Deloitte & Touche Consulting Group

MALTA MARITIME AUTHORITY

YACHTING DEVELOPMENT IN MALTA

STAGE TWO: SITE SELECTION

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1. INTRODUCTION

1.1. Purpose of the Study

This study forms Stage Two of the investigation into the potential for yachting development commissioned by Malta Maritime Authority (MMA) and the Planning Authority (the Terms of Reference for which are presented as Appendix I).

Stage One investigated in detail the likely level of potential demand for further yachting facilities, the characteristics of this demand, and, in very broad terms, the potential viability, technical constraints and the environmental implications. The outcome of that report was a conclusion that, in overall terms, there is potential demand for a further 900 marina berths, about 450 hard standing spaces and associated facilities. This assumes an appropriate level of service and quality and does not take account of current proposals for marina development. In this respect, the dedicated hotel marina proposals will largely generate their own specific demand, and will have little impact on the generic model. However, if the present proposals for Manoel Island, with the marina element, proceed as planned, then there is likely to remain a shortfall of a further 600 berths and over 500 hard standing spaces (there will be some displaced yard facilities).

The above conclusions to Stage One have been reached from a high-level investigation and, as requested, have not taken any account of site specific criteria. Clearly, different locations will affect the level of potential demand to some extent, and other factors, such as the environmental impact, design constraints and financial viability, will be very dependent on the site under consideration.

In Stage Two the issue of specific sites is introduced into the study. Stage Two evaluates all the possible locations for marina development and other yachting facilities, through a mapping and sieving process. This process identifies potential "areas of search" around the coastline and ultimately short-lists the sites which are most appropriate. The mapping and sieving revolves primarily around technical, environmental and planning issues, although market and financial factors will affect the ultimate success of any development.

The next section outlines the methodology used to short-list and evaluate individual sites for yachting development.

1.2. The Methodology

1.2.1. Short-listing Sites

We have used a three-tier process of evaluating and short-listing potential sites.

- The first, we have called the "mapping" stage, whereby the whole coast of the Maltese Islands has been considered against a set of criteria which effectively will rule out the possibility of yachting development in certain areas. These criteria include planning restraints, environmental sensitivities and major technical difficulties or costs. The process was carried out using detailed maps (scale 1:25,000, 1:10,000 and 1:2,500) and aerial photographs (scale 1:4,000 or 1:10,000) supplied by the Planning Authority, along with site visits as appropriate. From this process, an initial short-list of about 20 sites were put forward for further consideration. (Further details of the process and outcome are given in Section 3.)

- We have called the second phase the "site sieving" process, whereby we have looked in more detail at the short-listed sites, evaluating their individual strengths and weaknesses and "scoring" each against a set of wide-ranging criteria. These criteria cover over 40 technical, environmental, social, market and planning issues and a simpe scoring system has been devised to show the relative appropriateness of each site (see also Section 4). From this process a second short-list of just a few sites are identified for consideration in the next stage.

- The third phase is the more detailed technical, environmental, market and financial evaluation of the few sites which are most appropriate for yachting development (Sections 5, 6, 7 and 8). The main design criteria have been assessed with their cost implications, as have the environmental issues and indicative costs, the demand and economic factors and the overall financial viability, indicating, as appropriate, any likely funding shortfall.

From the above process it is anticipated that the Maltese Government, Planning Authority and Malta Maritime Authority will be able to draw sound conclusions relating to the way forward for yachting in Malta and decide on the most appropriate location(s) for potential development.

It is anticipated that a third stage of this study will follow, which will focus on the chosen site(s) for development and will, in detail, assess the viability, opportunities for funding, appropriate designs and a full environmental impact assessment.

1.2.2. Financial Illustrations

High level financial projections have been prepared for the short-listed sites identified in Stage Two of this study. The purpose of the projections is to

indicate the relative financial viability of the different sites and highlight any funding shortfalls that arise.

The financial projections derive from the research and modelling performed during Stage One of this study. These generic illustrations have then been developed a stage further and tailored to reflect the appropriate number of berths and hard standing spaces and the estimated capital investment and funding costs likely to be incurred in relation to each site.

Thus the Stage Two model illustrates the likely profitability levels of a marina operation in that location, the direct marina development costs, relative environmental costs and the wider cost implications in terms of economic benefit and other likely infrastructure needs.

Capital Cost Assumptions

The capital cost estimates provided in this stage of the report are based on the best information available, at today's prices and take no account of future rates of inflation or significant changes in exchange rates.

The costs are for major infrastructure items, including breakwaters, pontoons, land reclamation and dredging, paved areas (car parking and hard standing), shoreside facilities and services and general landscaping. It assumes that basic utilities are available and will be connected to the site at the appropriate level, without major capital cost implications. Not included in the capital cost estimates are technical equipment (e.g. workshop equipment or winches, etc.) and fitting out costs, which will lie with the operator, rather than the developer.

We would stress that the development costs are based on desktop appraisals of existing information, maps and photographs, together with site visits to appraise the potential implications of development. In some cases we have tried to obtain more local costs from contractors or operators to verify the capital cost estimates, but this has generally not been forthcoming. In particular, it would have been helpful to have been able to compare the cost estimates from the 1993 Coode Blizzard report on Xemxija with the actual construction costs for the breakwater at Msida (which is the most recent significant breakwater construction of a comparable nature in Malta). However, because this work was primarily undertaken by the Public Works Department, and took place before the establishment of the MMA, we have been advised that is not possible to obtain comparable cost information. In preparing this report, no detailed site surveys or technical studies have been carried out, as this level of detail is appropriate to Stage Three of the study.

Funding assumptions

There are many different ways of funding large capital projects, such as marinas. This stage of the study is not looking in detail at the funding of specific sites, so a clear comparative stance has been used for the funding assumptions, based on typical funding practice in Malta.

Thus, the projections assume that the 100 per cent of the capital cost of marina development is funded through a 12 year bank loan with repayments over the first 10 years of the marina's operating life. We have also assumed that the new marina will take up to 10 years after opening to reach full capacity.

In addition, all capital investment is likely to take place in the two years prior to opening, in view of the fact that the key cost items such as the breakwater construction, land reclamation and dredging can only be carried out before a marina is put in place. (In reality a more phased development could be carried out, but the impact on funding is generally likely to be small, because of the proportion of up-front costs.)

Funds will therefore be required up to two years before the opening of the marina and will be repaid in full within 10 years of opening. Interest charges are based on Maltese commercial lending rates of 8.5 per cent. Repayments will not be evenly spread, but will be low in the initial years and increase in line with the expected increase in profitability of the marina as utilisation and take up increases.

Given that the level of capital investment required is significant and that the marina will have an expected life that extends well beyond a 12 year financing period, it is not surprising that there is a significant shortfall between the level of cash generated from the operation of the marina in its first 10 years and the level of bank loan repayments required.

For the purposes of this model, the shortfall is shown as an equal annual government subvention given to the marina operator for the first 10 years. Clearly other alternative forms of financing or of funding this shortfall are available (for example, raising finance through selling berthing space in advance, developing ancillary facilities or real estate, etc.), however, to facilitate comparisons the same approach is taken for all sites at this stage. This approach is also in line with similar practice in Malta on other large infrastructure projects.

Profit and Loss Projections

The main marina revenues consist of berthing fees and the rental of any associated hard standing space. It is assumed that the hard standing space will only yield the equivalent of rent and that any additional services performed (such as anti-fouling, engine servicing, etc.) would be carried out by a third party as a separate business venture, as is usual elsewhere.

The average annual income per berth is derived from the economic impact assessment (see also Stage One report) to reflect the mix of market segments that will use the proposed marina. The average annual income for a hard standing space is similarly derived from the Stage One work. Average annual income per berth and hard standing space are approximately Lm531 and Lm437 respectively, in a stabilised year of trading.

The size of the marina in a particular site then determines the overall revenue stream which is gradually built up over the first 10 years in a manner consistent with the build up of yachting demand outlined in Stage One. Yacht registration income has been excluded from the revenues of the marina as these accrue to the MMA and not necessarily to the operator/developer of a marina.

Administrative, marketing and maintenance costs are broadly unchanged from the generic Operating Profit projections developed in Stage One but reflect changes in the size of the marina as appropriate. Operating profit is adjusted for depreciation, interest charges and government subvention received so that profit before tax is established.

The capital costs of a marina are depreciated over their expected useful working life based on UK accepted norms. This varies from 50 years (e.g. breakwater structure) to 12 years (e.g. pontoons) whilst certain capital expenses such as buildings, land reclamation and initial dredging costs are capitalised and not depreciated.

It should be stressed that the capital costs obtained on a site specific basis are broad estimates and, whilst illustrative of the likely magnitude of costs and the relative ranking of sites, will clearly need to be revised and computed in greater detail during Stage Three of the study.

The projections have been prepared for broad comparative purposes as required by the Terms of Reference. They should therefore not be relied upon for the purposes of raising finance. The assumptions incorporated into these projections are unlikely to remain valid throughout the forecast period and actual results are likely to vary from projected results and these variations could be significant.

Overall Viability

The above financial projections must be viewed in the overall context of economic and environmental costs so that a relative ranking of the sites under consideration can be achieved. Both the environmental costs and the indirect economic benefits are derived from the generic frameworks developed in Stage One of this study.

The indirect economic benefits represent the full economic impact derived in Stage One (which was based on data obtained from interviews with both operators within the yachting industry and with various yachtsmen to establish spending estimates) less berthing income and hardstanding income which would be directly received by the marina operator.

The resultant amount of first round spending within the local economy is reduced by the Economic Impact Model at Stage One to reflect the import content, whilst a multiplier effect is incorporated to consider the level of local spending which is re-cycled in the Maltese economy.

The total projected economic impact derived at Stage One is Lm10.235 million per annum once yachting demand has built up to its stabilised trading levels in 2007, 10 years after new marina facilities are opened. The indirect economic impact is derived as follows :

	%	Lm000s
Total Economic Impact per annum in 2007	100	10,235
Less - Direct Economic Impact		
Berthing fees	(15)	(1,009)
Hardstanding		(499)
Indirect economic impact	85	8,727
Number of berths envisaged in Economic Impact Model		1,900
Indirect economic impact per berth		Lm 4,593

The indirect economic impact, which amounts to Lm4,593 per berth provided (per annum), represents approximately 85 per cent of the total economic impact.

The financial analysis in this Stage of the Study therefore incorporates the direct economic impact as part of the income in the marina operator's profit and loss projections and uses the indirect economic impact per berth calculated above to estimate the total indirect economic impact over the first ten years of the marina's operations.

The build up of the indirect economic impact over the first ten years is calculated consistently with the build up of berthing and hardstanding income as shown in the profit and loss projections for each site considered in this detail, using the 15:85 relationship established above. This then varies for each site under consideration based on the number of berths at that particular site.

In practice the direct and indirect economic impact will vary on a site specific basis as one site may appeal to a particular market segment more than others whilst substitution may also arise between different marinas. This variance is not sufficiently significant to alter the overall national indirect economic benefit for site ranking purposes but will require further investigation during the course of Stage Three of the Study.

The indirect economic benefits represent the full economic impact derived in Stage One, which is adjusted pro-rata for the size of marina developed, and exclude berthing income and hard standing income which would be directly received by the marina operator and are therefore already shown in the profit and loss projections. Thus, for the purposes of ranking the suitability of specific sites at this Stage (Two) of the study, the generic indirect economic benefits identified in Stage One have been utilised, although as previously noted, in actuality the build-up of demand from each market segment will vary (notably between international and domestic demand segments) between specific locations. This variance is not sufficiently significant to alter the overall national indirect economic benefit for site ranking purposes but will require further investigation during the course of Stage Three of the study.

The overall viability is critical to planning consent and will relate to other Structure Plan Policies limiting ancillary development or additional accommodation near a potential marina site.

1.2.3. Environmental Costing

The environmental costing methodology has been developed as a tool to enable decision makers to compare the significant environmental impacts for each potential site. The significant environmental impacts for each site have been identified through the analysis of the 16 detailed criteria utilised in the site sieving process described in Section 4.3. The methodology has been designed around practical limitations, depending on factors such as available data and time scale and conforms with the methodology that has been utilised and accepted in other environmental studies that we have undertaken for the European Commission. It may be appropriate to revisit the costs in greater detail during Stage Three of the study.

For each potential site, the significant environmental impacts associated with marina development have been considered. These have been identified by site visits and research and compared against available data (such as traffic data, water quality information, etc.) The significant environmental impacts that have been considered for the costing methodology include:

- degradation of water quality;
- noise;
- increase in traffic generation;
- relocation of any existing amenity;
- downstream damage through construction and ongoing marina operation; and
- loss of habitat.

The costing of these environmental impacts, where appropriate to a specific site, encompasses each of the 16 detailed criteria utilised in the site sieving process either directly or by proxy.

As part of the environmental impact assessment required for Stage Three of this study, the environmental impacts need to be addressed in more technical detail. In order to assist comparison of one site against another, indicative costs have then been attached to the most significant environmental impacts noted above. Whilst this methodology allows reasonable estimates to be included for the overall economic benefit comparison between sites, it is important to stress a number of limitations in the costing methodology.

Firstly, these costs do not represent the full environmental and social cost of marina development. This is because the costing methodology:

- only considers significant environmental impacts (the full environmental cost would need to consider all relevant environmental impacts); and

- has considered the incremental cost of water degradation as a result of marina development as constant across each of the short-listed sites. The site sieving process eliminated any "pristine" location (where the water quality is high) and therefore each of the short-listed sites has an existing level of water pollution. Although each short-listed site differs in the level of existing water pollution, the environmental cost of marina development will be limited (because water quality degradation has already occurred) and will be broadly the same in incremental value for each site.

  Clearly the full environmental cost of returning each of the short-listed sites to pristine water quality (if possible) would vary dramatically. However, this stage of the study is concerned with the incremental cost of water degradation as a potential cost of marina development and this is considered to be both limited and broadly similar for the short-listed sites.

Secondly, these costs represent ballpark figures for a marina development. The costing model used has not been developed to a level which accounts for more sophisticated factors, such as marina size, due to lack of available data. For example, the costs of congestion are based on an assumption as to the number of cars which would be delayed. A smaller marina would imply lower congestion, whilst a larger marina would be likely to lead to greater congestion. The environmental impacts costed in this report are those associated with a 600 berth marina development versus the current environment. This is because Stage One of the study estimated generic demand for 600 berths, although in practice marina development could occur in more than one location.

A second factor of the model is that it assumes that the development reaches capacity immediately. In reality, water quality, for example, will decrease over time and congestion will build up gradually as the marina reaches capacity. The rationale behind this approach is that across all sites these factors would be the same, hence, including more sophistication into the costing would not change the relative position of the sites, and it would imply a greater degree of accuracy than the data merits.

Thirdly, the costs are heavily dependent on the assumptions made. For example, in valuing the cost of traffic congestion, the costs will be dependent on the length of delay and the number of cars. The costs assume traffic levels to remain constant, and at this stage of the study no allowance has been made for more sophisticated effects such as traffic growth over the duration of the project.

2. EXECUTIVE SUMMARY

Stage Two of this study follows from the investigation into the generic demand for yachting in Malta (Stage One), introducing a site selection process for potential development projects. It starts from a consideration of the whole coastline of the Maltese Islands and works through a number of processes to a short-list of high potential sites for marinas and other yachting activity. These processes include mapping, using aerial photographs and detailed charts and maps, and site sieving, which evaluates those sites forming an initial list of possible locations, against each other, to identify the most appropriate. The final short-listed sites were then assessed in greater detail. The broad criteria and the tentative results of each stage of the process were discussed at consultative meetings with representatives of the Planning Authority and the MMA during November and December 1995.

2.1. The Coastal Mapping

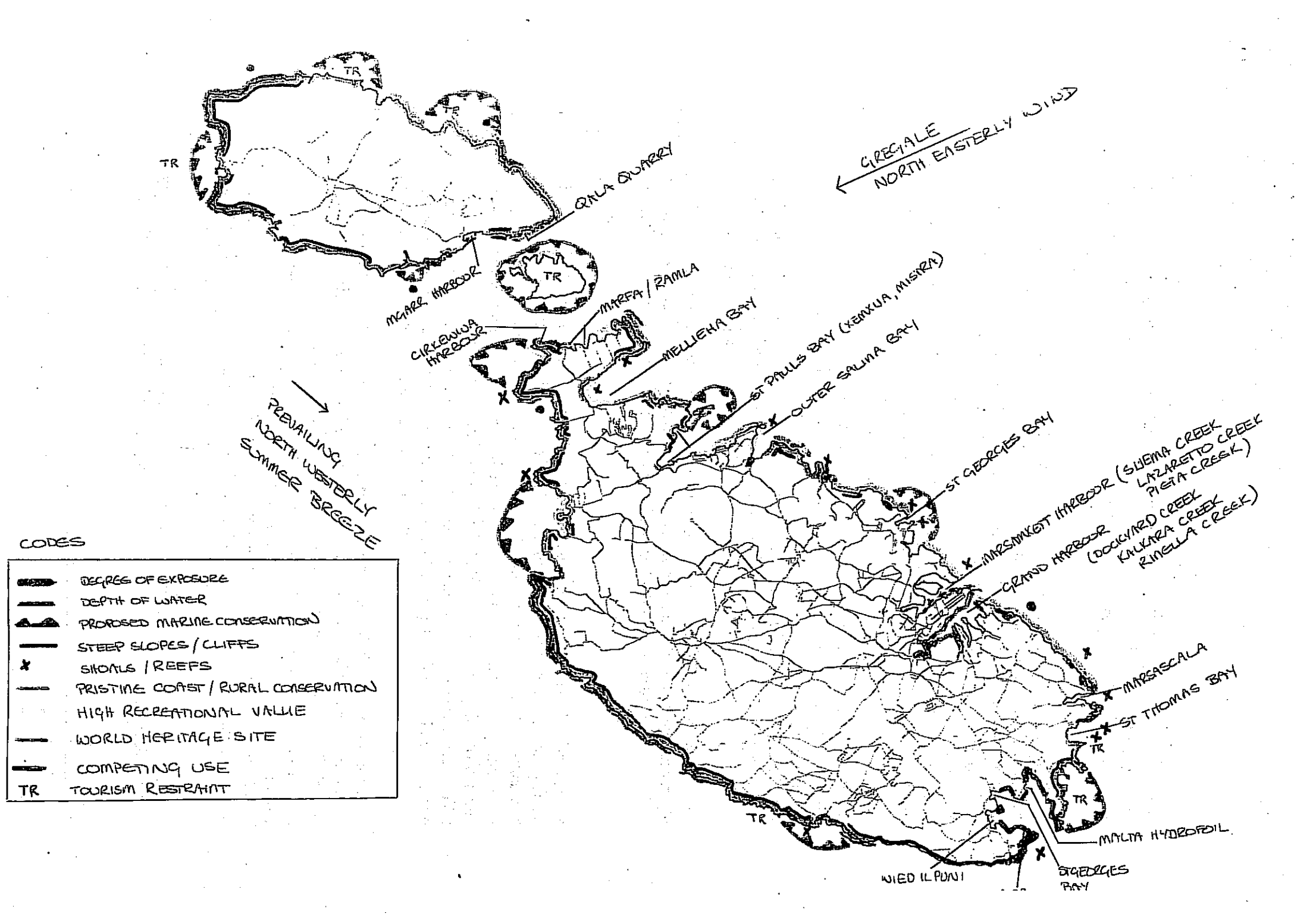
The mapping process "ruled out" areas of Maltese coastline on a number of key criteria, based on technical, planning and environmental issues. The technical criteria include the degree of exposure, depth of water, major navigational hazards, existing road access and services, land availability and, for marinas only, the degree of industrialisation. The environmental and planning criteria include rural and marine conservation areas, established competing uses, sensitive waterfronts (in terms of the ecology or built environment), high recreational or social amenity value and other Structure or Local Plan issues.

The map overleaf illustrates the coast of Malta and the areas which are ruled out by the main criteria in this mapping process.

The majority of Gozo coastline is generally pristine, with cliffs, high conservation value and often limited road access with no existing service provision. Two possible sites were identified, which include an extension to the existing Mgarr marina, and a hard standing facility at Qala Quarry. Comino was excluded because of the conservation status.

Working anticlockwise around Malta from Cirkewwa, the coast to Marsaxlokk Bay, is largely dominated by cliffs, deep water and a high degree of exposure. There are also a number of sandy bays and large areas with conservation status. Within Marsaxlokk Bay opportunities are restricted by the power station, Freeport, fish farms and the established fishing harbour activities. However, a marina might be possible in St George's Bay and yacht repair yard or hard standing activities might be appropriate at the Malta Hydrofoil site, or Wied il Puni, close to the Freeport.

Moving up the coast to Grand Harbour, there are more rural and marine conservation areas, followed by a long stretch of exposed coastline, providing little shelter, on which is located a sewage outfall, a planned reverse osmosis plant and the Mediterranean Film Studios. The only options identified for yachting development are in Marsascala Bay or St Thomas's Bay in the middle of that area.


TR
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QALA QUARRY
MGARR HARBOUR
MARFA / RAMLA
CIRKEWWA HARBOUR
MELLIEHA BAY
ST PAULS BAY (XEMXIJA, MISTRA)
OUTER SALINA BAY
ST GEORGES BAY
MARSAMXETT HARBOUR (SLIEMA CREEK, LAZARETTO CREEK, PIETA CREEK)
GRAND HARBOUR (DOCKYARD CREEK, KALKARA CREEK, RINELLA CREEK)
MARSASCALA
ST THOMAS BAY
MALTA HYDROFOIL
WIED IL PUNT
ST GEORGES BAY
GREGALE
NORTH EASTERLY WIND
PREVAILING
NORTH WESTERLY
SUMMER BREEZE
CODES
DEGREE OF EXPOSURE
DEPTH OF WATER
PROPOSED MARINE CONSERVATION
STEEP SLOPES / CLIFFS
SHOALS / REEFS
PRISTINE COAST / RURAL CONSERVATION
HIGH RECREATIONAL VALUE
WORLD HERITAGE SITE
COMPETING USE
TR TOURISM RESTRAINT

Grand Harbour has a range of possibilities, from marina developments in Kalkara or Dockyard Creeks, to yard or hard standing in Rinella or French Creeks. The other areas have existing dockyard activities, which would cause a high level of overlapping between commercial and leisure marine traffic, or, as along the Valletta waterfront, high conservation value.

Marsamxett Harbour offers possible marina sites in Sliema Creek, Lazaretto Creek and Pieta Creek, the latter forming an extension to the existing Msida Marina. Further along the coast, there is a mix of highly exposed areas and bays, most of which are heavily developed with little scope for further construction. One bay where there might be some possibility of a marina is in St George's Bay, St Julian's. Alternatively, Bahar ic-Caghaq Bay is a less developed option which also offers some shelter along that coast. Salina Bay has salt marshes in the inner area, but along Qawra Point there could possibly be a marina.

St Paul's Bay has already been considered in previous studies for a marina. In the outer regions it is relatively exposed, with a sandy beach at Selmun Bay and conservation status on the northern side. However, within Xemxija is a possibility, as is Mistra Bay, with its natural shelter. The inner area of Mellieha Bay also offers a possibility for marina development, but this would have to avoid the sandy beach, which has high social and touristic value.

Finally, along the northern coast of the island, there are a number of small sandy beaches, a reverse osmosis plant and some exposed regions. However, marinas might be possible at Ramla Bay, Marfa Bay, or Cirkewwa, by the ferry harbour.

2.2. Site Sieving Process

The list of 23 possible sites identified through the mapping process (18 for marinas and five for boatyard or hard standing) were then assessed in terms of specific strengths and weaknesses, related to technical, environmental, social, market and economic considerations. However, the emphasis was upon environmental and social issues as being the primary determinants of suitablity at this stage, prior to detailed consideration of market and economic criteria in relation to short-listed sites. This process reflected the enormous range of possibilities and highlighted how one site could be strong in some aspects but weak in others.

Thus a simple scoring system was devised to assess each individual site against over 40 different criteria. These criteria were divided into three categories: technical issues; environmental and social issues; and market, financial and economic issues. Greater weight was given to environmental and technical criteria relative to market and economic issues at this stage of the process because we believe that these are the most important areas which should be taken into account in the sieving out of potential sites. Market and financial criteria are more likely to be related to the success of a yachting development once a site has been selected.

The results of this scoring system are presented in tables 2.1 and 2.2 which follow. The higher the score given, the less appropriate that site is for yachting development.

Potential marina sites and boatyard/hard standing sites have been considered using the same basic criteria. However, the scoring system works differently for potential marina sites as opposed to hard standing or yard sites, because of the relative importance of the various criteria.

The two categories cannot be compared with each other and the scoring system provides an indication of the relative merits within each category separately in the following tables.

Table 2.1
Summary of the Site Sieving Scoring - Marina Locations

	Technical Score	Environ-mental Score	Market Score	Total Score	Ranking
Dockyard Creek, Grand Harbour	21	16	10	47	1
Lazaretto Creek, Marsamxett Harb.	34	27	13	74	2
Kalkara Creek, Grand Harbour	39	26	13	78	3
Xemxija, St Paul's Bay	39	27	15	81	4
Outer Mgarr Harbour, Gozo	37	30	15	82	5=
Marfa Bay, Malta	32	30	20	82	5=
Sliema Creek, Marsamxett Harbour	38	27	17	82	5=
Pieta Creek, Marsamxett Harbour	36	27	20	82	5=
Cirkewwa Harbour	34	29	20	83	9
St George's Bay, Marsaxlokk	37	29	22	88	10
Marsascala Bay	42	29	18	89	11
Ramla Bay, Malta	38	34	18	90	12
St George's Bay, St Julian's	43	32	16	91	13=
White Rocks	42	33	16	91	13=
Mistra Bay, St Paul's Bay	36	40	17	93	15
Mellieha Bay	36	40	18	94	16=
St Thomas' Bay	40	34	20	94	16=
Outer Salina Bay	43	41	15	99	18

Source: Deloitte & Touche Analysis

Table 2.2
Summary of the Site Sieving Scoring - Yard/Hard standing Locations

	Technical Score	Environ-mental Score	Market Score	Total Score	Ranking
French Creek, Grand Harbour	14	16	11	41	1
Malta Hydrofoil Site, Marsaxlokk	15	16	15	46	2
Rinella Creek, Grand Harbour	19	26	12	57	3
Wied il Puni, Freeport	22	22	16	60	4
Qala Quarry, Gozo	32	36	14	82	5

Source: Deloitte & Touche Analysis

Key to Groupings of Sites:

Short-Listed Sites	
Possible Sites	
Unlikely Sites	

The sites have been grouped into three classifications:

Short-listed Sites are considered in detail later in this report;

Possible Sites are sites which have the potential for a marina or boatyard/hard standing but fall short of the requirements for international yachting development. These sites may, however, be developed in future for smaller or secondary facilities if viable; and

Unlikely Sites include locations where the cost of development would probably be unacceptable due to the depth of water or degree of exposure, or where the environmental or social disbenefits would be too great.

The strengths and weaknesses analyses for each site are provided in Appendix III. These are summaries of the principal advantages and disadvantages and, to a large extent, they amplify upon selected criteria utilised within the scoring system. In identifying a short-list of potential sites for both marina and boatyard/hard standing development, the strengths and weaknesses analyses provide the necessary further rationale for determining overall site suitability and selection.

The strengths and weaknesses analyses are thus a vital element within the site selection process because, arguably, one site could achieve a higher aggregate total score than others whilst ultimately being unsuitable for major development due to a significant single criterion. For example, although Outer Mgarr Harbour, Gozo, scores only slightly lower than Xemxija, St Paul's Bay, in the sieving system, it could only be developed to accommodate a limited number of yachts. As such, it would fall significantly short of the objective to develop Malta as an international yachting destination and would not substantially match the needs of the domestic market. Likewise, Cirkewwa Harbour ranks higher in aggregate score than St George's Bay, Marsaxlokk, yet it has been classified as an unlikely marina site because the degree of exposure and depth of water is likely to result in unacceptably high capital costs.

It is therefore important to emphasise that the ranking of any particular site in the scoring system has not determined the short-list selection in isolation, although in practice the combined analyses have resulted in the four top ranking sites being distinguished for detailed consideration.

Comparing these indicative scores with the strengths and weaknesses analysis highlighted no apparent conflicts, so a short-list of high potential sites was agreed for further investigation. The marina sites included Dockyard Creek and Kalkara Creek in Grand Harbour, and Xemxija in St Paul's Bay. Lazaretto Creek, although ranking highly, was excluded from this short-list as there are already plans to develop a marina as part of the Manoel Island proposals.

The boatyard and hard standing opportunities short-listed included French Creek in Grand Harbour, and the Malta Hydrofoil site in Marsaxlokk. Rinella Creek in Grand Harbour has also been considered further in this report, although in less detail since it is probable that it would be deemed an unacceptable development due to conflict with planning policy.

2.3. Potential Marina Sites not Short-listed

Potential marina sites which individually do not fulfil the criteria for international yachting development, but might be considered further at a later stage, include St. George's Bay, Marsaxlokk, where a relatively low cost facility might be developed for the domestic market, and Outer Mgarr Harbour, Gozo, where summer moorings and some increased marina berthing might be effectively arranged.

2.4. Xemxija - Potential Marina Site

Xemxija is located along the most popular part of the Maltese coast for yachting activity and domestic users will therefore consider it a popular location for a marina. However, while such a location might reduce the sailing distance, as compared with the current marina at Msida, to the island's most popular cruising grounds, it is likely to have an impact on road congestion around Xemxija at peak times and the outer part of the area, for example at Fekruna Point, has recreational use for swimming.

In terms of international yachting market sectors, Xemxija offers no specific relative strengths as a marina location and so demand from these sectors will be secondary.

Technically, it is feasible to accommodate a full 600 berth marina at Xemxija, with hard standing for approximately 200 yachts, but it may be more appropriate to develop a smaller facility for domestic demand primarily. Such a project could then be relatively easily and cost-effectively extended at a later date within the line of the existing breakwater, if demand justifies. This, would serve to spread the yachting activity and enable the focus of international yachting activity to remain around Valletta and the main harbours of Malta.

A marina development at Xemxija (of either size) will not be financially viable on its own. Opportunities for developing additional income-generating infrastructure (such as residential or tourism facilities) are likely to be limited by space availability and will relate to Structure Plan policies (in particular SET 1 and SET 11) limiting additional accommodation or ancillary development in the area. We have quantified this shortfall and illustrated the funding requirement in the form of a subvention relating to about Lm 4.6 million for a 300 berth marina, or Lm 6.31 million for 600 berths, over a 10 year term. There will also be environmental costs of about Lm 3.1 million over 10 years.

However, in overall terms, these costs will be offset by the wider economic benefit of the investment programme, the construction project and on-going yachting activity, which will bring a net benefit to Malta of almost Lm15 million over 10 years. A marina (of either 300 or 600 berths) is projected to make an annual operating profit of about Lm 137,000 or Lm 230,000 respectively, prior to financial charges, depreciation and taxation in a stabilised year of trading.

2.5. Dockyard Creek - Potential Marina Site

Dockyard Creek is regarded as the "jewel in the crown" of Grand Harbour and offers a world-class urban environment. Dockyard Creek could, if developed appropriately, become one of the most prestigious and impressive marina settings in the Mediterranean, with its unique historic surroundings. A marina for 600 berths could be comfortably accommodated, with space available for limited expansion if required, and hard standing provided for approximately 75 boats.

The formation of the creek is appropriate for a marina, with deep water, existing wide quays and surrounding infrastructure. The construction of a marina would require relatively little capital and the main structures could be "floating", with little or no lasting impact on the existing built environment. The creek is significantly affected by long-period waves travelling across its entry in Grand Harbour. These cause a surge and swell effect within the creek in addition to wave reflection from the vertical face of the south-west shoreline. It is envisaged that a floating breakwater with a depth of eight to ten metres and a width of approximately five metres would be sufficient to overcome any significant wave disturbance within the creek, although this assumption will require detailed wave pressure investigation at a later stage in the study. Other environmental impacts will be limited, because of the history of boating activity in the creek, with possible traffic congestion being the main issue.

However, Dockyard Creek is likely to have primarily international appeal, this being the market likely to generate least road traffic and bring the greater economic benefits to the area. Local demand may show some initial resistance to a location in the "south" of the island.

The main consideration for the development of a marina in Dockyard Creek is that it should form part of an overall urban regeneration programme to provide the "social" infrastructure necessary to the success of a marina. This area has already been highlighted for tourism development and a marina would contribute towards this objective.

In overall terms, a marina in Dockyard Creek is likely to cost in the region of Lm1.8 million in capital construction. This would require the equivalent of a Lm2.4 million subvention spread over ten years and a further Lm1.75 million to cover associated environmental costs. However, Malta will benefit overall, through some Lm 1.4 million of interest payments to local banks, the capital investment and associated employment, and a further Lm14 million of wider economic benefit from yachting related expenditure. At a stabilised trading position, the marina development might make an annual operating profit of about Lm176,000.

2.6. Kalkara Creek - Potential Marina Site

Kalkara is the second creek in from the sea in Grand Harbour and is currently used for a few moorings and two boatyards. Its position is similar to Dockyard Creek in that the creek is significantly affected by long-period waves travelling across its entry in Grand Harbour and a similarly substantial floating breakwater is likely to be necessary to avoid unacceptable wave disturbance.

The development of a marina in Kalkara Creek will provide an opportunity for a powerful international maritime attraction as part of an urban regeneration programme, which could bring wide benefits to the local area. A marina could form the focus of waterfront development in the area, although the physical environment of Dockyard Creek will remain a stronger draw in overall tourism terms.

It must also be stressed that the success of a marina in Kalkara will depend on the progression of an overall tourism development plan, to ensure provision of other social infrastructure and a lively atmosphere.

Demand for the facility is likely to start with international visitors, while domestic demand may take a little longer to accept it as a safe and prestigious location. The site is probably not appropriate for a marina of more than 500 berths - the constraints being the size of the creek and the lack of shore side space.

In this respect, some land at the head of the creek will need to be reclaimed and the inner boatyard facility will need to be relocated, to provide for car parking and hard standing for approximately 160 boats. A floating breakwater and pontoon system will keep the costs of development down and enable flexibility if demand changes.

The environmental impact of a marina in Kalkara is not likely to be great, as the marina will be going into a creek where there is already boating activity and semi-industrial repair activities. Traffic should not be an issue if the proposed Conspicua bypass scheme goes ahead, although parking will remain tight. The main concerns will be over the visual impact and careful design will be needed to overcome this as far as is possible.

Overall, the project would require subvention in the region of Lm 2.5 million over ten years, with an additional Lm 1.4 million of environmental costs. However, again, this will be offset by wider economic benefit to the country of about Lm 13.6 million, a Lm 2 million capital investment programme and interest payments to local banks of over Lm 1.5 million. This suggests a net gain to Malta of about Lm 13 million. At a stabilised trading position, the marina is estimated to achieve an operating profit of around Lm 160,000 per year.

2.7. Yard/ Hard Standing Sites

Additional yard and hard standing requirements will depend, to a large extent, on the marina location selected for development as different sites under consideration have varying capacity for yacht hard standing, thereby increasing or reducing the requirement for yacht hard standing at an independent site. Additionally, there is merit in there being sheltered water between a marina and a yacht repair yard and therefore benefit in a close proximity between the two areas. At the moment, the yard facilities in Malta have the capability to service current and future yachting demands, but are seriously constrained by lack of hard space.

Three sites were investigated for supplementary yard and hard standing space, all of which seem to have some factors making them strong potential sites, but also with some significant constraints.

French Creek, the next creek to Dockyard, has a number of dry docks all of which are still in use. Therefore, available space is limited at the present time. A small potential site identified by the Planning Authority is towards the mouth of the creek and could offer space for about 130 yachts for hard storage. This would be an appropriate location, particularly if a marina were developed in Grand Harbour, and the environmental impact would be very low because of the existing boat-related activities and limited infrastructure changes needed.

Rinella Creek, also in Grand Harbour, would likewise complement marina facilities nearby, and could provide space for yard and hard standing space. Some land reclamation and dredging work would probably be required to create an appropriate quay for boat access. However, we understand that the creek is currently used as a local recreation area and that any development would conflict with planning policy. It is not therefore considered to be an option for hard-standing development.

The final site investigated is the Malta Hydrofoil site in Marsaxlokk, which has existing yachting activity along the shoreline, with slipways and areas for hard standing. This location, with the existing factory buildings (which are assumed to have an appropriate internal structure) could provide a comprehensive yacht servicing and storage centre for local and international demand. Some work would be required to increase the level hard standing areas and improve the waterfront access for boats, but again, because of current activities, the development is likely to have a minimal environmental impact.

The development of any of these sites is likely to be financially viable, because of the low level of capital investment required and one or more could be developed to cater for the Island's needs. Yard and hard standing services are important activities in terms of contributing to the wider Maltese economy and so the net benefit of developing such sites is likely to be significant.

However, all the potential sites identified have some limitations and their relative value is tied in, to a large extent, with the selection of a marina location. Other opportunities for small boat storage areas could also be investigated in more detail, once the marina location is decided.

2.8. Conclusions

The demand potential for yachting in Malta can be met in a variety of ways, depending on the site selection and the strengths and constraints of individual locations. In this report the sites have been selected as giving the best balance between economic benefits to Malta and environmental impacts. These sites also offer the greatest potential to present Malta as an international yachting destination and have been evaluated using the basic parameters established in Stage One of the study.

The short-listed marina sites include Dockyard Creek and Kalkara Creek in Grand Harbour and Xemxija in St Paul's Bay. In addition, yacht repair yard and hard standing services will also need to be expanded and there are a number of possible locations in Grand Harbour and Marsaxlokk. However, while more than one of the yard/ hard standing opportunities may be followed, the decisions should be related to the marina site(s) selected, in particular to their location and hard standing capacity.

Table 2.3 summarises the relative economic value of the main marina locations including the estimated hard standing capacity at each site, bearing in mind that additional yard or hard standing developments in other locations will significantly increase the wider economic impact.

Table 2.3
Comparative Economic Value of Marina Developments

Ten Year Cumulative Costs & Benefits	Kalkara Creek 500 berths 160 hard standing (Lm million)	Dockyard Creek 600 berths 75 hard standing (Lm million)	Xemxija 300 berths 200 hard standing (Lm million)	Xemxija 600 berths 200 hard standing (Lm million)
Annual Operating Profit (stabilised trading position)	**0.160**	**0.176**	**0.137**	**0.230**
Benefits				
Capital investment (Assuming it is spent locally)	1.96	1.80	3.15	4.42
Interest costs	1.54	1.43	2.38	3.36
Additional economic impact	13.59	14.36	9.89	16.44
Overall Benefits	17.09	17.59	15.42	24.22
Costs				
Government subvention over 10 years	(2.53)	(2.14)	(4.69)	(6.31)
Additional environmental costs	(1.43)	(1.75)	(1.91)	(3.10)
Overall Costs	(3.96)	(3.89)	(6.60)	(9.41)
Total Economic Benefit	**13.13**	**13.70**	**8.82**	**14.81**

Source: Deloitte & Touche

It is estimated that there will be a significant shortfall between the level of cash generated from the operation of any of the potential marinas in the first 10 years and the level of loan repayments to be satisfied. For the purposes of illustration, the shortfall is shown as an annual government subvention given to the marina operator throughout the first 10 years. Clearly alternative forms of financing or of funding this shortfall are available and will be required (for example, raising finance through selling berthing space in advance, developing ancillary facilities or real estate, etc.), however, to facilitate comparisons the same approach is taken for all sites at this stage. This approach is also in line with similar practice in Malta on other large infrastructure projects.

The Government subvention is the annual cash shortfall that the developer / operator would face after considering annual profitability and the repayment of 100 per cent of development costs through a 12 year commercial bank loan (two years paying interest only during the build out stage followed by 10 years paying interest and capital repayments). It is an iterative balancing figure to ensure that the project repays the commercial bank funding within the timeframe envisaged.

In actuality it is rare for a project to be 100 per cent bank funded, as banks typically lend two-thirds of the total development cost. However, it is an appropriate scenario to consider at this stage as it incorporates the opportunity cost of capital across the whole development. As previously stated, in practice a substantial level of funding will be required to be provided by the developer out of internal resources, debentures sold, the sale of concession pontoons or from other ancillary development opportunities. This will reduce the bank borrowing requirement and, in turn, the need for government subvention.

The additional economic benefits represent the full economic impact derived in Stage One, which is adjusted pro-rata for the size of marina developed, and excludes berthing income and hard standing income which would be directly received by the marina operator and therefore already shown in the profit and loss projections.

The final selection of a marina site, or sites, will involve a wider range of issues than those considered within the terms of reference for Stages One and Two of the Yachting Development Study. For example, a marina could play a pivotal role in the regeneration of waterfront areas within Grand Harbour and draw a significantly higher level of economic benefits than those identified as a direct consequence of marina operations.

The strengths and weaknesses of each site are discussed in detail during later sections of this report, however, the principal advantages and disadvantages in relation to the contrasting short-listed marina locations are summarised below:

Table 2.4
Summary of Locational Advantages and Disadvantages - Marina Sites

	Kalkara & Dockyard Creek	Xemxija
For	Potentially strong international appeal linked to urban regeneration. Lower investment requirement. Well-matched to Structure Plan policies in relation to development in built-up areas and tourism and recreational uses (Ref: SET1, TOU6, UCO3).	Popular choice for the domestic market and therefore lower risk. Proximity to cruising grounds. Encouragement will be given to continuing development in built-up areas (Ref: SET1).
Against	Potential initial domestic market resistance. Competing uses (boatyard and No.1 Dock). Road access is currently poor.	No special international appeal. Competing uses (moorings and recreation/swimming). May cause road congestion. Higher investment requirement. Ancillary facilities would be constrained by planning policies. Higher environmental costs

Source: Deloitte & Touche

Similarly, the principal advantages and disadvantages of the three short-listed hard standing sites are summarised in the following table:

Table 2.5
Summary of Locational Advantages and Disadvantages - Hard standing Areas

	French Creek	**Rinella Creek**	**Malta Hydrofoil**
For	Harbour location.	Harbour location.	Partially developed.
Against	Competing use (dry docks). Proximity to residences.	Competing use (amenity). Conflicts with planning policy and is unlikely to be developed.	Possible impact upon local village.

Source: Deloitte & Touche

3. COASTAL MAPPING

3.1. Our Approach

A framework of initial 'ruling out' criteria has been prepared. These criteria represent the basic issues which we have considered to be important enough to exclude parts of the coastline of the Maltese Islands for potential marina or yacht repair/hard standing development in the initial stage of the site selection process. The criteria include technical or environmental cost implications which we feel would make yachting development in a particular site not viable or unacceptable. For ease of reference, a map illustrating the coastline of the Maltese Islands with the appropriate criteria marked up is presented as page 37 of this report.

In carrying out the mapping process, physical inspections of the Maltese coastline, detailed maps (1:25,000 and 1:2,500), Admiralty Charts and various aerial photographs supplied by the Planning Authority were used, in accordance with the terms of reference. The broad criteria and the tentative results of the process were discussed at various meetings with representatives from the Planning Authority and MMA during November and December 1995.

3.2. Initial 'Ruling-Out' Criteria

The criteria may be classified into two categories as follows :

- environmental, planning and social criteria; and
- technical and cost criteria.

The principal planning policies relating to potential yachting development are identified in Appendix II. These provided an essential context for the mapping process and for the preparatory meetings with representatives of the Planning Authority and the MMA.

These criteria and the implications in the site selection process for marina development and yacht repair/hard standing sites are discussed in the following paragraphs. Although there is considerable overlapping, marina sites and boat yard/hardstanding sites do have some different requirements. Criteria which apply only to marina sites are indicated by the symbol M, whilst criteria which apply only to boat yard/hardstanding sites are indicated by the symbol H.

Environmental, Planning and Social Criteria

- ***Pristine coastline/ rural conservation areas*** - proposed development in areas designated as rural conservation areas in the 1990 Malta Structure Plan have been ruled out. It is suggested that marina development benefits would be outweighed by environmental and long-term social implications of further expansion into the Maltese Islands' limited areas of pristine coastline. There are numerous examples of such areas along the coastline of Gozo and the south west coast of Malta. Reference Structure Plan policies RCO 1, RCO 2 and RCO 10.

- ***High recreational or social amenity value*** - the presence of a popular sandy beach is a criteria for ruling out a potential site for development. The Maltese Islands have few sandy beaches, and they are heavily used by both residents and tourists in the summer months. Areas designated as swimmers' zones by the MMA where yachts are prohibited from entering or other beaches or bays which are well established as popular swimming areas are also ruled out. An example of an area affected is Marsalforn Bay in Gozo. Reference Structure Plan policy RCO 16. Additionally, there is a need to maintain public access around the immediate coastline which will rule out some sites. Reference Structure Plan policies CZM 3 and UCO 3.

- ***World Heritage Sites*** - development along the Valletta coastline is ruled out given its designation as a World Heritage Site and comments in the 1990 Structure Plan indicating that there should be no obstructions to the views of Valletta from the sea. Reference Structure Plan policies UCO 1 and UCO 3.

- ***Competing use (industrial uses)*** - activities such as a reverse osmosis plant, sewage outfall, power station or busy docks in the vicinity are seen as being incompatible with marina development as they will make the marina environment unpleasant whilst possibly also affecting the efficient running of the nearby industries.

- ***Competing use (other established uses)*** - we have ruled out areas where there are established competing uses for which there are likely to be no easily established alternatives, e.g. cruise ship quays (inner Grand Harbour), ship fuelling facilities (Rinella Creek), the coastal film facilities (Rinella coast), and the main fishing port of Marsaxlokk. Additionally, areas of high agricultural value have been ruled out as inappropriate for marina/hardstanding development.

- ***Proposed marine conservation areas*** - coastline adjacent to proposed marine conservation areas in the 1990 Structure Plan are considered inappropriate for as potential sites for yachting activity. Reference Structure Plan policy MCO 1.

- ***Tourism restraint areas*** - areas marked 'Tourism Restraint' on the 1990 Structure Plan Diagram have been excluded due to the anticipated knock-on effect of marina development.

- ***Other Structure or Local Plan issues*** - such as specification of the type and extent of boating activity in Marsaxlokk, around the Freeport site and Grand Harbour, or the value of land for agricultural use. The main planning policies relating to yachting development are outlined as Appendix II. In particular with reference to Structure Plan policies SET 10, TOU 7, TOU 13, RCO 1, RCO 2 and UCO 3.

Technical and Cost Criteria

- ***Degree of exposure*** - if there is no natural shelter, or a wide open coastline exposed to the north easterly storms, there will be a requirement for a very large breakwater structure, which would have high construction and environmental costs.

  Generally speaking, such extensive breakwaters are only considered if enclosing a large space of water for use by commercial vessels of all sizes (e.g. Grand Harbour or Malta Freeport). With a large breakwater when there is no natural shelter, there may also be long period swell resonance problems if the marina configuration coincides with the period frequency of waves. This would make the marina berths untenable in certain swell conditions.

  Even for hard standing, an open site would be inappropriate as yachts would need a safe mooring while waiting for removal from the water, as well as a degree of shelter when stored on land.

  An example of the coastline ruled out by this criteria is that along the Sliema coast road (Tower Road).

  A bay which is too small for any proposed yacht marina, even a small marina, is also ruled out on this criteria as any development would entail a breakwater that extends into exposed areas, with the same associated problems as discussed above. An example of this is Bahar ic-Caghaq bay on the north coast.

- ***Waterfront access*** - due to the difficulty of towing large yachts on land, potential yacht hard standing sites or repair yard sites are only considered in detail along waterfront locations. It is noted that all major established yacht repair facilities are located at waterfront sites and that any inland hard standing sites are minor in scale and provide solely for smaller craft.

- ***Depth of water*** - sites have been ruled out where there are open seas and the depth of water adjacent to the coastline is greater than 20 metres. This would mean that any breakwater would be prohibitively expensive to construct. This rules out parts of the northern coast of Gozo and the south west coast of Malta, for example. Likewise hardstanding sites require safe holding moorings for ease of access in and out of the water.

- ***Inaccessible cliffs and steep slopes on the immediate coast*** - marinas and related yachting facilities require easy waterfront access from land. The costs, in financial and environmental terms, are too great to consider digging into cliffs and steep slopes as being accepted general practice. Areas ruled out of the search process by this criteria include, for example, Dingli Cliffs on the south west coast of Malta. Reference Structure Plan policy RCO 10.

- ***Shoals and reefs at the potential marina entrance*** - yachts require relatively straightforward access into a marina, particularly in storm conditions. We do not consider it acceptable or practical to remove sand spits and reefs for marina development, because of the environmental implications, the initial costs and the likely need for ongoing dredging as the sand spit naturally re-builds. Shoals and reefs affect areas such as the entrance to St Thomas' Bay. For mapping purposes reefs and shoals within a 10 metre depth are marked.

- ***No current road access or existing infrastructure*** (i.e. availability of water and electricity) - this would make the cost of development extremely high and, given the current level of development in Malta, we would suggest that further spread of "urbanisation" for the sake of marina development is best avoided even where roads and public utilities are available. This criteria then rules out, for example, parts of the waterfront adjacent to the Coast Road. Reference Structure Plan policies SET 1 and SET 11.

- ***Industrialisation*** - a yacht marina in the heart of a heavily industrialised area would be unpopular with users due to pollution, noise, light, dust, etc. This rules out areas such as inner Grand Harbour and Malta Freeport. However, such areas might be appropriate for a yacht repair yard, particularly in areas where there is a history of boating industry. Reference Structure Plan policy SET 7

- ***Land availability*** - adequate space must be available for related land-side marina facilities either through reclamation at reasonable cost or through purchase. Reference Structure Plan policy SET 7

3.3. Mapping

The initial 'ruling out' criteria have been applied to the coastline of the Maltese Islands and their application is described below. The detailed reference points are taken off the 1:25,000 scale maps but the results of the mapping process are shown diagramatically on the map on page 37 for ease of reference. Some areas will clearly be ruled out of further consideration by more than one criteria. The issues described relate to presumptions against marina development, unless the sites have been specifically identified as possible sites for yachting activity.

3.3.1. Gozo and Comino

The bulk of the Gozo coastline is generally pristine and there are cliffs along a significant proportion of the western end of the island. Much of the coast is protected as a rural conservation area whilst many of the bays fall within proposed marine conservation areas or swimmer-only zones. The specific areas of coast are described below, working anti-clockwise around the island from Mgarr Harbour.

East Coast (Mgarr Harbour to Marsalforn Bay via Ramla Bay)

Mgarr Harbour is an existing yacht marina which successfully embraces fishing, commercial and yachting activities. The area within the present breakwater is considered to be fully utilised given that additional pontoon berths were made available in 1995. Further expansion might be possible, but would require the repositioning of the smaller breakwater by the existing yacht marina. Such development would have to be studied carefully given that the coastline in the area becomes pristine only a short distance away from the existing breakwater. However, a **possible site** for a marina may exist outside the current harbour and the possibility also exists to provide a formal arrangement of seasonal summer moorings.

Heading around the coastline, the area between Mgarr Harbour and Hondoq ir-Rummien is characterised by cliffs or steep slopes with no coastline indentations, deep water and limited road access. It is also relatively pristine. However, there is a disused quarry and former water desalination plant at Hondoq ir-Rummien which may be a **possible site** for hard standing. We understand that there are plans to redevelop the plant into a fish farm nursery.

The coastline between Hondoq ir-Rummien and San Blas is pristine, with cliffs, no natural indentations offering shelter, no existing road access and a small sewage outfall in the vicinity. There is a small sandy beach at San Blas Bay.

The shoreline between San Blas and Ramla Bay is exposed and falls within a proposed marine conservation area. Ramla Bay is Gozo's largest sandy beach and is affected by a number of structure plan policies advocating tourism restraint in the area.

The coast between Ramla Bay and Marsalforn is exposed and pristine with no road access.

Marsalforn Bay is a popular swimming area with a small sandy beach and private developments along most of the bay. Yachts are currently prohibited from entering the bay and there is a small fishing boat enclosure within the bay.

West Coast (Marsalforn Bay to Mgarr Harbour via Xlendi)

Marsalforn Bay to Reqqa Point is part of a proposed marine conservation area and is very popular with scuba divers. The coast is generally pristine with the exception of Qbajjar Bay which is a popular bathing area. The area is listed in the Structure Plan as an area for tourism restraint.

Reqqa Point to Dwejra Point is characterised by cliffs and no road access. There is also a small offshore sewage outfall. Dwejra Point to Wardija Point is pristine coastline and falls within a marine conservation area in which tourism restraint is advocated. In particular, there is Fungus Rock and the surrounding area which is considered very environmentally sensitive and quite special.

Wardija Point to Xlendi Bay is pristine coastline characterised by cliffs with no road access. Xlendi Bay itself is narrow and popular with swimmers and small craft moorings, with steep slopes on both sides and limited land-side space for further waterfront development.

The coast between Xlendi and Mgarr ix-Xini is pristine and dominated by cliffs. Mgarr ix-Xini itself is a narrow bay within a proposed marine conservation area, whilst the coastline immediately beyond it is exposed to rough seas. The coast between Ras il-Hobz, Xatt L-Ahmar and Mgarr Harbour is protected as a rural conservation area and previous intentions to consider a marina development at Xatt L-Ahmar were overruled on environmental grounds.

Comino

The island of Comino is within a proposed marine conservation area and is an area with a tourism restraint policy.

3.3.2. Malta

South West Coast (Cirkewwa Harbour to Marsaxlokk Bay)

The coast between the Cirkewwa Harbour quay wall moving westwards towards the sewage outfall at ic-Cumnija encompasses a proposed marine conservation area. It is also a rural conservation area with steep slopes and restricted road access. There is a sandy beach and a ferry quay within Paradise Bay, which is the only bay within this region.

The coast beyond ic-Cumnija to Ras il-Wahx is dominated by cliffs and has no road access. The entire coast is protected as a rural conservation area.

The area between Ras il-Wahx and Ras ir-Raheb is a proposed marine conservation area and includes the sandy beaches at Golden Sands, Ghajn Tuffieha and Gnejna.

The remaining coastal area between Ras ir-Raheb and Ghar Lapsi features cliffs, limited road access, deep waters adjacent to the coast and rural conservation area status.

The coast between Ghar Lapsi and Wied iz-Zurrieq is ruled out on a number of criteria due to its proposed marine conservation area status, a popular bathing area within Wied iz-Zurrieq, proximity to the Hagar Qim and Mnajdra Neolithic temples, which are of worldwide historic importance, the inaccessibility of the low-lying areas and a tourism restraint planning policy in the Structure Plan. The Blue Grotto along this stretch of coast is also of high amenity value for tourism and local bathing, as well as being within a marine conservation area.

Beyond Wied iz-Zurrieq most of the coastline is dominated by cliffs and has no natural indentations offering shelter. The Hal Far Industrial Estate also borders part of the coast in this area.

Marsaxlokk Bay Area

The outer part of the bay is dominated by Malta Freeport Terminal 1 and work is in progress for Terminal 2. As a result there is a large vertical face breakwater and significant, and growing, levels of commercial shipping within the outer part of the Port. The Local Plan states that further expansion of the Port of Marsaxlokk will not be permitted, as it is felt that there is only limited scope to relocate heavy port uses from Grand Harbour to the Freeport, because of the restricted area of suitable shoreline (Local Plan policy MP 01, see Appendix II). The outer Harbour of the Port is to be left free from any type of permanent moorings (MP 02).

A low lying waterfront site on land between Malta Freeport and Pretty Bay known as Wied il-Puni was identified as a **possible site** for hard standing.

Pretty Bay contains a large sandy beach and is a popular bathing area. Outside the entrance to Pretty Bay there is the Shell Oil Pier.

St George's Bay has numerous small craft moorings and a small breakwater. The Local Plan identifies it as an 'Opportunity Area' and here there may be a **possible site** for marina development. The Local Plan implies that Boat moorings are to be intensified (see Appendix II, reference MB10, MB13), that the existing garden at the head of the bay is to be upgraded, but that no boat storage will be permitted.

The coast between St George's Bay and Fort St Lucien has oil and gas depots. There is also an experimental fish farm in the area linked to the National Aquaculture centre at Fort St Lucien. Immediately beyond the Fort, the coastline is inaccessible due to steep slopes.

The former Malta Hydrofoil factory located by the waterfront at the entrance to Marsaxlokk fishing harbour is a **possible site for a yacht repair yard and hard standing**. The land is low lying and a slipway is already in place. The site of the present Malta Hydrofoil factory falls within an 'Opportunity Area' identified in the Local Plan. One of the objectives for this area is to encourage commercial, including marine-based, activities. A formal development brief is to be developed for the area (MB07).

Marsaxlokk fishing harbour is full of small fishing craft moorings and trawlers and is Malta's main fishing port. The long term storage of boats in the area used by the open air market is to be prohibited (MB12). Priority for mooring rights within Marsaxlokk Inner Harbour is for local fishermen with traditional craft (MM13).

The remaining coastline within the bay between Marsaxlokk and Delimara point is dominated by the power station which was built within the surrounding cliffs and therefore offers limited waterfront access.

South East Coast (Marsaxlokk Bay to Grand Harbour)

The area between Delimara Point and Xrobb il-Ghajn is a proposed marine conservation area and a designated rural conservation area. The Structure Plan advocates tourism restraint in this region whilst part of the coast is dominated by cliffs.

The coast between Xrobb il-Ghajn and the Jerma Palace Hotel (St Thomas' Tower) falls partly within a rural conservation area and a tourism restraint area. There is also Munxar Reef by the entrance to St Thomas' Bay with a minimum depth of water of three metres, which may be a hazard for yacht access, particularly in bad weather. However, despite this, St Thomas's Bay might be a **possible marina location**, if land-side development keeps away from the side with the conservation status.

Marsascala Bay is a **possible site** for marina development. It is a long, narrow bay with numerous small craft and yacht moorings.

The coast between Marsascala (Zonqor Point) and the entrance to Grand Harbour (Ricasoli Point) is exposed with no significant indentations. In addition, along that stretch of coast, there is a planned reverse osmosis plant at Zonqor Point, a sewage outfall at Xghajra (entry prohibited to marine vessels) and the Mediterranean Film Studios, which offers waterfront tank facilities for special effects.

Grand Harbour

Rinella Creek is the outermost creek of Grand Harbour. It is exposed to reflective waves caused by the gregale and has a small sandy beach at its head. By the entrance there is also an industrial tank cleaning facility for large commercial shipping. It is not a suitable environment for a yacht marina but may be considered as a **possible site for yacht hard standing**. Although it is discussed further in this report, we understand that there would be considerable planning resistance to development in this area in accordance with the draft Local Plan (see also section 8.4), and it would not gain approval.

The draft local plan states that the Outer Harbour (defined as Dockyard Creek and Kalkara Creek) is to be dedicated to residential, leisure and tourism uses, which could include a marina.

Kalkara Creek is a **possible site** for a marina. There is already a commercial yacht hard standing and repair facility and a number of small boat moorings. The area is designated as a priority area for new tourism and recreation development in the 1990 Structure Plan. The draft Local Plan notes that the area offers a unique opportunity to integrate marine activities and village life given the waterfront centre of Kalkara.

Dockyard Creek is another **possible site** for a marina. The area has an outstanding waterfront due to the historic wharves, churches and fortifications which surround the creek. The existing superyacht berths are located in Dockyard Creek by Fort St Angelo. The area currently has some industrial use due to the tug boats located there and Number One Dock. The draft Local Plan suggests that Number One Dock is to be decommissioned and the area around and adjoining the Dock is to be developed for residential, tourism, cultural, limited commercial and open space purposes.

The Inner Harbour areas are currently utilised for commercial and industrial shipping activities and make use of the extensive waterfront quays. This includes the deep water quay at il-Menqa, which is still in regular use. In addition, in Marsa Creek, where there may be some surplus land requirements, there is a power station and a reverse osmosis plant, both of which need the waterside location and, for the reverse osmosis plant in particular, a clean supply of water. In addition, the access to this area of the Inner Harbour will probably not be appropriate for yachts, because of the high level of commercial shipping in the area.

The maritime activities in this area are expanding at present, so the commercial importance of the inner harbour is likely to increase, and may outweigh any benefits of marina development. The Dockyard area around French Creek is currently busy with ship repair activities. While these are diminishing to some extent, it is an important area to complement Malta's other maritime activities. Therefore, while some rationalisation may occur, this area would only be **possible as a site for yacht repairs and hard standing** in the longer-term.

The Valletta waterfront of the Grand Harbour is not appropriate as it contains a number of quays currently well used for other important purposes, such as those for cruise liners, and there are planning restrictions associated with the World Heritage Site status of Valletta.

Marsamxett Harbour

Sliema Creek is the outermost creek of Marsamxett Harbour. It contains various small craft moorings and is the landing place for a number of tourist excursion boats. At one end there is the Manoel Island Yacht Yard. The 1990 Structure Plan designates the area as a priority area for new tourism and recreational development (TOU6-10,13) and as an international yachting centre (TOU 7), therefore it is considered a **possible site**.

Lazaretto Creek is also designated as an international yachting centre (TOU 7) and an area for tourism development. It is anticipated that the current marina with quay side moorings will be partially replaced by a **possible yacht marina** related to the development of Manoel Island.

Msida Creek contains the bulk of Malta's existing marina capacity and no further expansion is considered possible.

Pieta Creek is identified as a **possible site** for a yacht marina, developing out from the existing marina facilities. The area also includes the Gozo ferry quay and the Armed Forces Patrol Boat depot, which would need to be re-sited.

Along the Valletta waterfront, beyond the 40 berth Excelsior Hotel marina, no further development is permitted given Valletta's World Heritage status.

North East Coast (Sliema to St Paul's Bay Area)

The coast between Tigne Point and Sliema Tower is exposed with no indentations.

Balluta Bay through to Pembroke (Ras l-Irqieqa) is a proposed marine conservation area. Within this region, Balluta Bay is a popular bathing area and any possible enclosure of the bay with a breakwater might also affect the nearby picturesque Spinola Bay, with its numerous small craft moorings and waterfront cafes, bars and restaurants. The Malta Hilton, at Spinola Point is proposing a small marina in an area cut out from the existing coastline. The coast along Dragonara Point is generally exposed and utilised by a private beach club. St George's Bay has a small sandy beach at its head, but is densely occupied by small craft moorings and much of the coastline is taken up by hotel beach concessions. However, given its natural protection, the already degraded nature of the beach and the clearing of some nearby buildings for redevelopment, the bay will be considered as a **possible site** for a marina.

The coast from St George's Bay to Qalet Marku is generally exposed with limited natural indentations. In parts there are conflicting uses, such as the Pembroke Reverse Osmosis plant, or steep slopes with limited road access and no waterfront infrastructure. There are also some popular bathing areas, particularly in the area around White Rocks and the holiday complex. Whilst Bahar ic-Caghaq Bay itself is probably too small to be considered for a marina development, the area around it has no characteristics which rule it out for marina development, so the location will be considered further as a **possible marina site.**

Qalet Marku has no land-side infrastructure and falls within a rural conservation area. It is a popular bathing and barbecuing area with a very small sandy beach and the whole coastline is pristine in that there are no buildings. Further back from the coast road however, there is a large landfill site which is clearly in view. Marku's shoal, with a minimum water depth of six metres is adjacent to the entrance to the bay, although this is unlikely to be much of a yachting hazard, except to the deepest draft boats in bad weather.

The coast between Qalet Marku and Salina Bay has the above characteristics of no infrastructure, rural conservation status and the landfill site, whilst having no natural indentations in the shoreline to provide shelter.

Salina Bay is considered as a **possible site** along Qawra Point, although it should be noted that this is a popular bathing area. Further into the bay there are salt marshes and the south side of the bay has rural conservation status.

St Paul's Bay Area

The entrance to St Paul's Bay has deep water close to shore and is relatively exposed. Mid-way into the bay (Rdum l-Abjad to l-Ghazzelin) is a popular bathing area. There are organised small craft moorings for pleasure craft and fishing boats within a small breakwater arm at Rdum l-Abjad (by Gillieru restaurant).

Xemxija, right inside St Paul's Bay is a **possible site** although any development must take the nearby nature reserve and sewage overflow issue into consideration. There will also be numerous boat moorings in the summer which may be displaced by a marina development.

The area within St Paul's Bay from Xemxija (Rxawn Point) to Mistra Bay is difficult to access due to steep slopes.

Mistra Bay is considered as another **possible site** due to the high degree of natural shelter afforded, and the large stone slipway in the bay. However, it falls within a rural conservation area and the coastline is relatively pristine. There are also fish farm cages which would need to be relocated.

The coast between Mistra Bay and St Paul's Islands is unsuitable for consideration due to cliffs, deep waters and its status as a proposed marine conservation area.

The coast from St Paul's Islands to Mellieha Bay can be ruled out on a number of counts. It has limited road access, is largely too exposed and parts of that coast have rural conservation area status. There is also a popular sandy beach at Selmun Bay.

Mellieha Bay Area

Mellieha Bay contains Malta's largest sandy beach (at Ghadira) and is a popular bathing area with locals and tourists. There are also the Mellieha Shoals by the beach, creating a minimum depth of 2 metres of water, which would affect any marina development. The bay as a whole is particularly popular for wind surfing.

The southern coast of Mellieha Bay (Ras il-Griebeg to Ghadira) is exposed and has limited road access due to steep slopes on the outer reaches. Further in there are numerous residential units close to the water's edge, along with a popular bathing area. Consideration will be given to a **possible marina** along this inner coast, because the area is already developed with good road access and other infrastructure. However, there are no natural indentations along that stretch of shore and any development would have to extend into the main part of the bay.

The north coast of Mellieha Bay (Ghar Baqrat to ta' l-Imgharrqa) is occupied by the Mellieha Bay Hotel development which extends right onto the coastline. Further out, towards the mouth of the bay (Ta' L-Imgharrqa to the White Tower on Ahrax Point) the coastline is made up of cliffs which prevent waterside road access. The coast is exposed and in pristine condition whilst the surrounding land appears to be popular with bird hunters.

North Coast (Mellieha to Cirkewwa)

The small inlet by the White Tower offers only limited shelter and is pristine coastline with no nearby infrastructure.

Ramla tat-Torri offers a popular sandy beach, surrounded by small beach huts built along the water's edge, and there are numerous small boat moorings within the bay. The surrounding infrastructure is basic. The sheltered area is relatively small and any possible breakwater structure might have to extend into open waters which would also affect the next bay (Little Armier). Little Armier Bay and Armier Bay have similar characteristics to Ramla tat-Torri and also enclose small sandy beaches with numerous beach huts along the water's edge.

Ramla Bay, opposite the Ramla Bay Hotel is a **possible site**. It has good road access and infrastructure. There is no sandy beach whilst the land gently slopes upwards from the water's edge. There are some small boat moorings within the bay and some beach huts at the water's edge.

Marfa Bay, behind the Ramla Bay Hotel, contains an old Gozo ferry quay and a small breakwater. The surrounding land slopes gently upwards and the road access is good. The bay will therefore be considered as a **possible site,** although we have been advised that much of the available land space may already be taken up by a proposed hotel development.

The coast from Marfa to Cirkewwa is exposed to north easterlies and there is a reverse osmosis plant which limits nearby development. The northernmost tip is considered as a **possible site,** bearing in mind the proposed development of an all-weather ferry port at Cirkewwa.

3.4. Results

Following the mapping process, large areas of the Maltese coastline were ruled out of the site selection process for yachting development. Also as a result of this process, a number of sites were selected as being worthy of more detailed investigation. This does not mean that the sites are necessarily suitable for yacht marina development or for hard standing facilities, but that they have not been excluded at this initial stage in the process, as being totally inappropriate or unacceptable. The potential of these possible sites is considered in greater detail in the "site sieving" process that follows (Section 4) and the relative attributes of each are evaluated.

The sites initially short-listed for consideration in terms of possible yachting development are listed below.

Potential Marina Locations:

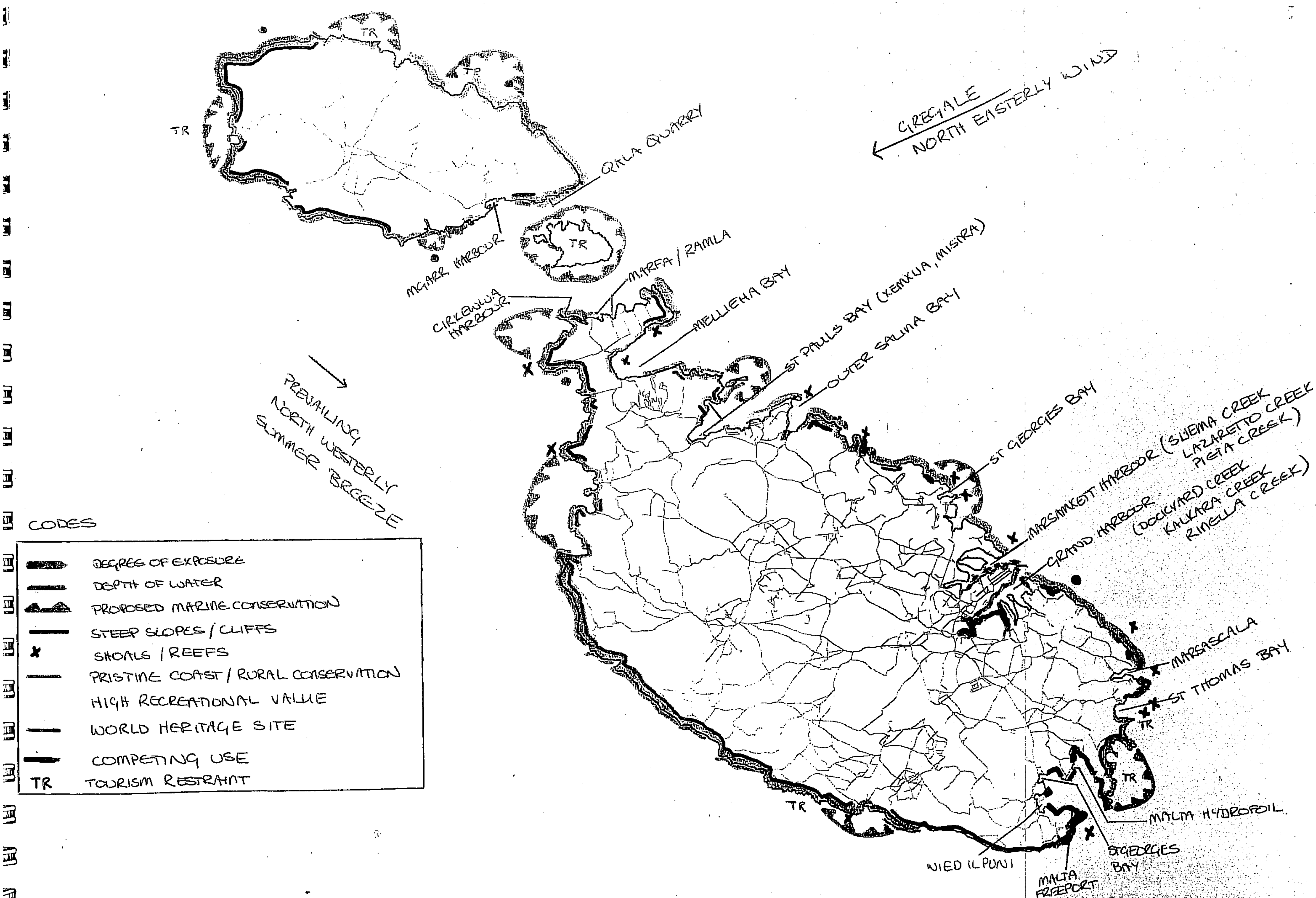
- Outer Mgarr Harbour, Gozo
- Cirkewwa Ferry Harbour, Malta
- Marfa Bay, Malta

- Ramla Bay
- Mellieha Bay
- Mistra Bay, St Paul's Bay
- Xemxija, St Paul's Bay
- Outer Salina Bay/ Qawra Point
- Bahar ic-Cahaq Bay
- St George's Bay, St Julian's
- Lazaretto Creek, Marsamxett Harbour
- Sliema Creek, Marsamxett Harbour
- Pieta Creek, Marsamxett Harbour
- St George's Bay, Marsaxlokk
- St Thomas' Bay
- Marsascala Bay
- Kalkara Creek, Grand Harbour
- Dockyard Creek, Grand Harbour

Possible Yard/ Hard standing locations include:

- Qala Quarry, Gozo (hard standing only)
- Wied il-Puni, Marsaxlokk Bay (hard standing only)
- Malta Hydrofoil site, Marsaxlokk (yard or hard standing)
- Rinella Creek, Grand Harbour (hard standing only)
- French Creek, Grand Harbour (yard or hard standing)

The map overleaf illustrates the coastal mapping process and the main areas of Maltese coastline ruled out at this stage.



TR
TR
TR
TR
QALA QUARRY
GREGALE
NORTH EASTERLY WIND
MGARR HARBOUR
MARFA / RAMLA
CIRKEWWA HARBOUR
MELLIEHA BAY
ST PAULS BAY (XEMXIJA, MISTRA)
OUTER SALINA BAY
PREVAILING NORTH WESTERLY SUMMER BREEZE
ST GEORGES BAY
MARSAMXETT HARBOUR (SLIEMA CREEK LAZARETTO CREEK PIETA CREEK)
GRAND HARBOUR (DOCKYARD CREEK KALKARA CREEK RINELLA CREEK)
MARSASCALA
ST THOMAS BAY
TR
TR
TR
MALTA HYDROFOIL
ST GEORGES BAY
WIED IL PUNI
MALTA FREEPORT
CODES
DEGREE OF EXPOSURE
DEPTH OF WATER
PROPOSED MARINE CONSERVATION
STEEP SLOPES / CLIFFS
SHOALS / REEFS
PRISTINE COAST / RURAL CONSERVATION
HIGH RECREATIONAL VALUE
WORLD HERITAGE SITE
COMPETING USE
TR TOURISM RESTRAINT

4. SITE SIEVING PROCESS

4.1. Approach

As mentioned in the introduction (section 1.2), this stage of the site selection process is used to shorten the original "areas of search" identified from the mapping process, into a list which represents those sites which balance environmental, technical and economic issues within practical and acceptable levels for yachting development, although the emphasis remains upon environmental and social issues as being the primary determinant of suitablity at this stage prior to detailed consideration of market and economic criteria in relation to short-listed sites.

A total of 23 possible sites resulted from the initial mapping process and each of these were visited by a team of consultants (including environmental, technical and tourism specialists). From this investigation, the main strengths and weaknesses of each site were listed to illustrate the interaction of the various implications and constraints.

Then 41 key criteria were drawn out from this analysis as being most relevant to the sieving process. These criteria were discussed and refined through group discussions with the range of team contributors and a simple scoring system developed to rank one site against another in a clearer way.

In order to identify short-lists of potential sites for both marina and boatyard/hard standing development, the scoring system and the strengths and weaknesses analyses were considered in combination to determine overall site suitability and selection.

The list of sites has been divided into those with potential for marina development and those which may be appropriate for yard or hard standing areas.

The details of these processes and the outcomes are presented in the following sections.

4.2. Strengths and Weaknesses

All the 23 sites considered have some strengths and some weaknesses in terms of suitability for yachting development. A full analysis of the relative advantages of the sites is presented as Appendix III. We have considered the relative merits of each site under three broad headings: technical aspects, environmental and social issues and market-related factors. Clearly, there will be overlap between these areas, but the breakdown will clarify the main points.

4.3. Sieving Criteria

Below we explain the individual criteria and how the scoring of each has been applied to the potential sites for yachting development as part of the sieving process.

It is acknowledged that scoring systems are very difficult to assess accurately, because of the potential for artificially weighting a particular site through subjective scoring or through an inappropriate weighting of individual criteria. We have tried to avoid this through devising a simple scoring system based on only three variables (as well as a "not-applicable" scenario) and by including a wide range of criteria to include all the main aspects which might be valid bases for considering marina, hard standing or yard facilities.

The criteria are divided into three areas - technical, environmental and social, and those related to market, financial or economic issues. These are just broad categories and some criteria could fall within the boundaries of more than one category. We have used our judgement in the allocation. The majority of the criteria used in the scoring system are within the bounds of the first two categories (16-17 criteria each) because we believe that these are the most important areas which should be taken into account in the sieving out of potential sites. Market and financial criteria are more likely to be related to the success of a yachting development once a site has been selected.

This system is clearly not infallible, but is used as a basis for guiding decision making. The ultimate results have been checked for "reasonableness" and we are confident that the system reflects a valid approach to weeding out inappropriate sites.

Technical Criteria

1. ***Navigational Aspects*** - relates to the ease, or otherwise, of navigating a small boat, night or day, in the area of the proposed marina. For example:
   - are there offshore hazards to contend with?
   - is the entrance channel narrow or restricted?
   - would storm seas or gale force winds create additional risks?

2. ***Degree of Site Exposure*** - this basically highlights whether the site is on an exposed coastline, or within a sheltered creek. The degree of exposure will affect the size of the breakwaters needed, the orientation of the berths, the type of mooring system and the layout of the hard standing.

3. ***Capacity for a Large Marina*** - relates to the ability of the site to accommodate the potential demand and be flexible to possible future changes in demand levels.

4. ***Existing Water Depths*** - this criteria relates the water depth to the need for dredging to create a deeper water environment. It is preferable to avoid having to undertake any dredging to form a basin area deep enough for the various boats. Nevertheless, limited dredging in soft sediments is, of course, better than having to blast out any rock over a wide area.

5. ***Extent of Breakwaters*** - this clause was included to give guidance on the likely size of the breakwater which will be required and the relative cost implications. For example, it covers both the extent of the structure in terms of length and weight. The greater the extent of breakwater needed, the greater also will be the environmental implications as discussed elsewhere.

6. ***Inner Wave Problem*** - is a technical issue relating to the likely conditions within a marina at that site. Although a site might be well protected from large offshore waves it is still possible to experience small wind-generated waves of a limited fetch. These small waves can cause boats to roll uncomfortably unless provision is made to design against them.

7. ***Car Parking*** - in this case, the issue of the required car parking space was raised. The scoring considers whether it would be difficult to create an adequately sized car parking space on appropriate land. The higher the score, the more difficult or costly it would be.

8. ***Boatyard*** - likewise, this criteria relates primarily to the availability of adequate space to provide a reasonably efficient boatyard facility on the marina site. A full boatyard repair facility is unnecessary, however, at a minimum there should be emergency repair facilities (with workshop space of around 650 square metres, and a slipway and hoist, capable of accommodating all sizes of boat normally berthed in the marina) provided in the near vicinity. It is anticipated that major repair facilities (normally requiring a yard with a minimum of 10,000 square metres, including a workshop of up to half this area, associated with a marina in excess of 500 berths) will be principally provided by those already existing.

   In considering the suitability of independent boatyard/hard standing sites, however, a full repair facility is important and will incorporate specialist equipment within the workshops.

9. ***Hard standing*** - again, this criteria relates to a space availability for hard standing adjacent to marina sites. In many cases, the hard standing space can be doubled up with some of the car parking space. However, there are also specific hard standing requirements for a level surface and some waterside access for boats.

   In considering the suitability of independent boatyard/hard standing sites, there should be provision for yacht owners to undertake routine maintenance and level standing for a minimum number of yachts to secure viability, say 80, depending upon the relationship between the site and other yachting developments nearby.

10. ***Supporting Facilities*** - this criteria was specifically intended to establish whether or not there was likely to be difficulty in providing the necessary supporting facilities locally for a marina development. This would include expertise in boat repairs, engine maintenance, chandlery, etc.

11. ***Distance from Existing Utilities*** - the scoring for this issue reflects the proximity of water, electricity, telephone or sewerage systems. Whilst remote sites might possess excellent physical parameters, it is nevertheless necessary to also consider the shoreside restraints, such as the existence of roads and utilities, which, if required, would add significantly to the financial and environmental costs.

12. ***Water Circulation*** - in confined areas, such as shallow bays, water will not circulate very efficiently. For natural flushing to be maintained, it is essential that any manmade obstruction placed in the area is shaped or located so as to minimise the effects on natural water circulation. Some sites will need more careful consideration, with cost and possibly environmental implications, and the scoring has been carried out to reflect this.

13. ***Construction Costs*** - this issue was included to be able to roughly distinguish between a marina site which would be expensive to construct, as opposed to one which could be constructed relatively cheaply. This issue will have a major impact on the economic viability of a site.

14. ***Construction Period*** - this will depend upon the location of the site and the degree of complexity of the various structures. Some marinas would be much quicker to construct than other, hence the scoring for this criteria will give relative values between the different sites.

15. ***Boat Displacement*** - relates to the level of disturbance to existing moorings. Several of the sites inspected already possess numerous moorings placed there by local boat owners. Where the location of a proposed marina would result in these mooring being removed, then the degree of boat displacement was scored as raising a problem, relative to the number of moorings being displaced.

16. ***Access to the Site*** - the ease of access to the marina site from the hinterland depends upon the existing roads. Some sites already have an established road network, while others do not and will need to have this upgraded.

17. ***Irreversible Structures*** - reflects the ease with which the marina structures, once built, could be dismantled or moved. For example, a rubble mound breakwater is there for its design life, although a floating breakwater could be relocated. Pontoon systems can be rearranged, while solid quay can not. The relevance of this point is that sometimes it is advantageous to establish a site or a marina layout for the short- to medium-term to take account of changing demand, or it may be that the surrounding environment is of such as quality (such as in Dockyard Creek) that it is preferable not to inflict permanent structures considering the very long-term value of the surrounds.

Environmental and Social Criteria

1. ***Direct Loss of Habitat*** - relates to the loss of ecospace or land which is available for marine ecology. This occurs due to three factors, firstly, if a breakwater is required it will take up part of the sea bed causing loss of habitat. However, this will be partially offset if the breakwater is a rubble mound breakwater, as habitats will be created (although in a different form) between the rocks. The second factor is due to the positioning of pontoons and yachts which block out light. Ecology dependent on this light is therefore destroyed. The third factor is loss of habitat due to other development issues, such as loss of sea bed due to land reclamation for car parking or hard standing. The most significant damage in this respect, would be where a marina development was planned in an area of clear shallow water, with, for example, sea grass meadows which would be threatened.

2. ***Indirect Loss of Habitat*** - relates to loss of habitat due to ongoing downstream effects of increased activity and increased pollutants. (The one-off downstream effects as a result of construction are considered under point 10 which follows.) A site was scored highly if it was in a relatively unspoilt area and downstream habitats could be considered to be under threat from a potential development.

3. ***Water Quality*** - where increasing number of pollutants are released in a confined space, water quality will deteriorate. The main types of pollutants associated with marinas are anti-fouling agents (most commonly Tributylitin (TBT) which is the main active ingredient in organotin-based anti-fouling paints having an ecological impact even at very low level, particularly on molluscs), sewage (faecal coliforms) and hydrocarbons (from fuel run-off and refuelling points). With the exception of TBTs, the environment has an inherent capacity to assimilate these pollutants and water quality degradation can be reduced by effective management. Apart from the level of pollutants being released, one of the key factors will be water circulation within the marina which will be dependent on design features. The additional factor which will contribute to water quality will be the existing level of pollutants being emitted into the area. This is considered under point 6 below.

4. ***Existing Levels of Disturbance*** - if a marina development is considered in a undeveloped area where yachts and the associated infrastructure are not already a feature, sensitive species are likely to be displaced. This effect is often measured using bird species, but other species may be similarly displaced. Where the area is undeveloped, sites would be given a high score to reflect this issue.

5. ***Level of Competing Uses: recreational*** - where a marina development will displace recreational use, such as swimming or windsurfing, a potential site was given a high score in the sieving process. For example, a marina developed in Mellieha Bay which is heavily used for swimming in the summer months, would result in a significant loss of amenity and therefore has been afforded a high score. Replacement value and compensation is considered under point 15 which follows.

6. ***Level of Competing Uses: sewage outfall and drainage problems*** - where a site is currently used for sewage and storm water drainage (such as Xemxija), any marina development would need to address this in order to prevent further unacceptable degradation in water quality. This type of use would result in a high score in the sieving process. A new sewage treatment plant for the northern end of the island is planned which should reduce drainage issues in the longer term.

7. ***Level of Competing Uses: fish farm activity*** - a marina development which would have to displace fish farming would incur high costs. Although it would be possible to relocate the fish farms, this is an expensive operation as effectively production needs to cease for about six months, resulting in loss of revenue. However, it is feasible to have a development in the same area as a fish farm which does not threaten the flowing water supply and therefore does not require the farms to relocate. While the first scenario would score highly, the latter one would not.

8. ***Level of Competing Uses: other issues*** - there may be additional "use" issues which need to be considered in positioning a marina development. For example, the existence of underwater pipelines (which may need access for maintenance), heritage issues, for example where wrecks are sited on the seabed, or the use of the coastline for industrial uses, such as a reverse osmosis plant. Any alternative use would result in a higher score.

9. ***Conservation Status of Area*** - there are a number of protection categories which restrict development, such as a Marine Conservation Area (MCO 1), Rural Conservation Areas (RCO 1), World Heritage Site status, etc. Where conflict with these categories is likely to be a problem, a site would score highly.

10. ***Likelihood of Construction Damage*** - refers to the one-off effects of marina construction. This includes the impacts of transportation of material to the site, damage to the surrounding area as a result of construction (e.g. turning points for vehicles) and downstream effects, resulting from large quantities of sediment floating downstream or a need to relocate excavated material downstream. As sea grass meadows (with their associated ecology) are sensitive to water quality these will be damaged by any close, upstream activity.

11. ***Visual Impact of Marina*** - where boats are already a feature, the "view" from land or sea will not be significantly altered by a marina development, although there may be some who feel strongly against boats being ordered rather than scattered (which has been used as an argument against upland afforestation). As boats are a man-made feature, we have only scored visual impact highly where boats are not currently a feature and where there will therefore be a significant visual change.

12. ***Noise Impact of Marina*** - refers to the additional noise that will be created by a marina development. This is more likely to be an issue where the marina is close to a residential area or an area which has an amenity value for "peacefulness".

13. ***Likely Impact on Traffic Generation*** - any marina development will result in increased traffic. Sites scored more highly if there were likely to be additional impacts associated with traffic, such as congestion (which results in high environmental and social costs) or impacts associated with road and parking construction.

14. ***Likelihood that marina development would downgrade the area*** - in environmental terms a marina development could either improve or degrade the area depending on the existing environmental quality of the site. A site which is currently in a developed area, is polluted and no longer used, would benefit from development, whilst the opposite case of development in a pristine, undisturbed area would represent an environmental downgrade and would be therefore be given a high score.

15. ***Need/Costs of Replacement Amenity*** - this relates to the need to provide a replacement amenity. For example, loss of recreational swimming could be addressed by providing a swimming pool, which while not identical in terms of amenity value, will at least provide some sort of compensation value.

16. ***Conflict With existing Local/National Structure plan*** - where there are existing plans for an area which may conflict with marina development, a potential site was given a high score. The views set out in the Marsaxlokk local plan and the draft planning document for the Grand Harbour region have been incorporated in our considerations as clearly planning consent will be required for any development and such consent would not normally be forthcoming if the proposed development conflicts with stated planning policy.

Market, Financial or Economic Criteria

1. ***Lack of likely social benefits*** - relates to the sites which, if developed, might generate significant employment in an area where unemployment is relatively high. In reality this only applies to the potential sites on Gozo, where there are limited employment opportunities being generated generally, and the sites in the Three Cities where the development of yachting facilities would utilise boat-related skills and assist with urban regeneration.

2. ***Land acquisition problems or costs*** - highlights those sites where we believe that the space required for a significant level of yachting development would require the acquisition of existing private developments or parcels of land; or where there is insufficient space and therefore the development would require reclamation of land from the coastline which will have added cost and time implications. For example, Marfa Bay scores highly because we understand that there is a hotel development planned for the site behind the bay, which will limit available land, and likewise Sliema Creek is very constrained on the north side by the road, while the Manoel Island shore currently houses the active Manoel Island Yacht Yard.

3. ***Lack of attractiveness to user groups*** - is a relative scoring comparing those sites initially short-listed, with the least attractive gaining the highest score and vice versa. The criteria relates to the main market sectors of demand which are most likely to use a yachting facility in that location and compares the relative appeal of that site against the others. For example, Xemxija will have primarily domestic appeal as a permanent berthing location and in this respect it will have strong appeal because of its location, access, existing tourism infrastructure and profile. St George's Bay, Marsaxlokk is also likely to be a domestically-oriented facility, but the appeal will be less than for St Paul's Bay because of the nearby power station, Freeport and it is on the side of the island least frequently sailed. In contrast, Dockyard, Kalkara or Lazaretto Creeks will have a higher level of international appeal, and all are attractive and highly appropriate marina locations.

4. ***Existing traffic noise*** - this relates to the relative peace of the location and the disadvantages which will be perceived by users of a berthing location which is permeated by regular traffic noise. One good example is the impact of the busy road along the side of Pieta Creek, which will not be acceptable, particularly to yachtsmen who are staying on board overnight. This is one of the disadvantages of the existing marina at Msida. (This criteria is not applicable to hard standing sites.)

5. ***Distance from local owners*** - a criterion which applies to the domestic market both in terms of the appeal of the location related to the accessibility of home, and also to the detrimental impact of additional traffic and fuel consumption. We have assumed that the majority of domestic yacht owners will live in the more affluent areas lying in the triangle between St Paul's Bay, Valletta and Mdina. No geographical analysis of boat ownership is available to support this assumption although the preliminary report of the 1995 Census of Population and Housing shows that the largest concentration of the population by region is in the outer main harbour areas, followed by the northern region, whilst the inner harbour area registered a substantial drop in population levels. Therefore, sites on Gozo, at Marsaxlokk through to Marsalforn and at the top end of the island are considered as relatively far from the source markets.

6. ***International market appeal*** - this criterion compares each site with the general standard of locations for marinas around the Mediterranean and will be relevant to Malta's ability to attract international demand, despite the limited cruising areas and distance from the main yachting areas. In this case, Sliema Creek and Lazaretto Creek will have more appeal than the majority of sites because they are close to the main social activity, in relatively good quality surrounds (including views of Valletta) and will represent a concentration of yachting with all the associated infrastructure. Kalkara and Dockyard Creeks are the only locations with a really special location in terms of the international market and may therefore be able to attract significantly higher levels of foreign visitors, with longer average stays, than at other sites.

7. ***Primarily domestic appeal*** - this is seen as a disadvantage as such a site will contribute less to the profile of Malta in the international yachting scene, the market where there is greatest potential economic benefit for the island.

8. ***Demand risk*** - highlights those locations where there are factors which may increase the uncertainty of identified demand potential being realised. Examples of this issue include the sites in Grand Harbour, for which there are some current local perceptions of high crime and lack of interest, or even sites which offer no particular features to provide recognised status for users (both internationally or domestically). Some of the issues here may seem subjective, but the scoring has been carried out based on our knowledge of the international yachting scene and research, both formally and informally, with local boat owners in Malta.

4.4. Scoring System

The scoring for the above criteria has been kept simple to try and alleviate as much subjectivity as possible and to portray as valid a system as possible. There are three scores: "3" denotes that the criteria would be a problem on that site; "2" suggests it will be an issue for note, but not a serious problem; while "1" reflects that the criteria is not an issue at all for that site. A zero score implies that the factor has no relevance at that location.

Potential marina sites and boatyard/hard standing sites have been considered using the same basic criteria listed above. However, the scoring system will work differently for potential marina sites as opposed to hard standing or yard sites, because of the relative importance of the various criteria.

The two categories cannot be compared with each other and the scoring system provides an indication of the relative merits within each category separately in the following sections.

The individual scores assigned to each potential site in relation to technical, environmental/social and market criteria are added to reach a total score, which can be used for relative ranking. The full scoring system is provided in Appendix IV and a summary of the results, for both marina sites and boatyard/hard standing sites, presented in ranked order in the following sections.

The strengths and weaknesses analyses for each site are provided in Appendix III. These are summaries of the principal advantages and disadvantages and to a large extent they amplify upon selected criteria utilised within the scoring system. In identifying a short-list of potential sites for both marina and boatyard/hard standing development, the strengths and weaknesses analyses provide the necessary further rationale for determining overall site suitability and selection.

The strengths and weaknesses analyses are an important element within the site selection process because, arguably, one site could achieve a higher aggregate total score than others whilst ultimately being unsuitable for major development due to a significant single criterion. For example, although Melliha Bay scores reasonably on technical and econimic criteria, it is likely to be wholly unacceptable in environmental terms. Likewise, although Outer Mgarr Harbour, Gozo, scores only slightly lower than Xemxija, St Paul's Bay, in the sieving system, it could only be developed to accommodate a limited number of yachts. As such, it would fall significantly short of the objective to develop Malta as an international yachting destination and would not substantially match the needs of the domestic market. However, alternatives for more cost-effective visitor moorings might be a more appropriate solution. For example, moorings could be put just east of the harbour entrance for use in settled weather, or further capacity could be achieved in the current marina through rearrangement of the current pontoons and layout.

It is therefore important to emphasise that the ranking of any particular site in the scoring system has not determined the short-list selection in isolation, although in practice the combined analyses have resulted in the four top ranking sites being distinguished for detailed consideration.

4.4.1. Marina Sites

Table 4.1
Summary of the Site Sieving Scoring - Marina Locations

	Technical Score	Environ-mental Score	Market Score	Total Score	Ranking
Dockyard Creek, Grand Harbour	21	16	10	47	1
Lazaretto Creek, Marsamxett Harb.	34	27	13	74	2
Kalkara Creek, Grand Harbour	39	26	13	78	3
Xemxija, St Paul's Bay	39	27	15	81	4
Outer Mgarr Harbour, Gozo	37	30	15	82	5=
Marfa Bay, Malta	32	30	20	82	5=
Sliema Creek, Marsamxett Harbour	38	27	17	82	5=
Pieta Creek, Marsamxett Harbour	36	27	20	82	5=
Cirkewwa Harbour	34	29	20	83	9
St George's Bay, Marsaxlokk	37	29	22	88	10
Marsascala Bay	42	29	18	89	11
Ramla Bay, Malta	38	34	18	90	12
St George's Bay, St Julian's	43	32	16	91	13=
White Rocks	42	33	16	91	13=
Mistra Bay, St Paul's Bay	36	40	17	93	15
Mellieha Bay	36	40	18	94	16=
St Thomas Bay	40	34	20	94	16=
Outer Salina Bay	43	41	15	99	18

Source: Deloitte & Touche Analysis

Key to Groupings of Sites:

Short-Listed Sites	
Possible Sites	
Unlikely Sites	

The sites have been grouped into three classifications:

Short-listed Sites are considered in detail later in this report;

Possible Sites are sites which have the potential for a marina or boatyard/hard standing but fall short of the requirements for international yachting development. These sites may, however, be developed in future for smaller or secondary facilities if viable; and

Unlikely Sites include locations where the cost of development would probably be unacceptable due to the depth of water or degree of exposure, or where the environmental or social disbenefits would be too great.

The table shows a clear leader, with a site which has scored the lowest in all of the three categories. Dockyard Creek would be technically straight-forward, environmentally sound, and an appropriate location for the potential market. The site scored 47, against the next ranked site, Lazaretto Creek, with a score of 74. Lazaretto Creek and Kalkara Creek (the third ranking site, with a score of 78) are quite similar in their attributes and, although there are some weaknesses or environmental issues to be overcome, both are thought to be strong potential marina locations. However, Lazaretto Creek is already accounted for in terms of marina development within the Manoel Island project.

The scoring system suggests that the next most appropriate marina site is Xemxija, with a score of 81. Xemxija is likely to have more market implications to consider than the top three sites and is technically more difficult (or costly) to construct, but will not have significantly more of an environmental impact than Kalkara above it.

The remaining sites all have some strong features in terms of marina development, but also some key weaknesses, which account for their disqualification from the selected short-list. Some of these might have value as marina developments, however, in terms of serving primarily domestic demand and as a way of spreading yachting activity. For example, Marfa Bay or St George's Bay in Marsaxlokk, both have existing sea defences which mean that they could be relatively easily developed as small marina facilities, but are unlikely to fulfil the objective of developing Malta as an international yachting destination. Mgarr, with a proposed extension to the existing facility, will probably be a less viable location because, being on Gozo, it will have more seasonal demand and is less convenient to the majority of users in terms of a permanent berth for a boat. Pieta Creek, likewise, while not an ideal site for an international marina, would offer a cost-effective way of extending the berthing capacity of Msida. Sliema Creek on the other hand, would form a good marina location if it were not already so busy with boating activity and local traffic.

Therefore, in looking at the overall requirement for the development of yachting in Malta, the top four scored sites are probably the only ones which merit further investigation for a major marina, although Lazaretto Creek is already being encompassed into the Manoel Island development scheme. As previously mentioned, several of the other sites would be suitable for smaller marina developments.

4.4.2. Yard/ Hard standing Sites

The summary of scoring for potential yard and hard standing sites is presented in Table 4.2.

Table 4.2
Summary of the Site Sieving Scoring - Yard/Hard standing Locations

	Technical Score	Environ-mental Score	Market Score	Total Score	Ranking
French Creek, Grand Harbour	14	16	11	41	1
Malta Hydrofoil Site, Marsaxlokk	15	16	15	46	2
Rinella Creek, Grand Harbour	19	26	12	57	3
Wied il Piunt, Freeport	22	22	16	60	4
Qala Quarry, Gozo	32	36	14	82	5

Source: Deloitte & Touche Analysis

Key to Groupings of Sites:

Short-Listed Sites	
Possible Sites	
Unlikely Sites	

In terms of yard/hard standing locations, French Creek scores the best in all three criteria (technical, environmental and social, and market and economic). It offers a heritage of boat repair facilities and therefore has the necessary hard infrastructure for yachting activities and further development of this type will have little, if any, environmental impact. However, in French Creek there is limited space available because of the dockyard activities.

The Malta Hydrofoil site at Marsaxlokk is also quite appropriate, with an existing base of boat-related activity and most of the infrastructure required already in place. However, Malta Hydrofoil is in a less central location and we understand, from our discussions with the Planning Authority, that other parties are already expressing an interest in the site.

A possible third yard/hard standing site is Rinella Creek, which would have great strengths for yachting activities, particularly in conjunction with marina developments in Grand Harbour. However, there are constraints on planning here and, although the location is discussed further in Section 8.4., it is unlikely to be approved for development.

The other hard standing opportunities assessed are not viable as significant developments, primarily on environmental grounds. It may be appropriate for the

authorities to consider other options within the wider planning arena, to encompass some of the areas ruled out by our mapping and sieving processes.

4.5. Conclusions - Short Listed Sites

In this section all the possible sites for marina or other yachting development have been evaluated, by virtue of technical and economic feasibility balanced against environmental impacts. The process started with an evaluation of individual site strengths and weaknesses, and the comparative value of these was then quantified through a simple scoring system. This system is biased towards the technical and environmental implications of marina development, because these are the issues of most relevance in site selection at this stage. Market implications have been brought into the sieving process, but have not been given proportionate weight as compared to technical and environmental considerations, although it is important to emphasise that ultimately market demand may be the arbiter for final site selection.

The scoring system is justified by the subjective evaluation of sites' strengths and weaknesses, and there seem to be no significant anomalies thrown up in the process.

Therefore, the scoring system, combined with the analysis of the strengths and weaknesses of individual sites, leads us to a short-list of potential marina sites for further evaluation, which includes:

- Dockyard Creek, Grand Harbour;
- Kalkara Creek, Grand Harbour; and
- Xemxija, St Paul's Bay.

These sites also ranked the highest.

Lazaretto Creek is clearly well-suited to marina development, but as there are well developed plans to create a marina there as part of the Manoel Island scheme, it has been excluded from our short-list for further investigation.

Other potential marina sites, which individually do not fulfil the criteria for international yachting development but might be considered further at a later stage, include St. George's Bay, Marsaxlokk, where a relatively low cost facility might be developed for the domestic market, and Outer Mgarr Harbour, Gozo, where summer moorings and some increased marina berthing might be effectively arranged.

Stand-alone yard and hard standing requirements will depend to a large extent on the marina site selected and the relative space availability. The needs of stand-alone yard facilities and hard standing space are quite different from those of a marina and so have been considered separately. In this respect, the most appropriate locations for the development of more facilities appear to be:

- French Creek, Grand Harbour; and
- Malta Hydrofoil Site, Marsaxlokk.

These sites do have significant constraints in terms of availability or planning issues and the main issues are discussed in section 8.

5. XEMXIJA - POTENTIAL MARINA SITE

The site sieving process which resulted in the selection of short-listed sites applied a far greater proportionate weighting to technical and environmental/social criteria than to market and economic factors. This section and the following sections, which provide detailed consideration of the short-listed sites, considers a more balanced review of the combination of these issues.

5.1. Technical Issues

5.1.1. General

St Paul's Bay is located towards the north of the Island. It faces north east and widens out from 300 metres at its inner end to over 1,300 metres at its outer end, some three kilometres to seaward. Over the majority of its length, water depths exceed 10 metres. However, in the upper reaches of the bay, shallower conditions exist, offering less than five metres of water. The seabed comprises silts and sands with occasional seaweed reefs. Bedrock is not believed to outcrop in the area, except adjacent to existing breakwaters.

Although the orientation of the bay exposes it to offshore waves generated by the gregale winds, the shelving seabed effectively reduces these to manageable proportions in the shallower region. Apart from the north easterly direction, the land offers good protection from wind from all other quarters. To the north and south, the ground is generally built up with two and three storey residential units. These are scattered in varying density along the shore. Around and behind the head of the bay very little development has taken place, providing a pleasant and natural feature to the area. The main road to Cirkewwa passes along this coastal strip, where a depleted sandy beach now lies.

From seaward, the navigational approaches are excellent. St Paul's shoal in the middle of the bay is not considered a serious hazard to small craft.

Although a small breakwater at Ghar-tal-Veccja provides limited shelter to boats berthed in its lee, the majority of boats swing to self-laid moorings out in the bay. These are nearly all seasonal moorings, with owners taking their craft out of the water over the winter period.

Water circulation is currently adequate. It is understood that the sewage discharge point at the head of the bay will be removed once the new treatment and outfall works have been completed.

5.1.2. Proposal

Various studies and preliminary investigation have already been undertaken for the St Paul's Bay area. Although this wide bay is particularly exposed to the gregale, it is technically feasible to construct a modest breakwater providing a high number of berths at the head of the bay.

Due to shallow water depths, a rubble mound breakwater would undoubtedly be the most cost-effective structure. As both the width of the bay and the water depths in this area are relatively constant, it would seem sensible to construct the breakwater in such a location that any future expansion could take place without further major capital outlay. To this end, it is proposed that a breakwater be constructed from the existing one at Ghar-tal-Veccja, across the bay some 350 metres. There are concerns over water circulation so, at this stage, it is probably preferable that no structure on the north coast is considered. Furthermore, it is feasible that it would be unnecessary to have more than one breakwater for the number of boats now being considered. (The Coode Blizzard report considered a higher figure of 1,000 berths.) There would be ample space behind the breakwater for 600 berths, which might be increased at a later stage, once pollution issues have been fully addressed.

Two scenarios were studied to reflect market demand issues: one for 600 berths and the other for 300 berths. Both would require a new road access from the main road roundabout below Triq San Pawl. The road will then follow the waterfront level and a car parking barrier will be needed about 100m along this roadway, to help prevent backing up to block the roundabout.

Both the schemes would also need reclamation of land for hard standing and car park areas and, due to the shallow depths in the bay behind the breakwater, dredging would be necessary. The extent of the dredged area and the reclamation area would need to be balanced. However, the facility would probably incorporate about 200 hard standing spaces.

Should a smaller marina initially be considered, it would almost certainly be sensible to make the reclamation sufficiently large for a bigger marina from the outset. Therefore, were a 300 berth marina to be built it would have the possibility of being upgraded to a 600 berth marina at a later stage as very little additional infrastructure would be required.

Both a 300 and a 600 berth marina at Xemxija would only take up one side of the head of the bay and would require a single breakwater arm. This will allow some space on the north side of the bay for current water-related activities to continue, including some mooring of local boats.

To minimise reflected wave action, all new structures should, where possible, have wave absorbing surfaces. The existing breakwater slipways and quay space should, if possible, be retained, although they would benefit from some refurbishment works. The area is also probably most suited to a small boat yard, although more land space is needed.

The position of the shoreside facilities, such as toilet blocks, administrative buildings, etc., would be ideally located centrally along the Ghaju Razul frontage.

5.2. Environmental and Social Considerations

The bay is heavily used by boats, the focal point for which is the area sheltered by the Xemxija wharf. The bay is also currently used for sewage and storm water drainage and a number of fish farms are located towards the outer regions of the bay. Several sampling sites have a poor bathing water quality rating, particularly by St Gerald's Street.

The points below give a more detailed view for each of the environmental criteria.

1. **Direct Loss of Habitat** - the existing space is already heavily used for moorings and therefore although there will be some loss of marine habitat as a result of increasing boat density, this is unlikely to be significant. Ecospace (or natural habitat area) would be lost for reclamation of land (for parking/hard standing) and for construction of the breakwater. Although it is unlikely that the environmental damage would be significant given the current level of pollution within the bay, further investigation will be required if the site is considered further as a potential development. The site is not mentioned as a locality with conservation value in the Schembri et al report (1987).

2. **Indirect Loss of Habitat** - as the area is already developed and under environmental pressure, the incremental effects of marina development should not be significant. As the area is currently noisy, there should not be significant displacement of land based species, but there may be increasing threats from pollution of downstream marine populations as a direct result of marina development. This will be particularly so as the existing pressures may be pushing downstream habitats beyond their environmental assimilative capacity. For example, there are sensitive points such as the nature reserve at the head of the bay and endemic species populations (such as the snail *Lampedusa scalaris*) in Mistra Bay which need to be considered in more detail in the environmental impact assessment.

3. **Water Quality** - out of 13 monitoring sites in St Paul's Bay, only four sites were rated in the highest category (1) in terms of bathing water quality (measured according to the levels of faecal coliforms present). These are at Sirenes water polo pitch, Barrakuda pitch, Vecca Bay and Xemxija Wharf. Other pollutants such as anti-fouling agents and petroleum hydrocarbons are also likely to be present as a result of current marine activities. Marina development will have an impact on water quality but to a less significant degree than in unpolluted areas. Although each short-listed site differs in the level of existing water pollution, the environmental cost of marina development will be limited (because water quality degradation has already occurred) and will be broadly the same in incremental value for each site. That is to say that, although the starting point in terms of pollution differs significantly between potential sites, the cost of restoring the site (following marina development) to the existing level of pollution will be similar.

However, although the cost may be similar, the environmental impact may be more noticeable at Xemxija than at, say, Dockyard Creek or Kalkara Creek because the water quality is higher than in Grand Harbour.

The main issue which needs to be considered is the diversion of sewage and storm water drainage, which will be required if a breakwater is constructed.

4. **Existing Levels of Disturbance** - a marina development is unlikely to significantly increase disturbance other than through increased traffic generation (see point 13 which follows). The bay is already heavily used on the marine-side and the road forms the bulk of the land-side disturbance.

5. **Level of Competing Uses: recreational** - as the bay is already polluted, very little swimming takes place at the head of the bay although there is some swimming further out. There are some recreational (and fishing) boats moored which would need to be accommodated in the marina or re-allocated new moorings, which could be more effectively distributed through planned provision.

6. **Level of Competing Uses: sewage outfall and drainage problems** - the existing sewage and storm water drainage would need to be diverted to avoid potential flushing problems within the marina.

7. **Level of Competing Uses: fish farm activity** - the fish farms currently located towards the outer regions of the bay would not be affected by a marina development at the head of the bay.

8. **Level of Competing Uses: other issues** - beyond the road at the head of the bay, the land is designated as an area of ecological importance and agricultural value. Clearly the marina development on the land-side needs to be constrained so this area is not damaged by development.

9. **Conservation Status of Area** - the coastline within the bay is not part of a protected area. At the head of the bay, behind the road, there is an area designated as an area of ecological importance and agricultural value.

10. **Likelihood of Construction Damage** - there is a risk of downstream marine impacts from dredging and breakwater construction. (See point 2). Additional damage may result from the transportation of breakwater material. During construction there is a high risk that the area behind the road will be damaged (e.g. due to parking and turning of construction vehicles), although this area could probably be restored after construction. The construction programme will also involve social and environmental impacts over a significant period of development. This needs to be addressed in more detail in the environmental impact assessment.

11. **Visual Impact of Marina** - a marina development is unlikely to have a significant visual impact as boats are already a feature of the bay.

12. **Noise Impact of Marina** - although boats are already a feature of the bay, there is a risk of a noise impact from the yachts (where the halyards rattle against the mast). The bay is not as sheltered as Msida and so there may be an adverse effect on the houses exactly adjacent to the marina. Traffic noise is unlikely to have a significant impact, given the existing high threshold.

13. **Likely Impact on Traffic Generation** - as the road is already busy, there is likely to be a significant traffic impact as a result of increased congestion at peak "yachting times". This will have an effect on local air pollution, as vehicles in Malta are not subject to vehicle emissions limits. Without emissions data or accurate traffic data relating to the traffic generated by the Msida development, it will be difficult to quantify the environmental component of this impact. The environmental costs have been approximated through estimating congestion costs, which provide a surrogate environmental costing, but these estimates are highly dependent on the assumptions made.

    It is probable that additional road infrastructure will be required to alleviate congestion and provide marina access, and that improvements to the utility supplies may be needed. It is not feasible to identify these requirements within the terms of this stage of the study although these points should be taken into account if the Xemxija site is considered further.

14. **Likelihood that marina development would downgrade the area** - a marina development is unlikely to have a positive impact on the environment (as a general rule) but in terms of minimising environmental impacts, given the current nature of the bay, negative impacts associated with the environment are unlikely to significantly downgrade the area. The highest potential sources of risk relate to traffic and negative downstream impacts.

15. **Need/Costs of Replacement Amenity** - the outer part of the area, for example at Fekruna Point, has recreational use for swimming. However, the bay is already polluted and this is outside the proposed marina area and is unlikely to be significantly affected.

16. **Conflict With existing Local/National Structure plan** - in relation to the development of land-side marina facilities, Structure Plan policies SET 1 and SET 11 require that new developments are constrained within existing built up areas. These policies would limit the development of any ancillary facilities at Xemxija.

    Structure Plan policy AHF 14 promotes the development of fishing boat berthing facilities in the North of Malta and this would need to be considered in any development at Xemxija.

    Under the auspices of Structure Plan policy RCO 23, it will be necessary to demonstrate that the development benefits outweigh any negative impacts.

Table 5.1 outlines the main environmental impacts of marina development in Xemxija and the indicative environmental costs associated.

Table 5.1
Environmental Costs of a 600 Berth Marina at Xemxija

Environmental Impacts	Environmental Cost Calculations	Total Costs Lm
Incremental degradation in water quality	Cost not possible to estimate - the incremental cost has been assumed to be approximately equal for each site.	
Risk of downstream damage - assumed to be limited by effective marina management.		
Short term habitat loss as a result of construction damage which could be restored (address in EIA). This assumes no rare/threatened species are affected.	Land restoration costs (limited surrogate for damage costs) over 1 ha = 325,000 ECU (from DTTI) = Lm 455,000 (1994 prices) x 3.88 % = Lm 472,654 in 95/6 prices. (Exchange rates 1 ECU=£0.7, Lm 1 - £0.5)	**472,600 in total**
Limited noise cost incurred.	Using a general premium for an environmentally pristine site of 20-25 %. Assuming noise is a fraction of this premium, the disamenity attached to marina noise could be estimated at 5%. 5% premium: cost = 0.05 x Lm 35,000 (apartment price) x 70 (no. of adjacent units) = Lm 122,500 - over the life of the project.	**122,500 in total**
Increased traffic generation resulting in increased pollutants from traffic fumes and road side litter. Some additional heavy metal run off effects.	Congestion costs - approx. 10,000 cars pass each day in each direction (traffic dep. data). Marina congestion will peak at weekends and evenings for 5 peaks. Assuming one peak affects 50% or 7,500 cars each for 15 mins. Cost = 5 x 5,000 x 0.25 x Lm 72.7/40 x 22 weeks = Lm 249,906/year.	**249,900 per year**
Total Cost Xemxija	Congestion: Lm 249,906/year House price :Lm 122,500 = Lm 12,250/year Land restoration: Lm 472,654= Lm 47,265/year	**310,000 per year**

Source: Deloitte & Touche

The table above summarises an estimate of the significant environmental costs for a 600 berth marina. If a smaller marina (with 300 berths and the same hard standing area) were developed, the environmental cost is estimated at Lm 191,000 annually.

The most significant environmental impacts associated with marina development in Xemxija are:

- risk of downstream damage (both during construction and as an ongoing effect);
- risk of construction damage to nature reserve;

- noise impact on residential area; and
- generation of additional traffic (and congestion).

5.3. Market and Economic Factors

Xemxija is situated along the most popular part of the Maltese coast for boating activity. Many Maltese also have summer residences in this part of the island. Therefore, as a domestic facility a marina in this location is likely to be very popular.

However, local demand is fairly concentrated at the weekends, with regular peaks in traffic to and from the marina on Saturday mornings and at the end of the weekend. A new marina at Xemxija will add to the pressure on roads which are already often congested in the summer. (The road leading to Xemxija is the main thoroughfare to Mellieha and the ferry terminal to Gozo and Comino.) While there may seem to be an associated need for road upgrading programmes to improve access to the north of the island, this need is likely to be related to general traffic volumes, of which marina-related traffic will only be a very small part at peak times.

Conversely, a marina at Xemxija will also reduce the sailing distance, as compared with Msida marina, to the popular cruising around Xemxija, and thereafter on to Gozo. Most permanent demand for berths is likely to be from Maltese owners, which will include those who own the myriad of small boats currently moored in the Bay. We understand that this might account for as much as 340 small to medium pleasure and fishing boats in the summer.

In international terms, St Paul's Bay is not particularly attractive and offers no special attributes which would give yachtsmen a reason to come to Malta specifically. However, it would give visiting boats a good second base in Malta, with easy sailing around the north end of the coast and the secondary Maltese islands. The issue of customs clearance based in Valletta and Gozo will mitigate against Xemxija as a main port of call, unless there were plans to change this.

Charter boats, would likewise find Xemxija a good visiting marina for island cruising, although the more central Msida location, closer to the airport and main hotels and tourist areas, would probably be a preferable base for operations and changeover activities.

For winter berthing boats, there are no significant advantages of a marina in Xemxija, compared to the current provision in Msida, with its established chandlery and other services, proximity to the airport and hotels (for those leaving their boats for the winter), and lively year-round environment (for those living aboard). St Paul's Bay is a quiet area in winter and, even with additional development, it is likely to remain highly seasonal without a major business base in that part of the island.

Finally, Xemxija is unlikely to be able to provide the required infrastructure and "glamour" for international superyachts to be attracted to any significant extent. Even when visiting with crew only, St Paul's Bay will not be able to provide the "one-stop-shop" required for refuelling, provisioning and maintenance.

Overall, while a marina in this location will provide some social and touristic upgrading of the area, it is likely to remain fundamentally a facility for local boat owners. Msida marina will remain for international owners and visitors, although it is not a particularly inviting environment away from social, historic and tourism centres of Malta, with a busy road running by. Overall the main benefit of a marina at Xemxija in international yachting terms will be the benefits of being able to offer a greater capacity, with more available berths for visitors.

There may be consideration for developing a smaller marina facility, with more limited ancillary services (i.e. less showers and toilets, limited laundry facility and simple chandlery outlet, etc.) which would be aimed at servicing the domestic market primarily, with some summer visitors. This would need to be considered in conjunction with development elsewhere for more internationally-oriented yachting provision.

In either case, other development opportunities are likely to be investigated to assist with the funding of a marina development. In the St Paul's area, second home residential properties would seem to be appropriate for the demand opportunities, although land availability is very constrained near to the water front (by existing development and the nature reserve at the head of the bay) and there would be planning constraints upon any significant ancillary development.

5.4. Financial Viability

5.4.1. Capital Costs

Based on the above technical specifications and design issues, a marina at Xemxija would probably cost in the region of Lm4.4 million for a 600 berth facility or Lm3.2 million for 300 berths, as follows :

Table 5.2
Approximate Capital Costs for a Marina at Xemxija

Estimated Broad Capital Costs	300 berth 200 hard/s (Lm 000s)	600 berth 200 hard/s (Lm 000s)
Preliminary investigation and design fees	130	182
Breakwater	500	500
Dredging	748	1,122
Reclaimed land	246	369
Pontoons	420	756
Buildings	60	70
Service connections	400	450
Shore works and quays	225	380
	2,729	3,829
Contractor's mobilisation (5%)	136	191
	2,865	4,020
Contingency (10%)	287	402
	3,152	4,422

Source: Posford Duvivier

5.4.2. Profit and Loss Projections

The projected profit and loss accounts of a 300 or a 600 berth marina operation at Xemxija for the first 10 years of operations are attached as Appendix V. The projected profitability in an established year of operations (e.g. 2007) may be summarised as in the table below:

Table 5.3
Illustrative Profit & Loss for a Marina in the Stabilised Year of Trading

Projected Marina Profit and Loss in 2007	300 berth 200 hard/s (Lm000s)	600 berth 200 hard/s (Lm000s)
Income		
Berthing fees	159	319
Hard standing	87	87
	247	406
Maintenance	(25)	(35)
Water & Electricity	(20)	(33)
Salaries and staff costs	(30)	(60)
Marketing	(20)	(30)
Administrative expenses	(15)	(18)
Operating profit	137	230
Depreciation	(83)	(118)
Interest	(47)	(67)
Profit/loss after financial charges	7	45
Subvention Required	469	631

Source: Deloitte & Touche

The year by year projections (Appendix V) highlight the dependence of a marina at Xemxija on significant government subvention, given the relatively high levels of capital expenditure required and the short period in which initial funding must normally be repaid in Malta.

With a 600 berth marina, beyond the year 2007, when all commercial borrowing has been repaid and no subvention is required, the marina is projected to generate an operating profit of Lm230,000 per annum which will be reduced by an estimated depreciation charge of Lm118,000 to generate profits before tax and interest charges of Lm112,000 per annum.

Comparable figures for a 300 berth marina show an operating profit of Lm137,000 which is reduced by a depreciation charge of Lm83,000 to a profit before tax and interest charges of Lm54,000 per annum.

5.4.3. Cash Flow and Funding

For a 600 berth marina, it is assumed that a Lm4.4 million 12 year commercial loan facility is required, which will be drawn down evenly in the two years prior to the opening. For simplicity, all transactions take place at the end of a financial year when 8.5 per cent interest is charged on the outstanding loan balance. Interest due during the two year construction period is capitalised so that the loan facility peaks at Lm5.4 million in 1998, the year of opening of the marina.

Interest and capital repayments are assumed to be made annually for the 10 year period to 2007 and funded out of operating profits (i.e. profits before interest and depreciation). It is then assumed that the shortfall will be met by annual government subvention of Lm631,000, which will enable the loan to be fully repaid by 2007.

On the same basis, a 300 berth marina will require a Lm3.2 million loan facility peaking at Lm3.9 million, and requiring government subvention of Lm469,000 for 10 years for the loan to be fully repaid by 2007.

5.4.4. Overall Viability

The Xemxija 600 berth marina requires approximately Lm6.3 million of public funds over a 10 year period to finance a Lm4.4 million capital investment. Lm3.4 million of these public funds, however, will be used to fund interest repayments on commercial borrowing.

The concept of funding through 100 per cent commercial borrowing aided by Government subvention is, in actuality, an unlikely scenario. Funding will, in probability, be subsidised by ancillary development opportunities and/or by long-term berthing fees or berthing rights. However, for the sake of economic comparability, this simplistic scenario provides the most appropriate basis for analysing alternative marina locations.

Other "public" costs will be the environmental costs which will be incurred by the development. These are estimated broadly at Lm3.1 million using the methodology developed in Stage One.

However, based on the earlier economic impact assessment (Stage One), it is estimated that the direct revenues of a yacht marina represent only 15 per cent of the total economic benefit to the economy from yachting. The methodology utilised for estimating additional economic impact is described in Section 1.2.2. previously. Government should therefore consider that during the 10 years when Lm6.3 million of subvention is required for a 600 berth marina, the project will also indirectly generate an estimated Lm16.4 million in the Maltese economy. These additional economic benefits represent the full economic impact derived in Stage One, which is adjusted pro-rata for the size of marina developed, and excludes berthing income and hard standing income which would be directly received by the marina operator and are therefore already shown in the profit and loss projections.

In addition to this, the construction of the marina will also generate economic benefit, through direct employment and the expenditure of the capital costs of the project locally, as will the interest payments accrued to local banks and financing organisations.

Therefore, the overall viability of a 600 / 300 berth marina at Xemxija with 200 hard standing spaces may be summarised as follows in Table 5.4:

Table 5.4
Illustrative Overall Economic Value of a Marina at Xemxija

Ten Year Cumulative Costs & Benefits	**300 berths 200 hard/s (Lm million)**	**600 berths 200 hard/s (Lm million)**
Benefits		
Capital investment (Assuming it is spent locally)	3.15	4.42
Interest costs	2.38	3.36
Additional economic impact	9.89	16.44
Overall Benefits	15.42	24.22
Costs		
Government subvention over 10 years	(4.69)	(6.31)
Additional environmental costs	(1.91)	(3.10)
Overall Costs	(6.60)	(9.41)
Net Economic Benefit	**8.82**	**14.81**

Source: Deloitte & Touche

5.4.5. Summary of Strengths and Weaknesses

A brief summary of this site's strengths and weaknesses is provided in the following tables:

ADVANTAGES		
Technical	**Policy, Social and Environmental**	**Market and Economic**
■ Well protected on three sides. ■ **The inner end of the bay is relatively shallow with a seabed of silt and sands, so unit costs for a rubble mound breakwater would be reasonable.** ■ No particular navigational problems. ■ Good road access. ■ Large area of water available. ■ Existing services and local infrastructure already present.	■ Boats are already a feature. ■ Noise impact is likely to be small. ■ Would be space for a large marina development. ■ Water is already polluted. ■ Unlikely to be downstream effects (already have fish farms and other boats). ■ the sandy beach has already been destroyed by development, but a marina might be an opportunity to recreate one.	■ The bay is already extensively used for boats and fishing and in summer is a lively place, busy with both locals and tourists. ■ Relatively close to many Maltese residences and key anchorages and is likely to be a popular base with local boat owners. ■ Existing hotels, restaurants and bars, along with other tourism infrastructure, along both sides of the bay, will give yachtsmen places to go.

ADVANTAGES (Continued)		
Technical	**Policy, Social and Environmental**	**Market and Economic**
	■ **Encouragement will be given to continuing development in built up areas (Structure Plan SET1).** ■ Fishing boat berthing facilities will be promoted in the north of Malta (Structure Plan AHF14).	■ Tourism around the St Paul's Bay area through to Bugibba is geared to the lower end of the package holiday market and a marina in the Bay might help upgrade the tourism image. ■ **This will provide a good second yachting base in Malta for tourists and a good base for charter boats, making the south side of the island more accessible.**

DISADVANTAGES		
Technical	**Policy, Social and Environmental**	**Market and Economic**
▪ Exposed to north easterly gales. ▪ **A large marina could monopolise all the inner end of bay.** ▪ Inner sandy beach to be reclaimed. ▪ Water circulation issues need investigation. ▪ Hard standing and car parking areas need to be reclaimed. ▪ **A lot of small boats currently use swing moorings in the Bay and will need to be re-housed, either in the new marina or other bays.**	▪ **Traffic impact would be significant (already a busy main arterial road).** ▪ Bay is used for sewage drainage which would need to be diverted to prevent circulation problems. ▪ Would need significant infrastructure. ▪ Site development to rear needs to be constrained because of nature reserve. ▪ The Structure Plan issue about traffic congestion on roads to Cirkewwa would not be significantly eased (IIT1/2). ▪ **The development of ancillary facilities would be constrained by existing planning policies.**	▪ Traffic and other noise may be a problem for sailors staying on their boats. ▪ **The bay has no significant international selling points, when compared to other Mediterranean marinas, so would have primarily domestic appeal.** ▪ No existing yachting infrastructure other than the marine fuelling station, so there will be a range of landside facilities required. ▪ Charter and wintering boats may prefer to be closer to the historic/ social/ touristic centre of Malta. ▪ Customs at Gozo and Valetta will mitigate against Xemxija as a main port of call for visitors.

Other Comments:

- It would be possible to create a beach at the inner shore of the bay, within the marina, to reduce wave action and create an attractive feature. It would also be possible to create a beach on the outside of a breakwater, but the sand would need to be topped up regularly to replace that washed away by the wave action.

- The loss of bathing space could be mitigated by creating a ledge and bathing access from the breakwater on the seaward side.

- It may be appropriate to consider a smaller marina for the domestic market at Xemxija, with limited ancillary facilities. This could be extended at a later date quite cost-effectively, if appropriate, through design and positioning of the breakwater.

5.5. Conclusions

5.5.1. Technical Issues

While it is technically feasible to accommodate a full 600 berth marina at Xemxija, it may be more appropriate to develop a smaller domestic facility, with limited ancillary facilities. Such a project could then be relatively easily and cost-effectively extended at a later date within the line of the existing breakwater if demand justifies. This, would serve to spread the yachting activity and enable the focus of international yachting activity to remain around Valletta and the main harbours of Malta.

Xemxija is a good site for a new marina developed on one side of the bay. It is technically feasible to construct the necessary infrastructure at relatively modest cost. By scaling down the size of the marina, it would also be possible to allow a high proportion of the existing swinging moorings to be relocated at a higher density in the remaining space at the head of the bay.

Construction works could be undertaken as a sea-born operation without interfering with local day to day activities on the shore.

5.5.2. Environmental and Social Considerations

Environmentally the impact of the development would be limited because of the existing environmental degradation in the bay. However, there will be a significant impact related to the construction period and noise and traffic generation may be an on-going issue.

The estimated environmental costs would be significantly higher at Xemxija than at either Dockyard Creek or Kalkara Creek, totalling Lm 1.91 million and Lm 3.1 million respectively for the 300 and 600 berth options.

5.5.3. Market Factors

A marina at Xemxija would primarily serve local demand and, as such, is likely to be a popular and convenient location.

5.5.4. Economic Viability

A marina development at Xemxija (of either size) will not be financially viable on its own. Opportunities for developing additional income-generating infrastructure (such as residential or tourism facilities) are likely to be limited by space availability and by Structure Plan policies limiting development outside existing built up areas. Therefore, government subvention is likely to be required, relating to about Lm 4.6 million for a 300 berth marina, or Lm 6.31 million for 600 berths. There will also be environmental costs of about Lm 3.1 million for 600 berths, or Lm 1.9 million for 300 berths, over 10 years.

However, in overall terms, these costs will be offset by the wider economic benefit of the investment programme, the construction project and on-going yachting activity, which will bring a net benefit to Malta. A marina (of either 300 or 600 berths) is also likely to make an annual operating profit of about Lm 137,000 or Lm 230,000 respectively, prior to financial charges, depreciation and tax.

5.5.5. Overall Conclusion

Xemxija would be a popular marina location for the domestic market and consequently is likely to have a lesser economic development risk than the alternative short-listed sites, although it is unlikely to enjoy any significant funding benefit from the development of ancillary facilities due to planning constraints.

However, the environmental and social impact would be greater than that estimated for either of the other two short-listed sites.

6. DOCKYARD CREEK, GRAND HARBOUR -POTENTIAL MARINA SITE

6.1. Technical Issues

6.1.1. General

Dockyard Creek lies in a sheltered location on the southern side of Grand Harbour. Over its length of some 1,000 metres, it tapers from 300 metres wide at the mouth, to about 75 metres at its inner end. At the head of the Creek lies the dry dock and shipyard, which we are informed are due to be decommissioned shortly. A marina development could only be envisaged here once the dry dock has been decommissioned, leaving only the tugs, presently moored in the creek, to be relocated.

The edges of the Creek are, for the most part, made up of quays and wharves. However, where natural rock outcrops exist, it shelves away steeply to provide 10 metres of water close to. In the deeper central section, depths up to 18 metres are obtained.

The creek is significantly affected by long-period waves travelling across its entry in Grand Harbour. These cause a surge and swell effect within the creek in addition to wave reflection from the vertical face of the south-west shoreline. It is envisaged that a floating breakwater with a depth of eight to ten metres and a width of approximately five metres would be sufficient to overcome any significant wave disturbance within the creek, although this assumption will require detailed wave pressure investigation at a later stage in the study. Locally generated waves within the harbour are not so significant due to the good protection offered by all the surrounding buildings.

The latter comprise a multitude of shapes and styles and create a delightful backdrop around the waterfront. The majority of those on the western side are residential. On the opposite side, historical quays and more recent commercial wharves now provide dormant deck space.

6.1.2. Proposed Development Options

With its central position within the Three Cities, Dockyard Creek ranks as one of the best natural sites for a sensitive waterside development in Malta.

Nevertheless, in order to provide safe and secure berths for yachts, a breakwater will still be needed at the entrance of the Creek. Due to depths of water in this area, a floating breakwater is considered as the most appropriate structure. Detailed studies would need to be undertaken to establish its optimum size and position. However, it is probable that it would extend into the Creek from St. Angelo's Wharf, leaving the entrance channel and fairway on the Senglea side.

By careful design, these breakwaters can be made visually unobtrusive. A low profile wave wall would front a public promenade along its deck. It would be

feasible to prefabricate the breakwater in the dry dock before floating it into position. Maximum use of local materials and labour would contribute to the large savings that could be achieved over any other type of breakwater.

The layout of the pontoons would be dictated primarily by the shape of the Creek extending seawards from the existing quays. Both the pontoons and floating breakwater would be located in position by mooring chains laid to anchors on the seabed. The cost of pontoons will be higher than at Xemxija due to the greater depth of water, which requires heavier mooring chains and larger pontoon structures. Provision for access to the dry dock will need to be maintained until such time as its future role is established.

It would be possible to cater for up to 900 berths although, due to the sensitivity of the site, fewer berths strategically oriented would probably be the better option.

If it were possible to utilise the dry dock area, then advantage could readily be taken of the existing workshops to provide a new boat repair yard. Notwithstanding this or other uses of the dry dock and adjacent structure, there is still considerable space along these inner quays to provide hard standing for boats that are to be taken out of the water during the winter periods. Only limited work is likely to be required to convert these areas to their new role.

The same area could also be utilised for limited car parking space for berth holders during the summer months.

Navigational access to Dockyard Creek and also the other Creeks would need careful bouyage in the approach channels. Harbour controls in major and busy ports elsewhere, like Portsmouth, Gibraltar and Marseilles, have been very successful in segregating commercial and pleasure craft in narrow channels. Consideration could be given to clearing the steel wreckage from the seabed between the St. Elmo breakwater and the shore, to facilitate the passage of small craft in and out of Grand Harbour.

Shore-side facilities, such as administration buildings and toilet blocks, could be encompassed into existing structures. It is assumed that nearby services could be utilised, so over-coming the need for any major engineering works.

The draft Grand Harbour Local Plan, which is currently under consideration, includes road improvements in the area which primarily revolve round a planned Cottonera Bypass. We understand from our discussions with the Planning Authority that access and congestion issues in the area which exist at present should be reduced and the Bypass, when eventually commissioned, could take the needs of a yacht marina into consideration.

6.2. Environmental and Social Considerations

The environment in Dockyard Creek is similar to Kalkara Creek although deeper water extends into the head of the creek and as a result, many of the comments on environmental impacts are the same.

1. **Direct Loss of Habitat** - there is unlikely to be any significant loss of habitat, given the deep water within the creek where little light penetrates to the bed, and that only floating structures are required.

2. **Indirect Loss of Habitat** - there are unlikely to be significant downstream environmental impacts due to the historic nature of activities within the harbour area.

3. **Water Quality** - the current water quality in the creek is likely to be poor given the current dry-dock activities within the creek and as suggested by measurement of petroleum hydrocarbons (Axiaq, 1993). It has not been a site measured for bathing water quality (as swimming is not permitted in the harbour) and data on pollution are not available. Given the current situation, a marina development is unlikely to further reduce water quality significantly and it seems reasonable to expect similar reductions in water quality as those experienced in Msida Creek. As previously stated, although each short-listed site differs in the level of existing water pollution, the environmental cost of marina development will be limited (because water quality degradation has already occurred) and will be broadly the same in incremental value for each site.

4. **Existing Levels of Disturbance** - a marina development is unlikely to have a significant impact on the levels of disturbance given the current activities in the area. As the area is developed as a commercial harbour it is unlikely that there will be any displacement of sensitive species.

5. **Level of Competing Uses: recreational** - as swimming is not permitted in Grand Harbour there will be no impact in this respect. There is some use of the creek for tourist excursions, but a marina development is unlikely to displace this activity. Other recreational uses include an annual boat show, festival and a boat race within the creek. These events can continue to take place if a marina is developed.

6. **Level of Competing Uses: sewage outfall and drainage problems** - it is unclear the extent to which the creek is currently used for sewage and storm water drainage. This may be a significant issue as drainage may need to be diverted beyond the boundaries of a marina development. However, a drainage diversion is unlikely to have a significant environmental impact on the total harbour area as the drainage quantities will not be significantly changed.

7. **Level of Competing Uses: fish farm activity** - not applicable as the area is not currently used for fish farming.

8. **Level of Competing Uses: other issues** - the main issue in terms of competing use is the decommissioning of the dry-dock. We understand that the decommissioning decision has been taken. Realistically, a marina development is dependent on this as it would be impractical to suggest relocation of the dry-dock. In addition, it is likely that the tugs will need to be relocated. As long as this is within Grand Harbour there are unlikely to be significant environmental impacts associated with this.

9. **Conservation Status of Area** - the area is currently protected as an urban conservation area. As most of the historic buildings are situated towards the mouth of the Creek, the development of the marina would therefore need to be constrained towards the head of the creek.

10. **Likelihood of Construction Damage** - as permanent structures (such as a breakwater) will not be required, there is unlikely to be a risk of significant construction damage.

11. **Visual Impact of Marina** - the visual impact of the marina could be a potential risk to the landscape if the marina extends towards the mouth of the creek. However, as historically boats have been a feature of this area and there is plenty of space towards the head of the creek, this should not be a significant issue.

12. **Noise Impact of Marina** - there is likely to be a noise impact as a result of halyards rattling against masts and some additional traffic noise. However, if the marina development is situated towards the head of the creek it should not have a significant impact on local residents. (This may need to be revisited if the development is envisaged to be close to a residential area).

13. **Likely Impact on Traffic Generation** - as the road is currently not busy, a marina will have a significant effect in increasing traffic, particularly at peak "yachting times". This will have an effect on local air pollution. Without emissions data or accurate traffic data relating to the traffic generated by the Msida development, it will be difficult to quantify the environmental component of this impact. A broad estimate using congestion costs as a proxy for environmental impacts has been included in the cost analysis.

14. **Likelihood that marina development would downgrade the area** - the current environment of Dockyard Creek is unlikely to be significantly downgraded by a marina development. There is likely to be a reduction in water quality, but marina management policies (such as the use of environmentally friendly anti-fouling agents and ensuring that sewage is not discharged within the harbour) can minimise detrimental impacts.

15. **Need/Costs of Replacement Amenity** - not applicable as long as the dry-dock is decommissioned and the tugs can be relocated. The annual regatta also needs to be considered in the design of any marina in Dockyard Creek or alternative arrangements for its location agreed with the local community.

16. **Conflict with existing Local/National Structure plan** - there would be little conflict with planning issues.

Structure Plan policies SET 1 and SET 11 encourage development within existing urban areas.

TOU 6 identifies the Three Cities area for tourism facilities, whilst UCO 3 identifies Dockyard Creek as the centre for Malta's maritime heritage - an objective which could be enhanced by a marina development.

RDS 4 lists planned road improvements and discussions with the Planning Authority indicate that a bypass around the Cottonera Lines is planned to improve access.

The most significant environmental impact associated with marina development in Dockyard Creek is the generation of additional traffic (and congestion). The broad cost implications using congestion costs as a proxy for environmental cost are considered in Table 6.1. The costs are highly sensitive to the assumptions made on the level of traffic and congestion time.

Table 6.1
Environmental Costs of a Marina in Dockyard Creek

Environmental Impacts	Environmental Cost Calculations	Total Costs Lm
Incremental degradation in water quality	Cost not possible to estimate - cost has been assumed to be approximately equal for each site.	
Increased traffic generation resulting in increased pollutants from traffic fumes and road side litter. Some additional heavy metal run off effects.	Congestion costs - approx. 7,000 cars pass area each day in each direction (estimate from traffic dep. data for Paola). Congestion will peak at weekends and evenings for 5 peaks. Assuming one peak affects 50 % or 3,500 cars each for 15 mins. Cost = 5 x 3,500 x 0.25 x Lm 72.7/40 x 22 weeks = Lm 174,934/year.	**174,934 per year**
Total Cost Dockyard Creek	Significant environmental cost approximately:	**175,000 per year**

Source: Deloitte & Touche

6.3. Market and Economic Factors

Dockyard Creek is regarded as the "jewel in the crown" of Grand Harbour and offers a world-class urban environment (of a similar ilk to the waterfronts in Venice). The creek has a history of boating activity from the early trading days and still berths tugs, superyachts and a few smaller boats. However, whilst a marina may be appropriate for this creek, we understand that the Planning Authority would discourage yacht repair facilities and the more industrial side of yachting.

A marina in Dockyard Creek would create a international yachting "destination" with a relatively high market value in comparison to other Mediterranean locations. It will, to some extent, make Malta a place to visit, rather than just a different cruising area or a convenient or cheap stopping point.

In reality, this may increase the number of international visitors and also serve to lengthen the average stay, as it will be more of a destination. The same considerations are likely to apply to charter boats and eventually to domestic demand. However, as with Kalkara, the success of the marina will also depend on the overall regeneration of the area, in terms of social and tourism infrastructure with local involvement.

Superyachts are a key market sector which could be actively courted in a redeveloped Dockyard creek, probably over and above the generic demand illustration, and would bring greater economic benefits to the island.

Domestic demand, as discussed in the previous section, may have some resistance to Grand Harbour as a permanent home for their boats, and security may be an issue in the early years. However, if this is managed well, and is seen to create jobs locally, the project could be a step towards dissipating any feelings of a "north-south" divide.

Inevitably there will be additional traffic generated by the project and again this will be improved by the development of the proposed Conspicua bypass. However, there may also be a requirement for a spur into Dockyard Creek to cater for localised demand. Again, consideration of ferry services to Valletta and Sliema will help alleviate any traffic problems.

Dockyard Creek is already home to several events during the year, such as the Malta Boat Show, held along Vittoriosa Quay, and the Birghufest, further up in Conspicua, both of which could still be held (if not developed further) with a marina in the creek. The existing Maritime Museum would also greatly benefit from the increased profile of Dockyard Creek. The regeneration of the area would bring a wider benefit of effectively increasing the tourism "capacity" of Malta, and providing a higher quality tourism environment for all visitors.

Additional development to make a marina project viable would be appropriate through conversion of existing waterfront buildings to apartments, hotels, restaurants and shops. The financial implications of this would depend on the availability of such properties and would have to be investigated in detail in Stage Three of the study.

6.4. Financial viability

6.4.1. Capital costs

A 600 berth marina at Dockyard Creek would cost approximately Lm1.8 million. This is significantly less than a marina at Xemxija and the costings are broadly similar to those for a marina at Kalkara Creek (described in the next section), adjusted for the fact that no land reclamation is necessary and a smaller floating breakwater is required. However, the site provides for a much smaller amount of hard standing space, at probably about 75 as compared with 160.

The estimated capital costs in relation to a marina at Dockyard Creek are as presented in the following table.

Table 6.2
Estimated Broad Capital Costs - Dockyard Creek

Construction Task	600 berths 75 hard/s Lm000s
Preliminary investigation and design fees	75
Breakwater	175
Dredging	-
Reclaimed land	-
Pontoons	930
Buildings	80
Service connections	250
Shore works and quays	50
	1,560
Contractor's mobilisation (10%)	78
	1,638
Contingency (10%)	164
Total	**1,802**

Source: Posford Duvivier

6.4.2. Profit and Loss Projections

The projected profit and loss account of a marina operation at Dockyard Creek for the first 10 years of operations is attached as Appendix VI. The projected profitabilty in an established year of operations may be summarised as in table 6.3.

The year by year projections provided in Appendix VI show that a marina at Dockyard Creek also requires a government subvention, because of the mis-match between the expected asset life the method of financing. However, given that the level of capital investment required is the lowest of the three options under consideration, the level of government subvention required is also the lowest at Lm213,000 per annum for 10 years. The overall shortfall is similar to that at Kalkara Creek, despite the higher capital costs in Kalkara, because in Kalkara Creek there is a higher number of hard standing spaces to generate revenue.

Table 6.3
Illustrative Profit & Loss for a Marina in the Stabilised Year of Trading

Projected Marina Profit and Loss in 2007	**600 berths 75 hard/s Lm000s**
Income	
Berthing fees	319
Hard standing	33
	352
Maintenance	(35)
Water & Electricity	(33)
Salaries and staff costs	(60)
Marketing	(30)
Administrative expenses	(18)
Operating profit	**176**
Depreciation	(102)
Interest	(30)
Profit/Loss after financial charges	44
Subvention required	213

Source: Deloitte & Touche

Beyond the year 2007, when all commercial borrowing has been repaid and no subvention is required, the marina is projected to generate an operating profit of Lm176,000 per annum which will be reduced by a depreciation charge of Lm102,000 to generate profits before tax and interest charges of Lm74,000 per annum.

The variation between the profitability of a marina at Kalkara compared to Dockyard Creek is brought about by the reclaimed land proposed for Kalkara Creek, which in turn increases the number of hard standing spaces available.

6.4.3. Cash Flow and Funding

We have assumed that a Lm1.8 million 12 year commercial loan facility is drawn down evenly in the two years prior to the opening of the marina. For simplicity, all transactions take place at the end of a financial year when 8.5 per cent interest is charged on the outstanding loan balance. Interest due during the two year construction period is capitalised so that the loan facility peaks at Lm2.2 million in 1998, the year of opening.

Interest and capital repayments are made annually for the 10 year period to 2007 and funded out of operating profits (i.e. profits before interest and depreciation) and government subvention of Lm213,000 so that the loan is fully repaid by 2007.

6.4.4. Overall Viability

A marina at Dockyard Creek requires approximately Lm2.1 million of public funds over a 10 year period to finance a Lm1.8 million capital investment. Almost Lm1.5 million of these funds are used to fund interest repayments on the commercial borrowing. However, certain environmental costs are also incurred, which are estimated broadly at Lm1.75 million using the methodology developed in Stage One.

Based on the estimate that the direct revenues of a yacht marina represent only 15 per cent of the total economic impact of yachting on the economy, government should consider that during the 10 years when Lm2.1 million of subvention is awarded, an estimated Lm14.4 million is generated in the economy indirectly. The methodology utilised for estimating additional economic impact is described in Section 1.2.2. previously. This is slightly lower than the comparative additional economic impact at Xemxija due to the provision of fewer hard standing spaces.

However, in reality, this wider economic benefit is likely to be higher as additional hard standing will have to be provided elsewhere, which will have a significant impact and, because of the prestige and cachet of the location, demand, particularly from superyachts, may well be much higher than currently envisaged. The estimate of additional economic impact has been limited to the generic values per berth and per hard standing space which were developed in Stage One of the study. This approach is justified due to probable dispersal of domestic and international demand between existing and potential marina sites, however, in actuality it is possible that Dockyard Creek may influence a greater number of international visitors to choose Malta as a yachting destination and consequently exert an overall higher additional economic impact.

Therefore, the overall viability of a 600 berth marina at Dockyard Creek with 75 hard standing spaces may be summarised as follows :

Table 6.4
Illustrative Overall Economic Value of a Marina at Dockyard Creek

Ten Year Cumulative Costs & Benefits	**600 berths 75 hard/s Lm million**
Benefits	
Capital investment (assuming it is spent locally)	1.80
Interest costs	1.43
Additional economic impact (*)	14.36
Overall Benefit	17.59
Costs	
Government subvention over 10 years	(2.14)
Additional environmental costs	(1.75)
Overall Cost	(3.89)
Total Economic Value	**13.70**

Source: Deloitte & Touche

(*) As previously stated, additional economic impact is estimated from the generic model developed in Stage One of this study and described earlier in Section 1.2.2. of this report. The additional economic impact may higher if Dockyard Creek were to be developed as a marina because it could result in the attraction of a larger overall number of international visitors to Malta.

6.4.5. Summary of Strengths and Weaknesses

A brief summary of this site's strengths and weaknesses is provided in the following tables:

ADVANTAGES		
Technical	**Policy, Social and Environmental**	**Market and Economic**
▪ Ample space for marina development in the water and landside. ▪ Existing quayside buildings which can be used for housing ancillary marina and other facilities. ▪ A floating (and removable) breakwater would be appropriate. ▪ **It would be a cost-effective marina development and a considerable number of berths could be provided.** ▪ Good access to the sea although a clear bouyed channel might be needed.	▪ Infrastructure required could be "removable" (i.e. no lasting damage). ▪ Boats in the past have been a feature. ▪ Water quality is poor already. ▪ No current recreational use of bay. ▪ Circulation should not be a problem as water is deep and limited breakwater is required. ▪ Would not affect residential area. ▪ **Structure Plan (SET1) encourages development in built up areas and specifically for this area to be developed for recreational and tourism uses (TOU6 and UCO3).**	▪ There has always been a heritage of boating activity here. ▪ **Could create an internationally spectacular yachting environment, given the quality of surrounding buildings and dock infrastructure.** ▪ **A marina would start to encourage wider tourism development, which could be of a higher quality.** ▪ Would generate local employment opportunities, and contribute to urban regeneration (Structure Plan issue SET7). ▪ Superyachts are already located in the Creek, so this represents no significant change of use ▪ A marina will strengthen the profile and status of the annual Boat Show in international terms..

DISADVANTAGES		
Technical	**Policy, Social and Environmental**	**Market and Economic**
■ **A marina will have to be carefully planned to minimise visual impact on the quality scenery around.** ■ A boat yard facility might not be accommodated within Dockyard Creek, and would then have to be located elsewhere. ■ Overlapping commercial and leisure marine traffic, which requires good navigational aids in the main fairway.	■ **Would need to wait until Dockyard 1 is decommissioned.** ■ Would need to relocate tugs. ■ Would need to consider security measures if crime rate locally is high. ■ Access to the site may need attention, although there are plans to build a bypass round the Cottonera Lines (RDS4) and the Structure Plan recommends improved ferry links from Grand Harbour to Gozo (IIT1/2). ■ There is an annual boat race which will need to be accommodated.	■ **There are some local perceptions which might mitigate against acceptance of a marina here.** ■ **Local acceptance problems may mean a slower demand growth.**

Other Comments:

- There is an opportunity to create a world-class yachting environment here which would generate international appeal in its own right and strengthen Malta's image in yachting and other tourism markets.
- Details of what could be achieved may be dependent on alternative uses for the dry dock area and the timing of any closure. However, a full marina development is not dependent on this dry dock.

6.5. Conclusions

6.5.1. Technical Issues

With a relatively modest capital outlay, it would be technically feasible to create a world-renowned yacht haven within Dockyard Creek. Furthermore, nearly all the structures required to create a marina could subsequently be removable without too much difficulty or expense allowing the Creek to revert back to its present day status.

The formation of the creek is appropriate for a marina, with deep water, existing wide quays and surrounding infrastructure. The construction of a marina would require relatively little capital and the main structures could be "floating", with little or no lasting impact on the current built environment.

6.5.2. Environmental and Social Considerations

Other environmental impacts will be limited, because of the history of boating activity in the creek, with possible traffic congestion being the main issue. The estimated environmental costs are Lm 175,000 annually.

6.5.3. Market Factors

Dockyard Creek could, if developed appropriately, become one of the most prestigious and impressive marina settings in the Mediterranean, with its unique historic surroundings. The success of the annual International Boat Show at Dockyard Creek accords within this setting.

However, Dockyard Creek is likely to have primarily international appeal, with local demand possibly showing some initial resistance to a location in the "south" of the island. International demand is likely to generate least traffic.

The main consideration for the development of a marina in Dockyard Creek is that it should form part of an overall urban regeneration programme to provide the "social" infrastructure necessary to the success of a marina. As this area has already been highlighted for tourism development, this would not be unreasonable.

6.5.4. Economic Viability

A marina in Dockyard Creek is likely to cost in the region of Lm1.8 million in capital construction. This will require Lm2.4 million of government subvention, spread over ten years, and a further Lm1.75 million to cover associated environmental costs. However, Malta will benefit overall, through some Lm 1.4 million of interest payments to local banks, the capital investment and associated employment, and a further Lm14 million of wider economic benefit from yachting related expenditure. At a stabilised trading position, the marina development might make an annual operating profit of about Lm176,000.

6.5.5. Overall Conclusion

Dockyard Creek would provide a spectacular international marina location that could raise the profile of Malta as a yachting destination, although it might initially encounter resistance within the domestic market and it is likely to recruit berth-holders at a slower rate than at Xemxija. Its successful development as a marina would require a co-ordinated programme of improvement within the immediate surrounding area.

The capital costs and environmental and social costs are estimated to be lower than those estimated at Xemxija.

Ultimately, the economic benefit may be greater than alternative marina sites if a larger number of international visitors were to be attracted to Malta because of Dockyard Creek's attractions.

7. KALKARA, GRAND HARBOUR - POTENTIAL MARINA SITE

7.1. Technical Issues

7.1.1. General

Kalkara Creek forms a partially sheltered bay in conjunction with Rinella Creek, at the entrance of Grand Harbour. The road runs around the head of the creek and along the northern side, with largely residential developments on the land-side. There is a small park at the head and a grand church, set back, but still prominent.

In Kalkara, substantial protection from storm seas is gained from the St Elmo breakwater and its smaller neighbour on the southern side of the harbour mouth. Nevertheless, a certain degree of wave action still permeates these creeks, which is exacerbated by the reflective nature of the shoreline. The creek is affected by long-period waves travelling across its entry in Grand Harbour. These cause a surge and swell effect within the creek in addition to wave reflection from the vertical face of the south-west shoreline. It is envisaged that a floating breakwater with a depth of eight to ten metres and a width of approximately five metres would be sufficient to overcome any significant wave disturbance within the creek, although this assumption will require detailed wave pressure investigation at a later stage in the study. Water depths in the outer reaches exceed 20 metres, although towards the inner end of the Creeks, the seabed shallows to only a few metres deep.

Kalkara Creek, to a greater extent than Rinella Creek, benefits from the natural formation of the land and surrounding structures, where a combination of quays and sea walls provide good access around the waterfront.

Two boatyards are located in the Creek, both of which have limited space which seems to be used to capacity. We understand that the innermost boat yard is seeking to expand its operation.

The surface area of Kalkara Creek has the capacity for some 750 berths. However, there is a shortage of suitable shore-side areas for either hard standing or car parking.

7.1.2. Proposal

Consideration was given initially to reclaiming a large tract of land at the head of the Creek, where advantage could be taken of the shallow depths, to provide for car parking and other shore-side facilities. This would require relocating the inner boatyard and would also result in the partial loss of the waterscape fronting the church and park.

For this reason, it was felt preferable to minimise construction works in this area and to consider other nearby sites which might be more suitable for the hard standing area and relocated boatyard. In this respect Rinella Creek would seem to be the most obvious location, and the potential of this is discussed in section 8.4.

At the same time, it was felt that marina development would probably be more in keeping with the atmosphere of Kalkara Creek if reduced in density to below 500 berths.

There will still be a requirement for significant levelled space for car parking and this can only really be accommodated in the upper reaches of the creek.

To reduce the impact on the vista from the church, it is suggested that only half the area would be reclaimed. With careful planning and screening, technically it would be possible to greatly enhance the old boatyard area by bringing it to the fore and use this for parking and limited winter hard standing. If this could be completed in association with a spur from the new ring road, local circulation could be readily improved and parking need not become a major issue. (In addition, as the facility will be more oriented towards the international visitors, then car parking demand is likely to be lower.)

Attenuation of the shore waves will be necessary and to this effect a breakwater across the entrance of Kalkara Creek will be required. Although detailed analysis of the wave climate has yet to be undertaken, it is likely that, due to the depth of water, a floating breakwater will be the most suitable option. This will give least visual impact, will cost less than a solid structure and will be movable if necessary.

The breakwater would extend in a westerly direction some 250 metres from Birghu Point. The entrance channel and main fairways would follow the Vittoriosa shore, with the pontoon system stemming from the opposite shore, where ease of access to the quays and pick-up points could be achieved.

In a similar fashion to the proposal for Dockyard Creek, both the floating breakwater and pontoons would be moored in place by a system of anchors and chains. Due to the depth of water, the mooring chains required would be heavier than at Xemxija and the pontoons more substantial. This results in a higher pontoon cost per berthing space.

Other facilities such as toilet blocks, Harbour Masters office, etc. are best located at a convenient position along the quay, central to the berthing layout, and could possibly be housed in existing structures.

It is assumed that the existing services, such as water, electricity and sewage, are all in the vicinity and can be connected without significant difficulty.

7.2. Environmental and Social Considerations

1. **Direct Loss of Habitat** - there would be a relatively small loss of habitat as a result of the decreased light available caused by the installation of a floating breakwater and pontoons and through increased boat density. As the water tends to be deep towards the outer parts of the creek and little light penetrates, the likely loss of habitat is unlikely to be significant in the main part of the creek. However, some available habitat will be reduced because of land being reclaimed for parking and hard standing space.

2. **Indirect Loss of Habitat** - as the area is already developed as a commercial harbour and under environmental pressure, the incremental effects downstream of marina development should not be significant.

3. **Water Quality** - the current water quality in the creek is poor given the current commercial uses of the harbour and as suggested by a study carried out to measure the level of petroleum hydrocarbons (Axiaq, 1993). However, it has not been a site measured for bathing water quality (as swimming is not permitted in the harbour) and data on pollution levels are not available. Given the current activities, a marina development is unlikely to further reduce water quality significantly and it seems reasonable to expect similar reductions in water quality as have been experienced in Msida Creek. As previously stated, although each short-listed site differs in the level of existing water pollution, the environmental cost of marina development will be limited (because water quality degradation has already occurred) and will be broadly the same in incremental value for each site.

4. **Existing Levels of Disturbance** - a marina development is unlikely to have a significant impact on the levels of disturbance given the current activities in the area. The area is a commercial harbour and it is unlikely that there will be any displacement of sensitive species.

5. **Level of Competing Uses: recreational** - as swimming is not permitted in Grand Harbour there will be no impact in this respect. There is some use of the creek for recreational boats and for the tourist cruises but a marina development is unlikely to displace this activity.

6. **Level of Competing Uses: sewage outfall and drainage problems** - it is unclear the extent to which the creek is currently used for sewage and storm water drainage. This may be a significant issue as drainage may need to be diverted beyond the boundaries of a marina development. However, a drainage diversion is unlikely to have a significant environmental impact on the harbour as a whole, as the drainage quantities will not be significantly altered.

7. **Level of Competing Uses: fish farm activity** - not applicable as the area is not currently used for fish farming.

8. **Level of Competing Uses: other issues** - there is a potential risk of loss of amenity as a result of preventing access to a number of wrecks sited in Kalkara Creek. Although diving is not currently permitted in the harbour, it could be argued that there is a potential loss of amenity as the wrecks have a heritage value. However, as this amenity value is not currently being realised, and a marina development can be developed without causing damage to the wrecks, the loss of current amenity is unlikely to be significant.

9. **Conservation Status of Area** - the area is currently protected as an urban conservation area. The development of land-side facilities for the marina would therefore need to be constrained and managed in line with this protection status.

10. **Likelihood of Construction Damage** - as permanent structures (such as a breakwater) will not be required, there is unlikely to be a risk of significant construction damage.

11. **Visual Impact of Marina** - the visual impact of the marina could be a high potential risk if the marina extends towards the mouth of the creek as the view towards Bighi hospital would be altered. However, a marina development at the head of the creek should not have a significant visual impact as boats are already a feature, although the view towards the church would be changed by more densely packed boats. This is not considered to be a significant cost as boats are already present, but this impact could be revisited through public consultation, when the design of the marina has been detailed.

12. **Noise Impact of Marina** - the road is not currently busy and there is a potential risk of noise impact as a result of halyards rattling against masts and additional traffic. However, this is likely to be offset to some extent by a property value increase as a result of development of the area.

13. **Likely Impact on Traffic Generation** - although the road is not currently busy, a marina will have a significant effect in increasing traffic, particularly at peak "yachting times". This will have an effect on local air pollution. Without emissions data or accurate traffic data relating to the traffic generated by the Msida development, it will be difficult to quantify the environmental component of this impact. As an internationally-oriented facility, there will be less demand for cars than at Xemxija. The environmental effect has been costed through the proxy of congestion costs. These may not be material as the peak yachting times are unlikely to coincide with peak business times in the area. However, congestion costs do provide a useful proxy for the environmental costs of increased traffic due to noise, emissions, damage, etc..

14. **Likelihood that marina development would downgrade the area** - the current environment of Kalkara Creek is unlikely to be significantly downgraded by a marina development. There is likely to be a reduction in water quality, but marina management policies (such as the use of environmentally friendly anti-fouling agents and ensuring that sewage is not discharged within the harbour) can minimise detrimental impacts.

15. **Need/Costs of Replacement Amenity** - there will be a need to accommodate existing fishing boats and small craft currently moored in the creek. More importantly, one of the existing boatyards will need to be relocated and significant costs may be associated with the relocation. The environmental impacts associated with relocation will depend on the characteristics of an alternative site.

16. **Conflict With existing Local/National Structure Plan** - there would be little conflict with planning issues.

    Structure Plan policies SET 1 and SET 11 encourage development within existing urban areas.

    TOU 6 identifies the Three Cities area for tourism facilities, whilst UCO 3 identifies Dockyard Creek (in close proximity) as the centre for Malta's maritime heritage - an objective which could be enhanced by a marina development.

    RDS 4 lists planned road improvements and discussions with the Planning Authority indicate that a bypass around the Cottonera Lines is planned to improve access.

The broad cost implications of the environmental impacts are illustrated in Table 7.1. which follows.

Table 7.1
Environmental Costs of a Marina in Kalkara Creek

Environmental Impacts	Environmental Cost Calculations	Total Costs Lm
Incremental degradation in water quality	Cost not possible to estimate - cost has been assumed to be approximately equal for each site.	
Noise cost has not been estimated here as houses are not close to area planned for marina.		
Increased traffic generation resulting in increased pollutants from traffic fumes and road side litter. Some additional heavy metal run off effects.	Congestion costs - approx. 5,000 cars estimated each day in each direction (estimate from traffic dep. data for Paola). Congestion will peak at weekends and evenings for 5 peaks. Assuming one peak affects 50 % or 2,500 cars each for 15 mins. Cost = 5 x 2,500 x 0.25 x Lm 72.7/40 x 22 weeks = Lm 124,933/year.	**124,933 per year**
Cost of boatyard relocation.	Land cost = Lm14,400; loss of earnings Lm 3,000 (one off costs, spread over 10 years) Capital Lm 20,000 (one off cost) - assumes 15% cost of borrowing to reach annual cost (Assumption that a new site can be leased - purchase would cost more)	**18,000 per year**
Total Cost Kalkara Creek	Significant environmental cost approximately:	**143,000 per year**

Source: Deloitte & Touche

Thus the most significant environmental impacts associated with marina development in Kalkara Creek are:

- generation of additional traffic (and congestion);
- potential noise impact on residential area;
- may be a potential risk of visual impacts, dependent on marina design; and
- cost of relocating the boatyard at the head of the creek.

7.3. Market and Economic Factors

Kalkara Creek forms the second creek of the Grand Harbour on the south side, after Rinella Creek. Kalkara Creek is currently used for a few moorings and has two boatyards on either side of the creek. Tourist boats (Captain Morgan cruises) also come into the creek as part of a Grand Harbour tour. The creek has not been developed to any great extent for commercial shipping, being shallower than other parts of the Harbour. Kalkara Creek is surrounded by a number of historic buildings, one of the most prominent being Bighi hospital.

Kalkara Creek is on the edge of the Three Cities area, which offers world-class urban scenery, albeit a little run down at present. There are plans to revitalise this area of the Grand Harbour and the hinterland, with tourism highlighted as a key development priority. A marina and other waterside infrastructure would assist this process and could form a lively focus to the area. Associated with this would be both employment and social opportunities for local people in an area with a relatively low average standard of living.

A marina in Kalkara would have a stunning setting in an environment traditionally associated with boats. However, it would be important to minimise the impact on views into the Creek for other users, particularly those views of the church at the head. For yachtsmen, Kalkara would offer a marina environment to rival and beat most in the Mediterranean and could have international "drawing" power and prestige.

In terms of the demand, the location would be ideal for visiting yachts, with good access from the sea, the port authorities and customs nearby and a relatively quiet location in terms of passing traffic. We would assume that social infrastructure, such as restaurants, bars and shops would develop in the surrounding area as demand grows. Likewise for charter boats, there would be inherent appeal in the location and access to and from the airport is good. A marina in this part of Malta would also encourage international visitors and charterers to explore the southern coastline as well as the more busy northern area.

Superyachts are unlikely to be accommodated in Kalkara Creek, but would probably remain berthed around the St Angelo headland in Dockyard Creek. Even so, the addition of a marina in Kalkara would improve the accessible facilities and services offered to superyachts.

Winter berthing boats would find Kalkara a suitable location, but would require good security and, for live-aboards in particular, an established level of associated infrastructure. Once the marina and the ancillary facilities are well established, then Kalkara could form a desirable location to winter a boat.

Domestic demand would present the most uncertain element of the operation, as there seems to be some reluctance to acknowledge the real quality and status of the environment in the Three Cities area. The national tourism organisation's brochure, for example, says "it is a mystery why (this area) is left out of most itineraries". Some of the resistance would appear to be from a perception of high crime, drugs and other social problems, although we have no evidence to support this. In addition, there is limited social infrastructure to attract visitors from other parts of the island. As a result of this north/south divide, it might take a while to establish local demand for a marina in Grand Harbour.

Therefore, a phased development, catering for international visitors initially might be an appropriate approach.

Other issues to consider regarding a potential marina in this location are access and displacement of other activities. At present the road access to Kalkara is somewhat convoluted and busy at peak times. We understand that a new access road to the Three Cities area, the "Cottonera bypass", is defined in the 1990 Structure Plan. However, while it is thought likely that the road will link in to Triq it-Taljani, between Rinella Creek and Kalkara Creek, the exact alignment of the route has yet to be finalised. The Planning Authority has identified this as a high priority scheme and it may therefore be open in about five years time. We suggest that ferry services for visitors (both international and domestic) are considered, to emphasise the water-based environment and improve access directly to Valletta and the Sliema waterfront.

At present there are quite a few boats mooring in Kalkara in the summer and two boatyard facilities. There may be displacement of some of these activities, which will be considered later.

Overall, a carefully managed tourism development programme, of which a marina might form a part, would assist in the restoration of the historic features of the area, improving the local economy and encouraging diversification in a way which could directly help the local population.

7.4. Financial Viability

7.4.1. Capital Costs

A 600 berth marina at Kalkara would cost approximately Lm2 million. This is significantly less than a marina at Xemxija due to the fact that only a floating breakwater is required, there are no dredging costs and land reclamation costs are much lower because of the shallower water.

The estimated capital costs in relation to a marina at Kalkara are provided in table 7.2.

Table 7.2
Estimated Broad Capital Costs - Kalkara Creek

Construction Task	500 berths 160 hard/s Lm000s
Preliminary investigation and design fees	87
Breakwater	260
Dredging	-
Reclaimed land	262
Pontoons	625
Buildings	80
Service connections	300
Shore works and quays	80
	1,694
Contractor's mobilisation (10%)	85
	1,779
Contingency (10%)	178
Total	**1,957**

Source: Posford Duvivier

7.4.2. Profit and Loss Projections

The projected profit and loss account of a marina operation at Kalkara for the first 10 years of operations is attached as Appendix VII. The projected profitability in an established year of operations (e.g. 2007) may be summarised as follows :

Table 7.3
Illustrative Profit & Loss for a Marina in the Stabilised Year of Trading

Projected Marina Profit and Loss in 2007	500 berths 160 hard/s Lm000s
Income	
Berthing fees	266
Hard standing	70
	336
Maintenance	(35)
Water & Electricity	(33)
Salaries and staff costs	(60)
Marketing	(30)
Administrative expenses	(18)
Operating profit	**160**
Depreciation	(84)
Interest	(32)
Profit/Loss after financial charges	44
Subvention required	253

Source: Deloitte & Touche

The year by year projections (Appendix VII) illustrate that a marina at Kalkara will still require government subvention, given the mis-match between the expected asset life and the relatively short period over which commercial funding must be repaid.

Beyond the year 2007, when all commercial borrowing has been repaid and no subvention is required, the marina is projected to generate an operating profit of Lm160,000 per annum which will be reduced by a depreciation charge of Lm84,000 to generate profits before tax and interest charges of Lm76,000 per annum.

7.4.3. Cash Flow and Funding

The proposed marina will require a Lm2.4 million loan, which would be a 12 year commercial loan facility, drawn down evenly in the two years prior to the opening of the marina. For simplicity, all transactions take place at the end of a financial year, when 8.5 per cent interest is charged on the outstanding loan balance. Interest due during the two year construction period is capitalised so that the loan facility peaks at Lm2.2 million in 1998, the year of opening.

Interest and capital repayments are made annually for the 10 year period to 2007 and funded out of operating profits (i.e. profits before interest and depreciation) and government subvention of Lm253,000 annually so that the loan is fully repaid by 2007.

7.4.4. Overall Viability

The Kalkara marina would therefore require approximately Lm2.5 million of public funds over a 10 year period to finance a Lm1.95 million capital investment. Almost Lm1.5 million of public funds would be used to fund interest repayments on commercial borrowing. In addition, there will be some environmental costs incurred. These are estimated broadly at Lm1.43 million.

On the other side, this is balanced against an estimated Lm13.6 million which will be generated in the economy indirectly through yachting activity. The methodology utilised for estimating additional economic impact is described in Section 1.2.2. previously.

The overall viability of a 500 berth marina at Kalkara with about 160 hard standing spaces may be summarised as in table 7.4.

Table 7.4
Illustrative Overall Economic Value of a Marina at Kalkara Creek

Ten Year Cumulative Costs & Benefits	500 berths 160 hard/s Lm million
Benefits	
Capital investment (Assuming it is spent locally)	1.96
Interest costs	1.54
Additional economic impact	13.59
Overall Benefits	17.09
Costs	
Government subvention over 10 years	(2.53)
Additional environmental costs	(1.43)
Overall Costs	(3.96)
Total Economic Benefit	**13.13**

Source: Deloitte & Touche

7.4.5. Summary of Strengths and Weaknesses

A brief summary of this site's strengths and weaknesses is provided in the following tables:

ADVANTAGES		
Technical	**Policy, Social and Environmental**	**Market and Economic**
▪ The site gains some protection from natural land formations and existing breakwaters. ▪ Excellent access to the seas, although navigational aspects need consideration. ▪ A floating breakwater would be appropriate to dampen reflective and period wave action. ▪ **The marina could be developed at a reasonable cost, relative to the number of berths provided.**	▪ Boats are already a feature. ▪ **Water is already polluted (and not used for other uses, e.g. swimming/ fishing).** ▪ The breakwater and the pontoons could be removed at a later stage without damage to the environment. ▪ There are unlikely to be water circulation or pollution problems. ▪ **Structure Plan (SET1) encourages development in built up areas and specifically for this area to be developed for recreational and tourism uses (TOU6 and UCO3).** ▪ Limited coastal defences are needed, which meets Structure Plan policy to keep new defences to a minimum (RCO23).	▪ The creek has a maritime history and established yacht yard businesses, which are looking to expand. Other small businesses providing social infrastructure used by yachtsmen would also develop. ▪ **It is part of a very grand and special heritage area of Malta rarely visited except by those who live nearby. Development of an international marina would raise the profile and understanding of the area.** ▪ A marina would encourage employment and general upgrading (Structure Plan issue SET7). ▪ The quality of the environment would attract international yachts and beat most other Mediterranean locations.

DISADVANTAGES		
Technical	**Policy, Social and Environmental**	**Market and Economic**
■ **Severe lack of landside space for development of ancillary services, particularly car parking.**	■ Loss of habitat due to breakwater.	■ **There are some local perceptions which might mitigate against acceptance of a marina here.**
■ Need for some land reclamation in the upper creek, although this will need careful landscaping to minimise the impact on the bay.	■ Damage to wrecks on sea bed.	■ Parking may be a problem and it may be appropriate to look at ferry services to Valletta.
■ Given constraints on land space, security of boats may be an issue.	■ Risk of water quality (due to circulation problems).	■ There are unlikely to be facilities for superyachts, although these could remain/ be extended in Dockyard Creek, as appropriate.
■ Overlapping commercial and leisure marine traffic will need management and good planning in the main fairway.	■ The area is designated for Urban Conservation (UCO1) which will put constraints on landside development.	■ Would need to consider security measures if local crime rate is high.
■ There will be some reflective wave action, so the floating breakwater will need to be quite deep.	■ Marina may have to extend as far as protected areas to be economically viable.	
	■ **Would need to relocate existing boat yards.**	
	■ Would need to find room for displaced boats and boat storage (Structure Plan issue SET7).	
	■ Marina noise would impact on residents.	

DISADVANTAGES (Continued)		
Technical	**Policy, Social and Environmental**	**Market and Economic**
	■ Access to the site may need attention, although there are plans to build a bypass round the Cottonera Lines (RDS4) and the Structure Plan recommends improved ferry links from Grand Harbour to Gozo (IIT1/2). ■ Additional road traffic impact in a residential area. ■ Careful planning and screening would be required to protect the visual impact upon the waterscape in front of the church.	

Other Comments:

- The shortage of available landside space is a significant problem. Land reclamation is an option, but the visual and other environmental impacts need careful consideration, as will the impact on the existing boat yard operations.

7.5. Conclusions

7.5.1. Technical Issues

Kalkara Creek offers an opportunity for the sensitive development of a waterside project. With minimal capital outlay, it would be technically possible to create a wonderful haven for the boating fraternity. Furthermore, as both the breakwater and pontoon system are floating structures, there would be minimal impact in the long term, should it ever be desirable for Kalkara Creek to revert back to its present day state.

The site is probably not appropriate for a marina of more than 500 berths - the constraints being the size of the creek and the lack of shore side space.

In this respect, land at the head of the creek will need to be partially reclaimed and the inner boatyard facility relocated, to provide for car parking and some hard standing space. Additional hard space will also be required elsewhere. A floating breakwater and pontoon system will keep the costs of development down and enable flexibility if demand changes.

7.5.2. Environmental and Social Considerations

The environmental impact will not be great, as the marina will be going into a creek where there is already boating activity and semi-industrial repair activities.

An important issue will be the need to relocate the existing boatyard and the costs associated with this move.

Traffic should not be an issue if the proposed bypass scheme goes ahead, although parking will remain tight. The main concerns will be over the visual impact and careful design will be needed to overcome this as far as is possible.

The significant environmental costs are estimated at Lm143,000 annually.

7.5.3. Market Factors

The development of a marina in Kalkara Creek will provide an opportunity for a powerful international maritime attraction as part of an urban regeneration programme, which could bring wide benefits to the local area. A marina could form the focus of waterfront development in the area, although the physical environment of Dockyard Creek will remain a stronger draw in overall tourism terms. It must also be stressed that the success of a marina in Kalkara will depend on the progression of an overall tourism development plan, to ensure provision of other social infrastructure and a lively atmosphere.

Demand for the facility is likely to start with international visitors, while domestic demand may take a little longer to accept it as a safe and prestigious location.

7.5.4. Economic Viability

The project will require government subvention in the region of Lm 2.5 million over ten years, with an additional Lm 1.43 million of environmental costs. However, this will be offset by wider economic benefit to the country of about Lm 13.6 million, a Lm 2 million capital investment programme and interest payments to local banks of almost Lm 2 million. This suggests a net gain to Malta of about Lm 13.13 million. At a stabilised trading position, the marina is thought likely to achieve an operating profit of almost Lm 160,000 per year.

7.5.5. Overall Conclusion

Like Dockyard Creek, Kalkara Creek would also provide a spectacular international marina location that could raise the profile of Malta as a yachting destination, although it might initially encounter resistance within the domestic market and it is likely to recruit berth-holders at a slower rate than at Xemxija. Also, its successful development as a marina would require a co-ordinated programme of improvement within the immediate surrounding area.

The capital costs and environmental and social costs are estimated to be lower than those estimated at Xemxija. However, it would not provide a flexible marina arrangement capable of further expansion, such as at the two alternative sites, and would be limited to a maximum of around 500 berths.

8. YARD/ HARD STANDING POTENTIAL SITES

8.1. General Issues

The potential marina sites discussed in the above chapters have limited land-side space for extensive yacht repair yards and the significant amounts of hard standing needed, or else the land available may not be appropriate in terms of the current or future use. Therefore, as yachting activity in Malta increases, there will be growing demand for additional yard and hard standing facilities. In reality, the existing yard facilities could probably cope effectively with the potential new demand levels identified, but their operations are often constrained by demands for yacht storage on the hard. While some yard facility will be required in, or close to, any marina development, the prime need is for additional hard standing space. Displacement of any existing yard facilities, however, will create a need for a new yard location, so this aspect has not been ignored.

The Stage One report details the definitions and components of hard standing and boat yard provision (see sections 10.5 and 10.6 of the Stage One report). The yacht repair yard and a hard standing base can have separate locations, although some hard standing will be required within a yard development to keep boats under repair, waiting for work to begin, or awaiting collection. Whether a hard standing area or yard are in a marina or separate, the same technical and design criteria will apply, in that the main requirements are for:

- sufficient flat space;
- preferably near the water's edge;
- strength to support the weight of the boats, mobile travel hoist and other heavy machinery.

In summary, the main differences between the requirements for a boatyard and hard standing are that a yard will require workshops and storage, and there will be different needs in terms of taking boats out of the water. A boat hoist is preferable for use with a hard standing area and a slipway for a boatyard. (Simple launching or recovery ramps, which are seen around the coastline of Malta, are primarily for local boat owners with small boats to make use of a car or tractor and a boat trolley. These ramps ought to be built into any marina scheme as well as a boat or travel hoist, although it will need to have public access.) See also the Stage One report for more detail on the technical and design criteria.

In terms of site selection potential hard standing and boat yard locations have been included within the coastal mapping and site sieving processes as for marina locations. However, while the criteria for ruling out areas of search are generally the same (for example, in terms of the conservation status, accessibility from land and water, existing infrastructure, conflicting uses and recreational or social amenity value), the issues of industrialisation will not apply. While hard standing and yard facilities are best located within proximity of a marina, the synergies with existing commercial use and industrialisation are strong.

This report has only considered potential sites that are located on, or in close proximity to, the coastline as this is likely to be a pre-requisite for the success of any major hardstanding and/or boat yard facility. Inland hardstanding facilities could be developed for smaller craft that are capable of relatively easy transport by road, but these are unlikely to meet either international demand (because larger boats would be excluded) or domestic demand (because smaller boats may often be more economically stored at, or by, the owner's residence).

Thus, the site selection process for yard and hard locations has run in parallel with the marina site selection, as detailed in Sections 3 and 4 of this report. However, greater attention was paid to the search within existing industrial areas and the site opportunities or potential for yard and hard standing facilities. Given the parallel process of site selection, only five additional potential sites (over and above the 18 sites considered for marina development) for boat yard/hardstanding were identified.

Following this process, the sites identified which would be most appropriate for a boatyard or hard standing are presented in this Section, with a more detailed analysis of the relative attributes and constraints (see also Appendix III on individual site strengths and weaknesses). Other areas may emerge for boat storage on land, but these short-listed sites would offer the chance for a significant base as an international as well as a domestic facility.

In our assessment of the following potential sites, we have assumed that the requirements for a boatyard are for the basic infrastructure and that the plant and machinery and specific operations will be installed by a third party.

8.2. French Creek, Grand Harbour

8.2.1. Market and Economic Factors

French Creek is the next inland creek from Dockyard Creek, which has been the historical home of ship repair facilities in Malta. There are a number of dry docks in the Creek, all of which are still in use. It is not clear whether any of these facilities are to be decommissioned in the next decade, so there would seem to be limited scope for potential sites in this area in the short-term at least.

However, our investigations did highlight a site identified by the Planning Authority as being potentially surplus land which could take a yacht repair facility or hard standing space. The site is a long, thin strip of quayside, bordered by the existing road, the creek and a large factory building. As far as we are aware this site is still used for dockyard activities and so there are a number of unknown variables as to the practicalities and timing of the site becoming available for yachting uses.

French Creek would be a very appropriate location for hard standing in conjunction with marina developments in Grand Harbour. The space available on this identified site, would probably go a long way to meeting the additional hard standing requirements if either Kalkara or Dockyard Creeks were developed for marinas as above, but would not be able to act as a replacement location for the displaced yard in Kalkara Creek.

On the downside, there may be some security concerns, particularly from locals, about keeping a boat in this area, but this would be a management issue and should not be difficult to mitigate.

8.2.2. Technical Issues

This site is on the quayside immediately inside the mouth of the creek and is bounded to the north by the old fortified walls and a small access road running round the end of the headland. We understand that there might be space between this road and the quayside for about 130 yachts for hard storage only.

A hoist will also be required for the operation and a small office. In addition, because of security, there will be the cost of adequate fencing and other security measures required.

Road access to the site is difficult, and would probably be impossible for boat transport. Therefore all access for boats will need to be from the water.

8.2.3. Environmental and Social Issues

Because of the historic boat building and repair activities of this creek, there will be little significant environmental impact from the creation of a hard standing area. Road traffic will be limited as mentioned above.

One possible issue is drainage from the site, which could add to the run-off into the creek. In the absence of available information, we have assumed that this will be a negligible cost, but this may need to be reviewed after technical studies and allowances made for capital works to improve drainage away from the water.

In terms of the social implications of yacht facilities being developed here, there are clearly a number of variables on which we are not able to comment relating to the current or other possible uses, timing, and overall plans for the dock areas. However, from the information available we would conclude that yacht hard standing would represent much lighter industrial use replacing the current heavy industry. Some of the more noisy and dirty dock activities would therefore be lessened (although this is part of an overall decline in these activities, rather than related to yachting development specifically). There would be some employment opportunities generated by the hard standing facilities. Therefore, the overall social impact is likely to be positive.

8.2.4. Financial Viability

As this site is being proposed as a hard standing, with little infrastructure requirements and unknown land costs, there is, at this stage, little to be gained from an attempt at a financial evaluation. In particular, we are not in a position to be able to estimate the capital costs of developing the site. The site will gain income related to rental of boat space and overheads will primarily relate to security and labour costs. Such an operation will not require any external funding, but is likely to be an important facility in helping meet the various needs of the yachting potential in Malta.

In broad terms the projected profit and loss account for an established year of operations may be summarised as in table 8.1.

Table 8.1
Illustrative Profit & Loss for a Yard in the Stabilised Year of Trading

Projected Yard Profit and Loss in 2007	Lm000s
Income	
Berthing fees	-
Hard standing	57
	57
Maintenance	(5)
Water & Electricity	(5)
Salaries and staff costs	(10)
Marketing	(3)
Administrative expenses	(10)
Operating profit	24
Depreciation	-
Interest (not estimated, say,)	(2)
Profit before tax	22

Source: Deloitte & Touche

8.2.5. Summary of Strengths and Weaknesses

A brief summary of this site's strengths and weaknesses is provided in the following tables:

ADVANTAGES		
Technical	**Policy, Social and Environmental**	**Market and Economic**
■ Sheltered site. ■ Existing quay with good water depths. ■ **Requires very little modification to quay space.** ■ Capital outlay would probably be low. ■ An improvement over existing use. ■ Local labour force nearby. ■ Services all in place. ■ Good access to sea.	■ Land available for boat yard and hard standing use (would not need to reclaim land) ■ Water in Grand Harbour area is already polluted. ■ Unlikely to be significant downstream impacts. ■ **Area already developed for industrial use and the Structure Plan encourages development in built up areas (SET1).** ■ Unlikely to cause significant conflict with recreational use. ■ Boating activities are already a feature and close to yachting "centre". ■ Boat storage needs are emphasised in the Structure Plan (SET7). ■ Zoning in the Local Plan would not conflict with this use.	■ **This location would be convenient for a marina in Kalkara or Dockyard Creek.** ■ Boating expertise exists in the area. ■ Would generate employment opportunities.

DISADVANTAGES		
Technical	**Policy, Social and Environmental**	**Market and Economic**
■ Poor road access. ■ Possibly contaminated land. ■ No room for expansion.	■ **May conflict with other commercial use or potential.** ■ May cause traffic difficulties (depending on current traffic levels and congestion)	■ Boat security may be seen as an issue.

Other Comments:

- French Creek would seem to be an ideal location for yacht yard and hard standing facilities because it was built for similar purposes. However, given dock yard activities at present the opportunities for yachting development here are restricted.

8.2.6. Conclusion

It has not been possible to provide a meaningful evaluation of French Creek as a potential hardstanding site at this stage. However, if either Dockyard Creek or Kalkara Creek were considered further as marina development sites then French Creek might be an attractive ancillary facility for boat storage which could be developed at a relatively low capital cost. In isolation its attraction would be limited due to the restricted road access to the site which would also preclude boat transport on land.

The potential of the site will be substantially dependent upon the future of existing industrial activities in the vicinity.

8.3. Malta Hydrofoil Site, Marsaxlokk

8.3.1. Market and Economic Factors

This site has the capacity to be developed as a comprehensive centre for yacht yard facilities and services, including some hard standing. It could be developed as with the current Manoel Island Yacht Yard under single management, or with several operators providing different services (for example, structural boat repairs and maintenance under one operator, while engine servicing and chandlery/ supplies could be under others).

If the site were to be developed to offer a comprehensive range of services with professional management and good security, it could be attractive to both international and domestic demand. However, as a site it will be unlikely to have the capability to service superyachts and benefit from the expenditure this market can bring for refits and maintenance. International users would focus most on competitive pricing, related to other countries, and reliable service, rather than the physical location. Therefore development of good technical and business skills are vital to control the operation and provide a cost-effective service.

For international users, Marsaxlokk is relatively easy to navigate to and its proximity to the airport is useful for those who may leave their boats unattended for the winter. While the immediate area does lack hotel accommodation should they wish to come for a couple of days mid winter to check up on progress, accommodation could be provided in Marsascala or elsewhere on the island. For ad hoc repairs, Marsaxlokk is again straightforward to find and provides an accessible and interesting location for those who may have to stay for a day or more while work is carried out.

In terms of domestic demand, although the site is currently some distance from the more affluent residential areas and from existing repair centres, the development is likely to be well received. In particular, the development will be seen as meeting a market need given the current shortage of hard standing; there is good road access and shelter for keeping the boats secure, and there will be benefits from having a comprehensive repair and maintenance centre. It may be appropriate to allow some space for local boat owners to have their boats taken out of the water and then to carry out annual maintenance and repairs themselves, as happens in most countries (both developed and emerging).

The development of a yacht yard centre in Marsaxlokk will bring some wider economic benefits to the area. Local employment has already been boosted by the Freeport development and the range of jobs offered. A yard will also seek to employ local labour and will offer opportunities for training staff in new skills of boat repair and maintenance. Initially these skills may have to be imported from other parts of the island with a tradition of boat yard services.

8.3.2. Technical Issues

In general terms, this site is already appropriate for yacht repair and storage activities, with a slipway, hoist facilities and areas of level ground. However, for a more efficient operation to be possible, some additional shore works will be required to extend the hard flat areas. Dredging and reclamation of part of the shore will give opportunities for better access for boats, with some strengthening of the quays.

There is likely to be adequate space on the existing site for hard standing for about 250 yachts, in addition to the area required for yard services.

We have not had access to the buildings on the Malta Hydrofoil site, and have assumed from the external appearance of the building and type of construction, that it is a steel-framed building which might conveniently be converted into a workshop. If this were so, then the site could effectively be converted into a fully-fledged boatyard. This would still require construction of slipways, winches and other machinery for major overhauls or repairs.

(If the building is unsuitable, with insufficient headroom, a significant number of internal columns, or similar, then the strength of the site for a boatyard is lessened and a new, more appropriate, building may need to be constructed in its place.)

8.3.3. Environmental and Social Considerations

The Malta Hydrofoil site is currently disused although there are some boat yard activities. Part of the site is occupied by a restaurant and sailing club facilities.

1. **Direct Loss of Habitat** - as the area is already developed there would be no significant loss of habitat. However, there is a small area covered by shrubs and vegetation on the Marsaxlokk side of the site which would need to be protected.

2. **Indirect Loss of Habitat** - there are unlikely to be significant downstream impacts. The area is already highly industrial, with the Freeport and power station nearby.

3. **Water Quality** - there is likely to be some reduction in water quality. The area is already polluted by the industrial activity in the area (for example, by petroleum hydrocarbons - although pollution is lower than in Dockyard Creek). The environmental impacts associated with boatyards are run off from anti-fouling agents, petroleum hydrocarbons and effluent from repair materials (such as paints and solvents).

4. **Existing Levels of Disturbance** - the area is already developed for marine-related uses, however, there would be an increased level of local activity. The infrastructural changes to provide for boat yard and hard standing facilities for yachting are likely to be limited.

5. **Level of Competing Uses: recreational** - there may be an amenity loss which would need to be replaced if the sailing club and restaurant need to be relocated.

6. **Level of Competing Uses: sewage outfall and drainage problems** - not applicable for hard standing development.

7. **Level of Competing Uses: fish farm activity** - not applicable.

8. **Level of Competing Uses: other issues** - not applicable.

9. **Conservation Status of Area** - area is designated as an area for urban development rather than conservation. A plan to develop a hard standing site should be consistent with this.

10. **Likelihood of Construction Damage** - not applicable. The bay is already being dredged.

11. **Visual Impact of Marina** - not applicable as boats are already a feature.

12. **Noise Impact of Marina** - not applicable as the site would not be next to a residential area.

13. **Likely Impact on Traffic Generation** - unlikely to be major. The roads are not generally busy and a hard standing area is unlikely to generate significant amounts of additional traffic. However, the access would be primarily via minor roads and during peak periods there may be some congestion. A particular issue might be access on Sundays, when there is a market in the area, but appropriate traffic management (e.g. encouraging use of the back coast road) could be used. A development stipulation restricting boat yard activities on Sundays might be considered.

14. **Likelihood that marina development would downgrade the area** - unlikely as the area is currently destined for development.

15. **Need/Costs of Replacement Amenity** - see point 5.

16. **Conflict with existing Local/National Structure plan** - there are no apparent conflicts with planning issues.

    Structure Plan policies SET 1 and SET 11 encourage development within existing built up areas and SET 10 states that major development is planned for Marsaxlokk Bay. SET 7 focuses on the

importance of boat storage as a community facility which is of high priority for planning applications.

Local Plan policy MM07 identifies the site of the Malta Hydrofoil factory as within an "Opportunity Area" which should be used to support tourism activities, including marine based activities.

The Local Plan also proposes the prohibition of long term boat storage in the area used by the open air market, so an alternative site will be required in the area.

The most significant environmental impact associated with hard standing development in Marsaxlokk is a risk to water quality as a result of run off. This is unlikely to be significant given the current use of the site and industrial nature of the area.

8.3.4. Financial Viability

Capital Costs

A yacht hard standing area with 250 spaces at the Malta Hydrofoil site would cost approximately Lm180,000, excluding land costs. The estimated capital costs are as follows :

Table 8.2
Estimated Broad Capital Costs - Malta Hydrofoil Site

Construction Task	Lm000s
Preliminary investigation and design fees	6
Dredging	20
Reclaimed land	20
Buildings	50
Shore works and quays	60
	156
Contractor's mobilisation (10%)	8
	164
Contingency (10%)	16
Total	**1.80**

Source: Posford Duvivier

Profit and Loss Projections

The projected profit and loss account of a yacht hard standing operation at Malta Hydrofoil for the first 10 years of operations is attached as Appendix VIII. The projections only show revenue derived from 'boat parking' during the winter months and do not include the potential income from yacht repairs; nor do they include the costs of employing specialist mechanics or of purchasing plant and machinery.

The projections envisage the operator of the boat yard acting as 'landlord' for the space occupied and providing basic utilities and a secure environment. The yacht owners may then either do their own repairs on site or employ their own mechanic, electrician, etc. to perform services directly for them.

The projected profit and loss account for an established year of operations may be summarised as in table 8.3.

Table 8.3
Illustrative Profit & Loss for a Yard in the Stabilised Year of Trading

Projected Yard Profit and Loss in 2007	**Lm000s**
Income	
Berthing fees	-
Hard standing	109
	109
Maintenance	(5)
Water & Electricity	(10)
Salaries and staff costs	(15)
Marketing	(5)
Administrative expenses	(10)
Operating profit	**64**
Depreciation	-
Interest	(4)
Profit before tax	60

Source: Deloitte & Touche

No government subvention is required. However no land acquisition costs have been included and these could be significant. Government may therefore wish to consider a range of incentives similar to those granted by the Malta Development Corporation to export-oriented businesses such as reduced factory rent and / or tax concessions.

Cash flow and funding

Again, we have assumed a Lm180,000 12 year commercial loan facility is drawn down evenly in the two years prior to the opening of the boat park. For simplicity, all transactions take place at the end of a financial year when 8.5 per cent interest is charged on the outstanding loan balance. Interest due during the two year construction period is capitalised so that the loan facility peaks at Lm221,000 in 1998, the year of opening.

Interest and capital repayments are made annually for the 10 year period to 2007 and funded out of operating profits (i.e. profits before interest and depreciation) so that the loan is fully repaid by 2007.

Overall viability

A boat park at Malta Hydrofoil would require no public funds. Based on the estimate that the direct revenues of a marina / boat park represent only 15 per cent of the total economic impact of yachting, the boat park may potentially generate approximately Lm4.2 million in the economy indirectly. Given the current boatyard use of the site, there are unlikely to be any significant environmental costs associated.

The overall viability of a 250 space boat park and yacht repair yard at the Malta Hydrofoil site is therefore such that there will be an overall net benefit to Malta, in terms of the Lm180,000 capital investment, a similar amount for interest charges to local banks, and about Lm4.2 million of wider economic benefit.

8.3.5. Summary of Strengths and Weaknesses

A brief summary of this site's strengths and weaknesses is provided in the following tables:

ADVANTAGES		
Technical	**Policy, Social and Environmental**	**Market and Economic**
■ Good road and waterfront access.	■ Boat yards are already a feature of the area.	■ Scope to develop a full yacht yard centre providing a comprehensive range of facilities and services - a one-stop-shop for boat owners.
■ **Reasonably level site, existing site and buildings suitable for workshops and repair yards including office complex.**	■ Water is already polluted.	■ Such a centre of excellence, if developed, could gain a strong reputation which would encourage visiting boats to Malta, such as the Manoel Island Yacht Yard does at present.
■ **Large area suitable for hard standing.**	■ Space for development (may wish to re-house restaurant and beach club).	■ It might be possible to buy out the restaurant and club area to provide an appropriately contained site with later expansion potential into surrounding empty sites.
■ **Could be developed at modest cost.**	■ No other-use conflicts.	■ Current long term storage of boats in the area used by the open air market is to be prohibited (MM12), so alternatives in the area will be needed.
■ Space for deep water offshore moorings.	■ **Land is already developed for this purpose.**	
■ Possible room for future expansion.	■ Not in a sensitive location or directly overlooked by any residential development.	
■ Some boat maintenance work is already undertaken in the area.	■ Boat storage facilities are encouraged in the Structure Plan (SET7) and Marsaxlokk is identified for major development (SET10).	
	■ Local Plans identify the site as within an "opportunity area" (MM07).	

DISADVANTAGES		
Technical	**Policy, Social and Environmental**	**Market and Economic**
▪ Exposed to winds from north east through to south east.	▪ Some vegetation damage. ▪ Local restaurant might need to be relocated. ▪ Access can be difficult while the Sunday market is active. Traffic management schemes may be required.	▪ **To create a comprehensive facility, it would be necessary to acquire an adequate space and we understand that there are other interests keen on the site.** ▪ Development of the yard as a centre of excellence would be dependent also on being able to provide the technical skills and professional management to deliver the required service.

Other Comments:

- This site, approximately 150m x 100m, properly laid out could accommodate over 250 boats - similar to Manoel Island. An allowance based on twice the average boat size of 10m x 3m = 60m² / boat is used. There is always the potential for boat stacking, a practice which is common in the USA, which would greatly enhance the potential before any future expansion need be considered.

8.3.6. Conclusion

The Malta Hydrofoil site could be developed as a significant centre for boat yard and hardstanding facilities that would attract both domestic and international users and provide an important economic benefit.

The environmental and social cost is likely to be limited and the site is well-suited for the purpose.

8.4. Rinella Creek, Grand Harbour

Rinella Creek is briefly discussed in this section. However, due to planning constraints discussed in Section 8.4.3. which follows, it is very unlikely to be approved for development as a boat hardstanding facility.

8.4.1. Market and Economic Factors

One of the difficulties raised by placing a marina in Kalkara or Dockyard Creeks is the lack of available a hard standing area for boats wishing to lay up ashore. However, Rinella Creek would be a convenient location, being the next creek seawards from Kalkara. Access is therefore straightforward and moving boats between the marina and yard, whether for repairs or winter storage, would not be constrained by the weather or sea conditions.

Given the relatively remote location on a no-through-road, security would need to be good to give boat owners confidence in the safety of boats from looting or damage. However, the site could accommodate a small yard facility and allow boat owners to carry out annual maintenance and repairs themselves. This would increase the market acceptance and value, particularly in terms of domestic demand.

Development at Rinella Creek would bring employment opportunities to the area and, with a yard facility as well as hard standing, new skills could be developed through appropriate training of local people.

8.4.2. Technical Issues

It would be a relatively straightforward task to construct a hard standing at the back of Rinella Creek. The land rises very gradually across the floor of the valley for about 100 metres. Although small terraces to the sides limit the extent of the sheltered area, it is considered that, by reclaiming some of the foreshore and constructing a small quay, there would be sufficient space for a boat yard similar to that currently being managed in the inner part of Kalkara Creek.

This would overcome the necessity for dredging, which otherwise would be required for boats of even modest draft to reach the quay.

8.4.3. Environmental and Social Issues

We are informed that any development proposed at the head of the bay would conflict with planning policy, which presumes that development in such valleys is restricted to create a rural "buffer zone" between various developed areas. In addition, the Structure Plan (RCO16) mitigates against any permanent development in sandy coastal areas and that public access to the coastline needs to be secured (CZM3). We are informed that various other uses have been proposed for the area, including the relocation of a scrap metal yard, which the Planning Authority has resisted to date. Rinella Creek is therefore not considered to be a prospective site for the development of boat hard-standing.

We also understand that, although bathing within the Grand Harbour is not permitted, in practice swimming does take place from a small sandy beach at the head of Rinella Creek and along the rocky shores of Valletta. The beach therefore has a high amenity value, as there is no nearby alternative site for bathing - an issue which is particularly relevant as many local residents do not have cars and are more reliant on public transport than in most other parts of the island.

Other environmental issues such as water quality and marine disturbance are not likely to be significant because of the existing development in Rinella Creek and the fuelling station with jetty used regularly by tankers. In addition, we understand that there are restoration works underway at the nearby Fort Ricasoli, but our information does not suggest that this will have any impact on yachting facility development in the area.

8.5. Conclusions on Potential Hard Standing / Boat Yard Sites

There are clearly a number of potential opportunities for additional hard standing and yacht repair sites. Because of the limited infrastructure, the capital costs are generally quite low and environmental costs are also limited because most sites are in areas already being used for similar activities. However, yard and hard standing are important activities in terms of contributing to the wider Maltese economy and so the net benefit is likely to be significant. Such sites are also likely to make a net operating profit and will require no additional financing from government or elsewhere.

However, all the potential sites have some limitations and their relative value is tied in, to a large extent, with the selection of a marina location. Therefore, the decisions on the development of any of these locations should be taken after marina sites have been decided. It may also be appropriate to follow up on the development of a number of these potential yard or hard standing sites, rather than just one, in order to meet demand levels.

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