
Shoreham Slipway Feasibility Study

Prepared for
West Sussex County Council

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CH2MHILL®

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Executive Summary

This feasibility study considers the locating of a new public slipway within Shoreham. Access to the river for leisure users has declined due to a variety of factors, principally from pressure of development and loss of associated parking. There is demand for a new slipway and support from many organisations. Three sites on the west bank of the River Adur were proposed by West Sussex County Council for detailed consideration; 1) Location A – Adur Recreation Ground, which is located between the A259 and railway bridges; 2) Location B – Ferry Road, which is located immediately downstream of the new footbridge; and 3) Location C – Soldier’s Point, which is just upstream from the harbour mouth around the first main bend in the river.

This study appraised each of the sites against a number of criteria, the summary of these findings are presented below using a star based system with 1 star being the lowest to 5 star being the highest (most favourable). This assessment was presented to stakeholders and landowners as part of a consultation process and their comments were factored into the report and the scoring system.

Criteria	Location A – Adur Recreation Ground	Location B – Ferry Road	Location C – Soldiers’ Point
Environmental Impact	★★★	★★★	★★★★
Vehicular Access & Parking	★★★	★	★★
Tidal and Flow Considerations	★★★	★★★	★★★
Health and Safety	★★★	★	★★
Design Considerations	★★★★★	★★	★★★
Operation and Management	★★★★★	★★★	★★
Cost and Risk	★★★★★	★★	★★★★
Landownership, Planning & Consents	★★★★	★★	★★★
Consultation and Public/Political Support	★★★★	★★	★★★
Overall Average	★★★★	★★	★★★

All locations are considered viable but **Location A – Adur Recreation Ground has emerged as the preferred option and this report recommends this site to be taken forward to design stage.**

The cost for constructing a slipway at each site is summarised below. These costs are based on concept designs. Potential savings have been identified for each site. For the preferred option of Location A, the savings identified included the following: combining the scheme with the Adur Tidal Walls scheme, removing the tarmac surface from the slipway car park and replacing the stainless steel articulated slipway cables with polyester cables. **Should all these savings be realised, the estimated cost for constructing a slipway at Location A is £118k (if delivered as part of the Adur Tidal Walls scheme).** This report concludes with a series of recommendations for delivering this project.

Option	Total Estimated Cost £	Potential Saving (Upper end estimate if all savings are realised)		
		Saving, £	Saving, %	Revised Cost
Location A – Adur Recreation Site	206,000	88,000	43	118,000
Location B – Ferry Road	357,000	95,000	27	262,000
Location C – Soldiers’ Point	233,000	68,000	29	165,000

1 Introduction

1.1 Study Objective and Scope

CH2M Hill (formerly Halcrow) was commissioned by West Sussex County Council (WSCC), acting on behalf of Shoreham Slipways Group (SSG), to investigate the options for the provision of a new public slipway at Shoreham-by-Sea (Shoreham) in West Sussex. The new slipway must have adequate parking and will provide good access for a range of users to both the River Adur upstream and the open coast.

The scope of this feasibility study is to assess the viability of providing a new public slipway in Shoreham with a view to recommending one potential site to be taken forward to design stage. The study also provides recommendations for future work and for gaining approval from the key stakeholders and statutory authorities.

1.2 Background and Scheme Rationale

As a coastal town and port, Shoreham has had a long relationship with the sea. However, many of the historic public slipways and hards¹ in Shoreham are no longer of practical use. This reduction in public amenity is principally due to the development of the river frontage and loss of parking. This has been noted in the draft Joint-Area Action Plan (ADC, 2014): “all of the slipways are now unusable for modern craft and lack sufficient parking and turning space.”

In response to the loss of an important local amenity, SSG was created in 2002 to raise awareness of the lack of usable river access at Shoreham and to campaign for greater provision of public access points to the River Adur and the surrounding coastline. Given the lack of a dedicated public slipway with good access/parking facilities, it has been identified that a new slipway is required to serve the growing marine leisure sector. The commitment to finding a suitable solution has been highlighted in the Joint-Area Action Plan (ADC, 2014): “The Partnership is currently working with the Shoreham Slipways Group to identify a suitable location in the harbour for a new public slipway with sufficient space for appropriately laid out parking.”

1.3 Existing Information

In order to determine the interface between each proposed slipway and the existing/proposed tidal defences, the outline design drawings from the Adur Tidal Walls project appraisal report (Halcrow, 2010) have been used (Refer to Appendix A for selected drawings). It must be stressed that these drawings are outline only and the designs may be subject to revision during the detailed design phase.

No bathymetry data was obtained for the project area, but data may be available through Shoreham Port Authority for the lower reaches of the Adur if needed at detailed design. Topography data along the flood defence alignment and in a few other locations, such as around the old footbridges and the Adur Ferry Bridge were available. Data from around the two footbridges was provided by West Sussex County Council. Shoreham Slipways Group supplied the data they have collated for previous attempts at planning and finding funding for a slipway at Shoreham.

Additional background information for the Ferry Road site was available due to a previous feasibility study (Hemsley Orrell Partnership, 2011) for a slipway at this location; ground investigation reports (Cass Hayward LLP, 2011) and a munitions survey report (Geoffrey Osborne Ltd, 2011) generated for the Adur Ferry Bridge. Access to these documents was provided by West Sussex County Council.

All reports, drawings and other documents used in this study are listed in the references section.

¹ A hard allows users to embark/disembark only, whereas a slipway permits launching and retrieval of boats.

1.4 Expected Outcome and Output

The expected outcome of this study is to agree on a preferred option(s) and provide a sound baseline for the design of the slipway. The following key deliverables have been identified and are fulfilled in this report and its associated appendices:

- i. A report establishing the need for a new slipway at Shoreham and the recommendation for a location for the new slipway after considering the three locations identified by the Shoreham Slipways Group;
- ii. A concept drawing of each slipway location;
- iii. A high level cost estimate (this is included in the body of the main report);
- iv. A draft designer's risk assessment for the preferred location.

1.5 Design Standards

This report has been prepared to take into account the latest relevant legislation and with consideration of current best practice. The following specific standards and guidance documents have been used to aid the concept design process:

- British Standards Institute (2013) *Maritime Works BS6349 Part 3:2013*.
- New South Wales Maritime (2005) *Engineering Standards and Guidelines for Maritime Structures*.
- US Army Corp (2004) *Recreational Facility and Customer Services Standard, EM-1110-1-400*.
- California Department for Boating and Waterways (1991) *Small Craft Boat launching Facilities*;
- British Waterways (2006) *A Users Guide*.
- Inland Waterways Association (2012) *Standard Slipway drawing, based on Standard Slipway Specification, June 1990*.
- Department for Transport (2007) *Manual for Streets*.

1.6 Consultation / Community Engagement

Given the wide range of potential users and the location on a busy section of waterway, there are a large number of parties which will be interested in the development of a new slipway at Shoreham. Aside from the user groups presented in Section **Error! Reference source not found.**, other consultees include the Environment Agency and Natural England, Shoreham Port Authority, the local councils, landowners and businesses which are located adjacent to each site. The stakeholder engagement and consultation processes are discussed in Section 12.

The attitudes of the stakeholders will also affect the usage of the scheme and therefore have an impact on the economics of the scheme. The economic business case for each slipway is discussed further in Section 0. Additionally, the project will require formal consent from the Environment Agency, Marine Management Organisation, Natural England, Shoreham Ports Authority and the local planning authorities. The consents required are discussed in Section 11.

2 Slipway Justification and Choice of Site

2.1 History of Access to River

Shoreham has had a long relationship with the sea and historically public access to the river and the open coast has been possible through a network of public slipways and hards. Development of the river frontage in recent decades has led to a reduction in access to a number of the historic slipways and hards in Shoreham, which are now no longer of practical use to leisure craft. This reduction in public amenity is compounded by poor access to associated parking for cars and trailers for those slipways which remain.

The slipway at Ropetackle was historically a well-used public amenity but development of the adjacent land has increasingly restricted its use due to the loss of turning and parking areas. Shoreham Slipways Group has been campaigning for a number of years to raise awareness of the lack of usable river access at Shoreham.

2.2 Current Access Options to River

There are currently 12 public slipways/hards which can in theory provide general public access to the river. However, these are all subject to serious practical constraints which render many of them unusable; the sites and their access constraints are listed in Table 2.1 below. From this list, only two of these are currently usable and both of these suffer from a chronic lack of parking.

Additionally, there are a number of private slipways on the River Adur that are suitable for use by car and trailer. Use of these is restricted to their respective private members. These are at Sussex Yacht Club (opposite Location B; refer to Figure 2.1), Shoreham Sailing Club and Shoreham Harbour Club (both adjacent to Location C; refer to Figure 2.1).

TABLE 2.1

List of Slipways/Hards at Shoreham

Public Hard / Slipway Name	Location	Access/Condition Notes
Ropetackle	Off High Street, upstream of Norfolk Bridge	Usable; Very restricted parking; Soft ground beyond concrete apron
Ship Street Hard	End of Ship Street	Extremely narrow (< 4 m); No public parking
Town Hall Hard	End of Town Quay (opposite John Street)	No access to water (vertical quay wall)
Star Gap Hard	Off High Street (opposite Church Street)	Extremely narrow (< 3 m) and steep; No public parking
Dolphin Hard	Adjacent to footbridge	No public parking or vehicle access; Very short tidal window; Limited access to river
Stow's Gap Hard	Within Sussex Yacht Club	No public parking; Limited access to river; Often blocked by moored boats and parked cars
Tarmount Hard	Immediately east of Sussex Yacht Club	Approx. 9 m wide; Very silted up and strewn with debris, approx. 75 m over mud to reach channel; There are plans to in-fill this hard
Surry Hard	Off Brighton Road, adjacent to Riverside Business Centre	Approx. 9 m wide; This has been cleared for development and has been in-filled; Access blocked by parked cars; No public parking
Humphrey's Gap Hard	Off Brighton Road (opposite Eastern Avenue)	No access to river (vertical quay wall)
Stoughton's Hard	Just to the East of Humphry's Gap	Filled in some years ago but SSG has members who have knowledge of its former use.
Emerald Quay Public Slipway	Riverside Road, adj. to Emerald Quay development/marina	Parking very restricted. No parking on nearby streets
Kingston Beach	Adjacent to Shoreham Harbour Lifeboat Station	Dangerous for trailers (long and narrow wooden ramp); Use prevented due to H&S concerns; Limited parking (designated as a village green)

Outside the River Adur, the nearest coastal public slipway to the west is at Littlehampton, then Chichester. To the east the nearest slipway is Newhaven, but this is not fully public access as it is owned and operated by a boatyard. The public slipway at Brighton Marina has gone.

2.3 Potential Users

The River Adur and Shoreham Port host a wide range of visiting leisure users, stretching from paddle-boarders and canoeists to powerboats and sailing craft of 25ft and longer. An indication of the usage of this busy stretch of river and coast can be gleaned from Shoreham Port's Annual Report 2013 (Shoreham Port Authority, 2014) which recorded that almost 11,000 leisure vessels set to sea from Shoreham Port in 2013. This number does not include small craft users which launch along the western arm of the Port and head upriver (such as canoeists). Potential user groups are presented in Table 2.2. Powerboat users are anticipated to be best served by this new facility and the slipway design specifically caters for car and trailer access. Depending on usage/management issues certain types of craft may be deterred or barred from using this facility.

TABLE 2.2

Potential User Groups

User Type	Powered	Priorities	Constraints
Canoeist/Paddle-boarder/Rowing Boat	Man-power	Quieter parts of the river More likely to explore/go upstream as well as downstream towards sea	Small, so unlikely to go seaward. (for sea use would typically launch directly from the beach)
Sailing Dinghy	Wind	Access to open coast Calm/quiet area for novices	Mast restricts access under bridges. Winds & tides dictate areas which are accessible.
Small Yacht (trailer sailors)	Wind/engine	Access to open coast	Mast restricts access under bridges.
Powerboat (RIB, speed, fishing)	Engine	Access to open coast, or possibly upstream	
Jetski	Engine	Access to open coast	Restrictions on use in harbour.

The anticipated key user types are all leisure but mostly power boats. Shoreham Slipways Group has identified potential main users as sea anglers, scuba divers, waterskiers and family leisure users. In addition, small craft users such as canoes and paddle boards would benefit from increased access to the river, although they are less dependent on a formal slipway. The majority of these users will likely be local (i.e. West/East Sussex), but the right facility could draw some visitors from much further afield. Jetskis are generally already well catered for within the harbour (with two dedicated locations on the east bank).

Sailing boats would probably typically not use any slipway located upstream of the footbridge due to the height restrictions of the bridges. However, it is not considered that many sailors would use a new slipway located further downstream due to the existing good sailing facilities within the harbour. The launching of dinghies from Shoreham Sailing Club (day visitors are welcome) is preferable due to changing/support facilities and its proximity to the wider waters of the harbour mouth/open sea (upstream locations would require increased tacking in a narrow channel, and these waters will likely experience gusty winds, particularly at low tide). Yachts may be more inclined to use Sussex Yacht Club and Lady Bee Marina (in the Eastern Harbour Arm) due to their pontoons and other facilities. Perhaps the main type of sailor who may be inclined to use a new slipway would be trailer sailors (day boats with engine). However, this is a relatively small group and the Sussex Yacht Club would cater for these users if the new slipway is not suitable for them.

2.4 Demand for a New Slipway and Potential Revenue

The access options to the River Adur have been decreasing over time and this is a significant restriction to public leisure boating at Shoreham-by-Sea. A new slipway will directly address the problems of river access and the resulting increase in visitor numbers is expected to create a beneficial knock-on effect on local businesses.

Slipway users are likely to typically spend five to six hours in Shoreham, or possibly longer where the tidal window allows. The method of charging for use of the slipway, either by parking charges or slippage fees, will have an impact on what the likely income from each user will be. As an initial estimate, the parking fee for a combined car/trailer is suggested to be set at £12, with perhaps an additional average spend of £10 per car mainly covering the purchase of lunch/refreshments at local shops and pubs. Estimated visitor numbers range from 20 users per day during fine summer days (typical usage of Ropetackle/Emerald Quay prior to the loss of parking at Ropetackle) to two users per week during the winter. Users from further afield are more likely to make the journey during summer months when the day is longer and weather generally finer. These estimations have been provided by Shoreham Slipways Group based on their knowledge of the historic and existing use of Ropetackle and other slipways in Shoreham.

TABLE 2.3

Projected annual use and resulting direct income for the new slipway at Shoreham-by-Sea

Time period	Number of Users	Slipway Income
<i>May to September; mainly weekends</i>		
20 fine weather days with 20 cars/trailers	400	£4,800
50 medium weather days with 5 cars/trailers	250	£3,000
40 poor weather days with 1 car/trailer	40	£480
40 days with no users	0	£0
<i>April and October; mainly weekends</i>		
8 weeks with 14 cars/trailers	112	£1,344
<i>November to March</i>		
22 weeks with 2 cars/trailers	44	£528
TOTAL	846	£10,152

The potential income of £10k per annum would likely have to feed back into maintenance and management costs for the slipway and car park and may be broadly similar for each location.

It is considered unlikely that the location of the slipway on the river will have a significant bearing on overall visitor numbers. A location closer to the sea has advantages, but other factors such as parking and slipway access are likely to be more significant factors. If the site is located further up river, more slipway users may be more inclined to go upriver. Upper Beeding is approximately 7km upstream of the Recreation Ground and would be a potential destination for those leisure users heading upriver. This has been a leisure destination for boaters from Shoreham since Edwardian times.

The additional income generation potential to the town is more difficult to assess and quantify, but additional visitors to the town will bring additional indirect spend into the local area and this is considered an important benefit. The overall positive economic benefit may vary according to slipway location (locations close to town may tempt users to spend more during a visit), but the overall benefit may be more related to the overall number of people using the slipway i.e. how popular it is, which is related to how good the facility proves to be and how wide a catchment it commands. In addition, bringing an increased number of boat users to Shoreham will provide opportunities for local marine leisure businesses to benefit (equipment and services). There are also intangible benefits to the town,

for example a potential increase in visitors generally to the town due to the waterway being more active, and hence more interesting. Overall a popular new slipway has the potential for improving amenity in West Sussex, and beyond, and will likely deliver a positive economic benefit to the town, which enjoys a rich maritime history.

2.5 Options for Improved Slipway Access to River

Three potentially viable slipway sites on the west bank of the River Adur were identified by Shoreham Slipways Group and West Sussex County Council for examination under this feasibility study. These are: Location A, at Adur Recreation Ground ('Adur Rec'); Location B, at Ferry Road/Lower Beach Road; and Location C, at Soldiers' Point. The character of each location is very different and each site produces a set of challenges. The three locations are shown in Figure 2.1 below.



FIGURE 2.1

Location plan showing the three potential slipway sites at Shoreham

Location A (Adur Rec) is situated to the west of Shoreham town centre, upstream of Norfolk Bridge and close to the railway viaduct. This is generally a quiet location on the river with a mud/shingle foreshore and the distance to the main channel is approximately 25m. There are no public slipways along this stretch of bank of the River Adur; however, the proposed site is diagonally opposite the Ropetackle slipway (see Figure 2.2). There are three small private slipways adjacent to this location; these belong to the 3rd Shoreham Sea Scouts, Adur Outdoor Activities Centre and Adur Cruising Association. This location was first identified as a potential site for a new slipway by SEEDA in 2001 and then by Adur District Council in 2003 and 2010.



FIGURE 2.2

View looking northwest at Location A, towards railway viaduct

Location B (Ferry Road) is sited at the western extent of Shoreham Harbour, adjacent to the new river footbridge. The river has a wide mud bank (approximately 94m from the river wall) with a shallow central channel at low tide. On the west bank of the Adur the nearest publicly accessible slipway is at Emerald Quay (less than 500m away) although parking is very restricted and the slipway has silted up through lack of maintenance. Historically, public river access to this section of the River Adur has been very good; there are several hards on the east bank and the remains of the old ford and causeway can still be seen at low tide (see Figure 2.3). This location was identified as a possible location for a new slipway in a 2001 SEEDA study (Shoreham Slipways Group, 2013a) and this site has planning permission for a new slipway, subject to meeting specific conditions.



FIGURE 2.3

View looking northeast at Location B showing shallow, old causeway in mid-ground

Location C (Soldiers' Point) is located close to the mouth of the River Adur. The river bank is mostly shingle sloping down to the river channel which is maintained by Shoreham Port Authority. In this area there are two private slipways, one belonging to Shoreham Harbour Club and one belonging to Shoreham Sailing Club. Public access is currently limited to those able to manhandle craft onto the beach. There is a gap between the Shoreham Sailing Club's boundary fence and the railing along the top of the revetment and wall which is wide enough for a trailer to access the beach, but this is currently blocked by two concrete blocks (see Figure 2.4).

There are two slipway options at Location C. Location C1 is at Soldiers' Point (as in Figure 2.4) and Location C2 is mid-way along the revetment between Soldiers' Point and Silver Sands. The former was identified by the 2001 SEEDA study and the latter was identified as an alternative location during a site walkover following the current study's inception meeting (July 2014).



FIGURE 2.4

View looking northeast at Location C showing current access to Soldiers' Point

3 Interfacing with Local Planned Schemes

3.1 Introduction

Shoreham and the Western Harbour Arm are entering a transitional phase, with traditional commercial port activities slowly being relocated to the Eastern Harbour Arm to make way for new residential and mixed-use employment opportunities. This vision is outlined in the Draft Joint Area Action Plan (ADC, 2014). The recent redevelopment of the footbridge linking the east and west banks of the Adur, co-funded by the sustainable transport charity Sustrans and West Sussex County Council, has boosted provision for cyclists in Shoreham. Additional public realm regeneration works are proposed for the Shoreham Beach approach to this new bridge. A major flood defence project to improve protection for Shoreham from tidal and fluvial flooding is currently being promoted by the Environment Agency and is at the detailed design stage.

These redevelopment and infrastructure plans all offer opportunities to reduce and/or share costs and potentially present alternative funding streams for the provision of a new slipway at Shoreham. However, these projects also present a series of time constraints on the efficient promotion and construction of the new slipway as an integrated part of these works. Once these projects have been delivered, these slipway sites will be further constrained, resulting in increased costs and any opportunities for cost sharing will have been missed.

3.2 Adur Tidal Walls

The Adur Tidal Walls project will improve the flood defence infrastructure along the banks of the Adur through a series of new and raised walls and embankments. The project appraisal was carried out by CH2M Hill (then Halcrow Group Ltd) and set out the works required to raise the defences to provide a 1 in 300 year return period standard of protection up to 2064 (flood defence height provides for 50-years' worth of predicted sea level rise). The detailed design phase of this project is currently underway by design consultants Mott MacDonald. It should be noted that the outline design of these infrastructure works may change during the detailed design process, which could have some effect on the findings of this report.

There is the potential to offset construction costs between the slipway and Adur Tidal Walls project. For example, temporary contractor areas and ramps onto the foreshore will be required for the flood defence construction, which could potentially form the basis for the slipway and its parking areas (particularly Locations A and C). There is also the opportunity for the slipway to provide the permanent foreshore access which was proposed as mitigation for the raised walls at Locations B & C. Although the flood defences will be upgraded at all locations (improved and raised), the Environment Agency is unable to fund amenity improvements (enhancements) through Flood Defence Grant in Aid (FDGiA). However, at Location B pedestrian foreshore access will be required as mitigation from the impact of the defences on foreshore access. This is one example where the integration of the slipway scheme and the flood defence scheme may result in an efficient way of improving public amenity from limited public funds.

The integration of these schemes also brings opportunities to share design inputs and contractors, bringing increased shared efficiencies. Subject to the agreement with the Environment Agency, the slipway works could be undertaken entirely by the Adur Tidal Walls team, with a one-off contribution to the Environment Agency from the slipway funders. The Environment Agency have an established mechanism for receiving contributions for additional enhancement works around their flood defence works and this is widely encouraged within the industry. The Environment Agency could effectively promote the slipway as an enhancement funded by third party contributions. This has the opportunity to improve the image of these infrastructure works, which are often disruptive to the local community. In addition, there is the opportunity to incorporate the planning and consenting requirements for the slipway under those required for the flood protection improvement scheme; refer to Section 11.

The improved flood defence option proposed at each slipway location is detailed below with constraints on the slipway highlighted (it is assumed that the Environment Agency would object to the use of a floodgate at the slipway):

- **Location A (Adur Rec):** The new flood defence will be provided by a new earth embankment with a crest height at +4.99mOD set back from the existing defence line by a couple of metres (refer to Section 6 for further explanation of Ordnance and Chart Datum). Therefore, it will be necessary for a slipway at this location to run up to and over this embankment. The ground levels both riverward and landward of the new bund are currently at approximately +3.90mOD. A gabion wall is proposed as part of the flood defence scheme to protect the existing riverbank from further scour.
- **Location B (Ferry Road):** A new sheet piled vertical wall with concrete pile cap is proposed at this location. The slipway ramp levels will have to integrate directly with the new flood wall as flood gates are generally discouraged by the Environment Agency (they are typically only used where any other options are impracticable). As a result, the slipway will have to go up and over the defences (crest level at +4.84mOD). Given the constrained access area, this puts further pressures on space at this site. The ramp would need to be elevated above the foreshore to reach the required defence level.
- **Location C (Soldiers' Point):** A new sheet piled vertical wall with concrete pile cap is proposed at this location to a finished level of 4.84mOD. The finished flood defence level is similar to the existing level, so levels for the slipway are easily managed. However, a new rock revetment is proposed in combination with the withdrawal of Shoreham Port Authority's maintenance of the timber groynes and shingle movements around the point. This may result in the future potential encroachment of shingle onto the slipway, or undermining of the slipway, particularly in the medium to long term. This presents a key risk, which may result in additional, potentially significant, future slipway costs. Hence Option C2 has also been considered to reduce this risk.

3.3 Ferry Road Scheme

The new Adur Ferry Footbridge spanning the Adur from the High Street on the East Bank to Ferry Road on the West Bank was opened to the public in November 2013. This bridge provides a new crossing point for cyclists and an upgrade to the previous pedestrian footbridge nearby. The project was jointly funded by Sustrans (a charity promoting sustainable transport), Adur District Council, West Sussex County Council and The Big Lottery Fund.

The existing Ferry Road car park will be upgraded as part of a public realm regeneration scheme to improve the flow of pedestrians and cyclists from the new bridge. The Ferry Road Scheme plans are currently in development but will impose further restrictions on the provision of a slipway at this location. Should Location B (Ferry Road) be proposed for the slipway, it is important that slipway plans are integrated with these regeneration works, otherwise the opportunity will be missed to find a complimentary solution at this spatially constricted site. These plans are likely to progress quickly to site and the opportunity for co-ordinating these schemes is limited. Even if co-ordination could be achieved, the requirement to leave an area for turning vehicles for the slipway would constrain the community enhancements proposed for this location, such as public seating and public art. Overall, the slipway would present issues for the redevelopment plans. Any change in these plans at this stage would be scrutinised by the public and this may result in local resistance.

Whilst a slipway located at this site has increased potential for its users to spend money in the local shops, it is considered that overall the slipway may reduce non-slipway use of the area and its amenities. This may reduce the benefits that are sought as part of the public realm improvements. This would be as a direct result of competition for local parking and potential conflict of pedestrians and slipway users.

3.4 Shoreham Harbour Joint Area Action Plan

The Draft Shoreham Harbour Joint Area Action Plan, hereafter 'JAAP', (Shoreham Harbour Regeneration Partnership, 2014) presents a guide for regeneration within the Harbour over the next 15 to 20 years.

The JAAP aims to “set out realistic, deliverable, locally supported and sustainable proposals for Shoreham Harbour and to manage the impacts of development over time”. The JAAP will be jointly adopted by Adur District Council, Brighton and Hove City Council and West Sussex County Council.

The JAAP area has been divided into seven “character areas”, of which Area 7 is the Western Harbour Arm. The Draft JAAP supports the changing nature of the Western Harbour Arm from commercial port to residential and mixed-use employment/leisure uses. The proposals include (JAAP, Section 1.1.8):

- The construction of up to 1,050 new homes along the Western Harbour Arm.
- An upgraded flood defence network integrated with a riverside walking/cycling route.
- New and improved social and community facilities.
- New and improved marine leisure facilities (e.g. possible new slipway and leisure pontoons).
- Improvements to local transport network.
- Upgrades to public spaces and historic features and better connections with surrounding areas.

As previously mentioned in Section 1.2, the JAAP specifically comments on the lack of access to the historic public slipways (JAAP, Section 2.10.9) and makes a commitment to “improve connections to and use of the waterfront, coast and beaches as attractive destinations for both locals and visitors” through Strategic Objective 8 (JAAP, Section 3.9). A new slipway would also bring public wellbeing benefits.

3.5 Summary and Site Comparison for Interfaces with Planned Schemes

The works proposed throughout Shoreham provide a unique opportunity to progress the slipway cause. The emerging JAAP offers planning policy backing for the slipway and a potential alternative funding opportunity. The Ferry Road redevelopment may offer some opportunity, but will likely further constrain the placing of a slipway at this location. There is significant opportunity to integrate the slipway into the Adur Tidal Walls flood defence scheme as an enhancement funded by a third party. There are opportunities for cost savings, sharing of planning and consenting requirements and the integration of the design and construction process. However, these unique opportunities will only exist for a limited period.

4 Environmental Impact

4.1 Introduction

This section presents a summary of the key environmental features of the Shoreham estuary and identifies those that have potential to affect the selection of a preferred slipway option. In addition, it identifies a number of issues that, although not relevant to the option selection, may be relevant to all options or will need to be considered as the scheme moves forward.

Potential impacts will fall into two main groups; temporary impacts associated with construction and permanent impacts, including any long term effects of construction and those associated with operation of the slipway. It is assumed that any temporary impacts associated with construction can be mitigated by appropriate programming or by adoption of appropriate controls during construction. Examples include programming of the works to avoid impacts on birds, migratory fish and noise disturbance to residents, and the adoption of suitable working methods to avoid contamination of the River Adur, temporary adverse visual impacts from construction plant and impacts on cyclists or pedestrians. Whilst some of these issues (as discussed below) will need further consideration as the scheme develops, it is the potential for permanent impacts that is of greater concern and on which the comparative assessment of environmental impacts will focus.

The main environmental features of the estuary and the implications for option selection are discussed below. Option-specific considerations are discussed in the following sub-sections of this overview.

4.1.1 Ecology

Adur Estuary Site of Special Scientific Interest (SSSI), is located upstream of the alignment of the (recently removed) old footbridge across the River Adur, extending upstream for approximately 2km. The key features of the SSSI are its inter-tidal habitat, reptiles, and wading and over-wintering birds.

The **saltmarsh and mudflats of the inter-tidal habitat** are the most important features of the SSSI and constitute BAP Priority Habitats. Any loss of inter-tidal habitat, irrespective of whether it is located within the SSSI or not, will need to be compensated. At present, it is anticipated that the River Adur Tidal Walls scheme will create 1.4ha of inter-tidal habitat, plus 0.05ha that will be available for future colonisation as sea level rises; a total of 1.45ha. Allowing for losses due to immediate encroachment into the estuary resulting from the footprint of the new defences (0.15ha) and coastal squeeze² over the next 50 years (1.1ha), a total of 1.25ha, the scheme will result in a net gain of 0.2ha. This net gain may be available to compensate losses incurred by the slipway (or alternatively, additional compensatory habitat may have to be found). It should be noted that the area available through the tidal walls scheme may change as this scheme progresses through detailed design, thus presenting a risk to compensatory habitat for the slipway. The area of inter-tidal habitat loss **could affect the option selection**.

Reptiles are likely to be present in areas of grass alongside the river. Reptiles are a qualifying feature of the River Adur SSSI, and high populations have been recorded in grass banks adjacent to the houseboats within the SSSI and adjacent to Shoreham Airport. Medium or low populations are likely elsewhere (based on the reptile survey undertaken by Halcrow for the Environment Agency, which was conducted in 2005, although habitat does not appear to have changed significantly since that time). Mitigation will be required to ensure no adverse impact on reptiles. This could entail temporary exclusion followed by re-colonisation or, if sufficient suitable habitat is not available immediately adjacent to the site, translocation to an alternative site. Alternative sites in close vicinity are limited. Although alternative sites have been identified and are being maintained to receive reptiles from the Adur Tidal Walls project, these (notably, Mill Hill Site of Nature Conservation Interest (SNCI)) may be able to accommodate low numbers of reptiles from the slipway scheme, but are unlikely to be available if high numbers require

² Coastal squeeze occurs when intertidal habitats are squeezed against a hard defence due to sea level rise reducing the space available for the habitat. Where there is no hard defence habitats can migrate inland as water levels rise.

translocation. The population of reptiles likely to require mitigation (especially translocation) **could affect option selection**.

The mudflats of the estuary support a range of **wading birds** including redshank, dunlin and ringed plover, for which the estuary is nationally important. Winter is the most important time of year for birds using the mudflats. Birds are vulnerable to human disturbance, which could increase as a result of a new slipway, so this issue **could affect option selection**. However, most slipway activity would be during the summer months and this could mitigate the effects of the slipway when in use.

A **Royal Society for the Protection of Birds (RSPB) reserve** is located within the River Adur SSSI, between the A259 Norfolk Bridge and the alignment of the old (recently removed) footbridge across the river. None of the options lies within the reserve such that direct land-take is not an issue. Potential impacts on birds within the estuary **could affect option selection**, and this will be **addressed as part of consideration of SSSI issues**.

The River Adur is of importance for **fish**, with the river supporting a wide range of fish including sea trout, roach, flounder, sand goby, mullet, bass, plaice, and solenett. The European eel and sea lamprey have been recorded in the catchment. These are protected under Annex II of the Habitats Directive and the latter is also on the critically endangered list of the IUCN red list. Migratory sea trout use the River Adur, whilst the saltmarsh provides a nursery and refuge for estuarine fish. Overall, the river supports fish considered to be of **up to national value**. The presence of human activity associated with use of the slipway and additional boats in the river is unlikely to affect fish behaviour, but construction activity can be more problematic. However, although this issue will need further consideration as the scheme develops (particularly in terms of programming if particularly noisy construction techniques such as percussion piling are required), given the relatively short construction period, it applies equally to all options and therefore will **not affect option selection**.

A small reserve has been designated in the west bank, towards the mouth of the River Adur to protect an area of **Childing pink**, a nationally rare plant species. This is dependent on the habitat on which it grows, but as none of the proposed options are likely to affect the reserve, this **will not affect option selection**, although further survey may be required.

There are also areas of **vegetated shingle habitat** located on the west bank, towards the mouth of the River Adur. This is a BAP Priority Habitat. As none of the proposed options are likely to affect vegetated shingle significantly, this habitat **will not affect option selection**, although further survey may be required.

There are no records or habitat suitable for **other protected species** such as amphibians, water voles, otters or badgers except a number of breeding birds, associated with trees and scrub, and a low potential for breeding and roosting bats associated with mature trees and the WWII pill boxes. As suitable mitigation can be proposed to address any impacts on breeding birds and bats by means of programming and prior survey, it is envisaged that these **will not affect option selection**.

4.1.2 Landscape and Visual Amenity

South Downs National Park is located to the north of A27 and is visually well separated from the proposed slipways. This factor is therefore **not considered relevant to options selection**.

Views of the river play an important part of the part of local community life and socio-economy (see Land Use and Amenity below). Views from local residential properties, footpaths and the new footbridge across the river are especially important. The **visual impact** on local residents and users resulting from the slipway and its use will need further consideration as the scheme develops and **could affect options selection**.

4.1.3 Cultural Heritage

Old Shoreham and Shoreham Conservation Areas, with a number of associated **listed buildings**, including some of Grades I, II* and II, are located on the east bank of the River Adur. These will not be directly affected and, although the visual impact of the options will need to be considered, these are **not likely to affect options selection**.

Marlipins and Shoreham Old Fort Scheduled Monuments are located on the east bank within Shoreham Conservation Area and on the west bank, facing out east to sea at the end of the beach spit respectively. Neither will be directly affected and both are sufficiently visually separated from the options such that they are **not considered relevant to option selection**.

A number of **unlisted archaeological features** (including World War II pill boxes) are located along the river banks and there is a high risk of **unrecorded buried archaeology**, particularly in the inter-tidal area in central Shoreham, downstream of the A259 Norfolk Bridge. There is a risk of affecting unrecorded buried archaeology remains in the inter-tidal area. This **could affect option selection**, although further archaeological assessment (which is likely to be undertaken as part of the River Adur Tidal Walls scheme) could provide further information on this issue.

4.1.4 Ground Conditions and Contamination

Historic landfill sites are known to exist at Adur recreation ground. Whilst there are no comprehensive records relating to landfilling at Adur recreation ground, it is understood that filling occurred between approximately 1960 and 1970 and it is believed to have accepted industrial, commercial and household wastes. Pulverised fuel ash (PFA) has been identified on Shoreham Beach. It is likely that any impacts can be mitigated by design and adoption of appropriate construction practices. However, **costs** associated with this issue **could affect option selection**.

4.1.5 Water Quality

Any works will need to comply with the **Water Framework Directive (WFD)**, which **could affect option selection**.

In terms of the WFD, the key question likely to be of concern to the Environment Agency and Natural England is whether the slipway is likely to result in any adverse impacts, particularly when taken in conjunction with the **River Adur Tidal Walls scheme**. An assessment of compliance with the WFD was undertaken as part of the Scoping stage of the flood defence scheme. The assessment concluded that the changes would not result in significant changes to water quality, flows, sediment transport, morphology or habitat quality in the Adur transitional water body, and that the scheme would not compromise the hydromorphological mitigation measures identified and in place for the water body. The provision of equivalent areas of inter-tidal habitat created to those lost and cladding of the new defences would provide additional nursery and feeding habitat for fish and improve biological habitat, such that there would be no deterioration of the Adur water body's biological status or prevent good status in the future. There would be no effects on other water bodies, and no effects on Protected Areas in the Adur (i.e. water "uses" defined by other EU Directives). The assessment therefore concluded that the scheme **would be WFD compliant** and an Article 4.7 exception test would not be required.

Hydromorphic studies undertaken by JBA to examine the effect of the **three slipway options** (Shoreham by Sea Hydromorphic Audit, August 2013) concluded that slipways at these locations would result in a **negligible effect on the wider estuary** when compared to natural variations with a limited effect on both local and wider estuarine deposition. It was noted that all sites are located in the long term deposition zone and therefore may experience local deposition. Minor changes in velocities were predicted for Locations A and B, but not of a magnitude to significantly alter the present day patterns of erosion and deposition. Very limited changes were predicted for Location C, but it was noted that further investigation may be required to assess the stability of the wooden groynes immediately downstream of the proposed slipway location, as any future failure of these structures could affect the stability of the slipway. Overall, whilst it is likely that there will be localised changes to water flow and sedimentation around the proposed slipways, these are unlikely to result in wider changes or adversely affect the hydromorphological mitigation measures in place.

All slipway locations would result in a loss of inter-tidal habitat. However, as it is envisaged that these losses can be compensated by the habitat creation proposals forming part of the River Adur Tidal Walls scheme, it is likely that when considered together, the proposals will be WFD compliant. However, this is dependent on the River Adur Tidal Walls scheme progressing, and there remains a risk that if insufficient inter-tidal habitat is created (a risk that is higher for Location B), a conflict will arise. This issue will **need to be reviewed as the scheme progresses**.

There would be potential for **spillages from vehicles and engines** during operation, which is relevant to Location B in particular, where cars and trailers will be parked on the causeway and **could affect the option selection**.

4.1.6 Land Use and Amenity

An informal footpath is routed along the river bank to the north of the A259 Norfolk Bridge and there are various footpaths providing access to the river, including the new footbridge across the river. Informal recreation plays an important part of local community life and socio-economy, and these are heavily dependent on **links to the river and river-based amenities**. Noise during operation could be an issue, particularly at the locations with nearby residents (Location B & C). The effects on informal recreation and amenities (including access to the river and noise) **could affect option selection**.

West Sussex County Council has recently constructed a new footbridge across the river to provide improved pedestrian and cycle access between the town centre and the beach spit, with its large residential community, sailing club and extensive beaches to the south. There are also proposals to redevelop the car park and commercial area to the immediate south of the footbridge.

4.2 Location A – Adur Recreation Ground

Considerations specific to Location A are as follows:

- Located within River Adur SSSI, but outside the RSPB reserve. There would be potential for direct effects:
 - A loss of approximately 0.04ha (12m by 35m) of inter-tidal BAP habitat within the SSSI is envisaged. This is a potentially significant impact, but it is likely that equivalent replacement habitat could be provided by the River Adur Tidal Walls scheme. If not, compensatory habitat would need to be provided. This issue in particular would need to be discussed with the Environment Agency and Natural England.
 - There may be operational impacts as a result of additional human presence and activity within the river and SSSI. This could affect birds using the relatively small area of mudflat immediately north of the proposed site but, noting especially that lower slipway usage is likely during the sensitive winter months, it is considered unlikely to affect birds using the main feeding/roosting area in the RSPB reserve to the south or the inter-tidal habitats north of the railway bridge. Construction would ideally need to be programmed outside the over-wintering period.
 - Previous reports suggest a low population of slow worms and a medium population of lizards at the lagoon to the south of the recreation ground. Reptiles are likely to be present in areas of grass alongside the river in the vicinity of the slipway, but in low numbers. It is likely that construction under a watching brief, moving any reptiles to outside a reptile fence would provide appropriate mitigation, with no requirement for translocation to an alternative site.
- No trees or scrub would require removal, indicating no impact on breeding birds or bats. There would be no loss of important terrestrial vegetation and no effects on other protected species is envisaged.
- It is unlikely that the additional human presence and activity will affect the use of the river by migratory fish.
- There are residential receptors on the east bank of the river, but no adverse effect on views of residents is envisaged. The physical structure and activities associated with a slipway would be in keeping with the riverside character of its setting.
- Presence of slipway and boat-related activity could add to the visual interest of the river.
- Adur recreation ground is a historic landfill site and chemical contamination and asbestos have been identified in proximity to the site. Some minor ground disturbance is likely, but it is

envisaged that adverse impacts on water quality, ecology and human health could be mitigated by design and during construction.

- No cultural heritage designations are located at the site. No significant impacts on known cultural heritage sites envisaged. The river bank and inter-tidal area on the east side of the river has been defined as of low cultural heritage sensitivity. The likelihood of unrecorded buried remains of archaeological interest in the inter-tidal area is likely to be low.
- It is envisaged that overall, when considered in conjunction with the River Adur Tidal Walls scheme, there would be no effects at the water body scale and the scheme would be WFD compliant.

4.3 Location B – Ferry Road

Considerations specific to Location B are as follows:

- Located outside (immediately downstream of) the River Adur SSSI and RSBP reserve. Therefore there would be no direct effects on the SSSI/RSPB reserve, but the following indirect effects:
 - There may be operational impacts as a result of additional human presence and activity within the river in close proximity to the SSSI. This could affect birds using the inter-tidal habitat within the SSSI/RSPB reserve to the north. However, given the distance and high level of existing human presence and activity in this area (including activity associated on the river banks, footbridge, houseboats and boats within the river), the additional activity is unlikely to affect birds using the main feeding/roosting area upstream. Construction would need to be programmed outside the over-wintering period.
- A loss of approximately 0.15ha (16m by 90m) of inter-tidal BAP Priority Habitat is envisaged. This is a potentially significant impact. Although it is likely that this could be provided by the River Adur Tidal Walls scheme, there is a higher risk that this may not be possible at this site. If it cannot be provided, compensatory habitat would need to be provided. This issue in particular would need to be discussed with the Environment Agency and Natural England.
- A low population of slow worms was recorded. Mitigation in the form of exclusion fencing, followed by re-colonisation could be appropriate but, given the proximity to the area of high reptile populations to the north, to be consistent with the River Adur Tidal Walls scheme, it would be more appropriate to translocate to the alternative receptor site at Mill Hill.
- No trees or scrub would require removal, indicating no impact on breeding birds or bats. There would be no loss of important terrestrial vegetation and no effects on other protected species is envisaged.
- It is unlikely that the additional human presence and activity will affect the use of the river by migratory fish.
- Residential receptors on the east and west banks of the river, and users of the footbridge and footpaths will be sensitive to visual impacts at this prominent position on the river. Although the general physical structure and activities associated with a slipway will be in keeping with the riverside character of its setting, the raised causeway with scour protection, the greater length of the overall structure and the presence of parked cars and trailers on the raised causeway when in use are likely to result in an adverse visual impact. This could affect residents of the houseboat immediately downstream, pedestrians on the riverside footpaths and the new footbridge. The proposals would also need to integrate with Adur District Council redevelopment proposals for the locality (both visually and in terms of land use). In terms of land use, a slipway and associated activity during operation could integrate well and provide added visual and land use interest appropriate to the river location, but the adverse visual impacts of the structure would need to be considered.
- Pulverised fuel ash (PFA) has been identified on Shoreham Beach. This is a potentially contaminative material, which can present as grey and ashy in nature or as small, black, coal-like

deposits. In the event of any development and/or building works take place on Shoreham Beach, it is the responsibility of the site owner/developer to establish the extent of such material on the site and to carry out appropriate remediation where necessary (Source: Adur and Worthing councils).

- No cultural heritage designations are located at the site. No significant impacts on known cultural heritage sites envisaged. The river bank and inter-tidal area on the east side of the river has been defined as of high cultural heritage sensitivity. The likelihood of unrecorded buried remains in the inter-tidal area is likely to be high.
- The use of the slipway and presence of cars parked on the causeway when in use could result in a loss of privacy for the houseboat located immediately downstream of the slipway.
- It is envisaged that overall, when considered in conjunction with the River Adur Tidal Walls scheme, there would be no effects at the water body scale and the scheme would be WFD compliant. However, a slipway at this location would result in a loss of approximately 0.15 ha of mudflat; the highest areas of the three options. Whilst it is envisaged that an equivalent area would be provided by the River Adur Tidal Walls scheme, it is likely that this option would not be considered the least environmentally damaging option and there remains a greater risk that, if not provided, the scheme would be non-compliant.

4.4 Location C – Soldiers’ Point

Considerations specific to Location C are as follows:

- Located outside the River Adur SSSI and RSPB reserve. Therefore there would be no direct effects on the SSSI/RSPB reserve, but the following indirect effects:
 - There may be limited operational impacts as a result of additional human presence and activity within the river. However, given the greater distance and likelihood of most users travelling downstream away from the SSSI/RSPB reserve rather than upstream, it is very unlikely that to affect birds using the main feeding/roosting area within the SSSI/RSPB reserve upstream.
- A loss of approximately 0.04ha (12m by 35m) of inter-tidal BAP habitat is envisaged. This is a potentially significant impact, but it is likely that this could be provided by the River Adur Tidal Walls scheme. If not, compensatory habitat would need to be provided. This issue in particular would need to be discussed with the Environment Agency.
- A medium population of slow worms was recorded in the area to the east of the slipway. However, a low population is likely at the slipway site. Mitigation in the form of exclusion fencing, followed by re-colonisation could be appropriate, suggesting no requirement for translocation to an alternative receptor site.
- Located outside the Childing pink reserve. It is possible that the plant has extended its range since previous survey work, but it is unlikely to have extended as far as the proposed slipway location. No adverse impact on the rare plant in the reserve is envisaged. However, if the alternative location further west is progressed, this would need further investigation, probably requiring confirmation by survey.
- Small isolated patches of vegetated shingle are present, particularly to the east of the slipway site. No loss of vegetated shingle is envisaged, but this would need to be confirmed by survey. If present, it is likely that translocation to suitable habitat to the east would provide suitable mitigation.
- No trees or scrub would require removal, indicating no impact on breeding birds or bats. There would be no loss of important terrestrial vegetation and no effects on other protected species is envisaged.
- It is unlikely that the additional human presence and activity will affect the use of the river by migratory fish.

- The site is located away from the main town centre opposite the industrial wharf extending towards Brighton and Hove, and, although within a residential area of the beach spit, there are few sensitive visual receptors with views of the site. However, siting the slipway downstream of the town centre could be viewed as a missed opportunity to add visual interest to the river in the more heavily used part of the town.
- Pulverised fuel ash (PFA) has been identified on Shoreham Beach. This is a potentially contaminative material, which can present as grey and ashy in nature or as small, black, coal-like deposits. In the event of any development and/or building works take place on Shoreham Beach, it is the responsibility of the site owner/developer to establish the extent of such material on the site and to carry out appropriate remediation where necessary (Source: Adur and Worthing councils).
- No cultural heritage designations are located at the site. No significant impacts on known cultural heritage sites envisaged. The river bank and inter-tidal area on the east side of the river has been defined as ranging from low (mainly) to high cultural heritage sensitivity. The likelihood of unrecorded buried remains in the inter-tidal area is likely to be medium.
- The proposal for River Adur Tidal Walls scheme is to leave the existing timber groynes with no further maintenance. These would therefore deteriorate over time, which could result in shingle sedimentation on the causeway (or even undermining). This could be managed by clearance. There would be some loss of inter-tidal habitat (0.04ha), but it is envisaged that this can be compensated by habitat creation proposed as part of the River Adur Tidal Walls scheme. It is envisaged that overall, when considered in conjunction with the River Adur Tidal Walls scheme, there would be no effects at the water body scale and the scheme would be WFD compliant.

4.5 Summary and Site Comparison for Environmental Impact

The most potentially significant factors are:

- 1) Land take of inter-tidal habitat, for which compensatory habitat will need to be provided and whether this land take can be accommodated by habitat creation proposed as part of the River Adur Tidal Walls scheme;
- 2) the visual impact of the slipway and the visual amenity value of the slipway-related activity generated; and
- 3) the potential archaeological interest of unrecorded buried remains within the inter-tidal area (although it is possible that further investigations undertaken as part of the detailed design and assessment stage of the River Adur Tidal Walls scheme will help to clarify this issue).

It is envisaged that overall, when considered in conjunction with the River Adur Tidal Walls scheme, there would be no effects at the water body scale and the scheme would be WFD compliant.

It is likely that the remaining potential temporary environmental impacts can be mitigated by design or construction. However, there are likely to be costs implications for some of these (for example, costs associated with the historic landfill at Adur recreation ground, reptile mitigation and any mitigation for Childing pink, should the alternative site at Location C be progressed).

Table 4.1 summarises the environmental impact at each location.

TABLE 4.1

Summary of Environmental Impact

Location A – Adur Recreation Ground	Location B – Ferry Road	Location C – Soldiers’ Point
Within SSSI (but outside RSPB reserve)	Outside but adjacent to SSSI (and RSPB reserve)	Outside SSSI (and RSPB reserve)
Estimated 0.04ha of inter-tidal habitat from SSSI requires compensation, likely to be accommodated by (0.2ha net gain from) River Adur Tidal Walls scheme	Estimated 0.15ha of inter-tidal habitat requires compensation, may be accommodated by (0.2ha net gain from) River Adur Tidal Walls scheme, but higher risk, if detailed design results in lower net gain	Estimated 0.04ha of inter-tidal habitat requires compensation, likely to be accommodated by (0.2ha net gain from) River Adur Tidal Walls scheme
Unlikely to affect over-wintering birds	Unlikely to affect over-wintering birds	Unlikely to affect over-wintering birds
Low population of reptiles likely. Mitigation by watching brief with exclusion fence likely to be suitable	Low population of reptiles likely. Mitigation by translocation to alternative (Mill Hill) site likely to be suitable	Low population of reptiles likely. Mitigation by watching brief with exclusion fence likely to be suitable
No impact on other protected species or fish envisaged	No impact on other protected species or fish envisaged	No impact on other protected species or fish envisaged No impact on Chiding pink reserve or vegetated shingle habitat envisaged
No significant landscape or visual impact	No significant landscape impact	No significant landscape or visual impact
Offers potential to add visual interest to river from boat-related activity	Offers potential to add visual interest to river from boat-related activity, but visual impact of raised causeway needs consideration	Offers little potential to add visual interest to river from boat-related activity
Low risk of unknown buried archaeological finds in the inter-tidal area	High risk of unknown buried archaeological finds in the inter-tidal area	Low risk of unknown buried archaeological finds in the inter-tidal area
Located at a historic landfill site, with potential for contamination	No records of contamination	No records of contamination
Likely to be WFD compliant, when considered in conjunction with River Adur Tidal Walls scheme	Likely to be WFD compliant, when considered in conjunction with River Adur Tidal Walls scheme	Likely to be WFD compliant, when considered in conjunction with River Adur Tidal Walls scheme

A high level comparison of the sites from an environmental perspective is given below. The scoring system is based on 1 star being low (poor) to 5 star being high (the best).

TABLE 4.2

Comparison Table – Environmental Impact

Location	Score
A – Adur Recreation Ground	★★★
B – Ferry Road	★★★
C – Soldiers’ Point	★★★★★

5 Vehicular Access and Parking

5.1 Introduction

Shoreham is accessed from the east by the A259 (from Brighton), the west by the A259 from Worthing and from the north by the A27 and A283. Local users may choose to approach along the A259, but it is likely that users from further afield will approach any of the proposed slipway locations from the A27. It should be noted that slipway users will form an insignificant part of the overall traffic into and within Shoreham.

A potential constraint for all sites are the restricted traffic flows around the busy A259/A283 (Ropetackle) roundabout, particularly at peak times and particularly flowing northwards over the Norfolk Bridge. However, West Sussex County Council is progressing a highways improvement scheme for this roundabout to improve traffic flows at this known bottleneck. The plans may include enlargement of the roundabout and creation of two lanes as an approach from the east. This highways improvement scheme is introduced in the Adur Local Plan and Shoreham Harbour Transport Study (Adur and Worthing councils, 2012) and detailed in the Shoreham Town Centre Study Report (Parsons Brinkerhoff, March 2014).

Parking is an important criterion which will heavily influence the success of the proposed slipway. Adequate parking for a range of trailer lengths and vehicles (representing the breadth of mariners that previously used the Ropetackle slipway) are required to ensure the slipway is well-used. The absence of such facilities has had a major effect on the usage of previously popular slipways at Shoreham, such as Ropetackle. It is also important that the parking provision does not have an adverse impact on existing residential parking nearby. In cases where the parking provision is intermingled with parking for non-users, then the duration of storage of trailers should be limited unless specifically agreed with the managing authority. A trailer storage limit of 24-hrs is considered appropriate (unless specifically agreed with the managing authority), but this may have to be re-considered if this restricts parking.

The kerb-to-kerb turning circle for a range of trailer lengths has been considered to determine the turning requirements of potential users. Most of the vehicles and trailers are able to complete a 180° turn in a circle of approximately 15 m diameter. However, most users would have the option to unhitch the trailer and manhandle their trailer if required.

It is possible that some of the slipway users may arrive at the slipway from the river/sea and that a trailer may only be undertaking a set-down or pick-up and not require storage, but this would only be a very small minority. This may also include some users arriving from beyond Shoreham from nearby marinas/ports to recover their vessels.

5.2 Location A – Adur Recreation Ground

Users cannot turn right into or out of the site off/onto the A259. Users departing the site towards Worthing will need to turn around at the A259/A283 roundabout at Ropetackle. Users arriving at the site from the north/east will have to proceed to the A259 roundabout where they can make a 180° turn to approach the site from the west. Queuing traffic into Shoreham and at the Ropetackle roundabout will cause most impact to users of a slipway at this location, although the proposed highways improvement scheme should ease the problem.

The site currently has a height barrier to prevent travellers accessing the recreation ground and the car park. There would be a requirement for maintaining this height restriction. The height barrier may restrict the boat size which can access the slipway car park, but depending on the slipway management regime adopted (Section 9) there may be an option to operate a key system through the Adur Outdoor Activity Centre, but this would restrict access to larger boats with high headroom requirements to normal operating hours. The alternative would be to rely on an automated barrier system for the car park and relocate the height barrier. This would allow early/late users of the slipway to avoid any height restrictions.

Currently, there is full public access to this area and within the car parks there are no parking restrictions or charges. There is a playground adjacent to the proposed slipway site and it is a popular location for walkers and cyclists as there is a riverside path heading upstream from this location. Additionally, the 3rd Shoreham Sea Scouts, Adur Cruising Association and Adur Outdoor Activity Centre share the same stretch of river bank between Norfolk Bridge and the Viaduct. The introduction of parking charges as part of the slipway management regime may be subject to local resistance. However, such resistance could be mitigated by the introduction of charges for trailer parking only.

The main grassed recreation ground is used for car boot sales and fairs, which will create competition on parking space availability. Pressure for spaces could be reduced by adequate signage and through the slipway parking/management system that is adopted. Signage and information provision online could advise users of upcoming events should this present a conflict that cannot be fully managed. The re-configuration or widening of the approach roads may become viable in the future should the usage of this road significantly increase due to additional traffic from the slipway in combination with any other amenity redevelopment plans at the recreation ground (e.g. Adur Athletics FC currently have an approved planning application given in 2006 for a new clubhouse with parking and football pitches. There is also planned redevelopment of the BMX track. Both of these potential schemes are beyond the slipway site).

5.3 Location B – Ferry Road

The approach roads to Location B are good, but local access in the proximity of the slipway will be more difficult following the planned ADC Ferry Road Scheme (described in Section 3.3). The proposed pedestrian route from the Adur Ferry Bridge to Ferry Road as part of the Ferry Road Scheme would cross the slipway access road. However, whilst this impacts on the pedestrian space generally, most pedestrians would follow the main path and would be clearly visible to approaching slipway users (who would not be reversing at this point).

The length of the slipway is significant at this location and the distance to be covered for reversing trailers is considerable. The difficulty of this reversing manoeuvre is dependent on a number of factors including, trailer and vehicle type (particularly size comparison), driver ability, visibility, roadway geometry, and the number of slipway users (refer to Section 7.3.2 for health and safety issues).

Parking provision is generally constrained in the area. Ferry Road car-park is used regularly by a range of stakeholders including local shoppers. Local market days will further increase the parking pressures. With the new footbridge and the public realm enhancements at this location, it can be expected parking demand will increase rather than decrease at this location in the future, particularly as more people choose to park at Ferry Road and walk over to Shoreham High Street from the west bank rather than drive around. The refurbished car-park will likely continue to be heavily used and is unlikely that the non-boating community would welcome any significant slipway parking in Ferry Road car park. Street-parking on the surrounding roads is very restricted (generally season ticket holders) and would not be advisable to slipway users. As slipway users rely on guaranteed, sufficiently spacious parking facilities, unless an area can be made available as part of the car-park refurbishment, the only alternative option for parking in the vicinity would be the limited space on the slipway causeway. The disbenefits of such an arrangement would be that the width of the causeway for reversing trailers would be further constrained and there would be limited space for such vehicles, likely resulting in users having to decouple their trailers to park them efficiently in the available space. For health and safety considerations, refer to Section 7.

5.4 Location C – Soldiers' Point

Vehicular access to Location C is generally good. However, due to the location at the end of the Western Harbour Arm, this site is the most remotely located from the main approach roads to Shoreham, but this is significantly offset by the reduced boat motoring distance to the open sea at this location. The additional road distance to the east of Location B is through residential streets, but these streets are relatively wide and generally free flowing.

There is ample street and off-road parking along Harbour Way, all which is currently free of charge. This is a residential area, but the surrounding properties generally have their own parking areas.

There will be a parking conflict at this location with members and visitors using the Shoreham Sailing Club. Car parking within the fenced off sailing club site is generally discouraged to leave room for boat rigging and visitors are asked to park their cars in the areas where the slipway parking would be located (www.shorehamsailing.org). The sailing club is typically open on weekends and Wednesdays hosting a series of weekly races and open meetings (March to December). In September 2014 they hosted the K1 National Championships. Providing information of Sailing Club event to slipway users, either by a noticeboard or online, could reduce the impact of this. However, this would remain an issue. Outside of sailing club use, the car parking is generally not pressured.

Access onto the slipway would generally be good at Location C1 as there is sufficient space to define a dedicated turning space (subject to parking control). Access to Location A would be OK, but there may be some impact on the road.

5.5 Summary and Site Comparison for Vehicular Access and Parking

The road network to all three sites is generally acceptable and planning improvements to the road network in Shoreham will improve things further (for all sites). Access through residential areas is not required at Location A, but fairs and the car boot sales using the recreation ground would need control and could result in some conflict.

Both Location A and Location C currently have free parking, and the introduction of charges at these locations may have some local resistance. Resistance may be somewhat alleviated by charging for trailer parking only. There will be a parking conflict with the Shoreham Sailing Club at Location A, particularly on busy racing weekends. Location B is generally a very constrained and busy area and parking on the causeway would have to be provided to partly alleviate parking pressures, and even then, sufficient parking to meet usage aspirations would not be available. Such parking arrangements would bring additional difficulties to the safety and access concerns at this site. Only location A has sufficient space to provide the parking spaces to meet the projected usage during busy times (particularly summer weekends)

A high level comparison of the sites from a vehicle access and parking perspective is given below. The scoring system is based on 1 star being low (poor) to 5 star being high (the best).

TABLE 5.1

Comparison Table – Vehicle Access and Parking

Location	Score
A - Adur Recreation Ground	★ ★ ★
B – Ferry Road	★
C – Soldiers’ Point	★ ★

6 Tidal, Flow and Geomorphology Considerations

6.1 Introduction

This chapter considers the fluvial and maritime criteria such as tides, sea level rise, currents, winds and waves, which will impact on the geomorphology at each location and the use of the slipway. In many cases these criteria will link directly to potential health and safety aspects related to slipway operation.

6.2 Tide Levels and Sea Level Rise

The overall usage of the proposed slipway and its resulting success will be heavily influenced by the tidal window during which it is accessible. In light of this, the tidal levels at each location have been considered both in the present day and looking at the potential rise in sea level over the design life of the structure. Tidal surges and to a lesser degree fluvial events will result in increased water level heights, but it is assumed that these events would rarely coincide with spring tides during times when the slipway would be in great demand. However, users will have to be warned of such events, particularly at Location B where the risk of getting caught by the tide would increase due to the requirement for a long, level causeway to access the slipway.

Table 6.1 shows the current tidal levels for 2014 taken from Admiralty tide tables; for convenience these are provided to both Chart Datum (mCD), which is primarily used by mariners based on relationship to Lowest Astronomical Tide at that location (LAT) and Ordnance Datum (mOD), which is converted to the datum (at Newlyn). The relationship between mCD and mOD varies around the British Isles.

The predicted sea level rise component and the resulting Mean Sea Level for 20, 50 and 100 years is given in Table 6.2. The sea level rise component follows Environment Agency guidance and the relative increases are applicable for all tidal states.

TABLE 6.1

Tidal levels at each location (2014)

Tidal Level	Location A		Location B		Location C	
	mCD	mOD	mCD	mOD	mCD	mOD
Highest Astronomical Tide, HAT	4.7	3.6	5.8	3.6	6.9	3.6
Mean High Water Springs, MHWS	4.0	2.9	5.1	2.9	6.3	3.0
Mean High Water Neaps, MHWN	2.7	1.6	3.8	1.6	4.8	1.5
Mean Low Water Neaps, MLWN	0.0	-1.1	0.8	-1.4	1.9	-1.4
Mean Low Water Springs, MLWS	0.0	-1.1	0.3	-1.9	0.6	-2.7
Lowest Astronomical Tide, LAT	0.0	-1.1	0.0	-2.2	0.0	-3.3

TABLE 6.2

Predicted sea level rise

Tidal Level	Predicted Increase, m
20 Years SLR (to 2034)	0.11
50 Years SLR (to 2064)	0.32
100 Years SLR (202114)	0.73

6.3 Tidal flows

The flow speed of the receiving water at each location is a function of the tidal prism and the channel geometry. At a given location flow speed will vary depending on the point on the tidal cycle, the size of the tide and the effects of fluvial flows. Local bathymetry changes and changes in sea level and the magnitude of extreme events will impact on flow speeds into the future.

Shoreham Port Authority provided a report Survey of Shoreham Port & River Adur: To Measure Flow Rates at Sites Suitable for PowerTube (Saunders Energy Ltd, 2013). This provided measured flow speeds at points close to the three proposed slipway locations. The mid-tide flow (considered to correspond to the maximum flow speeds) was measured at 2.6kn (1.3m/s) under the A259 bridge, 1.1kn (0.6m/s) under the pedestrian bridge and 1.8kn (0.9m/s) near slipway location C1, but these flow speeds would correspond to the part of the channel where the flow speeds would be at their maximum

CH2M Hill interrogated the results from an existing 1D-2D numerical ISIS-TUFLOW model which was developed by Halcrow (now CH2M Hill) for the planning of the Lower Adur Strategy. The output for a 1 in 5yr tidal event gave a maximum flow speed of 0.2m/s at Location A, 0.4m/s at Location B and 0.6m/s at Location C (2D cell averaged velocities). These outputs can be used comparatively to give an indication of flow speeds at each site, but it should be noted that the results are averaged for a given location and localised flow speeds may vary considerably.

In addition, Shoreham Slipways Group have undertaken basic flow speed measurements at each of the locations. Maximum flow speeds at Location A were observed as being approximately half that at Ropetackle slipway (which was considered to be on the upper end of what is considered safe).

The Hydromorphic Audit (JBA, 2009) indicates that maximum flow speeds are typically less than 0.3m/s outside the main channel and typically less than 1m/s within the main channel.

Whilst the data above provides information related to the maximum flow speed at each location, flow speeds either side of high water will be insignificant and users could choose the appropriate time to launch to suit their competence and risk level.

6.4 Channel Geometry, Winds, Waves and Tidal Windows

Table 6.3 summarises the main channel geometrical and environmental criteria at each site and reference should be made to the options plans.

Gusty conditions would prove problematic for sailing craft but would be less of a concern for powerboats and smaller craft. Sailing craft may find it difficult approaching these slipway locations, particularly in prevailing south-westerly winds where the slipway locations are generally up wind. Moored craft, narrow channels and bridges provide other obstructions to negotiate (refer to health and safety Section 7).

TABLE 6.3

Comparison of channel geometry, winds, waves and tidal windows at each location

	Location A	Location B	Location C1	Location C2
Width of receiving water at MHWS	130 m	100 m	65 m	100 m
Width of receiving water at MLWS	25 m	70 m	50 m	65 m
Flow speeds	Generally <1 m/s	Generally <1 m/s	Generally <1 m/s	Generally <1 m/s
Wind exposure and direction	Generally sheltered, except in strong northerly winds. Generally open area, hence may not be too gusty	Generally sheltered site, but could experience gusty conditions from buildings	Generally sheltered, but could be exposed in strong westerly winds. Potentially gusty conditions from high walls and buildings	Generally sheltered, but could experience gusty conditions
Waves (fetch)	Could be choppy at high water in strong northerlies	Potential for wind against tide chop at lower tides	High potential for wind against tide chop at lower tides. Could be choppy at high water in strong westerlies.	Possible wind against tide chop at lower tides
Tidal window (2014)*	Most states of the tide, other than approximately 2hrs each side of low tide	Full tide (except very low tides)	Full tide (except possibly low tides - depends on the lowest slipway level that can be achieved at the edge of the dredged channel)	Full tide (except possibly low tides - depends on the lowest slipway level that can be achieved at the edge of the dredged channel)
Tidal window (2034)*	Most states of the tide, other than around low tide	Full tide (except significant tidal surges at high water)	Full tide (unless there is a change in dredging regime)	Full tide (unless there is a change in dredging regime)
Tidal window (2064)*	Most states of the tide, other than around low tide	Full tide (except tidal surges at high water and HAT refer to Section 8.3.1.1)	Full tide (unless there is a change in dredging regime)	Full tide (unless there is a change in dredging regime)

*Assumes channel bathymetry does not significantly change into the future and discounts the any tidal restrictions under the bridges during high tides (particularly relevant to Location A – refer to Section 7.2.1).

6.5 Channel and Riverbank Geomorphology

The channel beds are generally considered stable at the three sites. However, the following details should be considered:

- The potential for a change of local channel geomorphology at each location due to the construction of a slipway was considered in the Hydromorphic Audit (JBA, 2013). This concluded that any changes resulting for the construction of a slipway at any of the sites would be insignificant (and probably too small to identify within the accuracy of the model).
- A slump of the mud bank at Ferry Road has been described in Section 8.3.1.2. This was thought to have occurred following a channel dredge, but may have been caused by burrowing of the Hairy Crab. Shoreham Port Authority do not currently dredge this site.
- Shoreham Port Authority maintain the dredged depth at Location C for commercial shipping. As the port migrate commercial operations to the eastern arm (Section 3.4), this dredging regime is likely to change into the future and may even cease altogether if there is no clear economic

benefit to the Port from this activity. This may have impact on the tidal access and river bed geomorphology at this location presenting a significant future risk for a slipway here.

- The shingle channel bank around Soldiers' Point, directly to the east of Location C, is currently stabilised by timber groynes. It is speculated that this point is a partly naturally occurring feature with shingle held through a combination of waves entering the channel from the harbour mouth and waves generated within the harbour during strong westerly winds. The Port manage the groynes and the beach at this location. The Adur Tidal Walls scheme proposes a change of management at this location, which will impact on bed morphology at this location, especially in combination with a potential future change in dredging operations. Refer to Section 8.4. This is a significant risk to a slipway at this location.

6.6 Summary and Site Comparison for Tidal, Flow and Geomorphology Considerations

All of the sites provide workable river access points, but there are some subtle differences between each site.

Flow speeds at each location are generally expected to be below 1m/s, but flow speed is expected to be most significant at Location C.

The shingle bank at Soldiers Point and the Western Harbour Arm channel are currently heavily managed by the port to maintain their operations. A change in these operations, either through the Adur Tidal Walls scheme or due to the JAAP aspirations, will create a change at this location, the scale and impact of which is difficult to assess at this time. These present a significant future risk to this site.

The river at Location A is wider, and potentially more exposed during certain conditions. The tidal window is also limited at low tide at this site (these limitations depend on tidal cycle, base river flow, and draft of the craft).

The stability of the foreshore at Location B is considered a key risk.

A high level comparison of the sites from a tides and flow perspective is given below. The scoring system is based on 1 star being low (poor) to 5 star being high (the best).

TABLE 6.4

Comparison Table – Tidal and Flow

Location	Score
A - Adur Recreation Ground	★★★
B – Ferry Road	★★★
C – Soldiers' Point	★★★

7 Health and Safety Considerations

7.1 Introduction

This section considers each slipway's immediate environment to determine any health and safety concerns that may develop during operation of the slipway. Nearby hazards, such as bridge piers, and the risks associated with the operation of a slipway, such as collisions resulting from vehicle movements, are also considered. The risks have been separated into landward and riverward risks to make the distinction between the hazards within each environment clearer.

All slipways have an underlying inherent level of health and safety risk associated with their use as they are specialist facilities with a unique interlink between land based vehicles and marine craft. However, slipway design (particularly siting) and management of the facility significantly reduce the risk. Competency for driving vehicles is tested, but reversing of a trailer down an incline towards flowing water is not typically taught. No competency testing is required for the use of marine craft, although some individuals choose to undertake appropriate training. Therefore, the safe use of a slipway is strongly linked to the competency of individuals.

The following are specific safety concerns which should be considered throughout the design/locating of any slipway:

- Loss of traction during manoeuvring resulting in hazards to pedestrians and risk of vehicle being taken into the watercourse. Key considerations: Slipway geometry (particularly slope), surface material (refer to Section 8), surface maintenance, algae/weed build up, trailer weight, vehicle type, drivers capabilities, weather conditions (dry and clear vs. wet, foggy etc) and slipway congestion levels.
- Accidental un-manned release of craft into watercourse. Key considerations: Flow speed, slipway traction, boat-handlers experience, provision of suitable temporary mooring points at various levels on the slipway (but the use of mooring rings will have to be managed to prevent boats being tied up for too long and restricting slipway operations).
- Watercraft/vessel collisions, either resulting from poor boat handling/navigation or potentially from failed engine. Key considerations: Slipway location, proximity of moored boats/obstructions, boat-handlers experience, number of craft on the water, extent of patrols by SPA, presence of slipway safety management officer. Collision risks are higher at manoeuvring location in the vicinity of a slipway rather than during inbound/outward navigation, although boats tend to be moving slower whilst manoeuvring. Overall, the harbour is not busy in comparison to other waterways.

7.2 Location A – Adur Recreation Ground

7.2.1 Marine Health and Safety

At high tide, this is one of the widest sections of the river, but it is well used by both the Adur Outdoor Activities Centre (AOAC) and the 3rd Shoreham Sea Scouts. Therefore, within the proximity of a new slipway there may be a number of novices undertaking water-sports. Currently AOAC use the area under the viaduct to practice canoeing in the saltmarsh creek system. This concern could be alleviated by the novice canoeists using alternative areas, e.g. downstream of Norfolk Bridge if the slipway becomes very busy. This area has previously been used by the Activity Centre's canoeists.

In addition to the novices, there are a number of boats moored nearby. These are not moored in the main channel and are deemed to be far enough from the slipway so as not to form a hazard to slipway operations.

A slipway at this location would have users launching in the direction of the railway viaduct, which is located approximately 60 m away. This is considered to be sufficiently far away from the slipway for this

to be a major hazard. In the unlikely event of a vessel collisions with the viaduct piers, it is anticipated that the piers would be designed to take such impacts and flow velocities are sufficiently low to limit vessel damage.

On the route to the sea there are two bridges which would have to be navigated. During high tides this may restrict certain powerboat users. However, sailing craft would only have a small tidal window (depending on mast height), but it is unlikely that mainly sailing boats would choose to launch at this location.

At low tide, the waters are relatively shallow in this area and the channel is relatively narrow, although anecdotally the channel alignment is relatively stable at this location. Navigation aids may be required to mark the channel; this should be investigated further during later design stages if this option progresses. Signage at the slipway could warn users of hazards at low tides.

It is anticipated that most slipway users will be heading to sea, rather than up-river. The route to sea is longest from this location and involves navigating through the more constrained/busy sections of the harbour. For users travelling upstream (more likely to be smaller craft), there will be a reduced risk of collisions.

7.2.2 Health and Safety on the Land

As noted in Section 5.2, there is a children's playground adjacent to the site. This is a fenced area and it has two entrances. One of these is on the opposite (eastern) side to the area where slipway vehicle manoeuvres would be undertaken and it is proposed that this should become the only entrance. The second entrance could be closed as part of any slipway scheme due to the safety hazards of it being located immediately adjacent to the proposed slipway location. Separate parking areas for the playground could be incorporated into any re-design of the local parking provision (there is plenty of scope at this location) and this could be linked to the path to the eastern entrance. Fencing could then fully segregate the children's play area/parking from the slipway site.

There is a path (used by cyclists and pedestrians) which crosses the proposed car park. This is not a public right of way (see extract from WSCC imap website in Figure 7.1). However, it is an informal route and there are plans as part of the Adur Tidal Walls scheme to incorporate a new footpath and cycleway along the crest of the raised embankment. As such, this route would cross the slipway at its highest point and it is anticipated that this would be a safe location to cross given appropriate warning signage. Obstructions to force cyclists to slow/stop may be required. It is not anticipated that a slipway at this location would obstruct any footpath/cycleway plans.

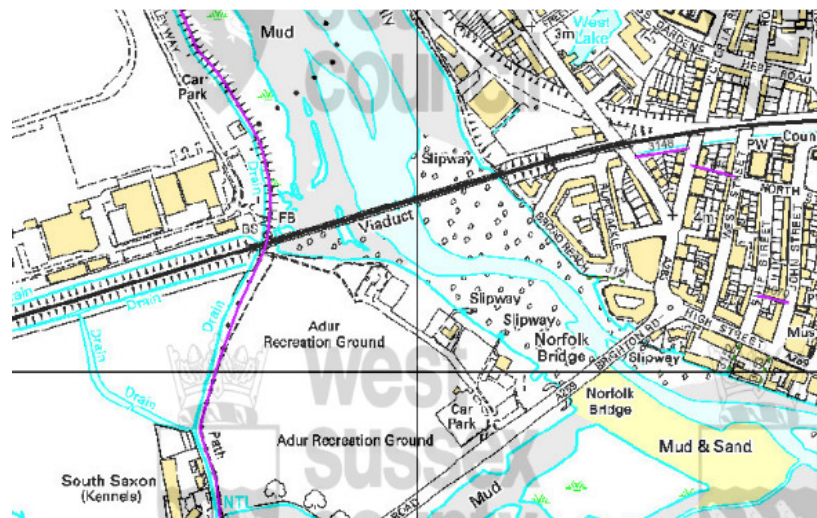


FIGURE 7.1

Map of Location A showing Rights of Way

The purple line indicates a public footpath running to the West of Adur Recreation Ground. Although, paths are marked through the proposed site, there is no indication of this being a public Right of Way.

7.3 Location B – Ferry Road

7.3.1 Marine Health and Safety

This slipway location is approximately 50m away from the new footbridge and situated opposite the Sussex Yacht Club's slipway. This stretch of the river can be relatively busy and at times there could be a dozen sailing dinghies tacking across the channel. However, these constraints are not considered to be a high risk to the viability of the slipway. Furthermore, Sussex Yacht Club was supportive during the planning application for the public slipway at this location.

There are a number of fishing boats moored within the channel relatively close to a slipway launch area at this location. Consideration would have to be given to moving some of these moorings if this conflict was appraised as a hazard with a slipway at this location.

For users heading to sea from this location, there are no bridges to navigate under.

7.3.2 Health and Safety on the Land

Health and safety concerns on the landward side of the Ferry Road slipway mainly stem from the large number of pedestrians and cyclists which cross the Adur Ferry footbridge. The proposals for the new car park at Ferry Road would alleviate some of these concerns as pedestrians will be guided to cross the slipway access road in defined locations where visibility is good. The proposed footpath has bollards preventing vehicles from accidentally driving onto it. However, it would not be possible to fully segregate the slipway users from the general public at this location, and there would be a residual hazards to the public which would have to be considered further at detailed design to mitigate these risks as much as possible. Close to the slipway, these safety hazards would be significant as slipway users would be reversing vehicles in a relatively tight space.

It is proposed that trailers be parked on the upper causeway (above all but the highest of tides) to reduce the number of manoeuvres required during the slipping and retrieval of vessels. During busy periods, the towing vehicle would need to be parked in the Ferry Road car park. The combined length of the slipway and causeway at this location is considerable. The reversing of trailers over such a length increases the risk to pedestrians. In addition, the causeway would be raised which would increase the hazards from a reversing vehicle straying from the paved area. This can be partly mitigated through the use of kerbs along the paved edges.

7.4 Location C – Soldiers' Point

7.4.1 Marine Health and Safety

This stretch of water is still regularly used for commercial shipping at high tide. In addition, the location of the slipway is adjacent to a bend in the river. Consequently, Shoreham Port Authority's Harbourmaster has expressed concerns with a slipway being sited at this location. This is due to hazards of vessel collisions where manoeuvring craft using the slipway could potentially collide with commercial shipping and other water users. These risks could be partly mitigated through strong management of the slipway and provision of safety and navigation information for slipway users. The Joint-Area Action Plan indicates that the commercial port aspect of the Western Harbour Arm is intended to reduce in the future; this would reduce the safety concerns at this location. However, even without commercial shipping navigating these waters, the proximity of the slipway to a 90 degree bend in the river would, to some extent, remain a hazard. This is one of the reasons for considering an alternative location (Location C2) further up-river as this reduces the risk of conflict with commercial shipping and reduces the hazards associated with vessels navigating the bend.

Shoreham Sailing Club is located on an adjacent plot, with a private slipway out towards the harbour entrance. Users of the Soldiers' Point slipway heading in the direction of the open coast will need to be made aware of the fact that other boats could be launching a short distance away around the corner. Information boards can help to communicate this information. Currently, the view of approaching vessels/watercraft would be obscured at low tide by the shingle beach and timber groynes. Whether these structures are retained in the future will depend on the detailed design of the Adur Tidal Walls scheme.

The channel at this location is currently dredged by the Port as part of their maintenance regime. This will result in a sudden drop at the end of the slipway. Consequently, a baulk would be needed at the end of the slipway to prevent trailers dropping off the end and to warn wading boat-handlers of the hazard. The future dredging regime may change depending on commercial shipping operations and financing, which would change this risk (most likely to be a reduction in dredging resulting from reduced commercial shipping operations in the Western Harbour Arm).

For users heading to sea from this location, there are no bridges to navigate under.

7.4.2 Health and Safety on the Land

This location is not particularly heavily trafficked by pedestrians or vehicles, and those that use the area are more likely to be local residents. The exception would be during event days at the sailing club where the area could become congested and in these circumstances the risk of vehicle/trailer collisions with pedestrians and other vehicles/trailers would be greatly increased. Careful management of parking areas in combination with signage and fencing could partly mitigate these risks but this would need careful consideration at detailed design in consultation with the sailing club.

Due to the linear, but not particularly wide parking areas, this design of parking at this site may result in users undertaking some vehicle/trailer manoeuvring into the road (particularly for Location C2). This would require detailed consideration at detailed design but due to the relatively light traffic usage this may not be too problematic.

A slipway at the alternative Location C2 would require high retaining walls. The fall from height hazard would have to be mitigated for pedestrians and vehicles through appropriate kerbs, handrails and signage.

7.5 Summary and Site Comparison for Health and Safety

There are hazards associated with the use of all slipways, but these can be partly mitigated at detailed design through careful consideration. The largest risks to health and safety during the successful operation of the proposed slipway stem from the potential for collisions both on and off the water.

Due to Location A site being located off the main public highway and away from residents and shoppers, there is only minimal conflict with other users of the area. Hazards associated with children and users of the footpath/cycleway could be mitigated through the detailed design stage. This stretch of water is used by the activity centre and the scouts but hazards of collisions could be managed.

There is a significant residual risk to the public and slipway users at Location B due to the existing constraints of this busy area and due to the length of the slipway required at this location to reach the main channel. Careful planning would be required to mitigate these risks. It is considered that hazards on the water could be managed.

Location C has potential significant residual risks associated with its safe operation due to its proximity to a bend in the river and the presence of commercial shipping at high tide. The alternative Location C2 partly mitigates these risks. Landward of the slipway, further consideration would be needed to manage the conflict with users of the sailing club during its busy periods.

A high level comparison of the sites from a health and safety perspective is given below. The scoring system is based on 1 star being low (poor) to 5 star being high (the best).

TABLE 7.1

Comparison Table – Health and Safety

Location	Score
A - Adur Recreation Ground	★★★
B – Ferry Road	★
C – Soldiers’ Point (Location C1)	★★

8 Slipway Design Considerations

8.1 Introduction

This chapter looks at the design considerations for the slipway works at each location. The design considerations for the landside parking and access works are included in Section 5. The designs are concept level only based on existing information to hand. This section should be read alongside the options drawings included in Appendix B. No further surveys or design related investigations were undertaken as part of this commission.

8.1.1 Design Life

A 50 year design life has been adopted for the concept design. This matches the design life for the Adur Tidal Walls flood risk management scheme (this scheme provides sufficient raised height in the flood defences to protect to a 1 in 300 yr return period storm to 2064, including allowance for climate change). The future management of flood risk is not known and the slipway may need to be reconfigured around raised flood defences beyond the end of the 50-yr design life.

8.1.2 Slipway Design Criteria

8.1.2.1 Slipway Slope

Choosing the appropriate slipway slope is a balance between safety/traction (shallower preferred) and the need to float boats without uncoupling the trailer (steeper preferred). Inland waterways with smaller craft are generally around 1 in 4 to 1 in 5 slope. British Waterways recommend a 1 in 4 slope for slipways used by cars and trailers and a 1 in 8 slope for slipways using tractors or winches (British Waterways, 2006) and a 1 in 4 slope is specified on the Inland Waterways standard slipway details drawing (Inland Waterways Association, 2012). In addition, slipways of between 1 in 3.5 and 1 in 4.7 are recommended for pleasure craft by US Army Corp (2004) and California Department for Boating and Waterways (1991).

Shoreham Slipways Group have considered other slipways both locally and further afield and usually a slope between 1 in 6 and 1 in 9 is provided. For the purpose of this feasibility study, it is assumed that a slipway slope of between 1 in 6 and 1 in 7 will provide a good balance between safety and usability. This slope, when combined with good traction, will typically allow launching and retrieval without uncoupling the trailer from the towing vehicle. This permits faster operations and will increase the capacity of the slipway at busy times. Where possible it is preferable to follow the in-situ ground profile to reduce material costs.

8.1.2.2 Slipway Width

The slipway width is most influenced by the expected user groups' requirements and the need for multiple launches/retrievals to be undertaken simultaneously. The 2011 Ferry Road feasibility study (Hemsley Orrell Partnership, 2011) adopted Shoreham Slipways Group requirements for a 12m wide launch/recovery section. This requirement is considered appropriate for the expected usage and has been adopted for this study.

8.1.2.3 Slipway Length

The slipway length is mostly dependent on the location and the length required to provide a wide enough tidal access window from the flood defence level. British Standard 6349 Part 3: 2013 (BSI, 2013) suggests that the design length should not be less than 2.5 times the length of the largest vessel to be accommodated. In the case of a 25ft vessel, the minimum slipway length according BSI, 2013 would be approximately 19m. All of the slipway options considered below exceed this length.

If larger boats wanted to use the slipway for retrieval, this would be dependent on the landward access for the trailers and is outside the scope of this study.

It is possible that users of locally moored craft will wish to use the slipway to temporarily remove their boats from the water for maintenance. It is proposed that such users could be directed towards Ropetackle as this is a wide concrete slipway which could easily accommodate a couple of boats

between two consecutive high tides while work was carried out. It may also be possible to use the new slipway during slack periods and by prior arrangement with the management.

8.1.2.4 Ground Conditions

The following sources of geotechnical ground investigation data and reports have been reviewed at high level:

- Cass Hayward LLP (2011) *Connect2 Shoreham Harbour Footbridge Replacement Ground Investigation Report 6010/005 Issue 3*
- Fugro (2010) *Shoreham River Adur GI Factual Report WAL090074*

8.1.2.5 Slipway Material

Slipway surface material is a very important consideration. The surface needs to ensure good traction at all times for vehicles and pedestrians. Maintenance of the surface is key to ensure the surface can be easily cleaned of debris (weed, algae, silt, shingle etc). Regular power-washing will be required, which rules out open modular systems. The form also needs to be affordable and provide a good design life and be easy to inspect, repair and replace. It is also advantageous that the structure can tolerate future minor differential settlement, particularly at the lower ends. A concrete upper slipway was identified as being appropriate to ensure a static, affordable, and flexible long term solution with minimal maintenance requirements. For the lower slipway, a more flexible solution was deemed appropriate to allow some resistance to minor settlement and to keep the foundation size small for a quick and easy installation. The option of cable tied revetment system proposed by Hemsley Orrell for the Ferry Road site is considered an appropriate system and has been adopted for all sites.

The Hemsley Orrell report recommended a load capacity of 7.5kN/m². Loadings have not been analysed at this stage. It is recommended that ground bearing tests are undertaken for the slipway length at detailed design stage to confirm this load capacity can be met.

8.1.2.6 Details

Some means for temporarily securing floated boats for trailer retrieval/parking is required. A series of simple stainless steel mooring rings are therefore proposed at a range of heights. It is assumed that a total of 6 rings at each site are secured to the slipway surface at the outer edges at a range of heights to cater for the full range of tide heights. Whilst a floating pontoon would be preferable, it has been discounted on cost grounds at this stage, but the design allows sufficient width for such a facility to be added should funds become available.

Handrails have been discounted for all locations, with the exception of short sections of the upper slipway at Location C2 where the falls are significant. Generally, fall heights have been reduced where possible but signage is considered appropriate. Hand railing can provide additional risks to floated craft and further constrict boat/trailer handling.

To prevent vehicles from reversing over the lateral edges of the slipway, a small up-stand would be required. This would be especially important where the slipway is on located on soft ground or is more than 100 mm above the original ground level.

8.2 Location A – Adur Recreation Ground

8.2.1.1 Slipway Geometry

The main constraint on the geometry of the slipway is the need for it to cross the proposed flood defence bund at 4.99 mOD (approximately 0.8 m above the existing ground level) to ensure the level of defence is provided comprehensively along the frontage. A crest width of 6 m has been selected for this location; this is wider than the flood bund crest to ensure trailers do not become grounded on the crest.

From the crest, the slipway slopes down to meet the existing ground level before continuing to the main river channel. This slope is 1 in 5, which is steeper than the other locations to match the existing ground level and reduce cost. This is steeper than the preferred slope but within the maximum steepness (refer to Section 8.1.2.1). Consideration should be given during subsequent design phases to slacken this slope

to approximately 1 in 6 to 1 in 7 through tweaking the alignment or the geometry if this is economically possible.

The alignment of the slipway is set perpendicular to the existing car park and children's play area as this also provides a suitable alignment to the main channel (with minimal cut/fill) and away from the saltmarsh and shallows approaching the railway bridge.

8.2.1.2 Ground Conditions

Little information is available concerning the ground conditions at Location A. Geotechnical investigation for the Adur Tidal Walls flood bund did not record any data riverward of the existing informal embankment. Anecdotally, the foreshore is mostly firm muds and shingle. The design assumes that the material is relatively competent, but still requires excavation of 400mm of mud/shingle and placing a layer of hardcore under the articulated concrete mattress. It is recommended that a ground investigation should be undertaken at this site ahead of any further design work.

8.2.1.3 Slipway Material and Details

It is proposed that the upper section of the slipway will comprise a 150mm thick concrete slab and the lower section will be an articulated concrete mattress. It is proposed that both of these will be laid over 400mm of compacted hard core, which will be encased with a suitable geotextile. To ensure stability of the edges, 1m³ rock gabions will be placed along each side of the slipway until the slipway re-joins the original surface (approximately 13m from the riverward crest of slipway). The gabions will extend above the in situ concrete removing the need for a concrete up-stand along this section.

8.3 Location B – Ferry Road

The feasibility of constructing a new slipway at this location was considered previously in the report titled 'Adur Slipway: New Slipway Feasibility Report' (Hemsley Orrell Partnership, 2011). This report presented a concept design which has been taken as a basis for this 2014 study. Discussions around this design are presented in this chapter, but the Hemsley Orrell design has been taken forward as the preferred solution as the scope of this commission does not allow for further slipway design inputs at this location.

8.3.1.1 Slipway Geometry

Hemsley Orrell Partnership proposed an elevation of the 55 m long causeway at 3.73mOD (equivalent to 7.0mOD using chart datum at harbour mouth, which corresponds to 100 mm above HAT). It was recommended to lower to level to MHWS at 3.03mOD (6.3mCD). With an elevation set at 3.03mCD, the causeway would be submerged over higher spring tides and during significant surge/fluvial events. This would limit operation during these events (typically only an hour each side of high tide). As climate change impacts of rising sea levels and increased frequency of significant events are realised, the operational window would reduce into the future. Hemsley Orrell Partnership identified the opportunity to raise the causeway in the future.

Periods of submergence of the causeway would bring operational inconveniences and potential hazards due to the increased potential for the causeway to become slippery/cut off. Due to the lack of parking area at this site, it is recommended that parking is incorporated along the causeway (refer to Vehicular Access and Parking chapter, Section 5). For these reasons it is recommended that the causeway finished level remains at 3.73mOD. This level would be 100mm above HAT and would remain dry during an event corresponding to MHWS (3.03mOD) with a surge/fluvial component of 0.47m and the equivalent of 20- yrs worth of sea level rise (0.23m). Raising it further to keep it dry during more significant events is not considered appropriate due to the increased land take (increased loss of habitat), increased visual impact and the direct increase in cost, hence viability of this option.

The proposed slipway slope was set at 1in7 in the Hemsley Orrell Partnership report, which lies within the preferred range. The overall length of the slipway from the flood defence line to the bottom of the slipway is approximately 95m.

The alignment of the slipway from Hemsley Orrell report has been adopted.

8.3.1.2 Ground Conditions

The ground conditions at this site are poor. Ground investigation data is available relatively close to the proposed slipway alignment from the recent footbridge construction. Generally the slipway alignment would be sited on upper layers of “recent alluvium” (refer to window samples WS1, WS2 & WS2 and borehole BHD in the footbridge ground investigation report (Cass Hayward, 2011)). This material is described as “very soft, dark grey, organic, slightly plastic, gravelly clay. With depth it graded into a grey, silty fine sand, which had a strong organic odour”. This organic layer increases in thickness from the bank towards the channel from “0.4m in WS01 to 4.9m in WS02 and 3.9m in WS 03”. Borehole BHD is close to the proposed slipway alignment. However, it describes 0.4m of made ground “sandy/clayey gravels of flint, brick and concrete”, suggesting that this is located on the old causeway alignment. The made ground at BHD overlays 3m of alluvium described as soft, grey, silty clay with fine to coarse gravels. The report describes “Dynamic probing in the alluvial deposits recorded equivalent SPT N values of 0 for the upper slay increasing to 2 to 4 with depth”. This equates to soft, incompetent material. These deposits form the alluvial flats which extend across the area of the proposed slipway alignment. The alluvium overlays gravelly beach deposits, which in turn overlay chalk at depth approximately 10m.

The other uncertainty regarding the foundations of a slipway on this alignment is the scour hole in the vicinity of the launch/retrieval area of the slipway (located on the main channel bank at the edge of the alluvial flats). This risk is well documented in the Hemsley Orrell Partnership (2011) where it was thought that this originated from historic dredging. An alternative potential cause has been highlighted through Shoreham Slipways Group that the instability was caused by Hairy Crabs burrowing into the bank. Regardless of the cause, this remains a risk for instabilities during construction and in the future, but this risk might be at least partly mitigated through dredging restrictions in the main channel.

Due to the depth of the alluvium it is not considered feasible to excavate down to competent material for the slipway foundations. Piled foundations into the chalk would be technically viable, but would be prohibitively expensive over such a length. The foundation design proposed by Hemsley Orrell has been taken forward, comprising hardcore layer wrapped in a suitable geotextile. The use of a temporary rock causeway over the foreshore for the construction of the footbridge provides some confidence in this assumption.

It is noted that the adjacent existing causeway appears to be relatively stable and may comprise 0.4 m of made ground, equivalent to the Hemsley Orrell design. At detailed design, consideration should be given to running the causeway along this alignment where any settlement may already have already occurred, thus giving a more stable foundation. However, this would need more detailed geotechnical investigation as this will increase the potential for differential settlement. This deviation may require a change in alignment at the end of the slipway to avoid the scour hole (but this would add to the difficulty of this long reverse).

Should this site be identified as the preferred option, it is recommended that the detailed design is preceded by specialist geotechnical investigations to confirm the viability of the Hemsley Orrell design, both in terms of load capacity of the alluvium and stability assessment of the scoured bank.

8.3.1.3 Slipway Material and Details

The proposed slipway construction of cable connected blocks would provide good slip resistance and would be relatively easy to clean. To facilitate the cleaning (with powerwash), it is recommended that a cable tied block with narrow gaps is used to avoid wash out of fines during cleaning. This construction form is also relatively lightweight, thus reducing the structure self-weight on the soft ground. Whilst cable tied blocks are generally less sensitive to settlement than solid concrete construction, the design life of such a system could be radically reduced if differential settlement becomes significant.

Hemsley Orrell Partnership (2011) recommended the installation of a kerb along the causeway length. This is considered appropriate due to the potential length that trailers would have to be reversed at this location and the drop either side.

8.4 Location C – Soldiers’ Point

Two options have been considered for Location C: Option C1 adjacent to Shoreham Sailing Club and Option C2 adjacent to Shoreham Harbour Club. These locations are very close to each other (approximately 140m apart) and many of the design considerations are the same for both Options.

8.4.1.1 Slipway Geometry

The slipway slopes at C1 and C2 have been set to align broadly with the existing levels. At C1 and C2, the upper slipway slope is set at 1 in 6 (for high tide access). At C1, to match the overall foreshore slope a gradient of 1 in 9 is specified, which is on the limits of what Shoreham Slipways Group have advised as a minimum slope. At C2 the lower foreshore is considered too flat and will limit the ability to launch at lower tides without de-coupling trailers. Should either of these slipway locations be progressed, it is recommended that the slopes are optimised through altering the slipway alignment or geometry.

8.4.1.2 Ground Conditions

There is little geotechnical information available regarding the ground conditions at Location C. The only information is from Fugro (2010) from a dynamic probe at the approximate location of the end of the slipway at Location C1 and another in the mid-beach at C2. These both show relatively weak material for the upper 2m of material. The material for the main route of C1 appears to be shingle and as it may not be appropriate to remove such a thickness of material close to a dredged channel, no hardcore under-layer has been allowed for beneath the concrete mattress. There is a risk that a regulating layer could be required. A geotechnical site investigation would be required to further develop the design at either of these locations to manage any geotechnical risks.

8.4.1.3 Slipway Material and Details

Option C1 includes a row of 1 m³ gabions either side of the upper slipway to provide a retaining function and to ensure the upper section of the slipway is clearly delineated. This will also serve as an up-stand to prevent reversing vehicles from going over the edge of the slipway. It is proposed that these gabions are extended on the eastern edge of the slipway into the lower slipway such that they will act as a small retaining structure for any shingle migrating towards the slipway. This will reduce future maintenance requirements for clearing the slipway of shingle, but this type of structure would only take a limited build-up of shingle before more extensive management of shingle would be required (removal using plant). The risk of shingle migration is dependent on the engineering option progressed for the Adur Tidal Walls scheme (Section 3.2). The impact of this scheme on geomorphology is briefly discussed in Section 6.5. The gabions will limit the impact of small shingle movements, but a risk contingency may be appropriate should more significant clearance of shingle be required to maintain the slipway (Section 0).

Option C2 is essentially proposed as an alternative location, should the risks associated with C1 become realised and be too significant to manage (risk of shingle movements and the risk of unresolvable navigational H&S conflict with the port operations). This option extends from the footway out over the existing revetment before sloping down to the foreshore. This upper section is up to 3 m above the foreshore and therefore to safely support the slipway edges of the upper section of the slipway, piling will be required. It is proposed that steel sheet piles are used, which will be cross tied to wallings each side to minimise the required toe embedment. The piled area will be backfilled with compacted hardcore before the 150mm thick in-situ slab is laid. There is a risk of increased wave reflections at this vertical structure which would need to be considered at detailed design. The lower section of the slipway is an articulated concrete mattress laid directly on a geotextile, but there is a risk that a regulating layer would be required.

8.5 Summary and Site Comparison for Slipway Design Considerations

At Location A, the engineering requirements are relatively simple and the engineering risks are relatively small. The geotechnical risk is considered relatively low and there may be the opportunity to rationalise the foundations at detailed design. The design utilises rock gabions (proposed locally for the Adur Tidal

walls scheme) for the upper section of the slope to ensure there is not a large drop along the side of the slipway and to formalise the edge.

At Location B, an engineering solution is considered feasible. However, ground conditions are poor and there is a significant geotechnical risk. Additionally, a larger volume of materials will be required to raise the slipway's approach causeway to a level which remains accessible on most tides over the slipway's design life.

At Location C1, ground conditions are unconfirmed, but there is concern that ground may be weak for the lower slipway sections. Limited site investigations suggests that the ground may be weak at depth at location C2 and there is a risk that a more robust geotechnical solution would be required. Each of these locations will require some stabilisation of the sides of the slipway through gabions and piles for Options C1 and C2 respectively. The engineering for Location C1 is relatively simple and construction risks are relatively small. However, the engineering inputs required should shingle mobilisation become a problem could be significant. Engineering risks associated with piling for Location C2 are more elevated as this is a more complex engineering solution.

A high level comparison of the sites from an engineering design perspective is given below. The scoring system is based on 1 star being low (poor) to 5 star being high (the best).

TABLE 8.1

Comparison Table – Engineering Design

Location	Score
A - Adur Recreation Ground	★★★★★
B – Ferry Road	★★
C – Soldiers' Point (Location C1)	★★★

9 Operation and Management

9.1 Introduction

Slipways around the country have varying levels of management. They range from slipways that are permanently manned with full control of users and payment, through to free slipways which have no payment mechanism and little control.

A management system is considered appropriate for any new slipway in the River Adur for the following key reasons:

- Safety of other waterway users through enforcement of safe operational practices, both on and off the water. A level of control will set the tone for visitors to use the facility and waterway sensibly and safely. A control mechanism will also provide options in the event that a certain individual needs to be turned away due to previously reported unsafe actions. Shoreham Port Authority have requested some form of management to this effect.
- A management system integrated with parking provision will link to a payment mechanism, which will fund the maintenance of the facility and potential future upgrades. This payment mechanism can be optimised into the future to manage user type and visitor numbers. Refer to Section 0 for potential revenue.

In addition, a management system could integrate the following:

- Isolate the slipway parking areas.
- Provide security for parked cars and trailers.
- Control how long vehicles and trailers remain on site.

Management and payment systems will likely differ at each potential location. Shoreham Port Authority has confirmed that they would not be seeking harbour dues for leisure users of a new public slipway, but they would expect an appropriate management system to be in place.

9.2 Location A – Adur Recreation Ground

There is currently much scope for extending the parking areas and creating a segregated area for slipway users at this location in combination with a payment system. A segregated parking area would be advantageous in that the provision of parking would be more predictable. Security of vehicles and trailers could also be incorporated.

A significant advantage to this location is the close proximity to Adur Outdoor Activity Centre (AOAC). They have indicated that the management of a public slipway could be incorporated into their control and there may be volunteers who would consider managing the facility with a physical presence, at least part-time during the busy periods. Their reception area is open from 9am to 10pm weekdays and 9am to 5pm weekends, which would cover most periods for which the slipway would be used. However, it is also important to cater for slipway usage when AOAC is closed.

There is scope at the site to provide a layby for slipway users to pull off the road, make payment and access the slipway site. A simple keypad or card system could be used to control a car park barrier. This is a more robust system of management than any solution which relies on automated systems. In addition, it could bring an additional revenue stream into the centre, both through launching fees and through the centre's cafe. The public slipway area and parking could be leased to the centre and fully managed by them. The centre and the scout centre may wish to use the slipway for their use as it would provide access at lower tide levels than their current slipway. However, use by the public should remain as a priority. The centre has indicated that their current CCTV system could be extended to incorporate the slipway area, thus further increasing security and control mechanisms.

9.3 Location B – Ferry Road

The potential conflict between slipway users and the general public at this site will require a robust management system for this location. There is the possibility that one of the local businesses could take on the collection of payment for the slipway, but opening hours and lack of suitable experience could prevent identification of a suitable non-automated management solution. The alternative would be to use a fully automated system of some kind. There are numerous automated systems which are used for car parks which could be applicable. Such a system would likely have to incorporate a barrier at the entrance to the causeway. This is due to the requirement to maintain public access to the houseboats at all times.

Organisation of such a system at this site would require detailed consideration. With all automated systems there will not be flexibility within the system and the control of the slipway may require extension of the CCTV to a centralised system at West Sussex County Council, Adur District Council or Shoreham Port Authority in order to maintain further control. Controlling the number of users on the slipway would be difficult to achieve from an automated system.

9.4 Location C – Soldiers’ Point

This location is remote from any local organisations of businesses. The only exception is the Shoreham Sailing Club, but this has very restricted opening hours. Therefore it would largely rely on an automated system as described for Location B.. There would be the potential to provide some segregated slipway parking at this area linked to a gate system. However, it may be more appropriate to adopt a pay and display system. Without segregated parking areas then identification of slipway users would not be feasible and control of collection of launching fees would likely prove difficult. This would require more detailed consideration should this site be progressed.

Shoreham Port Authority would require a robust management system to be in place for this site in particular due to potential conflict with commercial shipping and the sites proximity to a bend in the river. SPA have advised that the slipway should be at least part-managed with someone on site, even if this is in combination with an automated system. Providing such supervision could be difficult to achieve at this site.

9.5 Summary and Site Comparison for Operation and Management

Robust management options may be available at Location A through the Adur Outdoor Activity Centre. Location B and C potentially require more control to ensure the facilities remain well run and safe. However, these site will likely have to use automated control systems that will require increased up-front expenditure and maintenance commitments.

A high level comparison of the sites from an operational and management perspective is given below. The scoring system is based on 1 star being low (poor) to 5 star being high (the best).

TABLE 9.1

Comparison Table – Operation and Management

Location	Score
A - Adur Recreation Ground	★★★★★
B – Ferry Road	★★★
C – Soldiers’ Point	★★

10 Cost and Construction Risk

10.1 Introduction

This chapter considers the costs of the concept design for each option presented in Section 8. The drawings (see Appendix B) have been priced using information gained from previous projects and engineering cost books such as Spon's Civil Engineering Cost Handbook. Where information is not readily available or further design is required to inform the costs, a reasonable estimate has been made.

In all options, it has been assumed that stainless steel cables will be used to link the Dycel articulated concrete mattress together, but a cheaper polyester system is available.

The most likely sources of risk to the budget of this project are: (1) ground conditions being different to those anticipated, thereby requiring a more substantial and costly design or opportunities for value engineering; and (2) not raising funds for the project sufficiently promptly to generate efficiency savings by developing the design alongside the Adur Tidal Walls project.

An optimism bias of 40% has been selected to provide a contingency to these costs. This is less than the 60% Treasury recommendation but this reflects the relative construction simplicity of these works and the overall level of understanding of the issues at each site.

10.2 Location A – Adur Recreation Ground

The costs for Location A are summarised in Table 10.1. Location A comprises a 40 m slipway (including on-ramp and embankment crest), of which 23 m is in-situ concrete and 17 m is a Dycel articulated concrete mattress. A row of gabions are used either side of the upper portion of the slipway where the difference between the slipway finished level and the existing ground level is greater; 1 m³ gabions have been selected as these are a standard size and are sufficiently high to provide an up-stand on the slipway finished level. It has been assumed that the gabions along the toe of the Adur Tidal Walls embankment will be paid for within that project, as these would have been factored into their costings.

TABLE 10.1

Major Costs for Location A – Adur Recreation Ground

Cost Type	Cost (£)
Contractor General Costs	13,894
Activities and Materials	87,538
Labour	20,588
Site Investigation	2,000
Detailed Design and Tender Documentation	12,402
<i>Subtotal</i>	<i>136,423</i>
<i>Subtotal with SPONS Price Adjustment +11% for small works <£3m</i>	<i>151,430</i>
Optimism Bias Contingency (40%)	54,569
Total	205,999

A total of £88k of potential savings have been identified for this location (includes associated reduction in SPONS 11% uplift and Optimism Bias):

- Following the site investigation, the ground conditions may be better than assumed, reducing the amount of hardcore required to underlie the articulated mattress; this could save approximately £4k.

- Changing the stainless steel cables in the mattress to polyester cables would save approximately £6k.
- Removing the tarmac finishing to the car parking areas approximately £30k.
- Under the Adur Tidal Walls project, a number of efficiency-savings could be achieved with a total saving of up to £47k.

10.3 Location B – Ferry Road

The costs for Location B are summarised in Table 10.2. This is the most expensive option as the slipway at this location is the longest (94 m) and additionally requires a causeway to be built up above the existing ground level to provide access to the slipway over the full tidal cycle.

TABLE 10.2

Major Costs for Location B – Ferry Road

Cost Type	Cost (£)
Contractor General Costs	24,212
Activities and Materials	153,041
Labour	35,379
Site Investigation	2,000
Detailed Design and Tender Documentation	21,463
<i>Subtotal</i>	<i>236,095</i>
<i>Subtotal with SPONS Price Adjustment +11% for small works <£3m</i>	<i>262,066</i>
Optimism Bias Contingency (40%)	94,438
Total	356,504

A total of £95k of potential savings have been identified for this location (includes associated reduction in SPONS 11% uplift and Optimism Bias):

- Changing the stainless steel cables in the mattress to polyester cables would save approximately £14k.
- Under the Adur Tidal Walls project, a number of efficiency-savings could be achieved with a total saving of up to £80k.

10.4 Location C – Soldiers' Point

At Location C, two options have been considered; one at the eastern end of Harbour Way, adjacent to Shoreham Sailing Club; and the second adjacent to Shoreham Harbour Club. The former, Option C1, comprises an in-situ reinforced concrete upper slope with gabions and a Dycel articulated mattress on the lower slope. The Dycel mattress is underlain by a geotextile, which is placed directly on the existing shingle. The upper section of Option C2 is piled, filled with hardcore and overlain by in-situ reinforced concrete. The lower slope is a Dycel articulated mattress and geotextile, laid directly on shingle.

TABLE 10.3

Major Costs for Location C1 – Soldiers’ Point (downstream location)

Cost Type	Cost (£)
Contractor General Costs	15,751
Activities and Materials	101,987
Labour	20,588
Site Investigation	2,000
Detailed Design and Tender Documentation	14,033
<i>Subtotal</i>	<i>154,359</i>
<i>Subtotal with SPONS Price Adjustment +11% for small works <£3m</i>	<i>171,338</i>
Optimism Bias Contingency (40%)	61,743
Total	233,082

A total of £68k of potential savings have been identified for this location (includes associated reduction in SPONS 11% uplift and Optimism Bias):

- Changing the stainless steel cables in the mattress to polyester cables would save approximately £17k.
- Under the Adur Tidal Walls project, a number of efficiency-savings could be achieved with a total saving of up to £50k.

TABLE 10.4

Major Costs for Location C2 – Soldiers’ Point (upstream location)

Cost Type	Cost (£)
Contractor General Costs	25919
Activities and Materials	160527
Labour	41176.8
Site Investigation	2,000
Detailed Design and Tender Documentation	22,962
<i>Subtotal</i>	<i>252,585</i>
<i>Subtotal with SPONS Price Adjustment +11% for small works <£3m</i>	<i>280,370</i>
Optimism Bias Contingency (40%)	101,034
Total	381,404

A total of £89k of potential savings have been identified for this location:

- Changing the stainless steel cables in the mattress to polyester cables would save approximately £18k.
- Under the Adur Tidal Walls project, a number of efficiency-savings could be achieved with a total saving of up to £71k.

10.5 Summary and Site Comparison for Cost and Construction Risk

The four options detailed above are summarised in Table 10.5.

TABLE 10.5

Summary of Option Total Costs

Option	Total Estimated Cost £	Potential Saving (Upper end estimate if all savings are realised)		
		Potential Saving, £	Potential Saving, %	Potential Revised Cost
Location A – Adur Recreation Site	206,000	88,000	43	118,000
Location B – Ferry Road	357,000	95,000	27	262,000
Location C – Soldiers’ Point, Option 1	233,000	68,000	29	165,000
Location C – Soldiers’ Point, Option 2	381,000	89,000	23	292,000

A high level comparison of the sites from a cost and construction risk cost perspective is given below. The scoring system is based on 1 star being low (poor) to 5 star being high (the best).

TABLE 10.6

Comparison Table – Cost and Construction Risk

Location	Score
A - Adur Recreation Ground	★★★★★
B – Ferry Road	★★
C – Soldiers’ Point (Location C1)	★★★★

11 Land Ownership, Planning Considerations and Consents

11.1 Introduction

As with many coastal towns, riverside space at Shoreham is at a premium. Much of the river frontage has been outlined for redevelopment, reflecting the fact that the Western Harbour Arm of Shoreham Port is slowly transitioning from commercial port related activity towards housing and leisure. The transformation of the Western Harbour Arm is to include 1,050 new homes, new and improved social and community facilities and new and improved marine leisure facilities. The commitment to improving the facilities is highlighted in the Recreation and Leisure policy in the Joint-Area Action Plan (Paragraph 3.9.7, ADC, 2014). Due to the projected change in land use of the riverside frontage, the opportunities to provide public amenities such as a slipway may diminish as time progresses.

The main land-owners of the potential slipway sites are the Angmering Park Estate (Trustees of the Duke of Norfolk Estate) below Mean High Water Springs and West Sussex CC, Adur DC or Shoreham Port Authority above Mean High Water Springs. Angmering Park Estate are unlikely to object to a proposed slipway, but may want compensation for loss of bed area or rent for use of the river bed. The existing slipways and public hards are the responsibility of West Sussex CC above Mean High Water Springs as they form part of the highway.

Future land ownership of the slipway facility would have to be agreed between the respective organisations and may be linked to the management of the slipway.

The key consents that would be required for the slipway are a Marine Licence, Flood Defence Consent and Planning Permission. Each of these consents will require supporting documentation to show that the project complies with national and international legislation such as the Habitats Directive, the Water Resources Act and the Water Framework Directive.

A **Marine Licence** is required for all works below Mean High Water Springs and can be acquired through application to the Marine Management Organisation. To apply for this licence, it will be necessary to have a Habitats Assessment prepared and conduct a Water Framework Directive appraisal. The consenting process takes approximately 13 weeks and will require compensatory habitat where mudflat/saltmarsh is disturbed. The effect on intertidal habitats is discussed further in Chapter 4.

Flood Defence consent from the Environment Agency is required to do work on or near a river, flood or existing sea defences. An application form will need to be completed and plans and cross-sections submitted to the Environment Agency for approval. A large benefit of the slipway detailed design being developed within the Adur Tidal Walls Project is that it will be easier to demonstrate compliance.

Planning permission is required if any part of the new structure is within the local planning authority's area of jurisdiction. The access and parking for all sites will require planning permission from the relevant local authority.

Landowner Consent is also required. This includes the Angmering Park Estate (trustees of the Duke of Norfolk Estate) who are the landowner for much of the River Adur; the other landowners are either the Local Authority or Shoreham Port Authority.

The **Water Resources Act** (1991) regulates water resources, quality and pollution and flood defence. To comply with this Act, the project must not cause any deterioration of the water quality or ecosystems in the River Adur or the surrounding area.

11.2 Location A – Adur Recreation Ground

Above Mean High Water, the Adur Recreation Ground, including the access road, car parks and the Adur Outdoor Activity Centre (AOAC) site is owned by Adur District Council (ADC). The site of the AOAC centre is leased by ADC to West Sussex County Council (WSCC), who in turn have an agreement with AOAC, although maintenance obligations remain with WSCC. Below Mean High Water, the foreshore is owned

by Angmering Park Estate. The foreshore between the A259 road bridge and the railway bridge is leased to Adur Cruising Association (ACA) under a 5-year rolling lease, which has been in operation for over 40-years.

Land ownership issues are unlikely to prevent a slipway progressing at this site due to the overall support of a slipway at this location by ADC, WSCC, AOAC and ACA. However, the ownership and lease arrangements at the site would require due consideration.

The presence of AOAC nearby could potentially offer an opportunity for management of a slipway at this site (Section 9). If this slipway progressed with management via AOAC, there would be a need to agree the land-ownership and leasing arrangements. The following options could be explored:

- Angmering Park Estate have suggested that a land swap is progressed as discussed between ACA, Shoreham Slipways Group and WSCC, possibly about 3-years ago. This would involve transferring the ownership of a small strip of land currently owned by WSCC adjacent to the A259 road bridge (for construction access) to Angmering Park Estate. In return they would transfer the area required for the slipway to WSCC. The lease arrangement to stay as current, but with minor amends. This is considered a win-win solution for everyone to simplify land ownership in the area.
- Above Mean High Water, ADC could retain land ownership, but lease area to WSCC, who could in turn set up an extension in the agreement with AOAC for area above and below high water. As part of this arrangement it is considered that Adur District council would continue to operate the non-slipway parking areas and maintain the approach road as existing.

Planning permission and land agreements for this site could potentially be combined with the submission for the Adur Tidal Walls. This site is understood to have the lowest risk of planning-related objections and conditions, subject to satisfying the environmental aspects (Section 4). However, there are plans for upgrading the existing recreational facilities around this site and interfaces with any such developments would need to be managed. There is an approved 2006 planning application for Adur Athletics FC to build a clubhouse and upgrade the pitches. It is understood that this is unlikely to progress and their site is outside of the proposed slipway site. There are also plans to upgrade the BMX track. If any of these plans develop, then this may bring opportunities for co-ordinating efforts.

The Shoreham Beach Neighbourhood Plan is in the early stages of being drafted. This will have support from Shoreham Residents Association, local councillors, local businesses and residents. It is anticipated that such a group would favour this location over the other sites where there is a potential business and residential conflict.

11.3 Location B – Ferry Road

Above Mean High Water Springs, the Riverside Car Park, which is adjacent to the Ferry Road slipway site is owned by Adur District Council. Below Mean High Water Springs, it is understood that the river bed is owned by West Sussex County Council (as part of land acquisition for the footbridge). The car park is being redeveloped following the completion of the new Ferry Road footbridge to accommodate the safe passage of pedestrians and cyclists. The current plan for the car park incorporates access to the houseboats, the proposed slipway area and open amenity area. The most up-to-date plan for this area is included in Appendix A.

Outline planning permission for a slipway at this location has previously been applied for and approved, subject to the following conditions (Adur District Council, 2012):

- Submission by the applicants of satisfactory information regarding the impact on the mudflat habitat and details of proposed mitigation, including consideration of the advice of the Environment Agency and Natural England on the mitigation's acceptability.
- Submission by the applicants of a satisfactory amended plan showing the revisions agreed as necessary to address the highway safety issue (including a Stage 1 Road Safety Audit and designer's response) and consideration of the final advice from WSCC.

- Clarification as to where future maintenance responsibility would lie.

The principal change in the design of the slipway is the provision of trailer parking on the slipway. This change may require a re-submission of the planning application.

As outlined in Section 3.3, there is likely to be public resistance to a slipway sited at this location due to direct conflict with the proposed public realm improvements under the Ferry Road Scheme. The access to the slipway would require alterations to the Ferry Road Scheme proposals, which may lead to wider public consultation.

11.4 Location C – Soldiers’ Point

Above Mean High Water Springs, the shoreline is owned by Shoreham Port Authority and the highway is owned by West Sussex County Council. It is understood that the area below Mean High Water Springs required for the slipway is also owned by Shoreham Port Authority.

Landowner agreement from Shoreham Port Authority would likely be subject to agreement of appropriate slipway management measures to safely operate the site, particularly as this location is close to the bend in the river.

Planning permission for this site could potentially be combined with the submission for the Adur Tidal Walls. Obtaining permission for this site may prove more difficult in comparison to the other sites. There are potentially highways related issues (manoeuvring towing vehicles off the road) and parking (some of which may be used by local residents). This is a largely residential area and there may be local resistance to such a facility, possibly targeted on the visual and noise impacts, and parking. The sailing club as an adjacent landowner will likely have particular concerns regarding parking (Section 5.4).

11.5 Summary and Site Comparison for Land Ownership, Planning Considerations and Consents

The river bed of the Adur (below Mean High Water Springs) is owned by either West Sussex County Council, Shoreham Port Authority or Angmering Park Estate. The landward areas are owned by Shoreham Port Authority, West Sussex County Council and Adur District Council. None of the three locations pose any particular risks with regards to land ownership. Location B has previously has received planning permission for the construction of a slipway, subject to a number of conditions.

A high level comparison of the sites from a landownership, planning considerations and consents perspective is given below. The scoring system is based on 1 star being low (poor) to 5 star being high (the best).

TABLE 11.1

Comparison Table – landownership, planning considerations and consents

Location	Score
A - Adur Recreation Ground	★★★★
B – Ferry Road	★★
C – Soldiers’ Point	★★★

12 Consultation and Stakeholder Support

12.1 Introduction

Prior to this commission, there have been consultations with stakeholders and press coverage discussing the need for a new slipway in the River Adur. Shoreham Slipways Group have had regular committee meetings and meetings with various organisations. Overall there is strong support for a slipway, but gaining consensus on the location and operational arrangements has been difficult to achieve.

The consultation undertaken during this feasibility study has been centred on the key stakeholders listed below. CH2M Hill presented the draft report and associated drawings at a stakeholder meeting.

TABLE 12.1

Key Stakeholders

Stakeholder	Who/Department	Type	Interest and reason for Consultation
Adur Cruising Association	Chairman	Tenant	Foreshore lease from Angmering Park Estates at Location A
Adur and Worthing Councils	Engineering (Technical Services)	Local Authority and Landowner	Local Planning Authority Landowner for Location A
	Planning, Regeneration & Wellbeing		Scheme promoter for Ferry Road redevelopment
	Parking services		
	Environmental Health		
	Estates Officer		
	Parks & Foreshore		
	Planning (Development Management)		
Adur Outdoor Activities Centre	Chairman	River User	Potential management of a slipway at Location A
Angmering Park Estate	Land Agent	Landowner	Foreshore owner Location A
Environment Agency	Project Manager of Adur Tidal Walls scheme	Statutory Consultee	Promoter of Adur Tidal Walls flood defence scheme
			Statutory consultee for MMO, WFD, WRA
Shoreham Port Authority	Port Engineers	Landowner and Harbourmaster	Landowner for Locations B and C
	Harbourmaster		
Shoreham Harbour Regeneration Partnership	Planning	Local Authority	Links to town's wider regeneration aspirations
Shoreham Slipways Group	Committee	Local Group	Provision of background data and representation from user groups
West Sussex County Council	Highways	Local Authority and Landowner	Landowner for Locations B and C
	County Local Committee Chairman		
	Local Principal Community Officer		

12.2 Location A – Adur Recreation Ground

The following summarised the key feedback from various stakeholders for this site.

- Support
 - District engineer’s (Engineering, Adur and Worthing councils) preferred location as best savings with Adur Tidal Walls project can be achieved.
 - Preferred location. Good opportunity to bring added benefit to local businesses as within walking distance of the town centre (Planning, Adur and Worthing councils).
 - Shoreham Beach Neighbourhood Plan most likely to support this site (Planning, Adur and Worthing councils).
 - Supports site going forward and happy to enter into discussion about AOAC managing the facility (AOAC).
 - Considered best location for a public slipway and supports it (Adur Cruising Association).
 - Land ownership can be agreed at no cost (other than approximately £1k of legal costs) through a land swap with WSCC (Angmering Park Estates).
 - Preferred location (Shoreham Port Authority).
- Concerns
 - High contamination risk due to historic landfill, with potential asbestos (Environmental Health, Adur and Worthing councils). It is assumed that the Adur Tidal Walls scheme will address any contamination issues related to this site.
 - Loss of parking provision, H&S at playground and re-siting the Emergency Planning Container (Support Services, Adur & Worthing councils).
 - Access into site, parking, H&S at playground and flow speeds (AOAC).

12.3 Location B – Ferry Road

The following summarised the key feedback from various stakeholders for this site.

- Support
 - This site is considered a preferred option by some members of the Shoreham Slipways Group and has conditional planning application (Shoreham Slipways Group).
- Concerns
 - Parking for slipway would be exceptionally tricky to manage and potential loss of revenue to local business going forward (Parking Services, Adur and Worthing councils).
 - Redevelopment of the area is imminent, placing more constraints on a slipway at this location (Engineering, Adur & Worthing Council).
 - Space and use conflict (Planning, Adur and Worthing councils).

12.4 Location C – Soldiers’ Point

The following summarised the key feedback from various stakeholders for this site.

- Support
 - Provides the best tidal access and access to the open sea (Shoreham Slipways Group and AOAC).
- Concerns
 - Navigational safety on the bend is a concern and this location would require a robust management system to minimise risks (Harbourmaster, Shoreham Port Authority).

- Potential parking conflict with Shoreham Sailing Club is a key area of concern (Shoreham Slipways Group).
- Concerns with visual impact and likely to attract more public scrutiny (Planning, Adur and Worthing councils).

12.5 Summary and Site Comparison for Consultation and Stakeholder Support

Overall, Location A has received the most positive support from a range of stakeholders. Location B has received some significant opposition. There are some areas of concern that need to be addressed for any site that is taken forward.

A high level comparison of the sites from a stakeholder perspective is given below. The scoring system is based on 1 star being low (poor) to 5 star being high (the best).

TABLE 12.2

Comparison Table – Consultation and Public/Stakeholder Support

Location	Score
A - Adur Recreation Ground	★★★★
B – Ferry Road	★★
C – Soldiers’ Point	★★★

13 Options Appraisal

13.1 Options Comparison

The preceding chapters have considered the variables that feed into the options appraisal. Table 13.1 summarises the scores previously allocated to each of the main topic areas. It must be noted that some of the scoring is subjective, but the scores have been rationalised by the stakeholders at the stakeholder meeting. There are not considered to be any showstoppers for any of the locations. The scoring system is based on 1 star being low (poor) to 5 star being high (the best or most favourable).

TABLE 13.1

Overall Option Comparison

Criteria	Location A – Adur Recreation Ground	Location B – Ferry Road	Location C – Soldiers' Point
Environmental Impact	★★★	★★★	★★★★★
Vehicular Access & Parking	★★★	★	★★
Tidal and Flow Considerations	★★★	★★★	★★★
Health and Safety	★★★	★	★★
Design Considerations	★★★★★	★★	★★★
Operation and Management	★★★★★	★★★	★★
Cost and Risk	★★★★★	★★	★★★★★
Landownership, Planning & Consents	★★★★★	★★	★★★
Consultation and Public/Political Support	★★★★★	★★	★★★
Overall Average	★★★★	★★	★★★

13.2 Preferred Option

Location A is recommended as the location to take forward to design stage. This was confirmed at the stakeholder meeting and has strong backing from the wider stakeholders. Should for any reason Location A not be able to be taken forward, then Location C should be considered as the next best option.

14 Next steps

14.1 Next Steps and Recommendations

The following next steps are recommended to progress the scheme alongside the Adur Tidal Walls project:

Funding

- Identify and secure funding sources as a priority (refer to Section 14.2). This is urgent to realise the savings associated with delivering this scheme as part of the Adur Tidal Walls scheme as the Environment Agency require a commitment to funding by early January 2015. This will allow time for the slipway design to be incorporated into their flood defence works package prior to the design freeze preceding the EIA/Planning Permission/MMO licence process, which commences in early Spring 2015. The main stakeholders will need to agree a fund-raising strategy to meet the cost of the slipway to deliver it.
- Depending on the potential funding partners, more work may be required to outline the business case supporting a slipway in any location, particularly at the preferred option of Location A. Consider approaching tourism and regeneration specialists at Adur & Worthing Councils for ideas on maximising the indirect benefits of the scheme and to explore other potential funding sources.

Further Consultation and Agreements

- WSCC to present this report's findings to council committees so that members are informed and aware of the timeframes.
- Meeting between key Adur Recreation Ground stakeholders to agree the management approach (including payment mechanism) and confirm site ownership and maintenance responsibilities. Attendees to include Adur DC as landowner (of site and approach roads), Angmering Park Estates as owners of the foreshore, WSCC as lease holders and AOAC as potential managers. It is important that a clear vision of the management requirements during the operational life of the slipway be agreed prior to commencing detailed design in January 2015 as the decision may have some impact on the final design.
- Identify a new location for the container that is currently located at the Adur Recreation Ground car park (for emergency response vehicles).
- Meeting with Environment Agency to confirm programme, costs and next steps. Anticipated that Environment Agency obtain Marine License, Planning Permission and other consents for the slipway site with accompanying Environmental Impact Assessment.
- Continued land ownership negotiations ending up with new legal agreements.
- Further consultation with parking officers at Adur and Worthing Councils to agree parking provision at the slipway site.
- Liaison with Sea Scouts to outline plans.

Design, Consents and Programme

- If the scheme is developed as part of the Adur Tidal Walls scheme it is recommended that the Environment Agency's appointed designer reviews the concept design for Location A and their Early Contractor Involvement (ECI) supplier reviews the costs.
- During the development of the detailed design the risk identified in the designer's risk assessment in Appendix D should be considered to see if further mitigation can be identified. In particular risks associated with the new footpath/cycleway and the close proximity of the children's playground should be considered. The slipway slope would benefit if it can be slackened to at least 1 in 6 to 1 in

7, which will require additional level information along the proposed alignment to confirm. The slipway design, in particular the slope, will need to be agreed with the harbourmaster.

- Undertake basic geotechnical site investigation along the proposed slipway alignment to check bearing capacity and potentially rationalise the design.
- Confirm compensatory intertidal habitat can be provided as part of the Adur Tidal Walls scheme.

14.2 Funding Options to Consider

There is unlikely to be a single funding source and funding is likely to come from a range of sources. Possible funding sources to be investigated are as follows:

- WSCC infrastructure grants.
- County Local Committee funding.
- Adur and Worthing Councils – various.
- Environment Agency (would likely only be mitigation/cost saving/sharing opportunities).
- S106 agreements (e.g. Morrison's Supermarkets previously pledged £15k).
- Lottery Funding.
- Private sponsors such as land-fill tax rebate schemes operated by Biffa, Veolia.
- Possible voluntary effort from the Waterways Recovery Group either to work directly on the slipway or to provide related effort.

15 References

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Divider

Appendix A - Selected Reference Drawings

Adur DC plan of proposals at Ferry Road site

Selected Adur Tidal Walls engineering scheme plans (Outline Design)

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Appendix B - Option Drawings

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Appendix C - Option Costing Spreadsheet

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**Appendix D – Designer’s Risk Assessment
(preferred option only - Location A)**
