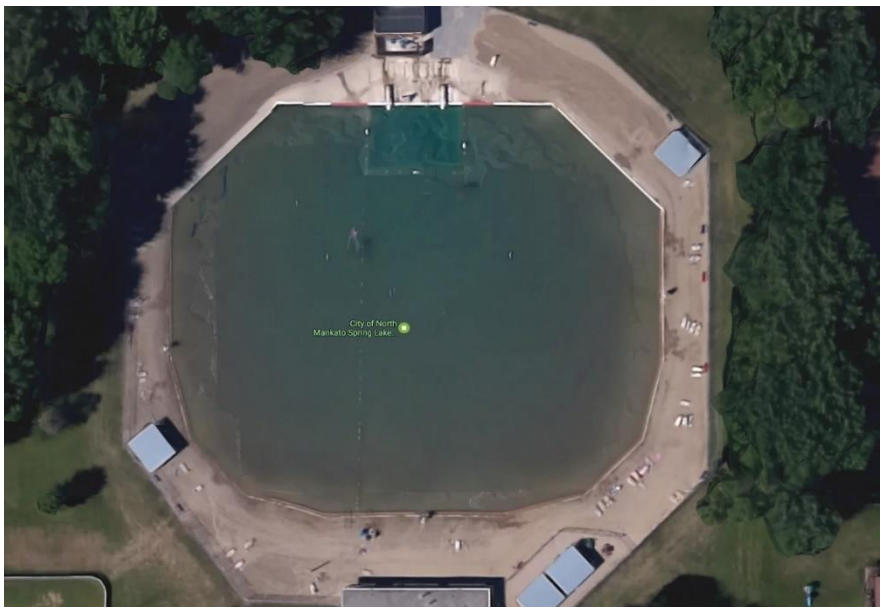
Facility Assessment

- For -

North Mankato Swim Pond
North Mankato, MN



February 23, 2017

- By -

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Executive Summary

Statement of Understanding

North Mankato owns and operates an existing outdoor sand bottom swim pond that is aging and has a number of accessibility and operational concerns. The majority of the equipment being utilized is undersized and a facility assessment is clearly warranted to determine the condition of the existing equipment, as well as to provide some information and recommendations for renovation, replacement and/or improvement options.

Assessment Process

Tom Schaffer and Paul Schaffer of USAquatics, along with City staff, completed an on-site evaluation of the existing outdoor swim pond on February 10, 2017 to determine its condition and feasibility of repair and/or renovation. Additionally, Tom Schaffer and Ryan Johnson of USAquatics met with Brad Swanson from the city of North Mankato Public Works on February 13th to discuss additional information and preliminary findings.

Scope of Study

The scope of this study covers the following areas of the facility:

- Swim Pond structure, recirculation, filtration, concrete deck area, fencing and sanitation equipment
- Compliance with new Federal and State Main Drain Laws
- Compliance with new Americans with Disabilities Act Laws
- Review of MN Department of Health swimming pool code
- Provide recommendations for repairs, renovations and upgrades including possible features
- Provide associated budget estimates

Study Criteria

The criteria used in our assessment include:

- Facility condition and other observable conditions
- Facility code requirements and compliance
- Existing Pool Facility plans provided by City
- An understanding of cause and effect associated with various aquatic designs including sand bottom swim ponds and operating procedures as presented to us through the assessment, review, and design of several thousand aquatic facilities

Intent of Report

The intent is to present a summary of necessary repairs and improvements, as well as expenses associated with those repairs and improvements. The goal of this study is to aid in the making of important decisions concerning the future of the outdoor sand bottom swim pond and related operating equipment by providing options for repairs, renovations and/or upgrades.

Summary

Based on discussions with staff, a physical assessment of the existing facility and conditions at the North Mankato outdoor swim pond, USAquatics has determined that the facility warrants a number of repairs and improvements. Several recommended and required repairs are listed for consideration. These options provide a range of facility improvements and repairs that would address operational, safety and code issues. USAquatics will also identify and provide several options for possible facility upgrades.

The existing facility is a sand bottom swim pond with a concrete diving well. Minor renovations have taken place in prior years to keep the facility operational and running, but not necessarily running more efficiently or with any less maintenance requirements. The swim pond is in need of major renovations.

The outdoor swim pond is a very unique and attractive facility. Minnesota is one of the few states where swim ponds are even possible – and only 13 exist within the State. These swim ponds are not under the jurisdiction of the MN Department of Health and do not need to follow swimming pool code. Using the State health code as a reference to establish a standard for good water quality to create a healthy and safe swim environment for patrons at the facility should be the goal. The location of the swim pond is ideal as it adequately services the needs of the community while also drawing in outside or non-local patrons. The swim pond also compliments the other planned improvements to the park including the ice/warming house to the West of the bathhouse.

In order to remain open and within good operating conditions – several items must be addressed. Addressing these concerns will not only allow the facility to remain open, but will also aide in attracting patrons.

POOL DATA

Existing Swim Pond Data	Recommended Swim Pond Data
Perimeter: 900 ft.	Perimeter: 900 ft.
Volume: 1,100,000 gallons	Volume: 1,100,000 gallons
Turnover Rate: 19 hours	Turnover Rate: 6 hours
Recirculation Rate: 1,000gpm	Recirculation Rate: 3,000gpm
Inlets: 59	Inlets: 86
Filter: 500sf D.E.	Filter(s): (2) 1,200sf Regenerative Media
Filtration Rate: 2gpm/sf	Filtration Rate: 1.25gpm/sf
Main Drain(s): single - 6”	Main Drain(s): dual – 12”
Surgetank: none	Surgetank: required (20,000 gallons)
Bather Load: 200	Bather Load: 800
Fixture Count: Men: 10 showers, 2 lavs, 3 toilets, 1 urinal Women: 5 showers, 2 lavs, 5 toilets Family: None	Fixture Count: Men: 5 showers, 2 lavs, 2 toilets, 3 urinals Women: 5 showers, 2 lavs, 5 toilets Family: 2 showers, 2 lavs, 2 toilets

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SECTION ONE: ASSESSMENT

Existing Site

The existing swim pond facility is located just West of Highway 169 on Webster Avenue. An outdoor ice arena and ballfields surround the existing pool, which is also located in close proximity Spring Lake. On street parking is available on Webster Avenue and surrounding streets and nearby parking lots.

There is some shade available on site from umbrellas and shade canopies; however, there is able room surrounding the swim pond where more shade is needed to the South and additional umbrellas could easily be installed. Shade allows patrons to extend visits by providing a much needed break from the sunlight. Some deck space for lounging is available at the north end of the site near the diving well.

The site is surrounded by a 7' chain-link mesh fence with barbed wire at the top and bottom rather than a knuckled connection. Due to potential injury, most municipalities we have worked with remove the barbed wire during renovation.

We recommend the barb-wire fence around the facility should be replaced due to potential for injury/safety concerns. Most outdoor aquatic facilities are opting to have vinyl-coated chain link fence installed in its place. The fencing should be 8'-0" in height, which also allows for 2" mesh to be used. We also recommend the addition of shade structures around the facility.

Swim Pond

The swim pond is in need of major repairs. The pond loses a considerable amount of water daily. The original liner has easily exceeded its service life and is in need of replacement. The pond bottom is neither sand nor pea rock, but a coarse sand and small gravel material.

Our recommendation is to replace the existing material with new clean sand or pea rock that can be sourced for the facility that would be safer for patrons and create greater visibility in the water. The existing pvc liner should be replaced at the same time the fill material is replaced.

Accessibility

According to Federal accessibility regulations, large pools (those with more than 300 linear feet of pool wall – this pond has approximately 900') must provide at least two accessible means of entry/exit, one of which must be zero depth sloped entry. The existing swim pond currently offers no means of ADA access.

Our recommendation is to create a ramped, zero-depth access into the shallow end of the swim pond. This ramp would include a railing and would serve as a means of accessibility for those who need assistance. A water wheel-chair would also be included for those in need of assistance. For a second means of ingress/egress, an ADA lift would be installed along the North wall where the depth is close to 3'. Another option would be to install ADA stairs with transfer tiers.

Deck Area

The concrete deck at the deep end of the pool is in poor condition and needs of replacement. The curb surrounding the pool is in fair condition and largely in need of repair/replacement. Expansion joints have failed where the curb changes directions and some concrete deterioration has occurred in these areas. Ceramic tile depth markers should be added to the deeper water areas that have a gutter. These depth markers should accurately reflect the depth at those locations and be appropriately spaced. As part of demolition required for the main drains and larger piping, much of the concrete deck on the North end of the site would be removed and replaced. Additional information regarding curb elevations from the City is pending.

We also recommend the addition of several shade umbrellas around the deck area and demolition as required to properly slope all deck areas to slope away from the pond at the deep end.

Recirculation System

The swimming pond has an aluminum gutter system along the North end of the swim pond. The pond was not in operation during the time of the site visit. The majority of the gutter drop-outs were scaled shut and only a small percentage of the existing drop-outs were able to be located.

Perimeter piping and inlets are in need of replacement. If flow-rates are increased, there would be a need for 26 additional inlets. The main drain was unable to be inspected at the time of the site visit; however, it is likely they are in need of replacement along with the piping to the main drain as it is undersized.

According to Federal Law, the "Virginia Graeme Baker Pool and Spa Safety Act" requires that all public pools and spas have ASME/ANSI compliant stamped Drain Covers. This has been indicated in a guidance document prepared by the U.S. Consumer Product Safety Commission and was recently confirmed by our office in a Q&A phone conference with officials regarding interpretation of the new law.

We recommend demolition and removal of the existing gutter system and replacement with a new stainless steel recirculation gutter, grating and integral recirculation inlets that would be extended to the corners on the East and West sides. Additionally, the perimeter piping is in need of replacement to allow for new inlets which would all be pvc. The main drain and cover would be replaced along with related plumbing. The main drain covers would be ASME/ANSI compliant, per the Federal Law requirements.

Pool Equipment - General

The pool equipment is housed in a separate mechanical house on the North end of the facility. The equipment within is largely original to the facility with a few exceptions. The equipment has met the needs of the facility for several years; however, for the most part it is outdated and very inefficient in terms of operation. The plumbing is cast-iron and in fair condition; however, valves and gauges are in poor condition. The majority of the plumbing is undersized to handle the flows required.

We recommend complete replacement of valves, piping, and gauges.

Pump

The swim pond recirculation is handled by a single 7.5HP recirculation pump with an integral strainer that is in extremely poor condition and has well exceeded its useful lifespan. The pump is located above water level, which is problematic when it comes to priming. The pump does not have a strainer that would allow the operator to see potential blockages. The pump also lacks a flow meter and vacuum limit switch.

Rather than using funds on repairing the older pump, we recommend replacing it with a large pump that would be capable of pumping a larger amount of water which would result in flow rates and turn-over rates closer to those desired. Water from the main drains and gutter would gravity drain into a new surgetank that would be sized to meet the needs of the facility.

We recommend replacing the existing pump with a dual pump system, complete with variable frequency drives, that are capable of flow rates required to bring the turn-over rate considerably lower than the 21-22 hours the facility currently has.

Heater

The facility currently does not provide a heater, which would greatly increase patron comfort and allow for a longer swim season and/or longer hours. Heated water is the number one amenity that patrons ask for when

questioned about improvements. Typically, heaters are present on outdoor pools unless they are located within a warmer climate. A pool heater will also aide in warming water at the beginning of the swim season, which further adds to patron comfort.

Heaters are expensive, but should be considered as an additional optional added amenity.

Filter

Pool filtration is currently handled by a vacuum DE filter that is very ineffective in terms of operation, as well as being undersized for the facility. Additionally, DE filters are known for requiring a very labor intensive cleaning process to maintain operation. For replacement, there are essentially two options: pressure sand filtration and regenerative media filtration. Regenerative media filters require a much smaller footprint and would easily fit within the current equipment building while pressure sand filters would need to be installed outside and within close proximity to the equipment building which would likely result in additional concrete work and fencing.

Regenerative media filters have a higher initial cost; however, they offer an actual payback scenario as the filters do not require backwashing as pressure sand filters do. Regenerative media filters are drained and rinsed when media is replaced.

We recommend replacement of the existing vacuum DE filter with Regenerative Media filtration. As part of this assessment, calculations will be completed to determine the payback scenario for both pressure sand and regenerative media filtration. To filter the volume of water required, two filters will be required.

Chemical Control

The existing system does not provide a chemical control system or way to control ph. All testing and chemical treatments are completely manually, which typically results in more operational problems and difficulty in balancing water chemistry. The new chemical control system and chemical delivery would be automated. A new controller would constantly monitor water for feeding chlorine and ph control.

We recommend the addition of a chemical controller with a user friendly web-based chemical controller that is up to date technology that can adequately meet the needs of the facility. Web-based chemical controllers require minimal attention and adjustments that can be completed remotely on a smart-phone or from a computer. Chemical injection points should be located on the return to pool pipe post-filter.

Turn-over Rate

The turn-over rate for the pool is estimated at 19-20 hours, which is approximately 800gpm. While swimming pool code requires a maximum turn-over rate of 6 hours. This is a good standard to adopt for this swim pond. This would also result in a much better water quality with higher visibility.

With the recommend changes listed above to the recirculation pump and filters – a turn-over closer to 6 hours would be attainable.

Features

The facility currently offers no features or amenities aside from two 1M diving boards. The addition of some above ground spray features and a tot slide in the shallow water area would be good options that would yield positive results. Other options include an aquatic climbing wall located at the deep end of the pool between the 1M diving boards. The addition of these features would likely result in the need for a dedicated "fall zone" that would be separated with rope and floats and would also require a dedicated lifeguard or attendant, depending on which feature was selected. Existing ladders would be replaced, and two new ladders would be added to service the features.

Another option would be the addition of one or two body flume waterslides to the East of the diving boards where the water level is 3'-6". There is plenty of deck space near the service gate for the slides and stair tower. A zip-line would also be an option for this facility. A starting platform would be located along the North end at the deeper water and the ride would extend South toward the shallower water. The addition of play features or amenities would attract additional patrons and keep entertainment levels up, while also increasing lengths of patrons stays. Longer patron stays will in turn result in greater concession sales and revenue. Revenue from attendance is also increased by allowing for a higher admission cost.

We recommend the addition of 2-3 above ground play features in the shallow water area, as well as additions of play features or amenities that are geared toward older patrons as well. With the exception of the climbing wall, any other feature listed would require a feature pump to supply water. This feature pump could be sized to allow for multiple features or future feature additions.

Diving Well

The concrete in the diving well is in fair to poor condition. The walls along the North end of the pond are in the same condition and in need of attention. The top of the concrete curb around the diving well is completely missing and the pvc waterstop is exposed. Since the concrete is in poor condition and the main drain is in need of replacement, a new 8" thick reinforced shotcrete shell should be installed in the diving well and North walls. The existing concrete would be utilized as a form only to place the new 8" thick reinforced shotcrete. The additional 8" to the walls would also allow for a larger gutter along the North side of the pond. The new liner could also terminate at the new pvc waterstop to prevent potential leaks.

We recommend the addition of 8" thick reinforced floors on top of the existing floors when the main drain is replaced, along with the addition of 8" thick reinforced walls along the North end.

SECTION TWO: EXISTING FACILITY PHOTOGRAPHS

Swimming Pond

Swimming Pond at deep end

Swim Pond conditions

Swimming Pond conditions

Swim Pond at shallow end

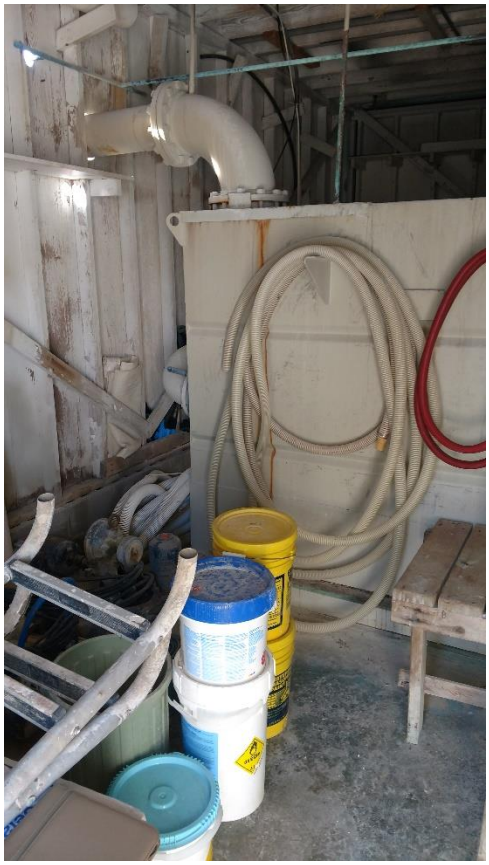
Inlet scaled shut

Wall conditions/deterioration

Cast-iron piping w/ lever valves

Pipe/Pump conditions

Plumbing into pump



Vacuum DE filter

SECTION THREE: RECOMMENDED RENOVATIONS/REPAIRS

Site Work

Based on our review and analysis, it is our opinion that the existing site is in need of some improvements to address some operational and safety concerns. The following work would also address some areas noted as lacking or where additions would increase patron comfort.

- Remove existing barbed-wire fence and replace with 8' vinyl coated chain-link fence.
  Probable cost estimate: $ 45,000
- Select demo and replacement of concrete deck.
  Probable cost estimate: $ 32,000
- Addition of shade structures around swim pond perimeter (8 total)
  Probable cost estimate: $ 35,500

Subtotal:	*$112,500*
Soft Costs (20%)	*$ 22,500*

Estimated Site Work Total: $135,000

Swim Pond

Based on our review and analysis, it is our opinion that the swim pond is in need of major renovations. The following repair work would be necessary for the facility to maintain operations and lengthen the lifespan of the facility, while also creating a suitable environment for patrons.

- Remove existing bottom fill material and replace approx. 58,000sf of pvc liner.
  Probable cost estimate: $360,000
- Installation of new fill material (approx. 1,000 cubic yards).
  Probable cost estimate: $ 86,000
- Select demo and replacement of concrete curb.
  Probable cost estimate: $ 32,000
- Addition of concrete ramp w/ rails at shallow end to create ADA access.
  Probable cost estimate: $ 29,000
- Removal and replacement of perimeter piping to include new inlets.
  Probable cost estimate: $ 36,000
- Addition of new depth marking tile and no diving tile per code.
  Probable cost estimate: $ 8,000
- Remove and replace all rail goods.
  Probable cost estimate: $ 12,000
- Addition of 2 ADA stairs on NE and NW sides of pond.
  Probable cost estimate: $ 18,000
- Demo and replace existing aluminum gutter with ss recirculation system (approx. 350')
  Probable cost estimate: $ 42,000
- Demo and replace existing main drain and related plumbing.
  Probable cost estimate: $ 28,000
- Add 8" reinforced shotcrete at North end wall and diving well.
  Probable cost estimate: $160,000

Subtotal:	*$811,000*
Soft Costs (20%)	*$162,000*

Estimated Swim Pond Total: $973,000

Features & Amenities

Based on our review and analysis, the swim pond is lacking in features and amenities that draw patrons in and keep patrons entertained at facilities for longer timespans. While none of these options are required, adding features and amenities would have a direct impact on revenue and attendance while simply making operational repairs would have little effect on either.

- Install Aquatic Climbing wall between existing 1M boards.
  Probable cost estimate: $ 42,000
- Install 3-4 above ground spray features in shallow water area. Work would include related pump and plumbing necessary for feature installation along with anchoring system/base.
  Probable cost estimate: $ 78,000
- Addition of 1 open flume waterslide and stair tower, approx. 35' high (includes pump)
  Probable cost estimate: $190,000
- Addition of 2nd enclosed body flume waterslide.
  Probable cost estimate: $ 72,000
- Addition of heaters sized appropriately for heating swim pond.
  Probable cost estimate: $ 96,000
- Addition of a Zip-Line type feature.
  Probable cost estimate: $ 36,000

Subtotal:	*$514,000*
Soft Costs (20%)	*$102,800*

Estimated Optional Features Total: $616,800

Mechanical Equipment

Based on our review and analysis, it is our opinion that the filters and pumps are very undersized resulting in a turn-over rate that is well below recommended guidelines. The work listed below would improve operation, water quality and allow for less on-going maintenance.

- Demo/remove existing DE filter, replace with dual regenerative media filter system.
  Probable cost estimate: $148,000
- Demo/remove existing recirculation pump and create recessed pump pit for new pumps.
  Probable cost estimate: $ 15,000
- Provide and install dual recirculation pumps with premium efficient motors and VFD.
  Probable cost estimate: $ 68,000
- Addition of chemical control system and related work.
  Probable cost estimate: $ 15,500
- Replacement of piping, valves, gauges, etc.
  Probable cost estimate: $ 30,500

Subtotal:	*$277,000*
Soft Costs (20%)	*$ 55,400*

Estimated Main Pool Renovation Total: $332,400

Estimated Renovation Total for all work: $2,057,200