On-the-Ocean Pool at Hasel Harbour, Denmark

WHITE ROCK PIER
ON-THE-OCEAN POOL BRIEF

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January 2021

White Rock Pier

INTRODUCTION

The purpose of this brief is to provide a high-level overview of the potential scope and costs for an on-the-ocean pool located at White Rock Pier. This brief will review the following:

- What is an “on-the-ocean” pool?
- Examples of on-the-ocean pools
- Potential programme scope for an on-the-ocean pool
- Estimated construction costs
- Issues for attention at the White Rock pier site

WHAT IS AN “ON-THE-OCEAN” POOL?

On-the-ocean pools (OP’s) are essentially outdoor pools that utilize natural bodies of water as their “pool tank”. OP’s can be located on not not just ocean water but any body of water. The have been located on lakes, rivers, and even artificially constructed outdoor water courses (usually fed by a natural source of water).

Part of the reason for this type of pool is to use a large body of water as a natural filtration system. Like ocean or lake bathing/swimming, the natural movement of the water constantly provides refreshed water to the “pool tank”. Some OP’s do use treated and heated water, but these types of OP’s are generally floating barges that contain an outdoor pool and are not true OP’s. A true OP operates just like a beach does, except that an OP provides a more formal structure to activities. These activities are similar to an aquatic centre, including diving platforms, lanes for lap swimming, deck space, and even saunas. Often, some form of change rooms and washrooms are also provided.

Unlike river and lake OP’s, a true on-the-*ocean* pool must be able to function with the changes in the tide levels. This is because the “pool tank”, which is usually bottomless, must provide a minimum depth of water. An OP that rests on the exposed ocean floor at low tide no longer functions and could introduce a potential safety hazard. A true OP must be located far enough out into the ocean that it always has a minimum depth of water below it.

Unlike their land-locked outdoor pool cousins, OP’s have to contend with movement caused by weather conditions. An OP must be able to resist high winds and rough seas, similar to the way a pier does. This means the OP must be solidly anchored and that its components cannot move independently other each other (like a segmented dock does). As such, a good portion of an OP’s design concentrates on anchoring and reducing the force of waves (the use of underwater wave attenuators can reduce wave strength).

Lastly, the temperature of an OP is the same as the temperature of the body of water it sits in. So just like going to the beach in off-summer months, sometimes the water can be quite chilly. However, many activities, from diving to rope swings to just putting your feet in the water are not hampered by cold water. Some activities, like cold pool plunges after a sauna, are assisted by the cold water. Options are available fend off cold conditions. This includes south facing deck areas with wind screens, glass wind screens, and smaller shallow pools with actual solid bottoms that use sunlight of solar panel heated water to increase the water temperature. Thus, it is possible to design toddler pools or teach pools to have warm water.

Overall, OP's have been very popular wherever they have been constructed. Their success has often been based on offering a wide variety of water activities (i.e., not just a rectangular lap pool). They often become a focal point for social activity because they attract a critical mass of people to them, which then creates opportunities to achieve other goals (visits to the general area, restaurant and shopping activity, increase public safety through numbers, out-of-town tourist visits, etc.).

EXAMPLES OF ON-THE-OCEAN POOLS

The following are examples of a variety of OP's. The examples range from true open bottom pools to closed bottom pools that float on the water. The pools that are located on rivers and lakes do not have to contend with tide movement, and thus they generally have lower costs overall.

The costs shown are in Canadian dollars and adjust for inflation to 2021. It is important to note that the costs are for the structure/facility itself, and do not include soft costs (design fees, land purchase, permitting, etc.). The costs also do not include site preparation. Items such as dredging, providing site services (water, sanitary, electricity, etc.), breakwaters. Geotechnical work (pier foundations), and portions of the facility that may be on land. These costs can vary significantly from site to site.

The commonality between most of these facilities are open bottom pools, dive/jumping structures, and significant deck space. There is an emphasis on social gathering and relaxation, as opposed to programs (learn-to-swim) and competitive swimming.

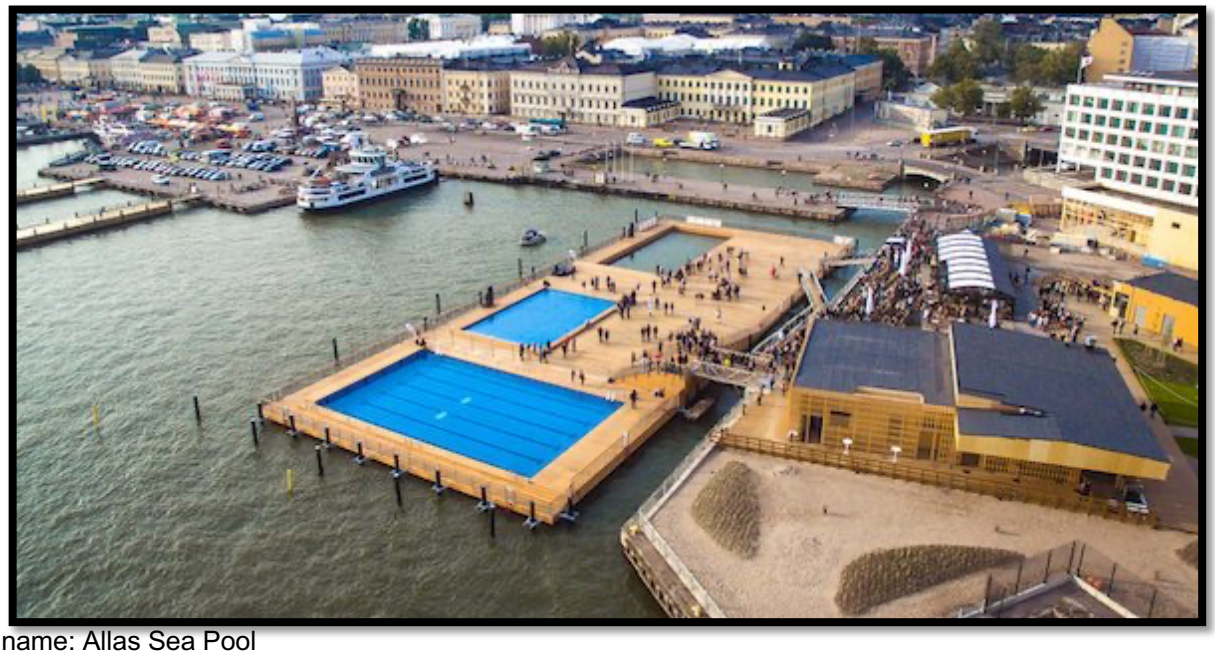
Almost all examples are from Europe, as Europe has the longest history in facilities of this type and thus have more examples to study. Given their success in Europe, it is likely that North America will see more of this facility type in the future.

name: Copenhagen Harbour Bath
location: Denmark
opened: 2003
amenities: natural water open bottom pool, natural water closed bottom pools, diving platform, deck space and seating area
cost: $2,804,700 (2021 CDN). Cost does not include soft costs or site development/servicing costs

name: Oslo Harbour Bath
location: Norway
opened: 2015
amenities: natural water open bottom pools, diving platform, deck space and seating area
cost: $2,612,000 (2021 CDN). Cost does not include soft costs or site development/servicing costs

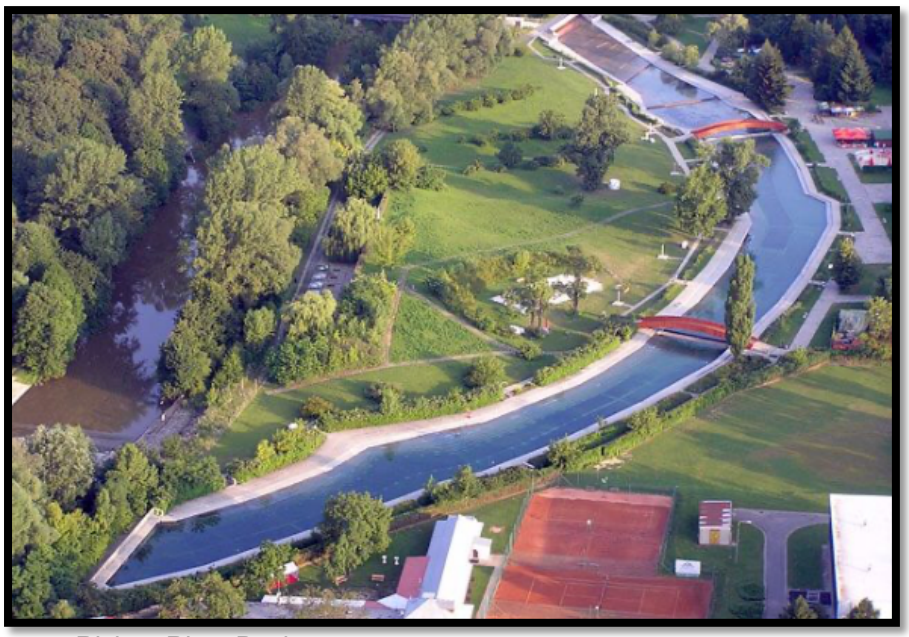
name: Kastrup Sea Bath
location: Denmark
opened: 2005
amenities: natural water open bottom pool, diving platform, deck space and seating area, washrooms
cost: undisclosed

name: Hasel Harbour Bath
location: Denmark
opened: 2013
amenities: natural water open bottom pool, closed bottom pool, diving platform, deck space and seating area, on-shore washrooms
cost: $2,140,000 (2021 CDN). Cost does not include soft costs or site development/servicing costs



name: Allas Sea Pool
location: Finland
opened: 2016
amenities: treated water close bottom pools, filtered sea water pool, deck space and seating area, on shore washrooms and change rooms
cost: $16,520,000 (2021 CDN). Cost does not include soft costs or site development/servicing costs

name: Spree River Pool
location: Germany
opened: 2004
amenities: treated water close bottom pool, deck space and seating area
cost: $1,791,000 (2021 CDN). Cost does not include soft costs or site development/servicing costs



name: Riviera River Pool
location: Czech Republic
opened: 2018
amenities: contiguous treated water close bottom pools in tandem, deck space and seating areas, water slides, change rooms and washrooms, picnic areas, food kiosks
cost: $1,812,000 (2021 CDN). Cost for pool tank only. Cost does not include soft costs site development/servicing costs, or costs for amenities beyond pool tank.

name: Floating Pool Lady
location: New York City
opened: 2007
amenities: treated water close bottom pool, deck space and seating areas, change rooms and washrooms
cost: $5,000,000 (2021 CDN). Cost for pool tank only. Cost does not include soft costs.

Potential Programme Scope for an On-the-Ocean Pool

OP's are not intended to replicate the services offered by indoor aquatic centres, and to some degree, outdoor aquatic centres. They are generally not intended to be learn-to-swim venues, swim club training pools, or aqua-fitness centres. They can be programmed for these sorts of activities, but OP's lend themselves to more leisure type activities much in the way outdoor pools do. As such, water-play activities are much more compatible. As can be seen of the examples of the true "ocean" pools above (i.e., not those with conditioned water in tanks with a bottom), the layouts have irregular shaped tanks, dive (jumping) towers, and large deck areas for relaxing with family and friends. This also has a great effect on the cost of the facility, for conditioned water in tanks with bottoms adds a significant cost to the facility's budget. We can see that New York City's Floating Pool Lady, a barge with a swim tank that has fully conditioned water, cost $5,000,000 CDN. Conversely, the Hasel Harbour Bath in Denmark, with two pools with bottoms, but filled with unconditioned ocean water and with ample deck space cost $1,140,000 CDN (with all costs in, likely around $2,000,000). Similar programs, similar area, but the Hasel Harbour Bath facility cost less than half of the Floating Pool Lady.

A potential program for an OP adjacent to the White Rock Pier could be as follows:

- One 20 metre by 10 metre tank with no tank bottom for lap swimming and deep water play (Wibits, rope swings, climbing walls, kayak lessons, etc.).
- One 10 metre by 10 metres shallow tank with bottom for toddlers with solar panel assisted heating for unconditioned ocean water coming into the tank.
- A dive/jumping platform with various take-off heights. This platform would also host a viewing platform for sigh-seeing and sunrise/sunset watching.
- Large deck space beyond the pool edges for deck chairs and social gathering. The deck space would be protected with wind screens.
- Two saunas large enough for 20 persons each with one being a traditional dry sauna and the other being a dry sauna with aroma therapy. The saunas would be adjacent to a cold plunge area with a climb out ladder.
- One fully enclosed shelter with two rooms with benches to be used as changing areas (each would also contain two private changing cubicles). A third room could be added for City staff and as an operations centre for special events (art displays, cannonball competitions, etc.).
- Two unisex washrooms with pumpable tanks.

This program is based on the idea of creating a facility that through its wide programme offerings can attract a critical mass of patrons throughout the year. This critical mass of people would create an additional economic benefit to local businesses in the off-summer months.

Estimated Construction Costs

Without a set facility programme, including the level of materials and finishes, it is difficult to produce a construction budget. However, a range can be set between a basic facility and a higher amenity facility.

The most basic facility would be a 4 lane (10 metre) x 20 metre tank with an open bottom and a 6 metre deck all around the perimeter (600m^2 of deck space). It would be supported on piers that allow it to rise and fall with the tide. It would have a tide adjusting access/egress ramp. This would be very similar to the original ocean pool that existed at the White Rock Pier from the 1920's through to the 1950's.

IMFS International Marine Floatation Systems, Inc., provided a cost estimate for such a facility. Not including any additional geotechnical work that might be required for the foundations of the piers, and not including any wave attenuation structures, they estimated the cost of the facility to be $1,600,000 CDN. With soft costs and a design contingency, this cost estimate would likely rise to about $1,800,000 CDN.

A mid-range amenity facility would be a facility similar to the Hasel Harbour Bath. This facility has two small pools, a dive/jumping tower, a seating area for viewing, and ample deck space (approximately 760m^2 of deck area). The cost, not including soft cost, design costs, or site development/servicing costs, was $2,140,000. When those other costs are included, as well as the anchoring system and access ramps, the total cost would likely rise to approximately $3,100,000 CDN.

A higher amenity facility would be similar to the Copenhagen Harbour Bath. This facility has a large open bottom tank and two smaller closed bottom tanks that use sea water. It has a viewing/seating platform that doubled as a dive/jumping tower. It has a generous amount of deck space (approximately 1,200m^2 of deck area). The cost, not including soft cost, design costs, or site development/servicing costs, was $2,804,700. When those other costs are included, as well as the anchoring system and access ramps, the total cost would likely rise to approximately $4,300,000 CDN.

None of the above examples are for facilities that had water treatment, such as New York's Floating Pool Lady. When water treatment is added the costs can increase by several million as not only does a mechanical treatment room have to be constructed, the tank has to be designed for removal and replacement of the water. Providing treated water also changes the nature of the facility. Now the facility is more able to handle programmed activities like learn to swim and aqua-fitness. The facility becomes more like a land-based outdoor pool, er even an indoor aquatic centre. This is counter to the more social/recreational purpose of a true ocean pool.

Issues for Attention at the White Rock Pier Site

There are a number of site specific issues that have to be considered if an OP is planned for the White Rock Pier. Without an actual program and design, it is really not possible to determine all issues, but the following list of items will have to be dealt with no matter what the project entails.

- Staffing. Guards and operations/maintenance personnel will be required to operate this facility. Unlike the Pier, which has general and season upkeep and cleaning, an OP would require daily staffing for lifeguards and cleaning staff as well as general and seasonal upkeep. The cost for this staffing would be dependent on the size of the facility and the type of amenities it is to provide.
- Protection. Having an OP that is open to the face of the ocean is not a determent, as the Kastrup Sea Bath facility demonstrates. However, the construction of a facility that must take the brunt of ocean storms will be more robust than the construction of an OP in a harbour. This location may require the extension of the existing rock breakwater to better protect the facility.
- Tides. At low tide, the tide water retreats to the rock breakwater. An OP has to be located such that even at the seasonal lowest tide, there is water under it and it remains afloat and not resting on the tidal flats. Furthermore, the water depth has to be enough to ensure the safety of users jumping into the water and expecting a safe depth of water below them.
- Sand movement. Piers, breakwaters, and structures (like an OP) in the tidal flats area affect the movement of the sand and silt that make up the tidal flats. This can lead to the build-up of materials in the immediate area and potentially requiring seasonal dredging.
- Pedestrian traffic. Adding an OP to the Pier will add an additional pedestrian load to the Pier as well. While the coming and going to the OP may not cause congestion, the area immediately around the entrance to the OP will become congested. It may be necessary to build additional width to the Pier in the immediate area of the entrance to the OP.
- Site Services. If any kind of heated space, washroom, or steam room become part of the program, there would be a need to deliver electricity, water, and sanitary services to the OP.
- Life-cycle costs. Unlike a building that is on land and has a durable rain screen, an OP is more or less always open and facing the brunt of any weather, be it ocean storms, rain, wind, or sun. There are many materials that can be used to protect the infrastructure of the facility, but everything, from the cladding to the fasteners, will likely have shorter service lives than for a similar facility on land. As such, a long term maintenance plan will have to be created to ensure the facility is always in is best condition.

Conclusion

Ocean pools have been proven to be very popular in Europe. They often become a destination in themselves for locals and tourists alike, creating a critical mass of patrons that drive up business for local establishments. They also become a focal point for social and family leisure activities.

The White Rock Pier lends itself to having an ocean pool, as it once had, and while there will be issues for the design to deal with, none would be unsurmountable or overly costly. Additionally, a ocean pool at the pier is very likely to increase activity for the local businesses all-year-round.

Given the examples provided herein, an ocean pool would likely cost between $2 million and $5 million dollars to construct, depending on size and the number of amenities.