

2014

Aquatic Facility Evaluation City of Merriam, Kansas



Kyle A. McCawley, P.E.

Larkin Aquatics

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Introduction

The citizens of Merriam, Kansas have enjoyed the Merriam Aquatic Center (MAC) facility for many years. Over time, maintenance efforts and ongoing repairs by City Staff have allowed the facility to continue to serve as an amenity to the citizens of Merriam. Nonetheless, as the facility has aged, it has been unable to keep pace with changing industry standards. Current health and building codes draw attention to the deficiencies of the facility. The community has taken the first step by realizing that the facility will need to be updated in order to continue serving as an amenity.

The purpose of this report is to provide the City of Merriam with an evaluation outlining the condition of the swimming pool when viewed by today's aquatic facility standards. This report will analyze the current condition of the pool and serve as a planning aid in organizing an approach to the future of this facility.

Executive Summary

From Larkin Aquatics' observation of the pool basin, pool deck, bathhouse, amenities and associated systems we are reporting the following findings:

Physical

1. The main pool basin appears to be in satisfactory condition. There are locations of concrete delamination to be monitored
2. There are pool lights missing from the in-pool light system – quantity 5.
3. There is excessive corrosion on the slide tower platform. The issue needs to be addressed.
4. The seams of the slide tubes need to be resealed.
5. The slide pool basin appears to be in satisfactory condition. There are locations of concrete delamination to be monitored – the basin stairs.
6. The water slide pump for the wading pool slide overheats during operation. Ventilation should be improved in the space.
7. City Staff has updated a number of critical treatment components; chlorinator (2013), chemical controller (2013) and service pump (2014).
8. The filter tanks exhibit corrosion. Replacement should be planned.

Codes

1. The women's and men's changing areas do not meet the requirements for a wheelchair accessible toilet compartment, per 2010 ADA Standards for Accessible Design.

2. The women's and men's changing areas do not meet the requirements for a wheelchair accessible shower compartment, per 2010 ADA Standards for Accessible Design.
3. The wading pool does not meet the 2010 ADA Standards for Accessible Design entry.
4. Changing areas do not meet current regulations for fixture count per the estimated capacity.
5. Overhead lighting levels were not evaluated. The system should be tested to verify adequate lighting levels for night swimming.

Applicable Codes and Standards

It is not unusual for an aquatic facility to outlive the standards for which it was designed. The evaluation of this facility is based on comparison to current state, federal and international design standards, guidelines, and building codes. These codes and standards are primarily concerned with safety and health issues. We learn more and more about safety and health as related to the aquatics industry every year. Codes and standards are constantly being updated and modified to accommodate new trends in aquatics. Larkin Aquatics recommends exceeding minimum design standards whenever feasible.

A list of the major codes, regulations and standards follows:

- Johnson County Environmental Sanitary Code
- Virginia Graeme Baker Pool and Safety Act (VGBA)
- International Swimming Pool and Spa Code (ISPSC)
- The Americans with Disabilities Act (ADA) - 2010 ADA Standards for Accessible Design
- International Building Code (IBC)
- Uniform Plumbing Code (UPC)
- National Sanitation Foundation (NSF)

FINA, USD, NFSHSAA and USA Swimming, are competitive swimming and diving organizations that publish facility standards. If the facility is used for competition events, Larkin Aquatics recommends utilizing FINA for swimming and diving dimensions and clearances and recommend that a renovation comply with these standards.

The NSF tests and approves equipment that is utilized in public swimming pools. We recommend that all major components, such as filters, piping, chemical feed systems, etc. be NSF listed.

Facility Overview

The Merriam Aquatic Center consists of 3 bodies of water – main pool, slide pool and wading pool. The main pool is 50 meters long by 25 yards wide. Three diving stands – two 1 meter and one 3 meter – positioned at the west end. South of the main pool is the slide pool. The slide pool is 25 feet by 25 feet with 2 fiberglass water slides. East of the slide pool is the wading pool. The wading pool basin is 25 feet by 65 feet with a number of interactive play features.

The entire facility is surrounded by a concrete pool deck and enclosed by a 6-foot high rod iron fence. There is a bathhouse with men's and women's changing rooms and staff area that serves the facility.

The mechanical building is on the north side of the site. The space consists of the pool recirculation pump, filters and sanitation system.

Over the years there have been a number of repairs and updates required to keep the facility operational. These have included, among other things, concrete repairs, replacement of recirculation piping, chemical and filtration system updates, and re-sealing construction joints in the pool basin.



Fig 1. Main Pool Basin

Main Pool

The pool basins – main pool, slide pool and wading pool – were built as cast-in-place concrete basins. This type of construction is very common for swimming pools. When built correctly, cast-in-place concrete basins are durable and long-lasting. However, care is required over the lifecycle of the basin. The joints need to be cleaned and resealed, and the coating (paint) needs to be reapplied every 3 to 5 years.

Minimal cracking and delamination of concrete was observed in the pool basin. This is expected given the facility's age. The observed cracks pre-date the most recent coat of paint and there is no visible indication of recent movement within the cracks. However, the cracks should not be disregarded. Any crack is a potential source of leakage. The appropriate course of action is to carefully monitor the existing cracks for further movement. The cracking and delaminating concrete should be repaired or replaced immediately.

The pool basin has a joint between the top of the gutter and the pool deck. It was observed that this joint had some deterioration in various locations around the pool. This damage appears to have been repaired by City Staff. The repair seems to be in satisfactory

condition. However, it should be monitored for further deterioration. Also, because of the age of the facility, it is very likely that this joint will continue to be problematic. The City should consider a long-term solution.

Deteriorating joints in the basin are a concern if they are not properly cleaned and resealed on a routine basis. Over time, if the original caulk has deteriorated, this joint can become a source of water loss from the pool basin.

During the examination of the basin, concrete delamination was observed at the deep-end joint transition. At this location thin layers of concrete were separating from the basin. This separation shall be repaired in order to prevent water penetrating the concrete basin and causing further damage. It should also be repaired in order to prevent a safety issue for patrons.



Fig 2. Deteriorated gutter/deck joints and delaminating concrete

During the inspection of the facility five pool lights were missing from the in-pool light system. The lights should be replaced in the near future.

If this facility is to remain in operation:

1. Monitor any cracks in the gutter/deck joint. Repair as needed, approximately every 2-4 years.
2. Create a long term solution for the gutter/deck joint.
3. Repair the delaminating concrete at the deep-end transition.
4. Replace missing pool lights.



Fig 3. Missing pool light

Slide Pool

The majority of concrete in slide pool basin appears to be in satisfactory condition. Surface cracking was observed in the stairs of the slide pool. The stairs should be repaired to eliminate the deterioration and eliminate long term damage.

During the inspection of the slide pool the slides and slide tower were evaluated. It was observed that the amenity needs attention in the near future. The underside of the slide tower exhibits excessive corrosion. There is corrosion on the structural steel and the tower decking. The corrosion on the structural steel is noticeable, however it seems to be minimal staining from the decking deterioration. The vast majority of the corrosion is from the tower decking. While this is unsightly, the main concern is the long term structural integrity of the system. It is recommended that the entire decking be replaced. And it is recommended that the structural steel be cleaned and recoated by a manufacturer's certified representative.



Fig 4. Capped Skimmer Line



Fig 5. Corrode slide tower

It was also observed that the seams between the fiberglass tubes have deteriorated causing minor gaps. The seams should be resealed.

If this facility is to remain in operation:

1. Repair slide steps
2. Replace the slide tower decking
3. Clean and recoat the structural steel
4. Reseal slide seams

Wading Pool

The MAC wading pool appears to be in satisfactory condition. City Staff has worked hard to maintain the concrete basin and the amenities. Over the years they have done numerous repairs and replaced play amenities.

The wading pool does require attention. The slide pump located in the “Old Man and the Sea” structure overheats while in operation. The structure should be modified to include ventilation within the space.

It was also observed that the pool drain piping is corroded. It is recommended that the piping be replaced.

There was also corrosion observed on the railing posts around the wading pool area. This rail should be repaired to ensure patron safety.

If this facility is to remain in operation:

1. Install ventilation for the slide pump
2. Replace corroded drain piping
3. Repair corroded railing

Mechanical Building

The mechanical building for the facility is in satisfactory condition. The City has made upgrades in recent years in order to improve the operation of the facility. They are:

- New chlorinator (2013)
- New chemical controller (2013)
- Service the recirculation pump (2014)

There are areas that still require attention in the mechanical room. There is corrosion on the electrical panels with in the mechanical space, however, at this point the corrosion appears to only be surficial. It should be cleaned to prevent detrimental deterioration.



Fig 6. “Old Man and the Sea” Feature



Fig 7. Corroded drain pipe



Fig 8. Surface corrosion

The filtration system needs to be addressed in the near future. The existing filter tanks have corrosion in the piping, welded seams, internal baffle and the access hatch. This is an indication that the filter tanks are near the end of their useful life. It is recommended that they are replaced.



Fig 8. Filter system

If this facility is to remain in operation:

1. Clean surficial corrosion on the electrical panels
2. Replace the filtration system

Sanitation System

The sanitation system at the MAC utilizes a solid-state chlorine system. This is an approved system and appears to be in working order. Staff should continue to monitor the operation of the system and address issue when they arise.

If this facility is to remain in operation:

1. Operate the system per the manufacturer instructions.

Bathhouse

The MAC bathhouse structure appears to be in satisfactory condition. There are no visible structural issues with the building walls. There are cracks in the ceiling skylights. The staff states that the cracks do not leak. However, the skylights should be replaced in the near future.

The interior of the bathhouse does not fully comply with the guidelines established by the Americans with Disabilities Act (ADA). The main issues are:

- Inadequately sized water closets
- Noncompliant lavatories

- Showers do not meet the dimensional requirements



Fig 12. Non-ADA compliant



Fig 13. Non-ADA compliant

(Reference **Appendix B - ADA Evaluation** for additional details of the compliancy issues)

If this facility is to remain in operation:

1. Replace the skylights
2. The water closets should be renovated to have proper grab bars and proper clear-floor space per the ADA regulations.
3. The lavatories should be hung at the correct height and locations per the ADA regulations.
4. The showers should be renovated per the ADA.

ADA Accessibility

On September 15, 2010 the Department of Justice signed into law the *2010 ADA Standards for Accessible Design*. At this time, the main MAC pool basin meets the ADA standards. The City had procured a pool lift and stairs in order to provide the required means of entry. However these means of entry require attention in order to be considered fully compliant. Both means of entry have issues with the accessible route to the element.

The pool lift has a hose that obstructs the accessible route. In order to rectify the situation it is recommended the pool lift be installed with a battery in lieu of the hose.

The stairs have an issue with a change of level at the top of the stairs. The top of the stairs are positioned in a recessed gutter. This creates a noncompliant change in level for accessibility. A new set of stairs should be installed that eliminate the change in level.

At this time the wading pool is not compliant. The pool is greater than 2 feet depth and therefore must follow the “swimming pool” requirements. Those requirements state that a

pool with less than 300 linear feet of perimeter wall must provide one accessible means of entry.

As stated above, the bathhouse does not meet the current ADA standards.

If this facility is to remain in operation:

1. Remove the hose to the main pool lift.
2. Install the stairs to the main pool without a change in level.
3. Install a pool lift in the wading pool.
4. (See above for ADA comments regarding the bathhouse)

Lighting

It was not determined whether the lighting system provides adequate lighting per current regulations to allow use of the facility after dark. If this facility is to remain in operation, and the pool is operated after dark, it is recommended that a photometric analysis be performed. If it is determined that current lighting system does not meet the Ten State Standards the lighting system should be updated to provide proper illumination.

If this facility is to remain in operation:

1. A photometric analysis should be performed to determine compliance with requirements if the facility is used for night swimming.

Summary of Actions

While all the systems are functioning, there are areas of the Merriam Aquatic Center that require attention. Below is a summary of the action items detailed within the report. Each item within the report was evaluated based on the following order of priority:

1. Compliancy
2. Safety implications
3. Current operating status
4. Importance of the component with respect to the entire facility
5. Life expectancy

Item	Concern	Resolution
ADA Access (Bathhouse)	Current configuration does not meet standards <ul style="list-style-type: none"> - Water closets - Lavatories - Shower compartments 	Renovated the bathhouse
ADA Access (Wading Pool)	Current configuration does not meet standards	Install a pool lift
ADA Access (Main Pool)	Hose in accessible route	Relocate the hose connection, or install a pool lift with a battery
ADA Access (Main Pool)	Change in level for the stair access	Install without a change in level
In-pool lights	Missing lights	Replace
Slide tower decking	Excessive corrosion	Replace
Slide tower structural steel	Surficial corrosion	Clean and recoat
Slide tube seams	Separation	Reseal
Filtration system	Deteriorating due to <ul style="list-style-type: none"> - Age of system - Excessive corrosion 	Replace
Wading pool slide pump	Overheating	Install ventilation system
Bathhouse skylights	Cracked	Replace
Concrete deterioration	Deteriorating pool sections; <ul style="list-style-type: none"> - Main pool deep end transition - Slide pool steps 	Replace
Gutter/deck joint (Main pool)	Deterioration of concrete	Develop a long repair with a structural engineer
Drain piping	Corroded at the slide pool and the wading pool	Replace
Deck railing	Corroded at the wading pool	Replace
Electrical panels	Surficial corrosion	Clean

Implementation Plan

The Implementation Plan was created based on a variety of factors. The top priority of the plan is to address safety concerns. The next consideration is to remaining life of a specific component. The final factor is the importance of the component to the overall operation of the facility. The objective of this plan would be to bring the facility into compliance with the current state and federal regulations. The current areas of deficiency that require attention are: ADA accessibility of bathhouse structure, slide tower and filtration.

Year 0 to 2

Item	Tasks	Estimated Cost
Slide tower decking	Replace	\$25,000 to \$50,000
Slide tower structural steel	- Clean and recoat - Replace compromised components	\$5,000 to \$20,000
Filtration system	Replace	\$75,000 to \$125,000
ADA Access (Wading Pool)	Install a pool lift	\$5,000 to \$10,000
ADA Access (Main Pool)	Install a pool lift with a battery	\$5,000 to \$10,000
ADA Access (Main Pool)	Install without a change in level	\$2,500 to \$5,000
Wading pool slide pump	Install ventilation system	\$2,500 to \$5,000
In-pool lighting	Replace	\$5,000 to \$10,000

Year 3 to 4

Item	Tasks	Estimated Cost
Concrete deterioration	- Repair main pool deep end transition - Repair slide pool steps	\$2,500 to \$5,000
Basin Coating	Recoat	\$25,000 to \$50,000
Gutter/deck joint (Main pool)	Develop a long repair with a structural engineer	\$25,000 to \$50,000
Cracked skylights	Replace	\$5,000 to \$10,000
Slide tube seams	Reseal	\$1,000 to \$2,000
Electrical panels	Clean	\$500 to \$1,000

Year 5 to 6

Item	Tasks	Estimated Cost
ADA Access (Bathhouse)	Renovation	\$400,000 to \$500,000
Drain piping	Replace	\$10,000 to \$20,000
Deck railing	Replace	\$2,500 to \$5,000

This estimation is intended to give the City of Merriam a point of reference as to effort required to update the facility to current standards. It is recommended that the City discuss the situation based on this estimate, the expected lifecycle of the facility and the needs and desires of the citizens. All of these factors should be considered and used as guidance for the future of the MAC.

Conclusion

The Merriam Aquatic Center is an aquatic facility rich in history and is a key component to the City. The repairs and upgrades that have already taken place have helped prolong the life of the facility. The facility pool has remaining years of service; however, there are issues that need to be addressed to ensure the health and safety of pool patrons. The most critical areas for the City to address are the filtration system, slide tower and the Americans with Disabilities Act compliancy of the bathhouse. With the adequate attention and responsibly resolutions the Merriam Aquatic Center can continue to serve the citizens for years to come.

Appendix A – Inspection Notes

Merriam Aquatic Center
Inspection: April 8, 2014

Mechanical/Filter Room

- New Pulsar® unit installed in 2013
- New Chemtrol® controller installed in 2013
- Minor corrosion on electrical panels
 - o Appears to consistent with the age of the facility
- Chemical room is in satisfactory condition
 - o There is 61 buckets (50 lbs each)
- Filters
 - o There are three 8' diameter tanks
 - o Media appears to be satisfactory
 - o The tank has corrosion inside and outside of – the most apparent on the seams
- Recirculation pump being serviced during inspection
 - o Pump is served every 5 years (per City Staff)

Main Building/Changing Area

- Building appears to be in satisfactory condition
- No visible structure issues
- No visible wood deterioration
- Single drinking fountain
 - o 38" AFF (Above Finish Floor)
 - o Button 34" AFF

Main Pool

- ADA Accessibility
 - o Pool lift (in storage)
 - o Pool stairs (in storage)
- Missing pool lights from pool wall niches – 5 total
- Toe ledge not painted a contrasting color to pool basin
- Loose plate on light pool junction boxes – southwest corner
- Diving board stands appear to be in good condition
 - o New diving boards purchased for 2014 season
- Some concrete spalling on the back/top of gutter wall – southwest area
- Some surface cracking in the main pool basin
 - o Observed along pool joints
 - o Some delamination along the deep-end floor transition
 - o Appears to consistent with the age of the facility

Slide Pool

- Corrosion on the bottom side of the slide tower
- Tower columns appear to be in satisfactory condition
- Marginal gaps in the slide tub seams – sealant/caulking as deteriorated
- Corrosion on supply pipes
- Plunge pool concrete appears to be in satisfactory condition
 - o Some cracking in the concrete stairs – bottom step

Wading Pool

- Corrosion on fence post
- Basin appears to be in satisfactory condition
- Corroded piping in drain pit
- Pump for slide overheats (per City Staff, not in operation during inspection)
 - o Minimal ventilation currently

Appendix B – ADA Evaluation

Facility: Merriam Aquatic Center – Meriam, Kansas

Date of Inspection: April 8, 2013

Women's Changing Area

	Compliance
Accessible Route (Entry)	
Turning Clearance	Yes
Protruding Objects	Yes
Accessible Route (Exit)	
Turning Clearance	Yes
Protruding Objects	Yes
Soap – Reach Range	Yes
Mirror	No
Bench	No

Comments

- The mirror is 42 inches above the finished floor. This exceeds the maximum allowable height of 40 inches above the finished floor (603.3).
- The bench seat surface is 16 inches above the finished floor. This does not meet the minimum height requirement of 17 inches for a bench to be considered ADA compliant (903.5).

Water Closet

	Compliance
Approach	Yes
Door	Yes
Clear Space	No
Seat Position (floor)	No
Grab Bars	No
Paper Dispenser	Yes
Toe Clearance	Yes
Ambulatory Compartment	Not required

Comments

- The compartment is 36 inches wide. This does not meet the minimum width requirement of 60 inches for a wheelchair accessible compartment (604.3).
- The seat is not located in the corner of the compartment. This does not allow for the proper clear space (604.2)
- The existing grabs are not located at the required positions (604.8.1.5).
- The women's change area has 6 or less fixtures, therefore it does not require an Ambulatory Compartment (213.3.1).

Lavatories and Sinks

	Compliance
Clear Space Approach (Forward)	Yes
Height & Depth	Yes
Faucet	No
Toe & Knee Clearance	No
Pipe Shield	No

Comments

- The faucet controls are not compliant. To operate the controls a twist of the wrist is required. This is not allowable (309.4).
- The required toe and knee clearance is not provided (306.3).
- The required pipe shield is not provided (606.5).

Shower Compartment

	Compliance
Approach	Yes
Compartment Space	No
Grab Bars	Yes
Controls	Yes
Spray Unit	No

Comments

- The shower compartment is 35.5 inches wide. The compartment is required to be 36 inches wide (608.2.1).
- The shower head is higher than 48 inches above the finished floor. And the shower spray does not have a hose 59 inches long (minimum) that can be used both in a fixed position and handheld (608.6).

Men's Changing Area

	Compliance
Accessible Route (Entry)	
Turning Clearance	Yes
Protruding Objects	Yes
Accessible Route (Exit)	
Turning Clearance	Yes
Protruding Objects	Yes
Soap – Reach Range	Yes
Mirror	Yes
Bench	No

Comments

- The bench is 12 inches deep. This does not meet the minimum depth requirement of 20 inches for a bench to be considered ADA compliant (903.3).
- The bench seat surface is 16 inches above the finished floor. This does not meet the minimum height requirement of 17 inches for a bench to be considered ADA compliant (903.5).

Water Closet

	Compliance
Approach	Yes
Door Swing	Yes
Clear Space	No
Seat Position (Floor)	No
Grab Bars	No
Dispenser	Yes
Toe Clearance	Yes
Ambulatory Compartment	Not required

Comments

- The compartment is 35 inches wide. This does not meet the minimum width requirement of 60 inches for a wheelchair accessible compartment (604.3).
- The seat is not located in the corner of the compartment. This does not allow for the proper clear space (604.2)
- The existing grabs are not located at the required positions (604.8.1.5).
- The men's change area has 6 or less fixtures, therefore it does not require an Ambulatory Compartment (213.3.1).

Urinal

	Compliance
Approach	Yes
Height & Depth	Yes
Flush Controls	Yes

Comments – NONE

Lavatories and Sinks

	Compliance
Clear Space Approach (Forward)	Yes
Height & Depth	Yes
Faucet	No
Toe & Knee Clearance	No
Pipe Shield	No

Comments

- The faucet controls are not compliant. To operate the controls a twist of the wrist is required. This is not allowable (309.4).
- The required toe and knee clearance is not provided (306.3).
- The required pipe shield is not provided (606.5).

Shower Compartment

	Compliance
Approach	No
Grab Bars	No
Controls	Yes
Spray Unit	Yes

Comments

- There is a 1 inch step-down into the shower area. The maximum allowable vertical change in level is ¼ inch (303.2).
- The grab bar on the back wall does not extend close enough to the adjacent walls. The grab bars shall be installed 6 inches maximum from the adjacent walls (608.3.2).

Pool Area and Basins

	Compliance
Drinking Fountain	No
Main Pool Perimeter Wall	More than 300 linear feet
Lift	Yes
Stairs	Yes
Slide Plunge Pool	Not required
Wading Pool	No – less than 300 linear feet

Comments

- Single drinking fountain provided. A minimum of two fountains are required; one for accessible to wheelchairs and one accessible to a standing person (211).
- The west wading pool is not compliant. It must have a sloped entry, or a pool lift (242.2). A pool lift is recommended.