, Żebbuġ, Gozo. Moreover, I declare that I am not in any way associated with any individual, company, association or grouping that has any direct or indirect, personal, professional or financial interest in the abovementioned proposed development.

Date

Signature

Such declaration is to be sent to MEPA when proposing the list of EIA Consultants prior to their approval or otherwise.

Appendix 2: Terms of Reference for the preparation of Archaeology/Cultural Heritage Assessment

Note: All requirements set out in these Terms of Reference must be complied with. If there are any sections, which are not relevant to this study, the reasons for not including the relative information in the study must be stated and justified. Moreover, if there are any aspects that the consultants deem to be important but which have not been requested, these are to be included together with a justification for their inclusion.

For the purposes of this document, cultural heritage is defined by Article 2 of the Cultural Heritage Act 2002 (CAP 445). This includes movable or immovable objects of artistic, architectural, historical, archaeological, ethnographic, paleontological and geological importance.

In the context of this development proposal, cultural heritage considerations are related to the area having a high degree of cultural heritage significance, both terrestrial and marine (underwater). In fact, the area is significantly related to the Knights' period due to a number of military related developments in proximity of the area for the proposed development. Moreover, the area was and still is significantly related to harbour-related activities and thus there is a high possibility that it might still contain undiscovered cultural heritage assets, especially underwater (e.g. according to the Missione Archeologica Italiana, 1964, an anchor was discovered in the vicinity of Marsalforn harbour).

Other considerations include:

- Features of archaeological value and potential on land and on or under the seabed;
- Military or civil architecture from the Knights' period to the British period; and,
- Features related to traditional maritime or coastal activity, such as saltpans, boat houses and mooring points.

The above cultural heritage definitions and considerations are not to be considered as exhaustive. The EIS must consider all other forms of cultural heritage, both known and unknown.

1. Objectives

The purpose of the Report of Survey⁴ is to provide a comprehensive study on the cultural heritage assets, consisting of archaeological, historical, architectural, rural and vernacular features, including rubble walls (if present). The report shall:

- a. Identify, describe, document and present all relevant information about cultural heritage assets within the area of study;
- b. Analyse the cultural heritage features within the context of the cultural landscape;
- c. Assess the physical, spatial and visual impacts of the proposed development on the cultural heritage assets;
- d. Assess the cultural heritage significance of each feature and of the area of study;
- e. Propose statutory and physical protection of the individual features and of the site;
- f. Identify potential impacts on the cultural heritage features arising during both the development phase and the operative phase of the development;
- g. Propose mitigation of impacts arising from proposed development and a monitoring programme during construction and operation of the development.

The survey and report should be specific to the identification, assessment and valorization of the cultural heritage value of the features within the area of study, irrespective of land ownership and any proposed development.

2. Area of Study

The area of study for the purpose of this report shall be proposed by the consultant and must be indicated on a site plan, subject to prior approval by MEPA in consultation with relevant agencies.

The study area shall at least cover the following:

- a. The total footprint of the proposed project; and,
- b. A 100m radius around the footprint for the underwater assessment.

⁴ Consultations with any relevant bodies, including the Superintendence of Cultural Heritage, Heritage Malta, NGOs and Local Councils are recommended.

3. Contents

3.1. Studies and Surveys

3.1.1. Desk-top Study

The desktop study shall seek to collate information about the cultural assets present, events that have taken place, the cultural relevance of the site throughout history, and the archaeological potential within the area of study. This study shall include:

- a. Reference to existing literature, old manuscripts, reports of previous discoveries;
- b. Study of toponyms;
- c. Analysis of cartographic, photographic, and other graphic material; and,
- d. A bibliography of sources consulted.

3.1.2. Site Survey

Fieldwork⁵, visual survey and research including field walking, topographic survey and remote sensing technique are to be used for these studies. Furthermore, given the location of the proposed works, data capture must include visual inspection of the seabed and sub-bottom profiling, as may be necessary. This shall also include:

- a. Identify and record surface features, also noting their condition. An attempt shall be made to describe typologies of cultural features. Typologies should be based on form, materials, technology, use intention, possible dating/phasing, and other architectural details that enable the distinction of one type from the other;
- b. Identify and record pottery scatters. However, the collection of pottery shards is not allowed;
- c. Recording of the features on a map (scale 1:2500); and
- d. The investigation of potential archaeology (buried or surface) should be considered as a reserved matter and as directed by the Superintendent of Cultural Heritage.

Any identified features are to be documented using the standard inventory cards as specified in section 3.1.3 below. Furthermore, a site plan of the area of study as detailed in Section 2 above, is to be submitted clearly indicating the location of the identified features (both underwater and coastal).

3.1.3. Recording Specifications

Relevant information for each feature shall be presented data cards as supplied by the MEPA (Data Capture Sheet specimen attached at the end of this document). Each feature should be individually identified with a consecutive reference number. The individual specific reference number shall be used throughout the report when cross referencing with maps, photos data cards and text. The information on each card for each feature shall include:

- a. Short description;
- b. Co-ordinates recorded up to 5 digits for each northings and eastings; based in the local/UTM grid reference;
- c. Locality and address;
- d. Site indicated on a map to a scale of 1:2500;
- e. Photographs;
- f. Scaled diagram/sketch;
- g. The significance of each feature, with a proposed grading following Structure Plan UCO and ARC policies;
- h. Existing and/or proposed legislative and physical protection;
- i. Current and proposed use/enhancement;
- j. Bibliographical references;
- k. Name of surveyors and date of compilation.

3.2. Statutory Protection

Reference shall be made to local heritage conservation legislation, international conventions and charters, Structure Plan policies, Local Plans, Scheduling and other relevant documents related to the protection of cultural heritage.

⁵ All fieldwork has to be authorised by the Superintendent of Cultural Heritage.

3.3. Description and Assessment of Impacts

All significant impacts and risks posed by the proposed project, both during construction and during operation, shall be assessed. Impact may include:

- a. Visual impact on the cultural landscape,
- b. Impact on the heritage assets and archaeological remains (whether on the surface or buried), including potential underwater archaeological remains;
- c. Impacts on the coastal heritage.

A cultural heritage risk assessment map shall be produced to assess the various impacts.

3.4. Mitigation Measures

This should include a description of the measures envisaged to prevent, minimise and where possible offset any significant adverse effects on the cultural heritage assets and their setting by the project, (including reference to consideration of alternatives). Such measures could include technological features; operational management techniques; enhanced site planning and management; aesthetic measures; conservation measures; reduction of magnitude of project; and health and safety measures.

3.5. Monitoring

A long-term monitoring programme of the impacts of the development on the cultural heritage assets and their setting shall be proposed. This shall include data gathering on the quality and progress of critical heritage features identified in the previous section, and spot checks. Therefore the following are required:

- a) A monitoring programme during any necessary scientific archaeological investigations, provided official written consent is obtained from the Superintendent of Cultural Heritage;
- b) A monitoring programme during construction; and
- c) A monitoring programme during operation.

3.6. Academic Competence

The survey and report shall be undertaken by suitably qualified person/s holding a degree in archaeology. The proposed consultant/s shall be approved by MEPA in advance of the commencement of the study.

MEPA				Ref. No.		
PROTECTIVE INVENTORY OF THE MALTESE CULTURAL HERITAGE HERITAGE DATA CAPTURE SHEET						
Location	Category	Type	Site Location (Address)			
Eastings	Northings	Feature	Period - Year			
S.S. No. 1	S.S. No. 2	Description				
S.S. No. 3	S.S. No. 4					
Date						
Neg. No.	Film No.					
Present Utilization						
Existing Legal Protection		GN. Number	GN. Date			
Comments						
Buffer Zone	A	B	C	D	E	Others
Eastings						
Northings						
Site Map						
Scale 1 : 2500						

Archaeological Characteristics – Sketch/Scaled drawings:

Condition: **Degree of Protection (Structure Plan policies UCO7 or ARC 2):**

State of Security: **Proposed Utilization:**

Basic Bibliography:

Compiled by:
Checked by:
Date:

Revised by:
Checked by:
Date: