



**Troy Aquatic Park
Assessment/Feasibility Study**

The City of Troy
September 5, 2024



Acknowledgements

The following individuals were instrumental in assisting the planning/assessment team in developing this Study for the City of Troy, Ohio. We thank all those individuals who participated in the process through meetings, site visits, surveys, and ongoing conversations.

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1. [Project Introduction](#)

Background

The Troy Recreation Department oversees the operation of the Troy Aquatic Park. Constructed in 2005, the Troy Aquatic Park (TAP) is one of the largest, most well attended Aquatics parks within the Miami Valley Region. In fact, the pool draws from a 20-25 mile radius which is primarily due to the overall lack of available aquatics in the area. The Aquatic Park is centrally located within the City of Troy next to the Hobart Arena.

The current facility is made up of the following features:

- A Bathhouse which provides administration space, concessions, men's and women's locker rooms, and lifeguard space.
- Large, fabric shade structures are placed throughout the site.
- A main, large recreation/main pool with zero entry, attached plunge pool with slide, and 6-Lane lap pool all connected to one filtration system.
- Rectangular heated tot pool with water depths from 0" to 18" connected to separate filtration system.
- Two, 30' water slides that empty into an oversized plunge pool. The oversized plunge pool can be utilized for other activities such as swim lessons or water fitness activities.
- Drop Slide into the lap pool.
- 1M Diving Board.
- Interactive play structure at zero entry pool
- A pool mechanical building providing space for all filtration equipment associated with the tot pool and recreation pool.

Due to the age and condition of the existing facility, the City has identified a need for a feasibility study to determine the best approach to extend the life and usability of the facility and the aquatics programs currently offered. This study will ultimately provide a road map for moving forward while addressing the condition of the existing facility and the potential of expanding the facility to accommodate current attendance projections and needs. In addition, trends in the design of aquatics facilities have drastically changed since the facility was designed and will be considered as part of this study.

Aquatics facilities and programs offer far reaching public health, safety and social benefits making planning for their continued maintenance requirements as well as expansion/improvement opportunities vital for their long term sustainability. As the County Seat of Miami County, Troy will continue to grow and build upon it's reputation of being a pleasant place to live and work. An active, modern aquatics facility is one amenity that plays a critical role in maintaining a community's quality of life. Even though aquatics facilities are in operation three months out of the year, they are a hub for inclusive, social activity throughout the summer promoting an active, healthy lifestyle for the community.

Objectives and Scope of Work

It is through this feasibility study that the City of Troy will begin planning for the future of the Troy Aquatic Park. Ultimately, it is envisioned that the TAP remains a robust outdoor aquatic center that serves a diverse range of users within Troy and the surrounding areas while offering opportunities for activities and use for many years into the future.

The primary objective of this study is to provide guidance and options for maintaining the existing facility while considering improvement and expansion opportunities. Specific objectives include:

- Assess the physical and operational condition of the existing facilities including building code and health department deficiencies.
- Evaluate and consider current and future needs for improvements or expansion.
- Identify current trends and recommend proper elements and amenities of desired spaces and activities within an outdoor aquatic facility.
- Provide recommendations regarding size, location, and aquatic components.
- Provide recommendations for best utilizing the existing site while enhancing safety and maintaining a best in class experience.
- Provide conceptual design (planning) alternatives and associated costs for expanding the aquatic amenities.

Community pool design has dramatically changed since the construction of the existing pool. A community focused aquatics facility is an amenity that helps achieve the vision of the community and enhance the quality of life, family, togetherness, and wellness of its residents. Successful modern aquatics facilities combine recreation and leisure components into one facility to create and support a full spectrum of activities.

2. [Executive Summary](#)

As previously noted, the facility was constructed in 2005 and is in its 20th season of operation. In November of 2023, our team visited the site and walked with pool staff. During this meeting we discussed existing maintenance and operational concerns with the existing facility. Our team also observed the existing facility in detail and noted existing conditions.

The TAP has been very well maintained. Everything was clean, orderly, and well presented. However, the facility is aging and ongoing maintenance will continue to increase in the coming years. Highlights of observations made are as follows:

- The gutter system/grating on the main pool has been in need of continuous repair and replacement over the years. Adding to the complications is the existing gutter grating is no longer manufactured and replacement sections have become unavailable.
- The pool shells are in fair condition and will require some significant attention in the coming years, if not sooner. Both the main pool and tot pool are constructed of concrete. The main pool was constructed over multiple pours requiring expansion/construction joints with water-stops. In many cases these joints are in very poor condition with much of the sealant missing or severely cracked. The tile along these joints is in very poor condition and the water-stop is "oozing" from the joints created by the multiple concrete pours.
- The pool shell has a quartz-aggregate finish. The existing condition of this finish is fair, at best. Over the years several areas have been patched/repared and this will continue with age if the finish is not fully replaced in the future.
- There are a handful of non-ADA compliant issues that should be addressed. The most major being there is no primary means of access at the main pool. Installing a chair-lift (portable) would fully resolve the issue.
- Both bodies of water utilize high-rate sand filtration. Both filters are original and have their original sand media and both have exceeded their typical sand media lifespan. Both may be in need of a sand media replacement also.
- The overall mechanical equipment is in good condition for its age and has been well maintained. However, a lot of this equipment is original and/or nearing its life expectancy. Continued maintenance will be required with some costly items such as pumps and the Children's pool heater will require replacement in the near future.

When planning for the future, it is important to merge perspectives from three key sources to develop the right plan. Those perspectives include the needs and desires of the community, the City, and industry trends/best practices.

The concept for the TAP was created with families, kids, and swimmers (fitness and competition) in mind while providing a best in class experience for the entire community. From aquatics staff, we learned the existing amenities are still serving the community well, while there was recognition that the existing facility simply was not large enough to adequately serve the number of visitors coming to the facility on a regular basis. City staff also acknowledged that even though they have been able to reasonably maintain the facility since it opened, they recognized the pool and the pool equipment are beginning to show their age and a refurbishment/replacement plan should be established.

Through our interaction with City staff, the three guiding principles for the project were identified as:

1. The TAP is a much wanted amenity offered by the City. The TAP should offer a modern and attractive aquatic experience that includes fun amenities, flexible/multiuse space, and can offer enjoyment to the community.
2. Offer an appropriately sized facility with the appropriate amenities that can accommodate anticipated attendance and serve the community well.
3. The TAP must be financially sustainable well into the future.

Our recommendation is to utilize and increase the occupied footprint of the existing site while renovating the existing pool to insure usability for the next 20 years. Our recommendations are as follows:

- Refurbish the existing pool shell and pool equipment with a focus on keeping the pool operational for the next 20 years. The existing main/leisure pool is still a desired amenity and should be maintained as part of any future plan.
- The bathhouse as well as the pump room have been well maintained through the years. Minor upgrades/improvements (Replace some doors, paint, etc.) are recommended. Plumbing Fixtures, Sinks, Counters and Mirrors (all restroom accessories) will require continued maintenance as well as potential replacement given their age, however, at the time of this assessment everything was functional and in acceptable condition.
- The existing pool deck, greenspace and landscaping have been very well maintained. There are some minor cracks in the pool deck that should be addressed as well as replacement of the "rope" and some posts at the edge of the landscaping.
- Replace the front entry wood entry pavilion with a new, painted steel entry pavilion.
- Consider one of three options to expand the aquatics facility.

Option 1 - Add Lazy River	\$7.1M - \$7.8M
Option 2 - Add Activity Tower	\$10.2M - \$11.0M
Option 3 - Add Leisure Pool	\$10.3M - \$11.5M

* With each option, expansion of the bathhouse as well as pump house will be required and is included in the projected cost as well as improvements to the existing facility.

Aquatics facilities offer a variety of health and wellness advantages through robust programming options and recreational use. Swimming has been shown to lower mortality rate and increase the quality of life, offering relaxation, flexibility, coordination and stress reduction advantages. Additionally, swimming and other aquatic activities are lower impact than many other activities and thus appeal to people of varying ages and ability levels.

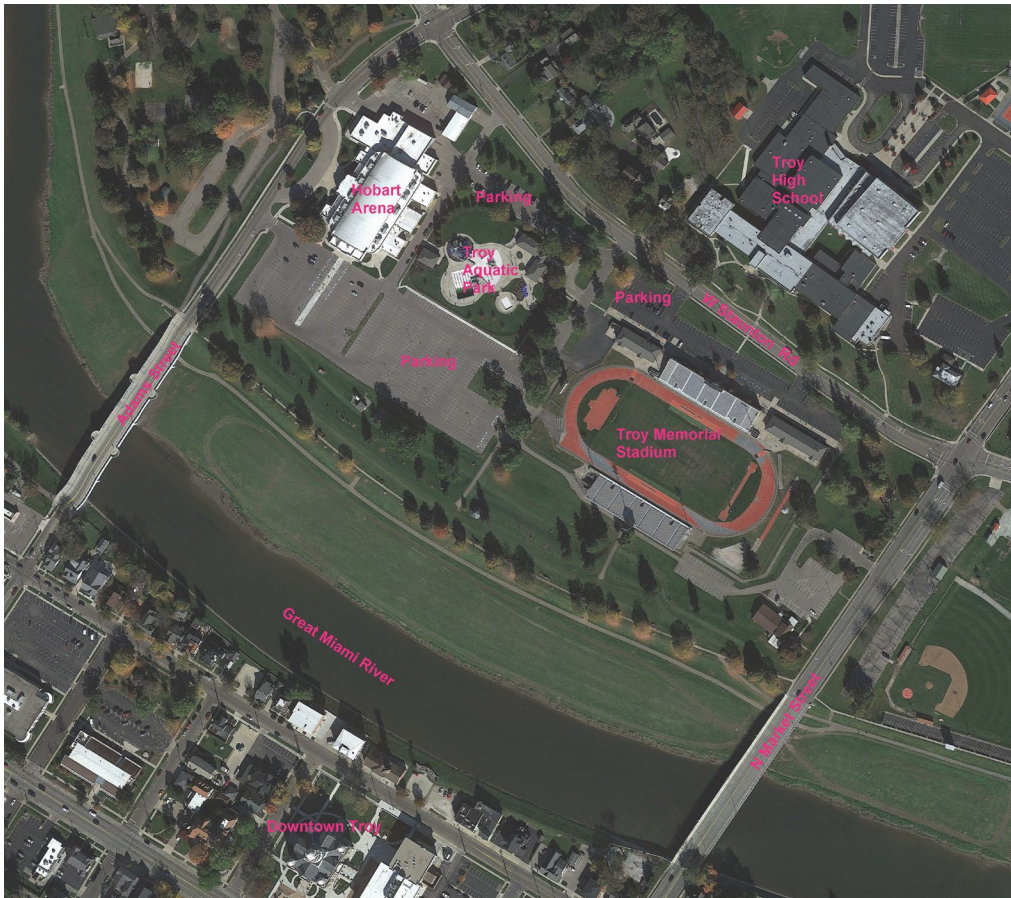
Modern aquatics facilities come in all shapes and sizes, however, it is important to right size the facility to best serve the community appropriately as well as be operationally sustainable. We believe the solution developed through this process will allow the TAP to exist and operate efficiently well into the future.

3. Existing Conditions Assessment

Overall Site and Buildings

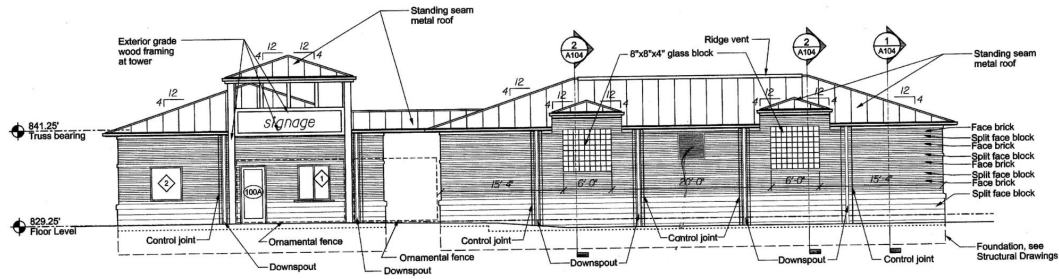
The existing TAP is located off West Staunton Rd between Hobart Arena and Troy Memorial Stadium. With the Great Miami River to the south and Troy City Park just west on the other side of Hobart, the location promotes a welcoming approach centrally located within the City of Troy and easily accessible for the entire community.

The facility is surrounded on three sides with parking and has sufficient accessible parking to serve the facility. The site overall is relatively flat with a gentle slope on the south side towards the river. Curb ramps are utilized at each sidewalk access point to allow for smooth transitions without a step. The complex is secured with a six foot high brown aluminum fence and screened with tall landscaping. There is one primary (public) entry point centrally located at the corner of the Bathhouse.



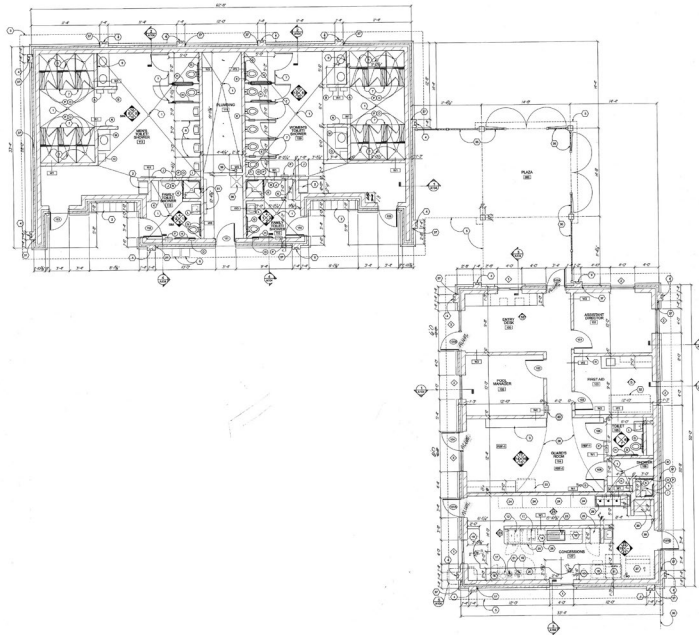
Overall Site Plan

The bathhouse serves as the primary structure for overall operations of the pool. This building was originally constructed in 2005 with the original pool and exists as it was constructed (no renovations). There is an elevated, central open air feature which identifies the entrance to the aquatics facility. This structure provides a secured ingress/egress to the pool(s) as well as a shelter for pop up storms if needed.



Front Elevation of Bathhouse

The bathhouse structure is load-bearing masonry with wood trusses. The building is clad with face brick and a standing seam metal roof. The entrance feature is of wood construction with a metal roof. The bathhouse provides space for administrative needs, men's and women's locker rooms, concessions, and limited storage/mechanical space.



Bathhouse Building Plan

The men's and women's toilet/shower rooms are both equally sized with six fixtures (WC and Urinals) each, six showers each, and three lavatories each. In addition to the gender-specific locker room, there are two individual family restrooms each with one shower, one lavatory, and one water closet. Lockers are provided on the exterior of each toilet/shower as well as within each of the locker rooms and should be replaced as they are quickly reaching the end of their useful life.

Both the Men's and Women's toilet/shower rooms are adequately sized to serve a pool facility of this size. The toilet/shower rooms are ADA compliant and align with current building code requirements. A separate, similar building also provides space for administrative functions, lifeguard break area as well as concessions. The administrative and life-guard spaces are adequately sized however the layout and use of space is slightly inefficient. In addition, there is a need to add additional lockers for staff use. Although functional, the concession space is tight and lacks sufficient storage.



Men's/Women's View of locker Room



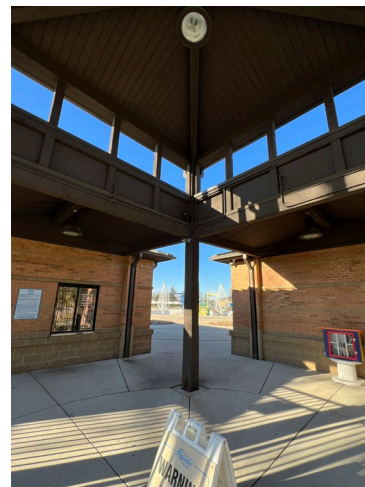
Administration/Life-Guard/Concession

The two buildings are connected with an open-air pavilion which primarily functions as the primary ingress and egress point to the pool facility. As-is, this pavilion is eye-catching and adequately signifies this is the point of which individual enter or exit the facility. The structure also provides cover during minor storm events and allows users to potentially wait out a storm as it passes.

Primarily constructed of exposed wood, this structure is beginning to show some deterioration. One of the primary structural columns is showing significant rot that appears to be from exposure to water. While the one is worse than the other three, all four columns are in the beginning stages of some level of compromise. If not addressed within the next 3-5 years, the conditions will simply continue to get worse.



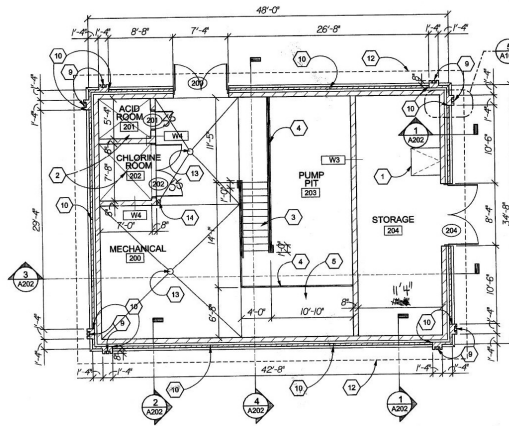
Wood Column Water Damage at Base



Overall View of Pavilion

Replacing the column (or all the columns) would require a complete dismantling of the Pavilion and then reconstruction replacing existing materials. With that in mind, we recommend the entire structure be removed and replaced with a painted steel (galvanized) structure. This approach will be more in-line with the building structures which were constructed with durability and low-maintenance in mind. A new structure would have added value and could potentially be designed differently further enhancing the refresh of the overall facility.

The existing pool mechanical building is in good condition and located on the site appropriately. Although tight, the building seems to be appropriately sized. This building is constructed similar to the bathhouse structures with load bearing masonry and a wood truss roof structure.



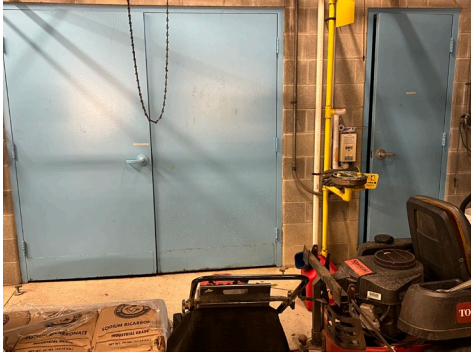
Equipment Building Plan

Although in satisfactory condition, the equipment building is maxed out as related to usable space. This could become an issue as pool equipment is changed, upgraded, or even added too.



Pool Equipment Building

Even though the building is in good shape, we do recommend replacement of all doors and associated hardware. The interior doors at the chemical room have rusted while the exterior doors are dented and showing wear and tear from 20 years of usage. In addition, the ventilation (exhaust) should be upgraded within the Acid and Chlorine Rooms.



Interior Doors at Chemical Storage

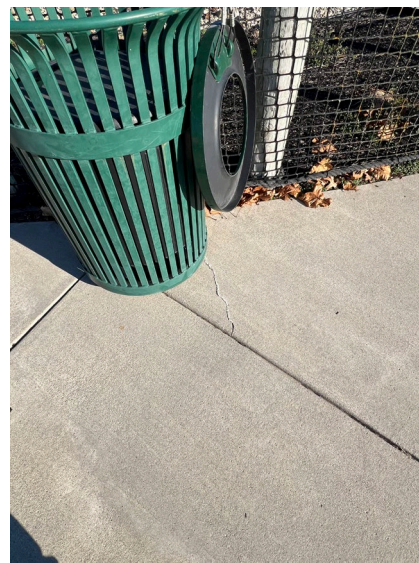


Exterior Doors at Pool Mechanical Building

The concrete deck surrounding and connecting the pools is in excellent condition and has been well maintained. There are a few minor cracks that should be addressed with replacement, but overall condition is acceptable. The adjacent landscaping is protected with a post and rope/net feature which themes the facility. However, the rope/net requires replacement as it's condition has been significantly compromised from the constant exposure to weather over the last 20 years. Shade is provided from large umbrellas distributed throughout and around the deck as well as in the zero entry area of the pool. These shade structures have been well-maintained..



Rope/Net Feature



Minor Cracking in Concrete Deck

The TAP has been very well maintained through the years. It is unusual for a facility this age to be in the condition that it is and those responsible, should be commended. The TAP provides a unique aquatic experience not matched by other community pools in the region.

Water Features and associated Mechanical/Pump Room Assessment

TROY OUTDOOR AQUATIC FACILITY

Observations from December 11, 2023. Pool was not operational.



GENERAL

Troy Aquatic Facility has two pools. One large combination Leisure Pool with zero depth activity area, slide plunge area, 6-lap area with diving hopper. The second pool is a small wading pool zero depth entry and five geysers. The Leisure Pool utilizes a full perimeter gutter system while the wading pool has three skimmers. Both pools are concrete construction with special aggregate finish and tile accent.

Pool sizes and dimensions;

Leisure Pool - Surface Area: 9,909 square feet

Perimeter: 560'-7"

Depths: Zero to 12'-0"

Volume: 304,980 gallons

Wading Pool - Surface Area: 600 square feet

Perimeter: 107 linear feet

Depths: zero to 1'-6"

Volume: 3,870 gallons

Primary ADA means of access is not present. Primary ADA access can either be a pool lift or ramp (sloped entry) with two handrails down to at least 2 feet of water depth. Secondary ADA means of access is by way of the stairs with narrow handrails, refer to pictures 2 and 3.

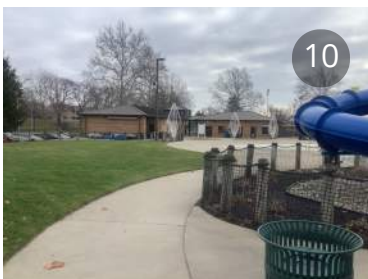
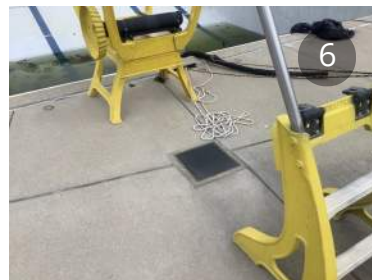
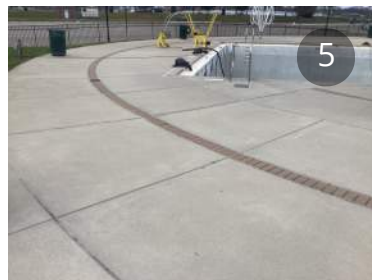
General means of access are by way of the zero depth area on both pools. There are one set of wide stairs at the end of the plunge area that also include a secondary ADA access with the narrow rails.



DECK EQUIPMENT

All the guard chairs are portable and were stored away. Based on staff they have four tall chairs and one short chair that are in fair condition.

Some lounge chairs were visible but most were stored for the winter. Other items like umbrellas were collapsed with their fabric shades removed and stored for the winter.



COMPETITION EQUIPMENT

There is one 1-meter springboard. The board itself has been stored for the winter. Overall it is in good condition with the support frame being recently painted.

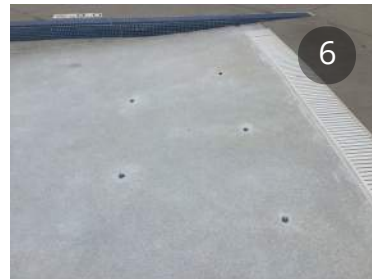
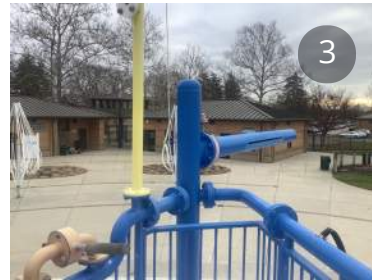
There are six starting platforms that are stored for the winter. According staff they are in good condition.



RECREATION EQUIPMENT - ACTIVITIES

In the leisure pool there is a series of ground sprays (geysers) along the very shallow end of the zero depth gutter. There is a group of five geysers at one end and five additional sprays, equally spaced along the zero depth grating. In the wading pool there is a group of five geysers along one side of the zero depth grating.

There is an SCS Watercolors play structure in the middle of the zero depth area of the leisure pool. The play structure itself is in good condition for its age. The one slide off the structure has severely faded over the years but functional and safe to use. The slide is equipped with a landing pad and barrier at the bottom. According to staff, there has been regular annual maintenance on the structure to keep it in good condition.



RECREATION EQUIPMENT - SLIDES

Kiddie Slide - Refer to Activities (Play Structure)

Waterslides - There are two water slides. One is a closed flume tub and the other is an open body slide that both start of the same slide tower at 22'-6" high.

Tower - The tower is constructed of painted galvanized steel with a wrap around style staircase leading up to the top with railings, handrails on both sides and a lockable gate at the bottom.

Flumes - Both flumes are fiberglass in construction and in good condition. The closed flume is 147'-6" in length and the open flume is 259'-3" long. Both flumes start at the top of the tower and terminate in the plunge pool area of the pool. Even though in reasonably good condition, the open flume slide should be re-caulked soon and there are sections that require replacement.

Barriers - There is a complete barrier around the slide tower consisting of wooden bollards with rope and netting. The barrier is showing its age and in fair condition.

Drop Slide - There is one drop slide located on the side of the lap lanes at the deep end of the pool. It has a closed flume that terminates above the water and starts at the top of the tower. The tower is constructed of painted galvanized steel with circular stairs, railings, handrails and locking gate at the bottom. Overall the slide flume and tower are in good condition, however should be re-coated and re-caulked. There is no barrier around the tower to protect patrons from bumping their heads on the stairs that are 7'-0" or less above the deck. WTI recommends a barrier around the slide towers with low hanging structure.



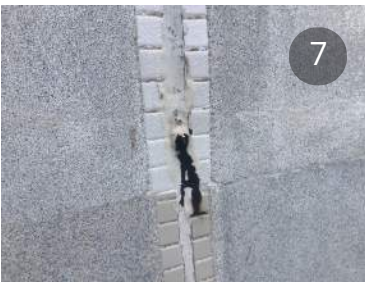
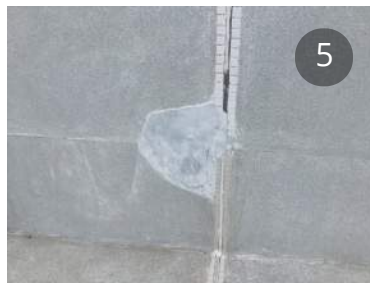


POOL SHELL

Both pools are constructed of concrete and appear in good condition with no visible cracks or spalling.

The Wading pool is constructed as one continuous pour for the floor while the Leisure pool is constructed of multiple pours. This leave several expansion\control joints throughout the pool. The joints themselves are in very poor condition with much of the caulk missing or severely cracked. The tile along each of the joints is also in poor condition.

The Leisure pool has five (5) underwater pool lights that are in fair to good condition however are not functional. It is not known if they are all working as the pool was drained at the time. The Wading pool does not have any in pool lighting.



FINISHES

The primary pool finish in both pools is quartz aggregate finish. The quartz aggregate is original to the pools and is in fair condition. Over the years there are several locations that have been patched\repaired and this will continue with age if its not replaced.

The secondary finish is ceramic tile for the lane lines, end-wall targets, common walls and water line at the zero depth area. Several areas of tile have to be replaced each year do to freeze thaw conditions. Remaining tile that has not been replaced is in poor condition and has little to no grout left between the tiles.

Depth Markings



PERIMETER SKIMMING

Perimeter skimming is handled by way of a concrete gutter with a PVC Swimout Overflow Grate System. The grating is in fair condition for its age and use. Staff noted that it is not possible to get replacement sections as this product is no longer manufactured. A small allotment of replacement sections have been purchased and is not on hand, however replacement of the entire grating system is a very high priority. At the zero depth entry there is a flat 12' grate that is in fair condition.

The Children's pool utilizes two skimmers and a zero depth entry grate for skimming. The skimmers and zero depth grating are in good condition.



INLETS

Both pools utilize floor inlets for filtered water return. The Leisure pool has 38 floor inlets and the Children's pool has 5. All the floor inlets have been capped for the winter and appear to be in good condition. The Leisure pool also has two wall inlets located on either side of the stairs at the slide plunge area.



SUBMERGED OUTLET SYSTEMS

The Leisure pool has two large main drains in the deep end of the pool measuring 3'-0" x 5'-0" and a single 12"x12" drain centered between the two slide flumes. This drain is connected to the main drains. The main drains are only used to drain the pool. The Children's pool has three 12"x12" main drains at the deepest end of the pool. All the drains are properly spaced and have updated VGB compliant grates and sumps. Paperwork for the drains is located in the managers office. All of the drains are in good condition.

FILTRATION

Both pools utilize high-rate sand filtration. The Leisure pool has four (4) horizontal, Neptune Benson #4896SHFFG high-rate stand filters. The Children's pool has one (1) Neptune Benson Legacy Series #48CCFG-3 high-rate, vertical sand filter. Both filters are original and have their original sand media. The filters are in good condition however both have exceeded the typical sand media lifespan. Both may be in need of a sand media replacement in the near future.

LEISURE POOL FILTRATION PUMP

The filtration pump is an Aurora model 340-ES, size is 6x6x11 and has a 40 HP Baldor motor. The pump and motor are in very good condition and have been well maintained over the years. This pump did receive a variable frequency drive several years back which has helped extend its life.

The pump is equipped with a PVC strainer on suction side of the pump with stainless steel strainer basket and a spare basket.



WATERCOLORS ACTIVITY PUMP

The Watercolors activity pump is an Aurora model 340-ES, size is 6x6x9 and has a 20 HP motor. The pump and motor are in fair condition and will be in the need of maintenance over the next few years. This pump does not have a variable frequency drive.

The pump is equipped with a PVC strainer on suction side of the pump with stainless steel strainer basket and a spare basket.



GEYSER SUPPLY PUMP

The geyser supply pump is an Aurora model 340-ES, size is 4x5x9B and has a 10 HP motor. The pump and motor are in good condition and have been well maintained over the years. This pump does not have a variable frequency drive.

The pump is equipped with a fiberglass strainer on suction side of the pump with stainless steel strainer basket and a spare basket.



BODY SLIDE PUMP

The body slide pump supplies water to both body slides and is an Aurora model 340-ES, size is 6x6x11 and has a 25 HP motor. The pump and motor are in good condition and have been well maintained over the years. This pump does not have a variable frequency drive.

The pump does not have any type of strainer on the suction side.



DROP SLIDE PUMP

The drop slide pump is an Aurora model 340-ES, size is 4x5x9A and has a 7.5 HP motor. The pump and motor are in good condition and have been well maintained over the years. This pump does not have a variable frequency drive.

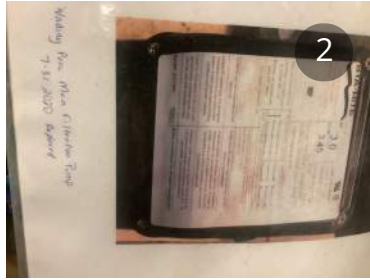
The pump does not have any type of strainer on the suction side.



CHILDREN'S POOL FILTRATION PUMP

The filtration pump is a Sta-Rite, Dura-Glas II series, #P4R6H3 and has a 3 HP motor. The pump and motor are in good condition and have been well maintained over the years. This pump does not have a variable frequency drive.

The pump is equipped with an integral strainer bolted directly to the suction side of the pump with a plastic strainer basket and a spare basket.



CHILDREN'S POOL GEYSER PUMP

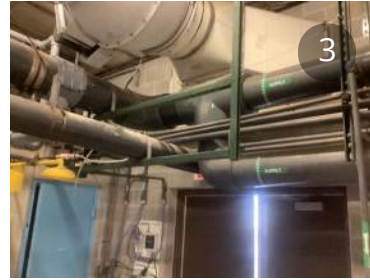
The geyser pump is a Sta-Rite, CCSP series, #CCSPHK3 and has a 7.5 HP motor. The pump and motor are in good condition and have been well maintained over the years. This pump does not have a variable frequency drive.

The pump is equipped with an integral cast iron strainer bolted directly to the suction side of the pump with a stainless steel strainer basket and a spare basket.



OBSERVABLE PIPING

All observable piping was in the mechanical room and made of sch 40, sch 80 and CPVC. There was a small amount of sch 40 for the backwash hub and trap. The majority of the piping is all sch 80 pvc for all suction and pressure lines. There is also about 150 feet of CPVC for the connections to and from the pool heaters. Most piping looks to be in good condition, however the piping over the main pump should be replaced.



OBSERVATION VALVES

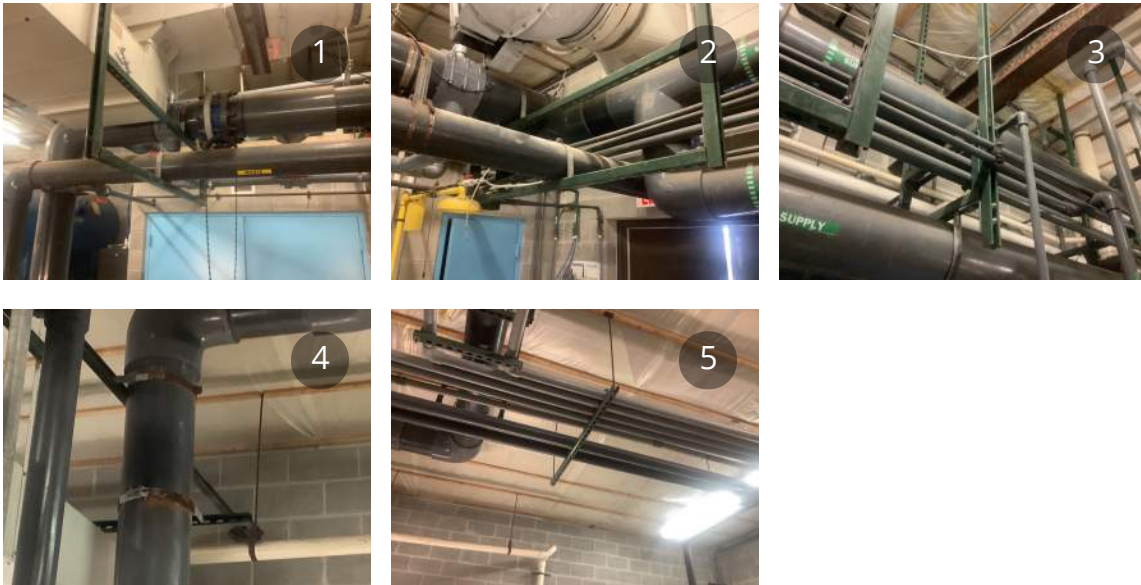
There are 31 observable butterfly valves, ranging in size from 4" to 10" with a combination of lever and gear handles. The valves are in fair condition with some having excess corrosion.

There are 10 observable ball valves that are all in good condition.



PIPE SUPPORTS & HANGERS

The pipe supports and hangers are made up of unistrut with threaded rod and hanger clamps. All appear to be in good condition.



CHEMICAL CONTROLS

The chemical controllers are both CAT4000 controllers that were installed approximately 5 years ago. They are a fairly advanced controller that appear to be in fair condition and should be replaced within the next 2-3 years.



SANITIZER

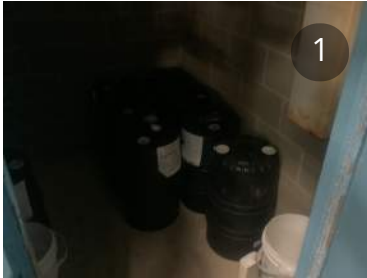
Both pools utilize Calcium Hypochlorite for disinfection. The Leisure pool has a PPG model 3140 chlorinator and the Children's pool has a model 3070. Both units appear to be working, however they leak and are in poor condition and should be replaced. The units are housed in their own ventilated room.



PH CONTROL

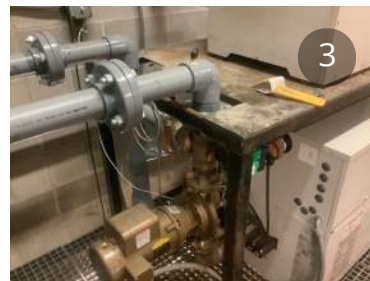
Both pools are utilizing acid for their pH control. It is injected into the filter return lines via Stenner metering pumps. The pumps appear to be in good condition. The pumps and acid are stored in their own ventilated room.

Acid is delivered to the site in 30 gallon carboys and is stored in the acid room directly on the floor. It is highly recommended that some form of secondary containment be added to prevent damage if there is a spill.



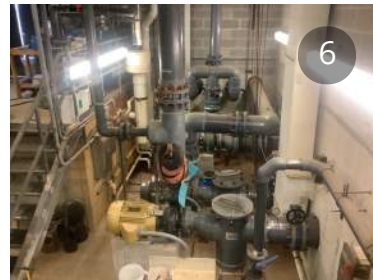
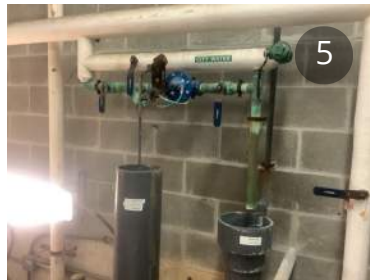
POOL HEATING

Heating for both pools is by way of natural gas pool heaters. The Leisure pool has a Lochinvar CPN2070, 2,070,000 BTU/Hour pool heater and the Children's pool has a Lochinvar ERN201, 200,000 BTU/Hour pool heater. The Leisure pool heater has been recently replaced (2023) and is in very good condition. The Children's pool heater is the original heater and is in fair condition.



MECHANICAL GENERAL

The overall mechanical equipment is in good condition for its age and has been well maintained. However, a lot of the equipment is original and nearing or exceeded its life expectancy. All items such as flow meters, autofills, valve legends, operating instructions, winterization instructions, pipe and valve labels were all present and meet standards. Continued maintenance will be required with some big ticket items such as pumps and the Children's pool heater should be looked at and planned for replacement in the near future.



4. Pool Capacity Analysis

Development of an understanding of the physical condition of the existing aquatics park will provide the City with a baseline understanding for maintaining the pool for the next 20 years. However, given the pool was designed 20 years ago utilizing data from that time, it is necessary to validate whether or not the general size of the facility (amount of water) is sufficient to support the community's needs with current data.

Prior to the design being developed for the existing pool, a feasibility study to determine the size and location of the proposed aquatic facility was completed. At that time, the study projected the population of the City would reach 22,992 by 2008 while the secondary service area would reach a population of 56,313 (79,305 Total Service Area Population). The market analysis provided within the report identified an average participation rate of 21.75% of the projected populations would utilize the pool facility. Utilizing the 21.75% participation rate on the total projected population of 79,305 equates to 17,249 potential swimming participants. The report noted that the participation numbers are for swimming and do not necessarily translate into expected attendance figures for the aquatic facility given many participants will utilize other facilities for swimming including lakes, rivers and backyard pools.

The report then concluded that weekly participation in aquatics activities from the 17,249 potential swimmers would be around 43%, equaling around 7,868 potential participants per week. Then, from this, the report indicates a bather load capacity of 1,000 -1,200 per day without showing much detail as to how that number was derived. It is assumed that the 7,249 potential swimmers was rounded up and divided by 7 days to get to the 1,000-1,200 bather load noted. Furthermore, it is noted that this was the "selected" proposal which could be construed as indicating there were options to select from, however the report does not make any mention of options considered.

The report then used this data to recommend a 10,000SF pool, zero to 12 feet deep with 134 linear feet of zero depth edge, one 160 linear foot body flume slide with a second 148 linear foot body flume slide, both starting from a 22 ½ foot water tower. Water play features recommended were five geysers, one SCS pool and falls, and a four level SCS watercolors unit with twenty interactive features. The six lap/competitive lanes x 25 yards was to include a diving hopper, 12 feet deep, with one, 1meter diving board and one drop slide. There is no indication as to how the bather load capacity was tied to this recommendation of features, however it could have been a best practice recommendation from the author of the report.

With the intent of validating the original recommendation, we have utilized our own proven methods we would typically utilize to determine pool size. To start with, we have calculated the average daily attendance at 3% of the population for the primary region while 1% is used for the secondary region. Utilizing the population figures from the original report, the attendance per day would then be calculated as follows:

City of Troy (Primary)	$22,996 \times 3\% =$	690
Secondary Service Area	$56,313 \times 1\% =$	563
Total Users/Day = 1,253 (very close to the 1,200 amount identified)		

$$1,253 \text{ Users/Day} \times 85 \text{ Days} = 106,505 \text{ individual users per season.}$$

The bather capacity of 1,000 – 1,200 originally recommended in the report appears to be in line with our methodology. It is common to reduce the peak hour calculation based on varying age groups, impact of weather conditions, and the fact that attendance drops significantly in mid-August when the kids go back to school and even budget of which seemingly was considered for the 10,000SF of surface area eventually recommended in the report.

Many times the lap/competition pool are is removed from the calculation of identifying water needs. Our calculations utilize a ratio of 15SF/Person to determine how much water is required. When utilizing this ratio, there would be some assumption that every 4'-10" x 4'-10" area of water was available for use. Water deeper than 3'-6" serves specific users such as lap swimmers or divers while water less deep has a broader, much more recreational use. Many time the lap/competition pool with diving is not figured into the bather load calculation and an additive feature based on demand within the community.

Pool Staff has been tracking attendance since the pool opened in 2005 and we can now utilize real-time data to test the amount of water and determine if it is sufficient to serve real-time attendance. Since 2018 (and excluding 2020 due to Covid), the average total attendance has been approximately 36,584 per season. Using Methodology #1, the 36,584 attendance is what we would use to calculate the average peak hour attendance as follows:

Methodology #1

Total Annual Attendance Average	36,584
Peak Month (30%)	10,975
Average Weekly During Peak Month (25%)	2,743
Peak Day at 25% of week	685
Daily Peak Hour @ 60% of Peak Day	411 People

With the utilization of real-time data, reductions to the peak day number should not be taken and if they are, they should be minimal and in the 10%-15% range at most. At 15SF/Person and 411 people, 6,165 of water surface area would be required.

The actual water surface area is as follows:

Tot Pool	650 SF
Lap Pool	3,160 SF
Slide Plunge	855 SF
Leisure Pool	5005 SF
Total Existing Water	9,670 SF

Given the Plunge Pool is specific to slide use and the lap pool has limited use to specific users, they would be considered additive to the 6,165 SF of water surface area recommended from the calculation. Adding the Tot Pool and the Leisure Pool together is 5,655 SF which is less than the 6,165 SF from the calculation. The difference in area is 510 SF. At 15 SF/person, this would reduce the bather capacity load from 411 to 377.

The average daily attendance currently being tracked for the 2024 season is 512 (May 25th – July 30th). This is significantly higher than the attendance numbers determined through the calculations above. As noted, the pool is designed for a bather capacity of 377. Utilizing the 512 average attendance at 15SF/Person would justify a need for 7,680SF of water which is 2,025 SF greater than what is currently provided (5,655SF).

The above calculation methods are typically used for pre-design efforts with the intent of testing the need for an aquatics facility as well as the projected success and sustainability of that facility. They are typically based on

current and projected population and provide the foundation to determine the minimum requirements for the amount water as well as operational costs and construction costs. Utilizing this data, the owner is able to determine whether or not they can afford to construct and operate an aquatics facility.

The building code ultimately determines the occupancy of the design for the facility. The 2024 Ohio Building code dictates a ratio of 1 Person/50 SF of water. Using the leisure and tot pool total area of 5,655SF would calculate to an occupancy of 113 for the pool itself. In addition, occupancy for the deck area is calculated utilizing a ratio of 1person/15 SF, which equates to an occupant load of 1,166 (17500 SF of existing deck). This indicates the existing facility is designed to accommodate a total occupant load of approximately 1,279 far exceeding the bather load capacities calculated above. However, of that 1,279 load, the pool itself is only designed to safely accommodate 113 users.

Pool staff have validated that the assumptions originally made are being exceeded and are continuing to grow. Peak Day (total admissions) surpasses 500 on a regular basis. It is anticipated daily attendance quantities will continue to increase well into the future. Other aquatic facilities in the area are very quickly reaching the end of their useful life and will either be de-commissioned or will have to be completely re-built. The recent closure of the Piqua pool combined with the growth across the community have been the primary influencers to the increased attendance at the Troy Aquatic Park.

Given the trends in the real-time usage of the pool as well as continued growing interest, we recommend expanding water opportunities. Based on the current daily average attendance of 512, we can easily identify a need for an additional 2,000-2,500 SF of water. We would recommend an expanding the water opportunities in the range of 6,500 SF – 10,000 SF. This would translate to a total water area of It is estimated an increase in water surface area between Water surface area can include many different types of water bodies and features such as spray pads, lazy rivers, leisure/recreation pools, etc.

To summarize the calculations outlined above:

Total Existing Water Surface Area	9,670 SF
Leisure Water Surface Area	5,655 SF
Bather Load Calculation	377 Users (15 SF/Person)
Current Average Daily Attendance	512 Users
Building Code Occupancy - Pool	113 Occupants
Building Code Occupancy – Deck	1,166 Occupants
Building Code Occupancy – Total	1, 279 Occupants (Facility)
Water Surface Area Exp. (Recommended)	6,500 SF – 10,000 SF (Leisure Water)
Bather Load	Additional 433 Users (15 SF/Person)
Building Code Occupancy – Pool	Additional 130 Occupants

5. Proposed Design Concepts

The primary objectives of this exercise was to evaluate the existing facility based on existing conditions as well as how well it is serving the community's needs and then, with that data in hand, make recommendations for moving forward. Through the assessment, we learned the following key points:

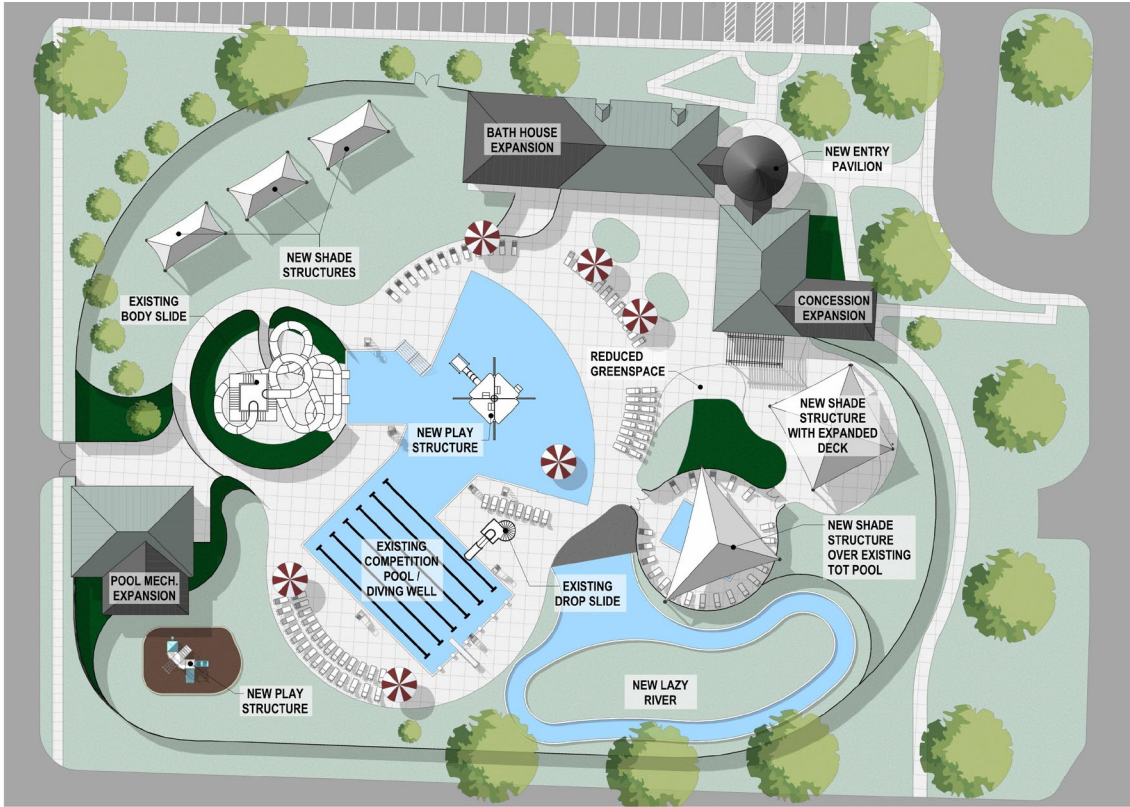
- The facility, in general, has been maintained very well. However, at 20 years old, it is starting to show it's age and there are issues specifically related to the pool equipment and pool vessel that should be addressed within the next 1-5 years.
- There is a broad concern for over-crowding as related to the amount of water available and whether it can serve the community adequately. Utilizing current attendance rates, we found there is evidence that the existing pool is undersized to adequately serve the community. In fact, there is some evidence that the pool's original design capacity has been inadequate since the pool was constructed in 2005.
- Additional shade structures are recommended.
- With any expansion of water, an expansion of locker rooms as well as the pool mechanical systems will be necessary.

With input from City Staff, three concept plans have been developed that addresses many of the issues/concerns as outlined above. These proposed plans would expand the site to include new water features. Each plan adds seating, shade structures, and even greenspace to some degree. Each concept plan also accounts for improvements to the existing pool and pool equipment. The concepts developed are as follows:

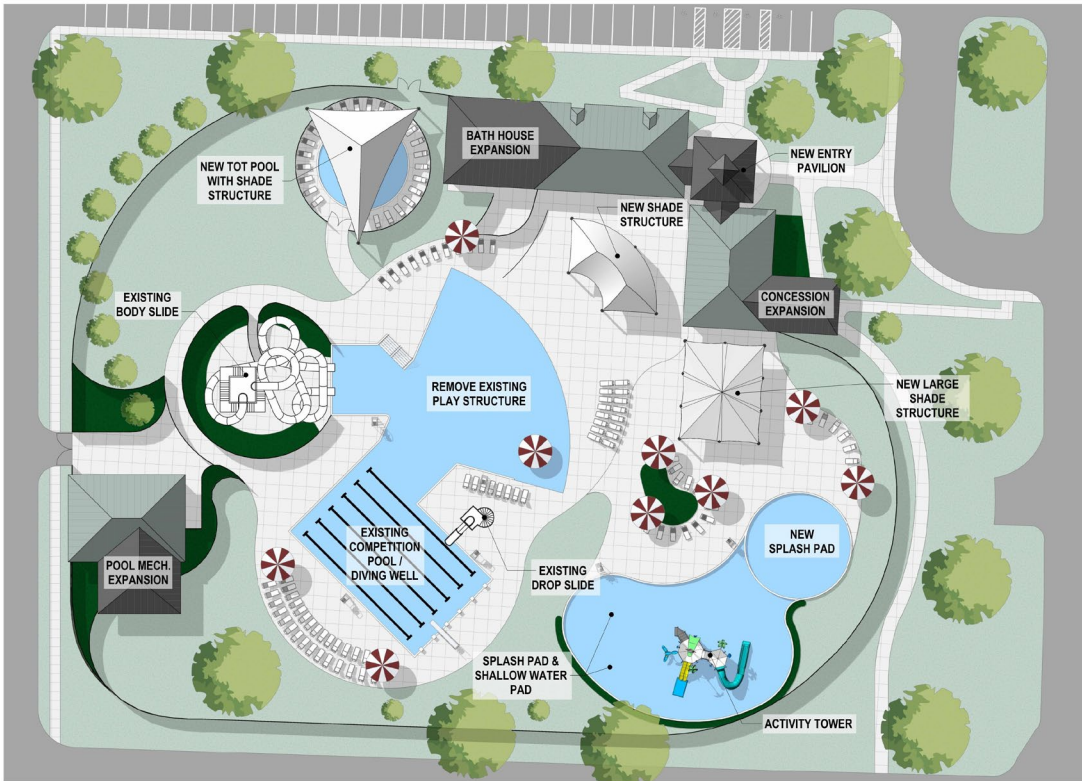
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|-----------|--------------------|
| Option 1: | Add Lazy River |
| Option 2: | Add Activity Tower |
| Option 3: | Add Leisure Pool |

Each concept plan impacts the existing site differently causing, in some cases, to relocate and re-build a new/improved tot pool. All concepts were designed around maximizing safety and maintaining existing primary water features (zero entry, competition pool, slides, etc). This investment will allow for the future long term sustainability of the facility for the next 20 years.

New fencing and landscaping will be included as needed with each layout. Comfort amenities (wi-fi, multiple seating areas with different options for seating, shade, family only areas, etc.) will be considered as the chosen design concept is further developed and implemented.



Proposed Plan - Option 1, Lazy River



Proposed Plan - Option 2, Activity Tower



Proposed Plan - Option 3, Leisure Pool

Aquatic trends are created when the experience and perspectives of guests, operators, designers, and manufacturers/suppliers come together, with guest experience and operator feedback leading the charge. Budgets and goals are also considered when exploring and selecting which trends are best fit for your facility.

Trends change over time and do not replace fundamental offerings such as zero entry, lap lanes, water slides and diving boards. However, trends do influence what guests expect and can enhance the appeal of a facility. Current and up-and-coming trends for larger facilities include the following:

- Multi-generational spaces and features that appeal to varying ages, abilities, and interests
- Flexibility in use of space
- Moving water such as a lazy river or wave generation
- Inclusive use play for all abilities
- Signature feature(s), such as slides, activity towers.
- Sustainability and efficiency in operations and systems.
- Staffing considerations such as lifeguard requirements.
- Use of UV treatment for pool water to increase disinfection.
- Use of regenerative pool water filtration systems allow for smaller mechanical rooms, lower water waste, reduced chemical waste, reduced heat loss, and improved water filtration.
- Use of recent innovations in pool water heating systems has reduced energy consumption and allowed for longer equipment life.
- Use of variable frequency drives for pumping systems has allowed for fine-tuning operation points and therefore reduced energy consumption



Activity Tower



Shade over Water



Lazy River



Leisure Pool (Multi-Generational)

Each of these trends have been considered and incorporated and considered with each concept in one way or another. Specific to the concepts being proposed, the following design goals were considered:

- Separate bodies or areas of water that can service varying groups of people simultaneously, each with its own unique offering.
- The facility should be set up for to provide for more active areas and more relaxed, quiet areas.
- Allow for maximized programming opportunities.
- The lazy river is a unique feature and adds interest/excitement to the facility.
- The activity tower would draw more families/children and be a unique feature.
- Simple, open water will maximize programming and serve a broader community.
- The concept is planned in a way to maximize safety and control as well as to allow each area to operate independently.

6. Opinion of Probable Cost

The tables below outline our opinion of probable cost for each concept planning option outlined above. It is anticipated that within each option there could be features added or even deleted from other options of which will impact the final cost of the final plan option. In each case, the costs associated with improving the existing pool are included in the total cost.

EXISTING POOL IMPROVEMENTS

General Improvements	Low Range	High Range
ADA Improvements	\$ 10,000.00	\$ 12,000.00
Existing Slide Structure Improvements/Maint.	\$ 20,000.00	\$ 25,000.00
Rope/Barrier Replacement	\$ 25,000.00	\$ 30,000.00
Misc. Maint Improvements (replace doors, repair concrete deck, etc)	\$ 45,000.00	\$ 50,000.00
Replace Open Air Wood Entrance (steel structure)	\$ 120,000.00	\$ 125,000.00
Sub Total	\$ 220,000.00	\$ 242,000.00
<i>Contingency @10%</i>	\$ 22,000.00	\$ 24,200.00
<i>Soft Costs @20%</i>	\$ 44,000.00	\$ 48,400.00
Total	\$ 286,000.00	\$ 314,600.00

Existing Pool Shell Improvements	Low Range	High Range
Repair Expansion and Construction Joints	\$ 10,000.00	\$ 12,000.00
Replaster Pools	\$ 250,000.00	\$ 275,000.00
Repair/Replace Perimeter Gutter	\$ 45,000.00	\$ 50,000.00
Replace Underwater Pool Lights	\$ 18,000.00	\$ 20,000.00
Repair Concrete Pool Shell	\$ 75,000.00	\$ 100,000.00
Surge Tank, Float Valve Maint.	\$ 50,000.00	\$ 55,000.00
Upgrade Chemical Controllers and Chemical Feed Systems	\$ 50,000.00	\$ 60,000.00
Repair and Upgrades to visible pool piping systems	\$ 20,000.00	\$ 25,000.00
Refurbishment and/or Replacement of Pool Pumps, Strainers, etc.	\$ 150,000.00	\$ 200,000.00
Repair of filtration and replacement of filtration Sand	\$ 80,000.00	\$ 85,000.00
Repair to inlets and suction outlet grates	\$ 75,000.00	\$ 80,000.00
Sub Total	\$ 823,000.00	\$ 962,000.00
<i>Contingency @10%</i>	\$ 82,300.00	\$ 96,200.00
<i>Soft Costs @20%</i>	\$ 164,600.00	\$ 192,400.00
Total	\$ 1,069,900.00	\$ 1,250,600.00

Grand Total Improvements (Existing)	\$ 1,355,900.00	\$ 1,565,200.00
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OPTION 1 – LAZY RIVER WITH EXISTING IMPROVEMENTS

Expansion, Option 1 - Lazy River	Low Range	High Range
New Play Structure at Existing Zero Entry Liesure Pool	\$ 40,000.00	\$ 45,000.00
New Shade Structures	\$ 20,000.00	\$ 25,000.00
New Shade Structure over Existing Tot Pool	\$ 60,000.00	\$ 75,000.00
New Shade Structure at Concession	\$ 45,000.00	\$ 50,000.00
New Play Structure with Shade	\$ 10,000.00	\$ 15,000.00
Lazy River	\$ 3,000,000.00	\$ 3,200,000.00
Expand Pool Mechanical Building	\$ 250,000.00	\$ 300,000.00
Expand Restrooms	\$ 350,000.00	\$ 400,000.00
Expand Concession Building (Storage)	\$ 200,000.00	\$ 250,000.00
Misc. Accessories (Chairs, tubes, life guard, etc)	\$ 8,000.00	\$ 10,000.00
Sub Total	\$ 3,983,000.00	\$ 4,370,000.00
<i>Contingency @15%</i>	\$ 597,450.00	\$ 655,500.00
<i>Soft Costs @30%</i>	\$ 1,194,900.00	\$ 1,311,000.00
Total	\$ 5,775,350.00	\$ 6,336,500.00
<i>Existing Facility Improvements Cost</i>	\$ 1,355,900.00	\$ 1,565,200.00
Grand Total, Option 1 Lazy River with Existing Pool Improvements	\$ 7,131,250.00	\$ 7,901,700.00

OPTION 2 – ACTIVITY TOWER WITH EXISTING IMPROVEMENTS

Expansion, Option 3 - New Leisure Pool	Low Range	High Range
New Play Structure at Existing Zero Entry Liesure Pool	\$ 40,000.00	\$ 45,000.00
New Shade Structures	\$ 20,000.00	\$ 25,000.00
New Shade Structure at Concession	\$ 25,000.00	\$ 30,000.00
New Leisure Pool (pool shelf, zero entry)	\$ 3,900,000.00	\$ 4,200,000.00
New Tot Pool with Shade	\$ 1,400,000.00	\$ 1,600,000.00
Expand Pool Mechanical Building	\$ 250,000.00	\$ 300,000.00
Expand Bathhouse	\$ 350,000.00	\$ 400,000.00
Expand Concessions	\$ 200,000.00	\$ 250,000.00
Misc. Accessories (Chairs, life guard, etc)	\$ 8,000.00	\$ 10,000.00
Sub Total	\$ 6,193,000.00	\$ 6,860,000.00
<i>Contingency @15%</i>	\$ 928,950.00	\$ 1,029,000.00
<i>Soft Costs @30%</i>	\$ 1,857,900.00	\$ 2,058,000.00
Total	\$ 8,979,850.00	\$ 9,947,000.00
<i>Existing Facility Improvements Cost</i>	\$ 1,355,900.00	\$ 1,565,200.00
Grand Total, Option 3 New Lesure Pool	\$ 10,335,750.00	\$ 11,512,200.00

OPTION 3 - NEW LEISURE POOL WITH EXISTING IMPROVEMENTS

Expansion, Option 3 - New Leisure Pool	Low Range	High Range
New Play Structure at Existing Zero Entry Liesure Pool	\$ 40,000.00	\$ 45,000.00
New Shade Structures	\$ 20,000.00	\$ 25,000.00
New Shade Structure at Concession	\$ 25,000.00	\$ 30,000.00
New Leisure Pool (pool shelf, zero entry)	\$ 2,800,000.00	\$ 3,100,000.00
New Splash Pad	\$ 800,000.00	\$ 1,000,000.00
New Tot Pool with Shade	\$ 1,400,000.00	\$ 1,600,000.00
Expand Pool Mechanical Building	\$ 250,000.00	\$ 300,000.00
Expand Bathhouse	\$ 350,000.00	\$ 400,000.00
Expand Concessions	\$ 200,000.00	\$ 250,000.00
Misc. Accessories (Chairs, life guard, etc)	\$ 8,000.00	\$ 10,000.00
Sub Total	\$ 5,893,000.00	\$ 6,760,000.00
<i>Contingency @15%</i>	\$ 883,950.00	\$ 1,014,000.00
<i>Soft Costs @30%</i>	\$ 1,767,900.00	\$ 2,028,000.00
Total	\$ 8,544,850.00	\$ 9,802,000.00
<i>Existing Facility Improvements Cost</i>	\$ 1,355,900.00	\$ 1,565,200.00
Grand Total, Option 3 New Lesure Pool	\$ 9,900,750.00	\$ 11,367,200.00