APPENDIX IX

ESTIMATE OF FACILITY CONSTRUCTION AND OPERATIONS COSTS FOR HUDSON RIVER SWIMMING SITES

Summary

There are a few large beach and floating pools being considered in highly urbanized areas in this study that will require special studies for design and operation cost estimates. These sites are in high use areas such as piers 52 / 53 in Manhattan or have unusual features such as the sites with large unused or underused structures at Kingsland Westchester County Park and Nyack Beach State Park in Rockland County.

Most of the other swimming sites that are being considered along the Hudson fit into a small or an intermediate sized swimming beach category. The natural beach limits are constraints at many of these sites and the needs in many of these areas suggest guarded beaches of 150 feet or smaller, and a few locations with beaches of 300 feet or greater in length. Many of these beaches are limited in width as well. These beach sizes indicate the potential for small or medium sized swimming facility operations depending onsite size and area need.

To obtain a scale of magnitude and cost of these small and medium sized swimming facilities and operations, several model sites were reviewed for their construction and operation costs (See photographs #1, 2 and 3). A really small, private site was also reviewed for those few locally administered operations that may fit this "mini-site" category. The results of these comparisons are discussed in this section. A summary of these sample sites by scale of magnitude comparisons follows:

Mini site
120 foot beach, private or special condition use operations.
Instant beach population: 50
Design day population: 150
Facility construction cost: $125,000
Operations costs: $25,000 / year

Small Public Hudson Swimming Site
150 foot beach, full public use.
Instant beach population: 100
Design day population: 300
Facility construction cost: $600,000+
Operations costs: $30,000+ / year

Medium Sized Hudson Swimming Site
Two adjoining beach areas, total length about 300 feet
Instant beach population: 200
Design day population: 600

Facility construction cost:	$1,000,000+
Operations costs:	$50,000+ / year

Potential Swimming Site Development and Operations

The potential swimming area sites selected for further study at this time include locations that span more than 130 miles of the Hudson River below Troy dam. These locations range from relatively rural areas, where needs include low population densities including areas with low and moderate income that are underserved, with practically no nearby public swimming opportunities, to the dense population of Manhattan. In the urban centers the few sites that are open for public swimming are very crowded, well beyond recommended standards.

The same site configurations and scales of programming will not fit all of the locations that have been selected for further study. This Appendix provides an insight into how the selected new sites can be configured, what operational programs may be considered at these sites, and what levels of costs may be involved with these selected project areas.

Natural or even engineered beaches are preferred by most swimmers and are generally less expensive to manage than pools. Off-season uses make beaches versatile elements in well-designed recreational areas. Consequently one initial goal of the Hudson River Swimming Feasibility Study was to identify the existing and potential beaches that could become the best prospective swimming areas. Floating pools provide additional options for those few areas with great need that do not have sites with natural beach potentials.

The few larger existing and potential swimming areas that will have the most intensive anticipated use and those locations with complicated adaptive uses of larger existing buildings, such as Croton Point, Kingsland Park, and Nyack Beach, will require specific studies to determine the best design, operating program and cost effective implementation. The goal for these high demand areas is to establish facilities and operating programs that will remain within site carrying capacities. Design limitations and operational arrangements that still provide equitable access to a scarce resource are routinely used in high demand urban oriented sites, but their site configurations and operational programs are beyond this phase of the overall study.

The small and moderate sized operations do, however, have many similarities, allowing a few model site development and program elements to represent potential designs, operations and costs that may be associated with most of these sites. The concepts that identify what programs may be involved at each site and what costs are to be anticipated are however only scale of magnitude values and rough initial concepts that would need significant additional study, when a project is to be advanced at the site.

Developing initial proposals for swimming sites requires the following:

1) A program concept has to be advanced for each selected site. This should give rough guidance regarding the population that will be served, the scale of operation

required to manage that site, and the facilities that will accommodate that level of use in a cost effective manner.

2) Initial analysis regarding site design concepts, operations, access, utilities, off season uses, staffing and other aspects of the projects will help to define a prospective swimming program and pose associated opportunities and costs for each specific site.
3) Environmental constraints and opportunities for other waterfront activities and alternative development options may also be well worth considering and should be posed to help guide detailed planning and review and to confirm or correct the initial concepts considered at the start of the project.

Operation of Hudson River Swimming Areas

There are many standard procedures and requirements that apply to designated swimming areas in New York State regardless of the entity that operates them. The State Health Department Regulations (Sanitary Codes) spell out the basic guidelines that specify water quality conditions and management, lifeguarding requirements and amenities serving the beach or pool, such as showers and comfort stations (Westchester County 1999). While it is possible to imaginatively deliver these services in a number of different cost effective programs, it is likely that proper solutions will have similar costs and operations. Similar sized beaches and pools on the Hudson, will not differ greatly in their upland facilities and operations from pools or beaches on lakes. A few of these "model" facilities and costs should therefore provide good guidance for initial planning for the development of new small and moderate sized swimming sites.

The evaluation of a few typical model facilities and operations will provide a few operations and costs packages that will relate to beach or pool size and operational concepts. Sizes were based on a few operating facilities that may represent different scales of magnitude that can apply to the Hudson beaches and pools under study. There are many other specific elements that can change these basic model requirements. High anticipated attendance, extended operating hours or seasons, local economic and wage conditions, nearby activities and local site and river conditions can all impact specific sites, usually increasing operational requirements and costs.

Hudson Specific Conditions

While the above discussion argues for standard costs, facilities, and operations, there are a few unique issues that the beaches on the Hudson must face. The two–directional tidal currents and proximity to the shipping channel must be carefully evaluated and addressed. A coastal feature that slows the incoming tide may accentuate the outgoing currents. The limited tidal range at the mouth of the river poses less of a constraint than the five foot rise experienced further upriver. Beach facilities, markers and operations must be designed for these specific conditions.

The proximity and configuration of the wake caused by large ships and barges in the shipping channel is another specific issue that must be addressed. These wakes are

deceptive given the great volume of water involved. Unlike the choppy conditions produced by small craft, these long period waves build up high on shore, changing erosion patterns, water heights and undertow conditions. One park's lifeguards have learned to warn small children in the shallow waters when the occasional large ship comes by. The tight draft conditions caused by silting in the channel are thought to exacerbate lateral water displacement, with waves sometimes displacing materials as large as discarded bricks onto the beach. The beaches that are close to, and face the shipping channel are also the most vulnerable to this condition.

Small boat traffic also presents some issues that may differ from many other water bodies. Boating on a navigable waterway under US Coast Guard jurisdiction, such as the Hudson River, entails some responsibilities and privileges that do not pertain to many smaller water bodies. While discharges and rules-of-the-road are closely circumscribed, the ability to navigate and to undertake related activities can not be constrained. Consequently park managers at Kowawese, Orange County, who do not permit swimming from the shore, complain that boaters come close to shore and can swim from their boat, frustrating beach bound park users (who are not allowed to swim). Additionally, recent State laws allowing municipalities to restrict personal watercraft may not apply to these internationally navigable waters.

Where swimming areas are designated and properly marked, boaters can still cause a hazard to swimmers. Some boaters do not respect the restrictions imposed, and others are inept at controlling their craft. At Croton Point Westchester County Park, an outer set of lemon lines were established to designate the no–boating area, after a boat got tangled in the swimming area line, shutting down the beach.

Floating materials constitute another problem especially after flood conditions. Natural and man-made debris washes on to beaches, which must be cleared and raked periodically. Floating debris ranges from logs and creosote treated lumber to sharp pointed water chestnut seedpods. Protected bays can be further impacted as these materials sink and create underwater obstructions. These problems may require special procedures with identifiable, recurring costs. Currently, operating beaches on the Hudson require a thorough clean up before opening, then periodic raking, occasionally involving mechanized equipment. One inland beach operated by Central Hudson at Rifton, Ulster County, utilizes an oil boom as the perimeter marker for their swimming area, instead of a lemon line, to help deflect some of the floating branches in their impoundment.

Many natural and man-made conditions that impact operations are common to other natural beaches. Strong currents in the upper Hudson River, at beaches run by the City of Glens Falls require special life guarding procedures. Rough wave and tide conditions are common to the barrier beaches, creating many analogous conditions. Floating debris and conflicts with boaters pose some problem on most water bodies. A protocol was established at some ocean beaches for the treatment of suspected medical waste, if found. Manuals established by State Parks, Westchester County, the Red Cross and others can be consulted to identify how lifeguards and maintenance personnel should respond to both routine and unusual operational issues.

Construction and Equipment Costs

As with operations, while a few unusual sites will require special designs, a choice from several general site configurations will fit most of the new sites identified in the Hudson Swimming Feasibility Study. Three facility construction costs and one final engineers' cost estimate was collected from State Parks, DEC and a private swimming beach for sample costs. None of these costs include all utilities or access requirements. These sites were as follows:

Mini – site
A small private beach at Babcock Lake, Rensselaer County, built a very small bathhouse in 1984. The structure serves approximately 50 people during most times on a 120 foot length of beach, with a few occasional peak hours or events with up to 150 people. People who come to the site tend to stay for a few hours on or near the beach, then leave. If this was part of a small park, an instant population of 75 can be a design estimate (an instant population is the number of people found on a beach and related swimming area in mid afternoon on a design day and time, say 10^{th}. highest day, 2PM). These mini-parks will experience considerable "turn-over", perhaps a factor of 2, for a design day population of 150.

A 24 foot x 20 foot building was developed to serve this population. This bathhouse / comfort station was built on a slab, constructed by contract for $14,000. Volunteer work on site added say $2,000 worth of labor. The cost of new lemon lines, floats, lifeguard chair and safety equipment equates to another $1,000, for a total 1984 cost of $17,000. Several sources for construction cost indexes indicate a doubling of costs since this date, for a total, present day cost of approximately $35,000.

This small bathhouse has no showers, with a Dept. of Health waiver based on the concept that all users have a private shower facility in a nearby home. A public site would require a larger water heater and two outdoor shower heads. This could constitute a minimal addition for a complete bathhouse. Also storage facilities were minimal in this building since they were available nearby. It is assumed that modifications would be required to upgrade this structure for use as a public beach, for a total cost ranging from $40,000 to $50,000.

Three small rooms in this structure provided:
1) a toilet, a urinal, a sink and a small changing enclosure for men,
2) two toilets, a sink and a small changing enclosure for women, and
3) a very small office for beach entrance control and for lifeguards.

These facilities are not fully compliant with the standards required to meet the Act for Disabled Americans (ADA); this addition alone would add 10% to the needed floor space in this building. A pre–fabricated beach pavilion was recently added near the bathhouse for shade and inclement weather, at a cost of $7,000 including some volunteer labor.

It is safe to say that the smallest of communities, with a willing "force account" (use of skilled public employees and their equipment) capability, can develop a functional set of building(s) serving a beach for approximately $50,000 to $60,000. Off-season, this same structure can serve as a comfort station.

Utilities at this private beach site consist of a simple septic tank, a leach field and connection to a community water system and nearby overhead electric and phone lines. If soils and terrain permit, an appropriate sized system could be installed on similar sites, though maintenance and clean–out would remain a constant task. Some small sites also operate with holding tanks and very frequent pump–out services, composting toilets and other devises are also options, but usually require more maintenance. A drilled well may be needed at some locations, sometimes combined with packaged water treatment systems. Wells must also be located at an appropriate distance from the septic system. Electricity is an added cost, especially for parks where undergrounding is required to meet State and Federal standards. $30,000 to $35,000 is a possible cost for utilities at a new beach, however site problems can easily add to these costs.

The site in this example operates with approximately 40 parking spaces on a dirt and gravel area, however most people going to this site are within an easy 15 minute walk from the beach. It is interesting (and discouraging) to note however that even with this convenient proximity, many drive so they can bring chairs, toys and coolers to the beach. Approximately 50 spaces are suggested for even these small sites, if they are automobile access oriented. If traffic permits, roadside parking and a sidewalk may serve some of these needs. If terrain, drainage and materials pose no problem, a simple gravel lot of this size (approximately a 14,000 sq.ft. area), with posts marking the parking lanes, can probably be developed for $20,000 to $25,000.

All together, a mini–site serving 150 people during a "design day" will require a $100,000 to $120,000 capital expenditure, exclusive of land, design and contingencies.

Small Sites

Small sites will have similar 100 foot to 200 foot beaches as the one described above, but may however require facilities developed to a higher standard to meet additional use by the public. A higher "instant" population would stay at the site during the mid-day hours, on a design day; say 100 on or near to the beach. Other site activities will also add people who picnic or fish, for a total instant population of 150. People would still primarily come from nearby, many for a half-day, for a total design day population of 300.

A likely model for a small state administered site was found in the modification of a structure built as group picnic pavilion and bathrooms on Peebles Island in 1997. The structure has ADA standard bathrooms, interior storage space and an enclosed "caterer's area" that would be re-designed to accommodate showers and changing facilities and a small lifeguards' office. The enclosed space is 30 ft x 22 ft. The adjoining open pavilion space accommodates 75 people, about half of the instant population on the site. The construction cost of this structure was $255,545, updated to a current cost of say $275,000.

The final, modified site, based on this design would have:

1) an ADA compliant and a standard toilet, a sink, a urinal, one ADA compliant shower stall and a small changing room on the men's side;
2) an ADA and a regular toilet, sink, ADA shower stall and a small changing room on the women's side,
3) a small office and the covered pavilion / picnic shelter space.

Another $25,000 may be involved with the space modifications described above, for a total of $300,000. The covered space in this design would be especially useful in the case of sudden rain, for shade and for winter storage. In the off-season and during evening hours the structure could be used for group picnics and to support park operations near the site.

If the typical small project can not be connected into public water or sewer systems, utility costs may not be similar to the mini – site described above, however given some added use, more capacity has to be anticipated, probably raising the utilities costs to $50,000 or more. A requirement for underground electrical lines can be assumed to add to these costs. Parking requirements will also increase, adding to the lot size. A 3.0 per car loading factor would yield a 50 car lot, however allowing for some turn-over constraints approximately 75 or more cars would need to be accommodated to support the beach of this size. Additionally school or group camp buses and other larger vehicles may have to be accommodated, for a total space of 22,000 sq.ft. Drainage may be more complicated, possibly necessitating paving or other surface treatment options. An additional $50,000 to $100,000 can be anticipated for the immediate swimming area access component of these small projects that are built to a relatively high standard.

The Department of Environmental Conservation constructed a bathhouse supporting a day use area at Pine Hill Lake adjacent to Belleayre Mountain Ski Center in 1992. This site has a 150 foot x 41 foot beach with a (instant) swimmer capacity reported at 89. The site is served by a somewhat larger bathhouse than the one described above and an 107 space parking area. This facility was built for $220,000 for the bathhouse and 338,000 for other site work, including the parking, for a total project cost of $558,000 in 1992, including design (usually 8%). A 25% increase in construction costs would equate to current costs to nearly $700,000.

A small site serving a design day population of approximately 300, that is designed for State operations or the programs administered by many other entities, will have capital costs for the immediate swimming facility area that approach $500,000, exclusive of land, design and contingencies, which can add 8 to 10% each, for a total of say $600,000.

Medium Sized Sites

A beach that can operate two swimming sections during peak use, along a 200 foot to 300 foot span of beach will serve an "instant" population of more than 200 people at the beach during many days of the year. These levels of use probably require a larger operation. If additional activities are available nearby, then usually half of the population is at a beach at one time, for a total mid-sized park instant population of 400 people. A lower "turn-over" factor of 1.5 can be anticipated for this category of "destination" park; consequently approximately 600 people will be served on a "design day". A successful project of this size was built at Point Au Rouch State Park on Lake Champlain, at a cost of $227,000 in 1985, plus equipment and furnishings. Adjusting for inflation, this will cost approximately $500,000 today. A similar bathhouse project now being estimated for Coles Creek State Park on the St. Lawrence River is estimated at $600,000, or about $300 per square foot.

The Point Au Rouch bathhouse included two ADA compliant toilets, six regular toilets, two urinals, six sinks, two ADA shower stalls, four regular shower stalls, two changing rooms, two tiled drying areas located next to the shower stalls, and a lifeguards' office. This building configuration can also be redesigned so that sections can be opened for off-season use as a comfort station.

Utilities are difficult to address on a conceptual basis for a project of this scale. Specific site analysis and estimates of use patterns will condition what solution will work. Often small packaged waste water treatment plants or a sand filter system will be required to meet projected use levels. Potable water may also necessitate well field development and treatment systems. A qualified operator may also have to oversee the facility, adding to operation costs. As with other public park projects, undergrounding electrical lines may also add to these costs. It can be estimated that $100,000 to $150,000 may be expended on these utility costs.

Access systems also become more complicated with larger sites. Some paved or treated parking areas and walkways are desirable and are possibly required on part of the site to meet ADA standards. Drainage can also become complicated with larger surface areas. Design for groundwater re-charge can add to these costs. The larger sites may become stops for bus routes, and charter buses may also be attracted to the site. Assuming that 90% of the users will be coming by car at a 3.0 loading, 120 parking spaces will be needed, for a total area of approximately 40,000 sq.ft.. Costs vary with materials and site conditions, but $125,000 to $200,00 can be anticipated. A separate structure that serves as a "contact station" controlling entry to the area may also be needed for this scale of project.

DEC is also planning a new bathhouse and park complex at Scaroon Manor in Warren County with a 2,375 sq. ft. bathhouse. This structure has a rental office, a warming area and a 12 foot x 25 foot vending area in addition to the rooms described in the examples above. Estimated at only $115 per square foot, budget of $273,000 was shown in plans developed in 1999 for this building. A different choice of materials and design probably accounts for these somewhat lower cost estimates. $416,422 is estimated for the site work

constructed during the beach development phase of this project. The total cost of this project is estimated at nearly $700,000.

All together, a medium sized beach oriented park serving 600 people on a design day will probably cost nearly one million dollars to construct, provided that no unusual site problems are encountered.

Operating Cost of Small and Intermediate Scale Swimming Programs

Some motels and small, restricted private swimming areas operate with one or two trained guards or a number of low paid part time staff and a modest operating budget of about $15,000 per summer (2000 summer's expenses for a small private beach located in rural Rensselaer County). These modest costs would not be adequate for a public swimming program which is located on the Hudson and which must compete for qualified lifeguards in a broader market.

The smallest of public swimming programs should still operate every day with acceptable weather from mid June through Labor Day, during an 80+/- day season, with an average of 8+ hour days. These small programs do however require a full time administrator who is also qualified to guard and provide staff training, and up to four lifeguards who work in shifts, with perhaps some of the guards working part time schedules. Two or three guards should be on site during practically most operating hours to allow for relief and emergency situations.

The cost of guards and qualified supervisors are in part conditioned on a currently tight labor market for these skilled staff. Even with limited fringe benefits (which is not always possible), $10 per hour per lifeguard and $15 per hour for the supervisor is a rough cost for many operations. Pay based on hours worked can save some costs, however overtime and weekend pay will often add to these costs. Given these assumptions, the supervisor will cost roughly $7,000 per summer for 11 five-day weeks, averaging 8-hour days. The lifeguards often work more flexible hours based on weather and peak operations. Many lifeguards are college students who return to school in late August. Given 8-hour days during good weather, 4-hour days 25% of the time, 140 lifeguard days will provide two guards during all 80 operating days. Another 20 lifeguard days and the qualified supervisor will provide added relief on peak days, for a total of $16,000+ for lifeguards, and a grand total of $23,000 guarding budget per summer.

Equipment replacement costs and utilities will add roughly $1,500 each summer, and clean – up and maintenance costs another $3,000, provided that this service can be coordinated with other similar duties at nearby areas as in locations such as at Mills-Norrie State Park in Dutchess County. Where operating entities carry insurance, this will pose an extra cost that is difficult to estimate, but is often available as a rider to other insurance policies. Part time use of vehicles and other equipment will also add to these costs. Site security and overall program management will also add to these costs. It is reasonable to assume that the present day costs of operating the smaller public swimming beaches will be approximately $30,000 per summer.

The mid -sized beaches that can operate an expanded area with two adjoining guarded areas during peak operations, can operate with a fully qualified supervisor and an assistant supervisor, costing $16 and $12 per hour respectively and six or seven guards. Other costs, and proportionally less staff during off peak operations do provide for some scale of magnitude savings, for a total of roughly $50,000 in operating costs for each season.

Operating only on weekend or half day hours can cut some costs. Independently administered and guarded teaching programs can sometimes take charge of weekday morning operations, saving some costs and expanding uses of the beach. Swimming areas that are administered as a satellite to other park or swimming operations can save on administrative, maintenance and security costs. Where these opportunities exist, savings of say 10% can be assumed. On the other hand, operations in areas with tight labor markets or problem areas for lifeguard recruitment and training will increase costs.

Swimming at Locations That Are Not Designated

The 2000 DEC survey of swimming in the Hudson indicated that many locations are being used for swimming that are not designated for this use. Additionally, site surveys indicated that many of these sites should not be recommended for public swimming. Liability and safety issues remain for these areas, especially where the public can access these shorelines for other recreational uses.

Where there are no restrictions on trespass, the access for specified activities such as hikers and sportsmen is anticipated, and the State's General Obligations Law exempts the landowner from liability, with the exception of only a few unusual situations. Swimming is not one of the activities identified in this law. Though this issue has received considerable attention, the responsibility owed to those who also choose to swim in an unguarded area is not clear. Further, a guarded area must also be a facility that meets all of the provisions of the State Sanitary Code.

One typical solution to this issue is to sign all known impromptu swimming access points, prohibiting swimming. Some property owners, and the practice in other states, goes beyond this, and adds the specific dangers that will be encountered; i.e. "polluted waters, dangerous currents, no swimming". Other opinions hold that in addition to the signs, positive enforcement against the prohibited activity must be documented. Contrary views are that these efforts only send "swimmers" to a less safe, but more secluded location at a nearby site.

The complex issues associated with safety and liability for swimming in closed areas deserves attention, however these issues are well beyond the scope of this study. It is likely that the provision of attractive, additional guarded sites will attract some of these dispersed swimmers to safer locations, providing an important component of a solution to these problems.

APPENDIX IX
REFERENCES

Westchester County Department of Parks, Recreation & Conservation. 1999. Lifeguard Manual. May 1999..