

Bridlington Town Centre Area Action Plan
Bridlington Harbour and Marina
Review of the BHC In-harbour Scheme

Context

1. This paper is one of five submitted by the East Riding of Yorkshire Council in response to the Inspector's provisional views on the inclusion of the Harbour Top as part of the comprehensive Burlington Parade development scheme. The five papers add to the evidence that is already before the Inspector. They should be read together and with the earlier evidence.
2. This paper (ED52) shows that an in-Harbour alternative to the Burlington Parade and Marina schemes would not meet the BHC's operational or commercial objectives.
3. The other papers show:
 - i. it is technically feasible to accommodate the Harbour Top development at the west end of the Harbour within a Phase 1 development to the benefit the Harbour's operations and finances (ED51);
 - ii. the viability of Burlington Parade and the benefits it will deliver for the established shopping core are dependent on the development of the Harbour Top (ED53);
 - iii. the Harbour Top and Marina developments will cause no substantial harm to the significance of the heritage assets but will instead secure their optimal viable use and deliver substantial public benefits (ED55); and
 - iv. the Harbour Top is an essential part of the AAP's positive strategy for meeting the Town Centre's objectively assessed needs, and is justified, effective and consistent with national policy (ED50).

Introduction

4. I am Bill Schlegel, a Senior Consultant from Jacobs Engineering currently acting as a Technical Adviser to East Riding of Yorkshire Council (ERoYC) and Bridlington Harbour Commissioners (BHC) for the proposed AAP harbour and marina scheme.
5. I am a Chartered Civil Engineer, a Fellow of the Institution of Civil Engineers and have a BSc in Civil Engineering. Previously, I was Chairman of the Maritime Board of the Institution of Civil Engineers and also a former British National Committee Member of the International Navigation Association, PIANC.
6. Within Jacobs, I am a technical specialist, providing leadership to the Water and Utilities Teams in the north of England, Scotland and Ireland.
7. Formerly, I was Technical and Environment Director for British Waterways, where I directed the technical resources and input into award winning waterway regeneration projects, such as the Falkirk Wheel in Scotland; the Rochdale and

Huddersfield Canals in the North; and the Kennet & Avon Canal in the South of England. I also supported the commercial exploitation of British Waterways water and property assets in the development of new joint venture companies

Background

8. I was one of the Jacobs and LeighFisher team appointed in June 2011 by East Riding of Yorkshire Council (ERoYC), in conjunction with Bridlington Harbour Commissioners (BHC), to report on the viability of the proposed harbour and marina development. This included an assessment of the impact of the construction of the new development on the operation of the harbour, together with the commercial impact on the harbour business. In addition, an assessment of the long term viability of the proposed marina was required. A high level assessment of the technical feasibility of the proposed scheme was also required, together with a review of construction programme and phasing options.
9. Draft reports were provided to ERoYC and BHC (ED29). These reports remain incomplete pending a formal response from BHC.

Additional Evidence

10. As part of the examination, BHC have proposed a much smaller alternative "In-harbour" scheme within the confines of the existing harbour, which does not require the construction of a new south breakwater. East Riding of Yorkshire Council (ERoYC) has requested I review the In-harbour scheme in relation to the requirement for an improved harbour and new marina at Bridlington. BHC stated at the examination in December that they were not promoting an earlier scheme proposed in 2009, which incorporates a Harbour Top development. However, for the purposes of comparison I considered the financial impact of including a Harbour Top development.
11. In carrying out this assessment I have considered:
 - i. The draft Jacobs and LeighFisher Reports on the feasibility of the AAP harbour and marina scheme (ED29), prepared for the ERoYC and BHC; and
 - ii. The Commercial Operations Requirement Study (Report Ip1509/YF2) prepared by Wheeler Trevitt Consultants Ltd, in February 2011 (referenced in ED29);
12. My additional evidence is presented as follows:
 - i. A brief description of the proposed In-harbour development,
 - ii. An assessment of the impact of the In-harbour scheme on harbour operations
 - iii. An assessment of the construction of the In-harbour scheme
 - iv. An assessment of the impact of the In-harbour scheme on harbour finances
 - v. A summary of my findings

- vi. A detailed report on the BHC In-harbour scheme supporting my evidence is provided as Appendix 1.

BHC In-Harbour Scheme

- 13. The In-harbour scheme proposed by BHC is confined within the existing harbour walls and includes:
 - i. Construction of an inner harbour wall and lock, providing c. 200 marina berths. The water is to be impounded at a minimum level of approximately half tide.
 - ii. An enlargement of the existing fishing quay on the South Pier;
 - iii. A reduced operating area for fishing vessels within the tidal basin due to the expansion of the marina and enlargement of the South Pier;
 - iv. A landing area for pleasure boats comprising of a floating pontoon and access ramp system in the north-east corner of the harbour;
 - v. Extending the North Pier by around 60m in length in order to mitigate the wave activity within the harbour;
 - vi. Demolition of the existing 'Chicken Run Jetty' to allow space for the new works;
 - vii. Land reclamation at the West End of the Harbour to provide an area for the marina and harbour landside facilities; and
 - viii. Dredging of the harbour basin to provide acceptable access.
- 14. The In-harbour scheme was originally proposed by BHC in 2009, when it included a landside development similar to that proposed in the AAP, including:
 - i. Closure of the West End car park;
 - ii. Removal of the Lawrence Complex;
 - iii. A property development similar to the scheme described in the Area Action Plan (AAP); and
 - iv. Removal or relocation of the Vessel Maintenance Facility (VMF).
- 15. Jacobs report "Review of BHC In-Harbour Scheme" (Appendix 1) provides details of proposed scheme, together with a detailed assessment of the construction and operational and financial impacts.

Operational Assessment

- 16. The marina proposed as part of the In-harbour scheme has limited capacity. The illustrative berthing layout shows provision predominantly smaller boats (up to 8m in length). I consider that there is a risk that if the market trend for increasing boat lengths continues the proposed occupancy capacity of the marina would not be achieved.
- 17. The In-harbour scheme provides 50 commercial berths, with boats moored 4 abreast within a very restricted tidal basin area. The Commercial Operations

Requirement Study (Report Ip1509/YF2), to which BHC contributed, identifies a requirement for 76 commercial berths, with boats moored 2 abreast.

18. The berthing capacity provided by the In-harbour scheme falls well short of the commercial and operating requirements set out in the Commercial Operations Study Report. I therefore consider that the In-harbour scheme does not provide for current and future requirements for Bridlington Harbour.
19. I have concerns regarding the operational feasibility of the In-harbour scheme, particularly wave resonance issues within the greatly reduced tidal commercial harbour basin, which presents a significant risk and would require further technical consideration.

Construction Assessment

20. I consider that the construction of the In-harbour scheme would significantly disrupt the operation of the harbour, due to the proximity of the works to operational areas. In contrast, the AAP scheme allows a new tidal basin to be constructed outside the operation harbour with minimal disruption to operations.
21. I have several concerns regarding the safe construction of the facility within the existing operational harbour basin. The proximity of the works to operational fishing and tourist operations means the works would have restricted access and be properly segregated from these areas, requiring occupation of the remainder of the harbour by the construction contractor. This, combined with a lack of safe access to moorings, would mean the harbour would have to be closed to leisure users for the duration of the construction of the marina basin. There is a risk that commercial fishermen and leisure users may permanently move to alternative locations as a result of the disruption during construction.
22. I consider that the access along the South Pier during construction presents a health and safety concern. This is a narrow access route, which would have to be used by vehicles serving the fishing operations and so could not be used safely for construction purposes. This would require the contractor to work in tidal waters.

Financial Assessment

23. I consider that the disruption due to the construction of the In-harbour scheme would lead to a significant reduction in harbour income until the scheme was completed, due to the disruption to commercial operations and loss of harbour dues from leisure craft.
24. I estimate that the completed conversion of the tidal basin to a non-tidal marina within the In-harbour scheme would not significantly change the harbour revenues from marine based activities. The high level financial assessment contained in Appendix 1 indicates that harbour revenue may actually be slightly reduced when assessed on a similar basis to the AAP scheme. The assessment in Appendix 1 shows it is the development of the Harbour Top area that would have the potential to significantly increase harbour revenues for the In-harbour scheme.

Conclusions

25. I conclude that the BHC In-harbour scheme does not meet the operational requirements for a harbour and marina in Bridlington as set out in the Commercial Operations Study Report.
26. I consider that the BHC In-harbour scheme places more emphasis on the development of the marina, rather than improving the quality and capacity of the commercial/fishing facilities. I also consider this may indicate that BHC believes a marina is a more sustainable use of the harbour in the long-term and there is demand for a marina in Bridlington.
27. The proposal of an In-harbour scheme by BHC may indicate that BHC could accept a more compact scheme than previously advised. Hence, I believe there is likely to be scope for realising value engineering savings on the AAP harbour and marina scheme, whilst maintaining the overall objectives of that scheme.

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Bridlington Harbour & Marina Project

Review of BHC In-Harbour Scheme

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1. Introduction

- 1.1 The draft Bridlington Town Centre Area Action Plan (AAP) is a key development plan document in the Local Development Framework (LDF) (the East Riding Local Plan) and it sets out a development strategy for the town centre and harbour area. It was formally submitted to the Secretary of State on 21 April 2011 and requires public examination.
- 1.2 As part of the examination, the Bridlington Harbour Commissioner's (BHC) have proposed a much smaller alternative "in-harbour" scheme within the confines of the existing harbour, which does not require the construction of a new south breakwater, and which BHC claimed was achievable without the level of development proposed in the AAP.
- 1.3 East Riding of Yorkshire Council (ERoYC) has requested a review of the in-harbour scheme in relation to the requirement for an improved harbour and new marina at Bridlington.
- 1.4 This report considers the alternative in-harbour scheme for the creation of a marina at Bridlington Harbour, as proposed by BHC. The BHC in-harbour scheme is assessed in relation to the:
- a. the operational requirements for a commercial harbour and leisure marina at Bridlington;
 - b. impact on the current harbour operation;
 - c. constructability of the scheme within an operational harbour; and
 - d. financial impact.
- 1.5 In 2009, in response to the AAP Preferred Options consultation, BHC proposed an in-harbour scheme which included a Harbour Top development similar to that proposed in the draft Area Action Plan (AAP). BHC stated at the examination in December that they were not proposing the 2009 scheme, and the latest BHC proposal appears to omit a Harbour Top development. For the purposes of comparison the financial impact of including a similar Harbour Top development is considered in this report

2. Project Scope

- 2.1 The in-harbour scheme proposed by BHC is confined within the existing harbour walls as shown in the Illustrative Layout IP1508/210 B, enclosed as Appendix A, and includes:
- a. Construction of an inner harbour wall and lock, impounding approximately 2/3 of the water area to provide in the region of 200 marina berths. The water is to be impounded at a minimum level of approximately half tide.
 - b. An enlargement of the existing fishing quay on the South Pier to allow space for manoeuvring of trucks. As the works are within the existing harbour walls the listed piers would not be required to be breached for the in-harbour scheme.
 - c. A reduced operating area for fishing vessels within the tidal basin due to the expansion of the marina and enlargement of the South Pier.
 - d. A landing area for pleasure boats comprising of a floating pontoon and access ramp system in the north-east corner of the harbour. Disabled access to the pleasure craft boarding pontoons is required.
 - e. Extending the North Pier by around 60m in length in order to mitigate the wave activity within the harbour.
 - f. Demolition of the existing 'Chicken Run Jetty' to allow space for the new works.
 - g. Land reclamation at the West End of the Harbour to provide an area for the marina and harbour landside facilities.
 - h. Dredging of the harbour basin to provide acceptable access.
- 2.2 The in-harbour scheme proposed by BHC in 2009, which included a landside development similar to that proposed in the AAP, is shown in the Illustrative Layout IP1508/202 B, enclosed as Appendix B. This Landside proposal appears to indicate:
- a. Closure of the West End car park
 - b. Removal of the Lawrence Complex
 - c. A property development similar to the scheme described in the Area Action Plan (AAP)
 - d. Removal (or relocation) of the Vessel Maintenance Facility (VMF)

3. Operational Assessment

Marina Capacity

- 3.1 Allowing sufficient space for a slipway, boat hoist and waiting/manoeuvring areas and taking into consideration the disposition of berths, a capacity of around 200 berths is estimated. This is confirmed by the illustrative layout in Appendix C, which shows an indicative berthing arrangement for a 200 berth marina in the area suggested in the in-harbour scheme. This is significantly less than the target of 320 berths proposed in the AAP scheme and would limit future growth of the marina business.
- 3.2 It is the Council’s and BHC stated objective to provide a high standard marina, which aims to achieve the YHA Four Gold Anchor Standard. Due to the limited landside space there is little scope for the provision of extensive marina facilities. Consequently, it appears unlikely the requirements of the YHA Gold Standard rating system (see Appendix I) could be achieved.
- 3.3 The in-harbour scheme would not meet the requirements for providing moorings for larger boats, as identified in the PLB berthing study¹ (SD03), and the Commercial Operations Requirement Study², as summarised in Table 1 below. There is no scope in the in-harbour scheme for providing any such moorings anywhere else in the harbour. The lack of moorings for larger boats does not meet the predicted future demands of the harbour. Current market trends show that boat lengths in marinas such as Bridlington are getting longer.

Table 1: Comparison of Proposed Bridlington Pontoon Berths: (Approximate figures based on a total of 320 berths and adjusted for continuity between reports)

Length Bands	Up to 8 metres	8.1 to 10 metres	10.1 - 12 metres	12.1 - 13 metres	Over 13 metres
PLB Study ¹ Berths	112	112	80	13	3
PLB %	35%	35%	25%	4%	1%
Commercial Requirements Study ² Berths	148	96	48	20	8
Comm. Req. %	46%	30%	15%	6%	3%
In-harbour Scheme Berths	129	59	12	0	0
In-Harbour %	64.5%	29.5%	6%	0%	0%

- 3.4 There is limited “Safe Haven” area within the in-harbour scheme. As the harbour is already congested, there is limited flexibility on space to berth in bad weather or when tides are unsuitable to enter the impounded basin. The lack of space may have an impact on attracting

¹ Bridlington Harbour Supply and Demand Study – June 2008, PLB Consulting Ltd & Faber Maunsell

² Commercial Operations Requirement Study (Report Ip1509/YF2), Wheeler Trevitt Consultants Ltd, February 2011

keel boat racing, as one of the key requirements of the events is to provide a sufficient area of safe sheltered water at all times.

- 3.5 The illustrative layout shown in Appendix A shows a narrow inner harbour wall, to save space. It appears that there would be insufficient space to allow two-way vehicle traffic along this route. Therefore, if vehicles were stopped to offload they would block the pier causing disruption to other users. In addition, fishing operators would probably also wish to use the new marina impounding wall to gain access to boats berthed along the south side of the wall, causing further congestion. This access route would be at a significant height above the water level, which raises safety concerns for vehicles travelling along the crest of the pier.

Commercial / Fishing Capacity

- 3.6 The in-harbour scheme would provide significantly reduced berthing capacity for the commercial fleet from that discussed in the Commercial Operations Requirement Study². This study recommends that an area at high tide, excluding the harbour entrance of no less than 3.1ha is provided for the use of commercial fleet. The area proposed within the in-harbour scheme for the fishing fleet is 1ha and is, therefore, significantly less than required. An illustrative berthing layout for the in-harbour scheme can be seen in Appendix C. Currently the commercial fleet operates in around 2.5ha of the harbour water space. Therefore the in-harbour scheme would significantly compromise this aspect of the harbour operations. The in-harbour scheme offers less space for the commercial fleet in comparison to the AAP scheme. The proposed berthing layout for the AAP scheme is shown in Appendix D. Due to the greatly reduced water space and the proposed layout the area surrounding the harbour entrance is likely to become congested, increasing the risk of marine incidents.
- 3.7 We understand that BHC believes that at least 2.5 to 3.0ha of water space is required to handle the demand of future commercial use. Therefore, the in-harbour scheme does not meet their own predicted requirements.
- 3.8 A good balance is required between the needs of the commercial shell-fishing sector and the aspirations of the marine leisure sector. Co-operation between these two very different sectors is imperative if a successful and cost effective multi user facility, such as Bridlington Harbour, is to grow and prosper in the future. The in-harbour scheme does not appear to strike this balance.

3.9 The required berthing capacity, as described in the Commercial Operations Requirement Study², is summarised below:

Table 2: Commercial Berthing for proposed tidal basin at Bridlington

Berth Length	Commercial Operations Requirement Study	In-harbour scheme
16m	6	6
14m	10	10
12m	31	8
10m	19	11
8m	4	8
6m	4	7
Other	2	0
Total	76	50

3.10 It can clearly be seen on the layout in Appendix C that the tidal area proposed in the in-harbour scheme would not address the berthing capacity prescribed by BHC, confirmed by their study². Fishing fleets, like those operating within Bridlington Harbour, can be transitory in nature, and often move to nearby locations where better facilities or economic benefit can be gained. There is a risk that the commercial fleet may move to other East coast facilities if they feel that they are being marginalised or pushed out of Bridlington. Alongside the requirement for sufficient berthing space, the fishing industry requires adequate parking, storage, maintenance facilities and space for manoeuvring. Storage space is required for lobster pots, nets and other fishing equipment. These requirements would need to be met both during the construction works and upon their completion. A worst case scenario would see the development of a new tidal basin, only to find that the majority of the commercial fleet had moved elsewhere in response to the ongoing disruption and compromised facilities on offer, during a prolonged and disruptive construction period.

3.11 There is no scope for expansion as the entire development is within the existing harbour walls. This leaves no options to expand in the future, without requiring major construction works. In addition the inner basin would already be obstructed with the new harbour wall and lock gate limiting future expansion options.

3.12 The in-harbour scheme still requires traffic to drive along the narrow historic south pier to access the truck turning area. This route could become congested, as it would also be an access route to the south side of the marina. The widened truck turning area reduces the water space available within the tidal basin, but does not improve storage and landside facilities significantly. The majority of the extension to the South Pier would have to be kept clear at all times to allow for vehicle access. In addition, it appears from the layout in Appendix A that the accommodation on the South Pier would be reduced to allow space for the truck turning area.

- 3.13 Despite the proposed addition of an extension to the North Breakwater there is the possibility of wave resonance issues within the tidal commercial harbour basin. Deep water at the harbour entrance would enable larger waves to enter the harbour. Due to the geometry of the outer end of the North and South Piers the waves are likely to refract into the tidal basin. In comparison to the existing harbour, the waves would then have a significantly smaller area in which to dissipate. The construction of the inner quay walls is likely to be a solid vertical sheet piled wall, which would encourage waves to reflect around the tidal basin. Rock armour could be used in the tidal basin to reduce the wave climate. However, this would further reduce the space available to the commercial fleet. This matter would have to be carefully considered, as a very confined tidal area so close to the harbour mouth is likely to result in an unacceptable wave climate under certain weather conditions, risking damage to craft in the harbour.
- 3.14 During Jacobs feasibility study undertaken in 2011, BHC expressed concern regarding wave reflection from the new quay wall required for the land reclamation at the West End of the harbour if carried out as a standalone first phase. Given the in-harbour scheme provides a much smaller tidal basin and a vertical wall closer to the mouth of the harbour, wave conditions in the in-harbour scheme must be of greater concern to BHC.

Landside Capacity

- 3.15 The landside space proposed for the in-harbour scheme would not appear to be adequate; particularly if a Harbour Top development were incorporated (The AAP scheme creates additional landside space through land reclamation behind the new breakwater to the south of the existing pier). Landside requirements include access, car parking, dry storage, areas to carry out maintenance, offices and retail. Limiting this space could have a significant detrimental effect upon the future success of the marina, as the provision of appropriate landside facilities are a key component in any high quality marina development.
- 3.16 Due to the general lack of usable operational space around the harbour (public roads and private property bound the harbour along its northern and western landward boundaries) the West End offers the main area of adaptable, open space within the harbour boundaries. Consequently, the ongoing availability of usable land in this area is key to the continued success of harbour operations.
- 3.17 Access arrangements to the harbour are similar to the northern area of the AAP scheme. The access to the commercial tidal basin and marina are constrained by the West End development causing congestion.
- 3.18 The 2009 in-harbour scheme includes a landside development similar to the "Harbour Top" development suggested in the AAP scheme. This development would appear to provide minimal space for marina operations, which would be significantly less than the landside area created by the AAP scheme. The AAP scheme includes a large area of reclaimed land to the south of the existing harbour which provides scope for greatly improved facilities. In addition, the AAP scheme

creates additional warehouses and storage space which could be constructed along the length of the new Main Pier.

- 3.19 The “Harbour Top” development in the 2009 in-harbour scheme has similarities to that suggested in the AAP scheme. BHC has objected to the AAP scheme due to the plans causing an adverse impact on the operation of the harbour and their statutory duties. If the “Harbour Top” development in the in-harbour scheme is similar to that in AAP scheme, it is unclear how the in-harbour scheme was acceptable to them in 2009.
- 3.20 As shown, the 2009 in-harbour scheme does not show any VMF buildings. However these could be accommodated if a similar landside arrangement to that presented within the AAP scheme was adopted.
- 3.21 Car Parking is a major source of harbour revenue; the in-harbour scheme doesn’t indicate any particular car parking areas. Car parking capacity would be significantly reduced in the 2009 in-harbour scheme, unless a similar arrangement to the AAP scheme was adopted. The AAP scheme includes the provision of a multi-storey car park within the landside development.
- 3.22 The layout provided in Appendix A appears to retain the Lawrence Complex. This does not appear to be feasible, as the land reclamation indicated would require the ground level in the vicinity of the Lawrence Complex to be raised significantly.
- 3.23 Property revenues would be reduced due to the need to demolish the Lawrence complex. New property would have to be provided within the in-harbour scheme to compensate for this.

4. Construction Assessment

- 4.1 The works proposed under the in-harbour scheme would be considered as a medium to large, complex marine civil engineering project. The procurement procedure is likely to involve one main contractor and specialist sub-contractors for individual items of work such as the dredging.
- 4.2 There are various construction options for each marine element. A key requirement of the construction methods considered is to limit the amount of disruption to the harbour users and public during the construction works. The construction work involved in the in-harbour scheme would seriously disrupt current harbour operations as the majority of the proposals are within the existing harbour. In order to minimise impacts on the existing harbour users, careful planning would be required to take into consideration seasonal and operational constraints. Detailed discussions with BHC would help minimise the effects on operations of the fishing fleet. Even if mitigation measures are put in place to minimise the impacts, the construction works would still cause significant disruption on the operation of the harbour and surrounding area.
- 4.3 Construction access along the South Pier would be limited, due to the restricted width of the pier and the need to maintain access for commercial fishing operations. For this reason, construction access would have to be an alternative route, possibly by sea, increasing the cost of construction. Construction of the new harbour wall and lock would require existing harbour users to vacate their moorings, to provide working space for the contractor and due to limited scope for safe access during construction. This could lead to users moving to an alternative harbour or marina location.
- 4.4 Unlike the AAP scheme, which allows the works to be phased with minimal disruption to harbour operations, the in-harbour scheme construction is likely to cause negative impacts on the environment, operational requirements, safety and access for harbour users and the general public. Marine construction works of this magnitude raise serious health and safety issues as they are to be carried out within an operational harbour that has public access. Construction traffic within the harbour would cause severe disruption to the existing users, both in and around the harbour site. Materials would have to be transported by sea where possible, to help minimise the impact on the traffic in the surrounding area.
- 4.5 The in-harbour development would have both long and short term effects on the marine environment at Bridlington, as would any other schemes to develop the harbour. Impacts include the loss of seabed, effects of dredging, seabed preparation, piling and rock placing. As the in-harbour scheme entails less construction work than the AAP scheme, it may have less of an environmental impact.

- 4.6 Alternative construction options would need to consider feasibility, capital and maintenance costs, aesthetics, heritage, and construction risk. These factors would affect the financial viability of the scheme.
- 4.7 Possible construction options for the inner quay walls include sheet piled, concrete blockwork, concrete retaining walls or revetted slopes. The construction methods and design adopted for each marine element would ultimately depend on the results of geotechnical investigations. Revetted slopes are to act as a spending beach if they are required to reduce wave activity. If the south side of the inner quay wall were to be sloped, it would reduce the water area available for the commercial fishing fleet. Also, the inner quay wall is required to impound the water in marina where a vertical solid structure is preferable. This means a vertical face is most likely to be required to conserve water space. This presents more risk of wave reflection within the tidal harbour (see 3.13).
- 4.8 Construction of the new quay walls and the reclamation works would provide access to carry out the remainder of the works. The new inner harbour wall and lock construction would have to be undertaken in sections, to reduce the disruption to operations. This part of the work would probably take over 18 months to complete.
- 4.9 The impact of ongoing construction work in the harbour may disrupt the operation of the facilities and therefore adversely affect the statutory responsibilities of BHC as a Trust Port.
- 4.10 The construction works would require considerable planning, careful phasing and due to limited space available would still be likely to cause significant disruption to all existing harbour activities.
- 4.11 It should be noted that the extension for the North Pier would probably be carried out at the beginning of the works to help mitigate the wave climate within the harbour. However, there is no obvious option for phasing the construction of the marine elements within the existing harbour basin that would avoid severe disruption to the harbour users. Phasing of the works would have to consider access to the inner section of the harbour whilst constructing the lock gate. For example, if the inner harbour walls are constructed prior to the lock gate the access would be severely restricted into the majority of the harbour. By comparison, the AAP scheme allows for the new south pier to be constructed first creating the new Tidal Basin in advance of the marina works. This provides a suitable facility for the commercial vessels whilst the construction of the marina is carried out.

Land Reclamation

- 4.12 If a Harbour Top development were included, the Land reclamation work could be undertaken in a similar manner to the Phase 1 of the AAP scheme, prior to constructing the remainder of the works.

5. Financial Assessment

In-harbour Scheme Without Harbour Top Development

5.1 The proposed BHC in-harbour scheme, without a Harbour Top development, would affect revenue and expenditure related to Harbour dues (commercial and leisure). A simple financial assessment of the in-harbour scheme was undertaken (see Appendix F), summarised in Table 3 below. The assessment is based on the figures derived for the assessment of the AAP scheme (see Appendix H). This includes an assumed marina charge rate of £183/m (excl. VAT).

Table 3: Impact of In-harbour Scheme Without Harbour Top Development on Annual Income & Expenditure

Item	Income	Expenditure	Balance
Current Harbour Total	698,000	593,000	105,000
Changes due to proposed Scheme			
Landside (Property & Car Parking)	0	0	0
Existing Harbour Activities	-45,000	50,000	-95,000
New Marina	315,288	229,882	85,407
Total Excluding Lifecycle	968,288	872,882	95,407
Lifecycle Allowances			
Harbour Lifecycle Allowance		36,750	-36,750
Marina Lifecycle Allowance		19,265	-19,265
Total Including Lifecycle	968,288	928,897	39,391

All 2011 prices

5.2 Without the Harbour Top Development, the in-harbour scheme shows a reduction of annual net revenue of c. £10,000. The increase in annual revenue due to berthing charges is offset by the additional costs associated with maintaining the lock and marina pontoons etc.

5.3 The harbour will have to make provision for the renewal of assets in the future, to be funded from net harbour revenues. An allowance for lifecycle works, based on the assessment of the AAP proposal and adjusted for the scale of the in-harbour scheme, is included in Table 3 above. Once the allowance for major lifecycle expenditure is included, net revenue falls by c. £65,000.

In-harbour Scheme With Harbour Top Development

5.4 The inclusion of a Harbour Top development would additionally affect revenue and expenditure related to Car Parking and Property. A simple financial assessment including the Harbour Top was undertaken (see Appendix G), summarised in Table 4 below. The assessment is also based on the figures derived for the assessment of the AAP scheme (see Appendix H) and an assumed marina charge rate of £183/m (excl. VAT).

Table 4: Impact of In-harbour Scheme with Harbour Top Development on Annual Income & Expenditure

Item	Income	Expenditure	Balance
Current Harbour Total	698,000	593,000	105,000
Changes due to proposed Scheme			
Landside (Property & Car Parking)	75,000	-25,000	100,000
Existing Harbour Activities	-45,000	50,000	-95,000
New Marina	315,288	229,882	85,407
Total Excluding Lifecycle	1,043,288	847,882	195,407
Lifecycle Allowances			
Harbour Lifecycle Allowance		36,750	-36,750
Marina Lifecycle Allowance		19,265	-19,265
Total Including Lifecycle	1,043,288	903,897	139,391

All 2011 prices

5.5 The proposed BHC in-harbour scheme with a Harbour Top development increases the annual harbour revenue by c. £90,000, ignoring major lifecycle expenditure. However, this increase is entirely due to the proposed Harbour Top development, which increases car park and property income. The net annual revenue due to the new marina is offset by losses of existing revenue streams associated with the current harbour operation (harbour dues) and increased maintenance costs associated with the construction of the new lock etc. Once an allowance for major lifecycle expenditure is included, the in-harbour scheme only increases annual net revenue by c. £40,000.

5.6 It is the development of the landside Harbour Top area which has the potential to significantly increase harbour revenues. Without this development, the in-harbour scheme would not provide sufficient additional net revenue to make a significant improvement in harbour revenues.

AAP Scheme

5.7

By comparison, the scheme set out in the AAP results in a significant increase in net annual revenue, as shown in Table 5.

Table 5: Financial Impact of AAP Scheme on Annual Income & Expenditure

Item	Income	Expenditure	Balance
Current Harbour Total	698,000	593,000	105,000
Changes due to proposed Scheme			
Landside (Property & Car Parking)	75,000	-25,000	100,000
Existing Harbour Activities	4,000	40,000	-36,000
New Marina	551,754	360,058	191,696
Total Excluding Lifecycle	1,328,754	968,058	360,696
Lifecycle Allowances			
Harbour Lifecycle Allowance		49,000	-49,000
Marina Lifecycle Allowance		33,714	-33,714
Total Including Lifecycle	1,328,754	1,050,773	277,982

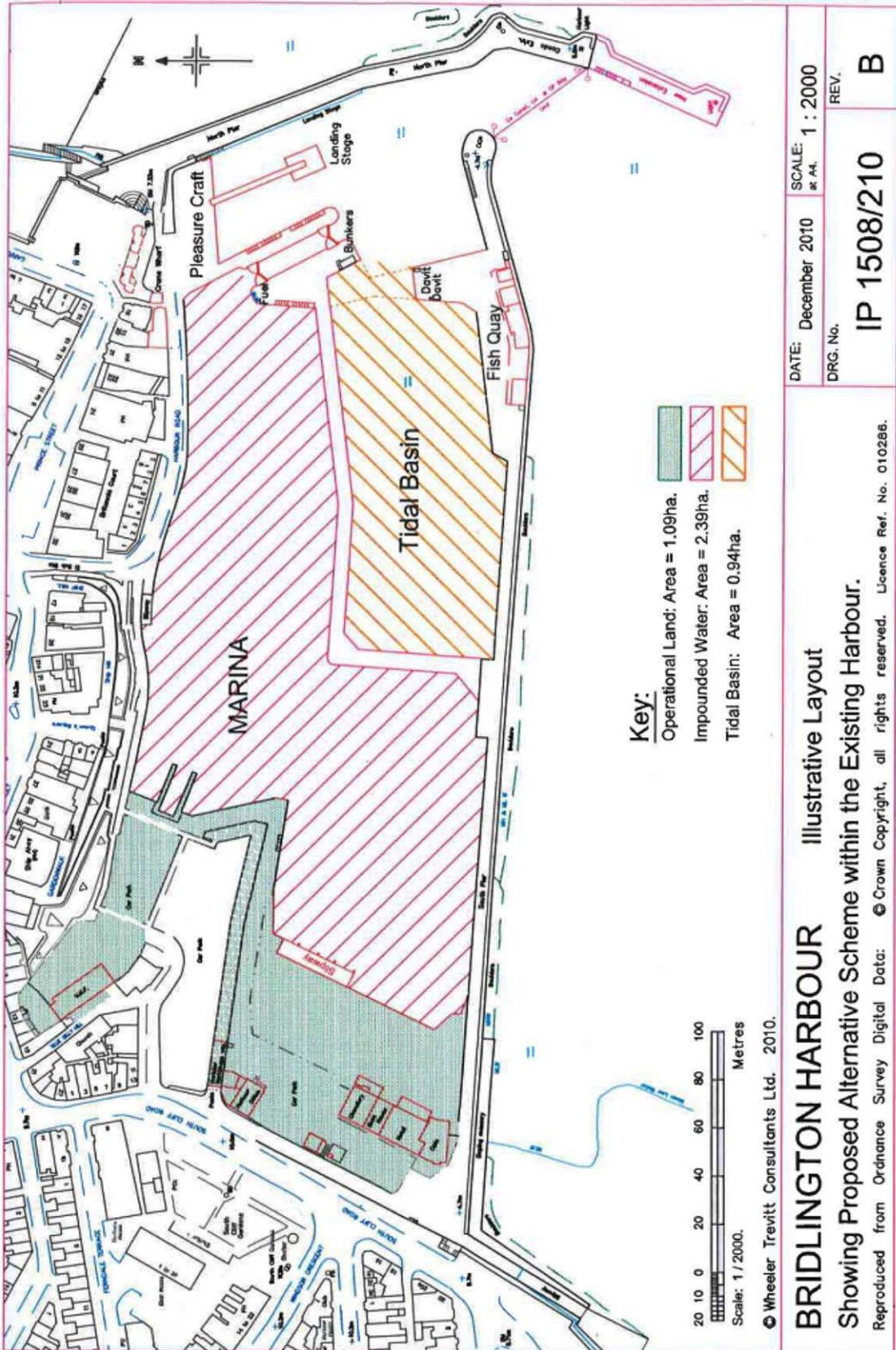
All 2011 prices

6. Conclusions

- 6.1 The BHC in-harbour scheme tabled as part of BHC's representations to the plan examination does not meet the commercial and operating requirements set out by BHC in their Commercial Operations Study Report.
- 6.2 The technical feasibility of the in-harbour scheme, particularly wave resonance issues within the greatly reduced tidal commercial harbour basin, presents a risk and requires further consideration.
- 6.3 The scheme would significantly disrupt the operation of the harbour during construction. This disruption could lead to a significant reduction in harbour income until the scheme was completed. The construction of the facility within the existing operational harbour basin raises several concerns. The proximity of the works to operational fishing and tourist operations means the works would have restricted access and would have to be properly segregated from these areas, requiring occupation of the remainder of the harbour by the construction contractor. This, combined with a lack of safe access to moorings, means the harbour would probably be closed to leisure users for the duration of the construction of the marina basin. There is a risk that commercial fishermen and leisure users may permanently move to alternative locations as a result of the disruption during construction.
- 6.4 Access logistics along the South Pier during construction present a health and safety concern. This is a narrow access route, used by vehicles serving the fishing operations, and could not be used safely for construction purposes.
- 6.5 The conversion of the tidal basin to a non-tidal marina within the in-harbour scheme would not significantly change the revenues from marine based activities. A high level financial assessment indicates that revenue may actually be reduced when assessed on a similar basis to the AAP scheme. The assessment shows it is the development of the Harbour Top area that would have the potential to significantly increase harbour revenues for the in-harbour scheme.
- 6.6 The in-harbour scheme appears to place more emphasis on the development of the marina, rather than improving the quality and capacity of the commercial/fishing facilities. This might indicate that BHC believes a marina is a more sustainable use of the harbour in the long-term and that there is demand for a marina in Bridlington.
- 6.7 The proposal of an in-harbour scheme by BHC indicates that they could accept a much more compact scheme than previously advised. Hence, there is likely to be scope for value engineering savings on the AAP harbour and marina scheme, whilst maintaining the overall objectives of that scheme.

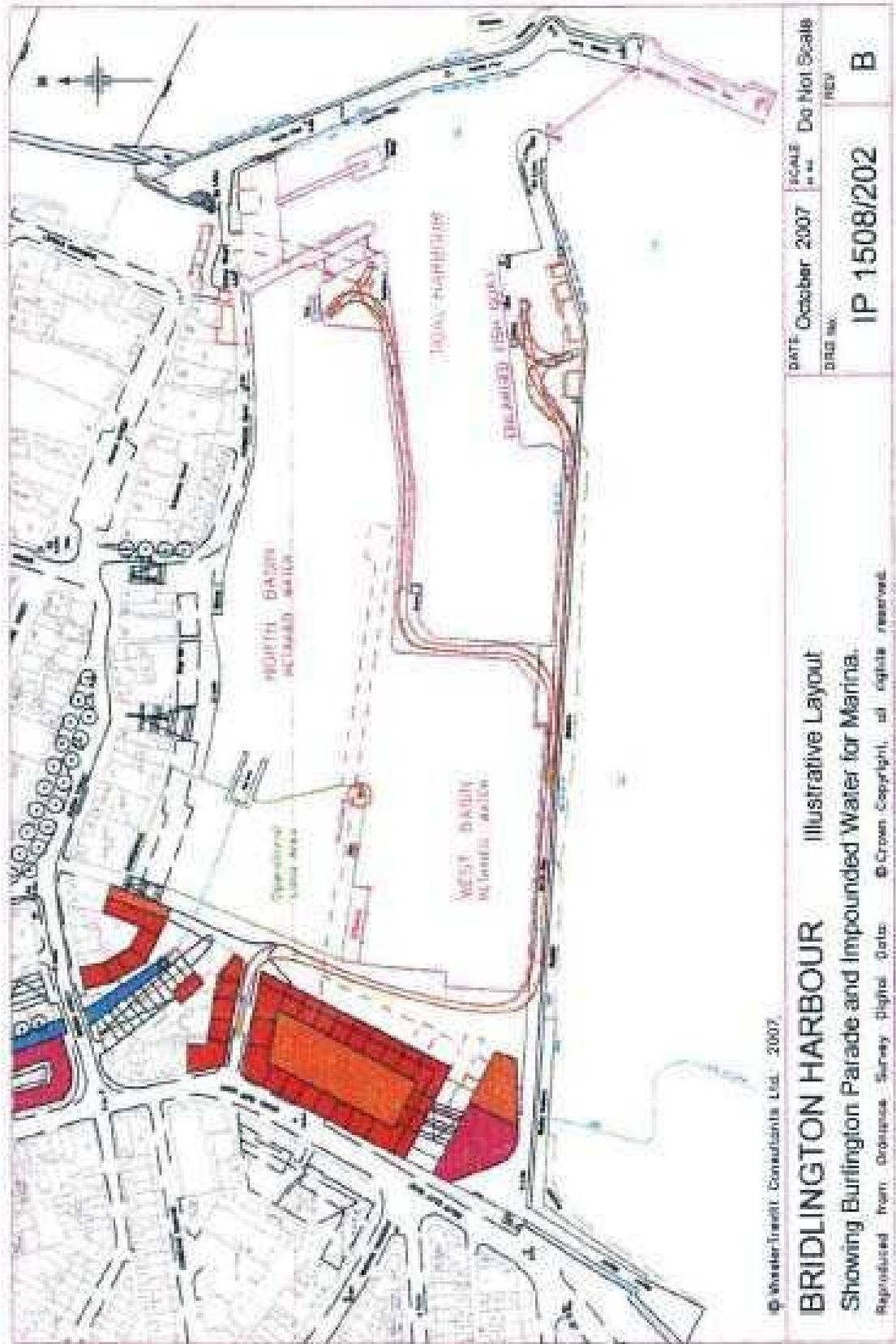
Appendix A

BHC Scheme 2010 Layout



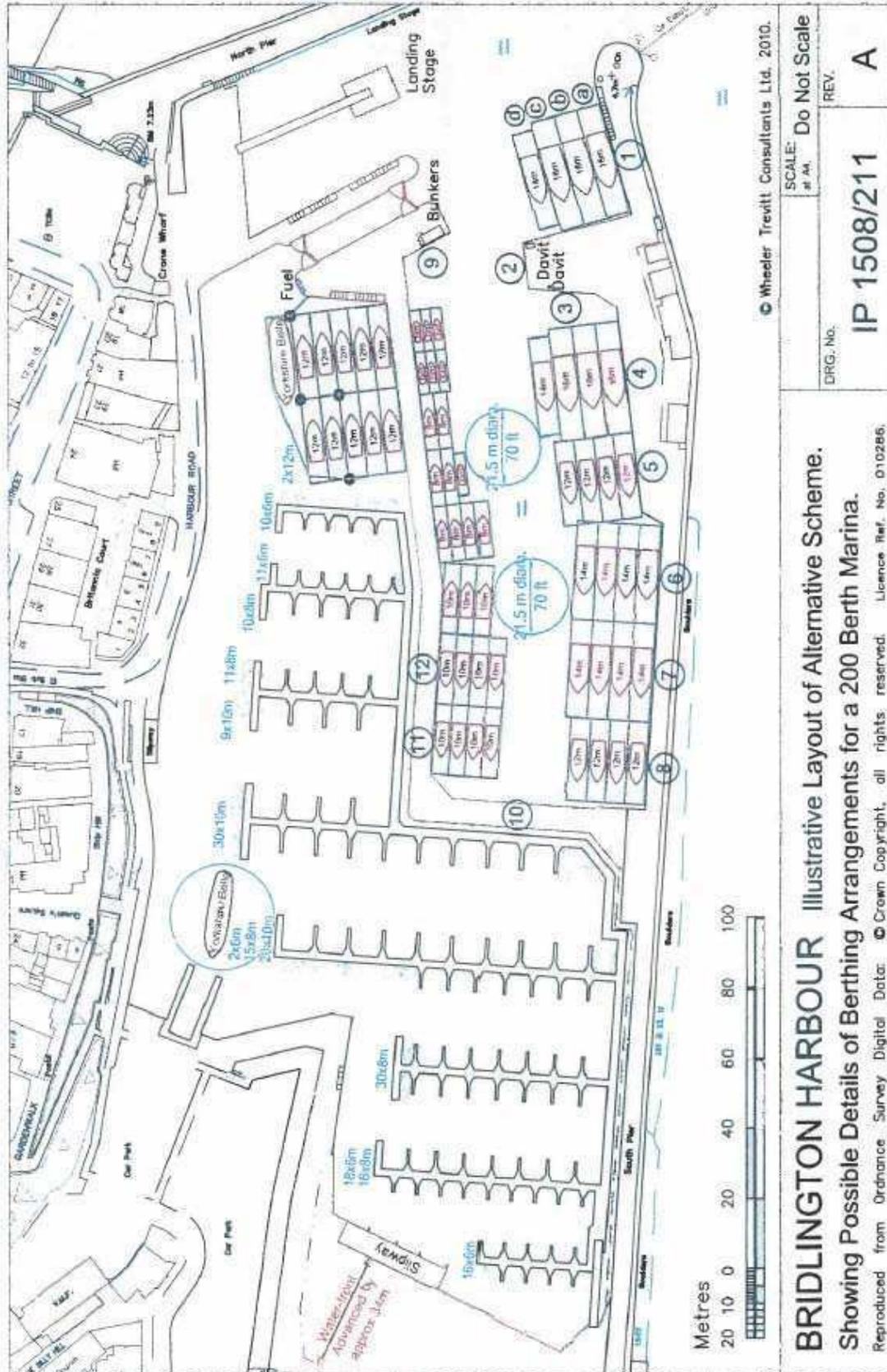
Appendix B

BHC Scheme 2009 Layout



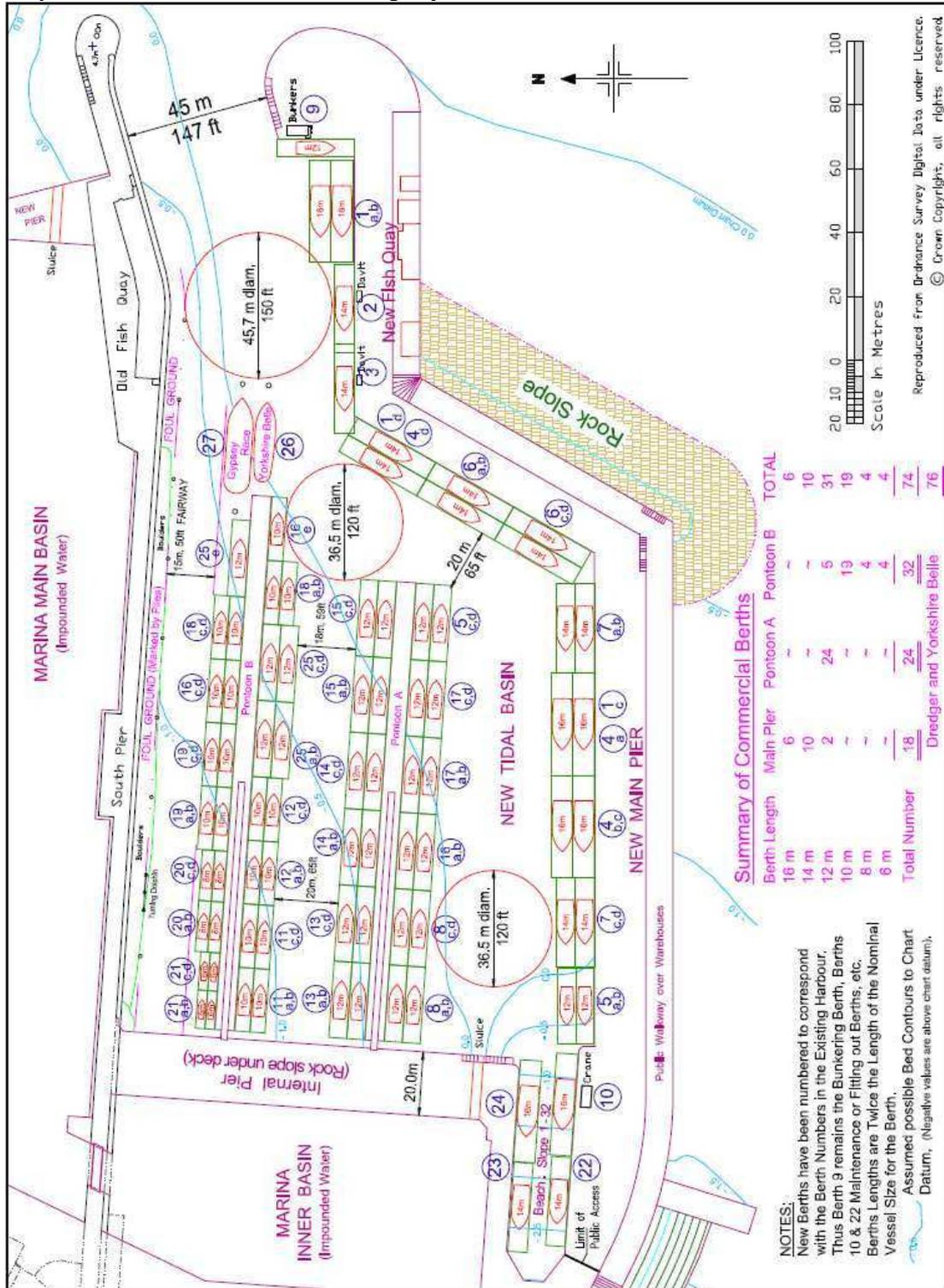
Appendix C

Illustrative Berthing Layout for BHC Scheme



Appendix D

Proposed Harbour Commercial Berthing Layout



NOTES:
 New Berths have been numbered to correspond with the Berth Numbers in the Existing Harbour. Thus Berth 9 remains the Bunkering Berth, Berths 10 & 22 Maintenance or Filling out Berths, etc. Berths Lengths are Twice the Length of the Nominal Vessel Size for the Berth.
 Assumed possible Bed Contours to Chart Datum. (Negative values are above chart datum).

Source: Commercial Operations Requirement Study (Report Ip1509/YF2), Wheeler Trevitt Consultants Ltd, February 2011

Appendix E

Approximate Current Annual Harbour Income & Expenditure (2011)

	Income	Expenditure	Balance
HARBOUR			
Landside			
Property			
Lawrence Complex	55,000		
Existing Warehouses	20,000		
Other Property	125,000		
Property Maintenance			
Car Parking			
West End	40,000		
Clough Hole	110,000		
Access charges etc		35,000	
Other	15,000	10,000	
Harbour Operation & Maintenance			
Landing Duties	210,000		
Harbour Dues - Private Craft	45,000		
Harbour Dues - Other	45,000		
Hoist/VMF/Ice Plant	33,000		
Harbour Maintenance		100,000	
Dredging		48,000	
Lock Maintenance etc			
Staff Costs		240,000	
Utilities		60,000	
Other Costs		100,000	
Harbour Total	698,000	593,000	105,000

Excludes Major Lifecycle Renewals

Appendix F

Impact of BHCP Scheme without Harbour Top Development Approximate Changes to Annual Income & Expenditure (2011 Prices)

	Change of Income	Change of Expenditure	Balance
Harbour Landside			
Property			
Lawrence Complex			no change
Existing Warehouses			no change
Property Maintenance			no change
Car Parking			
West End			no change
Clough Hole			
Harbour Landside	0	0	0
Harbour Operation & Maintenance			
Landing Duties	0		no change
Harbour Dues - Private Craft	-45,000		loss of all small berths
Harbour Dues - Other	0		no change
Increased Hoist & VMF usage	0		no change
Harbour Maintenance		0	no change
Dredging		0	no change
Lock Maintenance etc		50,000	more complex requirements
Staff Costs		0	no change
Utilities		0	no change
Other Costs		0	no change
Harbour Operation	-45,000	50,000	-95,000
Harbour Lifecycle Allowance		36,750	-36,750 75% of AAP
Marina			
Marina Berthing Charges	274,098		200 berths, same rate as AAP
Marina & Other Sales Revenues	41,190		200 berths, pro-rata AAP
Sales Costs		30,106	200 berths, pro-rata AAP
Marina Staff Costs		64,063	say 2 additional staff
Marina Maintenance Costs		33,285	200 berths, pro-rata AAP
Dredging		10,000	50% of AAP
Utilities		11,429	200 berths, pro-rata AAP
Other Costs		81,000	no change
Marina	315,288	229,882	85,407
Marina Lifecycle Allowance		19,265	-19,265 200 berths, pro-rata AAP
Total Change	270,288	335,897	-65,609
Total Change Excl. Lifecycle	270,288	279,882	-9,593
<i>Existing Income & Expenditure</i>	<i>698,000</i>	<i>593,000</i>	<i>105,000</i>
<i>Total Including Lifecycle</i>	<i>968,288</i>	<i>928,897</i>	<i>39,391</i>
<i>Total Excluding Lifecycle</i>	<i>968,288</i>	<i>872,882</i>	<i>95,407</i>

Appendix G

Impact of BHP Scheme with Harbour Top Development Approximate Changes to Annual Income & Expenditure (2011 Prices)

	Change of Income	Change of Expenditure	Balance
Harbour Landside			
Property			
Lawrence Complex	-55,000		demolished
Existing Warehouses	-20,000		demolished
New Warehouses	20,000		rental from new warehouses
New Property	25,000		rental from new facilities
Property Maintenance		0	
Car Parking			
West End	-40,000		loss of existing car park
Clough Hole	10,000		expand into council car park
New Multi-Storey	135,000		new parking capacity
Cancel access charges etc		-35,000	Council charge to Harbour
Allowance for other costs		10,000	
Harbour Landside	75,000	-25,000	100,000
Harbour Operation & Maintenance			
Landing Duties	0		no change
Harbour Dues - Private Craft	-45,000		Loss of all small berths
Harbour Dues - Other	0		no change
Increased Hoist & VMF usage	0		no change
Harbour Maintenance		0	no change
Dredging		0	no change
Lock Maintenance etc		50,000	more complex requirements
Staff Costs		0	no change
Utilities		0	no change
Other Costs		0	no change
Harbour Operation	-45,000	50,000	-95,000
Harbour Lifecycle Allowance		36,750	-36,750 75% of AAP
Marina			
Marina Berthing Charges	274,098		200 berths, same rate as AAP
Marina & Other Sales Revenues	41,190		200 berths, pro-rata AAP
Sales Costs		30,106	
Marina Staff Costs		64,063	only 2 additional staff
Marina Maintenance Costs		33,285	200 berths, pro-rata AAP
Dredging		10,000	50% of AAP
Utilities		11,429	200 berths, pro-rata AAP
Other Costs		81,000	No change
Marina	315,288	229,882	85,407
Marina Lifecycle Allowance		19,265	-19,265 200 berths, pro-rata AAP
Total Change	345,288	310,897	34,391
Total Change Excl. Lifecycle	345,288	254,882	90,407
<i>Existing Income & Expenditure</i>	<i>698,000</i>	<i>593,000</i>	<i>105,000</i>
<i>Total Including Lifecycle</i>	<i>1,043,288</i>	<i>903,897</i>	<i>139,391</i>
<i>Total Excluding Lifecycle</i>	<i>1,043,288</i>	<i>847,882</i>	<i>195,407</i>

Appendix H

Impact of AAP Scheme Approximate Changes to Annual Income & Expenditure(2011 Prices)

	Change of Income	Change of Expenditure	Balance
Harbour Landside			
Property			
Lawrence Complex	-55,000		demolished
Existing Warehouses	-20,000		demolished
New Warehouses	20,000		rental from new warehouses
New Property	25,000		rental from new facilities
Property Maintenance			
Car Parking			
West End	-40,000		loss of existing car park
Clough Hole	10,000		expand into council car park
New Multi-Storey	135,000		new parking capacity
Cancel access charges etc		-35,000	Council charge to Harbour
Allowance for other costs		10,000	
Landside	75,000	-25,000	100,000
Harbour Operation & Maintenance			
Landing Duties	20,000		due to improved facilities
Harbour Dues - Private Craft	-35,000		loss of small berths
Harbour Dues - Other	5,000		due to improved facilities
Increased Hoist & VMF usage	14,000		
Harbour Maintenance		-20,000	maintenance addressed
Dredging		0	
Lock Maintenance etc		50,000	more complex requirements
Staff Costs		0	
Utilities		10,000	
Other Costs		0	
Harbour	4,000	40,000	-36,000
Harbour Lifecycle Allowance		49,000	-49,000 Ave / annum over 35 years
Marina			
Marina Berthing Charges	479,672		
Marina & Other Sales Revenues	72,082		
Cost of Sales		52,685	
Marina Staff Costs		128,125	
Marina Maintenance Costs		58,248	
Additional Dredging		20,000	
Utilities		20,000	
Other Costs		81,000	
Marina	551,754	360,058	191,696
Marina Lifecycle Allowance		33,714	-33,714 ave. / annum over 35 years
Total Change	630,754	457,773	172,982
Total Change Excl. Lifecycle	630,754	375,058	255,696
<i>Existing Income & Expenditure</i>	<i>698,000</i>	<i>593,000</i>	<i>105,000</i>
<i>Total Including Lifecycle</i>	<i>1,328,754</i>	<i>1,050,773</i>	<i>277,982</i>
<i>Total Excluding Lifecycle</i>	<i>1,328,754</i>	<i>968,058</i>	<i>360,696</i>

Appendix I

Yacht Harbour Association (YHA) Gold Anchor Award Scheme: Basic criteria to qualify

To qualify for each Gold Anchor rating, marinas must satisfy each of the points in the corresponding columns to achieve the rating.

Attribute	One Gold Anchor	Two Gold Anchors	Three Gold Anchors	Four Gold Anchors	Five Gold Anchors
Ambience and Administration	<ul style="list-style-type: none"> Walk ashore access to berths Waste properly managed Clearly identifiable marina office Clean and adequate toilets and showers Maintenance policy 	<ul style="list-style-type: none"> Waste disposal facilities well signed Clear and good signage for the marina Customer feedback procedure Policy for enforcing local rules Access to car parking New berth holder induction event 	<ul style="list-style-type: none"> Access to clean and suitable laundry facilities* Up to date website Access to fuel service Management of flotsam and jetsam Information regarding access to river or canal (inland) Help and Information exchange for berth holders Daily weather forecasts and tidal information (coastal) 	<ul style="list-style-type: none"> Facilitate regular berth holder events Wireless Internet available at Berths Internal auditing procedure Welcome service 	<ul style="list-style-type: none"> Internet and photocopier available for berth holders Tourist information available Access to boat repair and services 24/7 office or alternative solution Staff uniform
Regulations and Directives	<ul style="list-style-type: none"> Compliance with statutory regulations Fire equipment & servicing record Adequate insurance (at least £2million Public 			<ul style="list-style-type: none"> Compliance with statutory regulations * Fire equipment & servicing record * £5 million Public Liability insurance 	

Attribute	One Gold Anchor	Two Gold Anchors	Three Gold Anchors	Four Gold Anchors	Five Gold Anchors
	Liability) Suitable illumination to cover the site Safety ladders First aid policy and an accident book Records of COSHH compliance Plant lifting equipment inspection (if applicable) Up to date electrical certificates Suitable berthing contracts (see TYHA template)			Suitable illumination to cover the site * Safety ladders *	
Environmental Compliance	Fuels and oils properly stored Prohibition of sewage discharge Oil spill kit available	Waste recycling program	Documented emergency (pollution and fire) plans Environmental policy Customers advised on environmental best practices	3 year compulsory environmental audits Staff trained in environmental best practice	
Berth Construction and Services	Drinking water available to berth holders Fairways have sufficient width for safe navigation Piers and walkways are	Fingers have adequate length and width	Trolleys for berth holders Berths accessible at normal maximum water levels Proactive support to RYA	Suitably trained staff Reception / visitors berth available	Trolleys for berth holders * Fairways have sufficient width for safe navigation * Piers and Walkways are

Attribute	One Gold Anchor	Two Gold Anchors	Three Gold Anchors	Four Gold Anchors	Five Gold Anchors
	robust and maintained Floating structures are well secured Safe berthing protected from waves and swell (coastal) Life buoys with heaving lines Adequate mooring cleats or eyes Clear navigation aides (coastal) Inclusion to local Port Waste Management Plan (coastal) Waste Management Plan (inland) Electricity available to berth holders where required		training		robust and maintained * Continuous Professional Development for staff Suitable layout and design of floating docks (coastal) * Life buoys with heaving lines * Gated access to marina or a suitable alternative Clear navigation aids (coastal) *

* Items marked with a star refer to the YHA code of practice which stipulates the minimum standard required