



# Aquatic Evaluation Report

Crown Park Pool Study  
Camas, Washington

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**Prepared For:**

City of Camas  
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## Executive Summary

WTI has been commissioned by the City of Camas to report on the current condition of the existing pool located in Crown Park. WTI visited the facility on March 7, 2017, toured the pool and related amenities, and met with staff to discuss operations. The enclosed report documents the observations from the site visit and outlines recommended capital and operational changes. Major components of the aquatic amenities have been given a score based on their observed condition, and these scores are weighted and aggregated to provide a total score. Below is a summary outline of the condition scores, recommendations and estimated capital costs.

The Total Aggregated Evaluation Score is shown below, and out of a possible high score of 100, is an indication of the condition of the aquatic amenities.

Total Aggregated Evaluation Score: **26.88**

The condition of a facility is a major determination of the effort and cost of maintaining the utility and value of the amenities. A deteriorated facility will demand higher annual operating expenses over time as parts break, systems fail, finishes deteriorate, and structures weaken. There are also efficiencies lost when operating aging systems or equipment which are unable to take advantage of current methods and financially sustainable practices. The current pool has exceeded its usable and efficient life. The cost of operating the aquatic amenities very likely exceeds the amortized cost of recommended improvements.

Below are the recommended repairs or replacements based on the observed condition of the aquatic components and the associated range of probable capital cost. A detailed description for each repair or replacement is included further in the report.

Install Separate Pool Mechanical Systems for Wading Pool	\$175,000.00 to \$250,000.00
Replace All Valves and Pool Piping	\$95,000.00 to \$135,000.00
Replace Sand Filters with Regenerative Media System	\$250,000.00 to \$325,000.00
Construct Surge Tanks	\$275,000.00 to \$375,000.00
Replace Pool Perimeter Gutters	\$160,000.00 to \$240,000.00
Replace Pool Return Fittings	\$20,000.00 to \$40,000.00
Replace Pool Paint Finish	\$15,000.00 to \$30,000.00
Install UV Sanitation Systems	\$90,000.00 to \$130,000.00
Install Chemical Balance System	\$10,000.00 to \$15,000.00
<b>Total Recommended Repairs or Replacements</b>	<b>\$1,090,000.00 to \$1,540,000.00</b>

For comparison to the investment necessary to maintain the existing facility, the probable cost to construct new aquatic amenities of similar size is also provided below. This cost amount involves only the pool vessel, pool piping, and pool mechanical equipment, and does not account for site, building, or building mechanical components.

**Probable Cost of New Construction of Similar Pools** **\$1,150,000.00 to \$1,550,000.00**

## Introduction

The purpose of this evaluation is to review the present condition of the aquatic amenities and aquatic mechanical systems at the existing Camas Municipal Outdoor Pool. The evaluation consists of visual examination of the pool(s) and associated mechanical equipment. The report outlines the present condition of the systems, equipment, and components and provides recommendations for repairs or replacements. Each recommendation is given an estimated range for the probable cost to construct, install, or perform the renovation or repair.

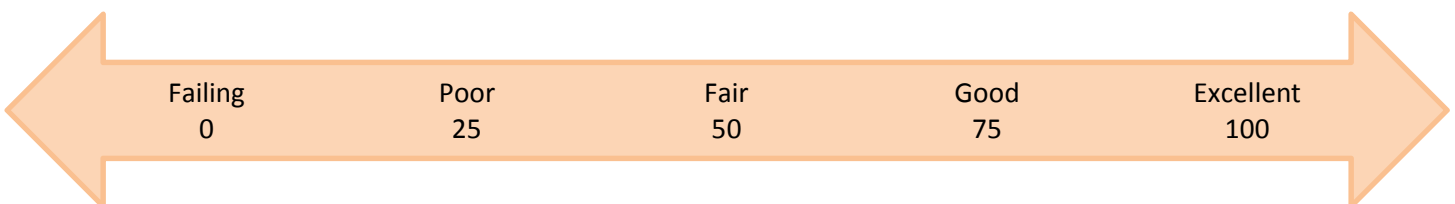
The aquatic center is a stand-alone aquatic facility serving the community of Camas. The facility was originally constructed with three bodies of water: a lap pool, a junior pool, and a wading pool. However, the wading pool has been decommissioned and filled-in. The main lap pool has six lap lanes with a minimum depth of approximately 3.0 feet and a maximum depth of approximately 8.0 feet. The junior pool is a small children's pool with a minimum depth of approximately 2 feet, 4 inches and a maximum depth of approximately 3 feet, 6 inches.

The pools are constructed with concrete and have painted interior finishes. The main lap pool and junior pool are filtered using the same three large sand filters. Therefore, both pools are one body of water. Further, both pools share one circulation system, water treatment system, and heating system. The pools are disinfected with sodium hypochlorite, which is injected into the pool system with a diaphragm chemical pump at the control of the automatic chemical controller. The pH of the pool water is balanced manually with the addition of muriatic acid. Pool water heat is provided with an outdoor pool heater adjacent to the pools.

## Methodology

WTI observed the condition of the aquatic elements at the facility. Aquatic elements include pool vessels, water features, pool filtration systems, pool circulation pumps, piping, valves and controls, and water treatment systems. Observations were conducted in a non-destructive manner and did not involve the removal of any structures or disassembly of any equipment.

Major components of the aquatic systems and structures are categorized in the report and scored based on their observed condition. The condition scores are weighted and aggregated to produce an overall evaluation score. Potential scores range from zero to one hundred, representing the condition descriptions below:



Total evaluation scores for each pool and aquatic amenities are compiled and weighted to create a total aggregated evaluation score. The total aggregated evaluation score provides an indication of the overall condition of the aquatic amenities of the facility.

Included in the report are observations and indications of the condition of the accessible means of pool entry and exit. WTI has endeavored to identify problems with the means of access and potential non-compliance with the Americans with Disabilities Act (ADA). Observations and evaluations included in this report do not constitute certification or verification of compliance with ADA requirements. ADA compliance is a legal opinion, and WTI is not able to anticipate or

guarantee judicial interpretation with respect to a facility's legal compliance. WTI recommendations are based on a current understanding of the technical requirements of ADA regulations on aquatic amenities.

Compliance with Virginia Graeme Baker Pool and Spa Safety Act (VGBA) regulations has not been verified or investigated as a part of this evaluation and report. Any statements regarding drains, suction fittings, or any other component pertaining to VGBA are preliminary observations only, and further inspection to substantiate compliance is necessary.

The cost amounts associated with the provided recommendations are the opinion of WTI based on a professional understanding of market conditions. Cost amounts have not been trade or contractor verified, and are intended to provide guidance for a preliminary aquatic budget.

## Recommendations

The following repairs or replacements are encouraged for immediate improvement of the aquatic center. These recommendations are needed, at a minimum, to allow the facility to operate more efficiently and effectively and provide a safe, healthy, and beneficial experience to facility users.

Aquatic amenities and components have been observed and considered for recommendations for improvement. Elements of the facility beyond the aquatic components, such as site, building, and building mechanical components, are excluded from the analysis of this report.

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### **Install Separate Pool Mechanical Systems for Wading Pool** **\$175,000.00 to \$250,000.00**

The main lap pool and junior pool are currently on a single pool mechanical system, making both pools a single body of water. The junior pool has a high-risk pool for contamination, particularly contamination caused by or related to an accidental fecal release. The children focused purpose of the pool, and small volume of water in comparison to number of people using the pool are significant drivers of this risk factor. Allowing the systems to be combined means any contamination of the junior pool also contaminates the main pool, and vice versa. The single body of water system also prevents the operation of the pools at different water temperatures.

A new pool system, involving a circulation pump, high rate sand filter, and water treatment system should be installed to support solely the junior pool. This system should also incorporate UV supplemental sanitation and a surge tank, both of which are discussed further in later recommendations.

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### **Replace All Valves and Pool Piping** **\$95,000.00 to \$135,000.00**

The pool piping is a mixture of PVC, galvanized steel, and cast iron, and numerous valves and fittings are also metal. Metal components in the pool circulation system are highly susceptible to corrosion and deterioration in the chlorinated pool environment. Significant corrosion exists on most of the metal components of the system, and the reliability of the piping, valves, and fittings to perform as intended is highly questionable.

All piping and fittings should be replaced with Schedule 80 PVC. Valves should be replaced, and if metal valves are installed each valve should have a corrosion resistance coating between all metal surfaces and the pool water.

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### **Replace Sand Filters with Regenerative Media System** **\$250,000.00 to \$325,000.00**

The current filtration system operates under the principle of pushing the pool water through a bed of sand. The circulation pump is located upstream from the filter; therefore, the bed of sand is on the pressure side of the pump. Small particles and debris are intended to be trapped and lodged in the small spaces and crevices between grains of sand. This style of filtration is not capable of filtering as small, or fine, of particles as alternative current filtration technology. The existing filters also require a significantly larger footprint in the mechanical room in comparison to modern filters.

A regenerative media filter should be installed to replace the existing sand filters. Regenerative media filters are located on the pressure side of the circulation pump and push water through perlite media. Perlite media is an excellent filtration material and can be commonly found in the beverage industry. The automated “bump” cycle of the system regenerates the used media to extend the lifespan of each media cycle. This process greatly reduces the amount of water consumed to flush the system, and cost savings due to this lower water consumption are seen in water, chemical and heating expenses. Regenerative media filters typically represent a higher capital cost than sand filtration methods. Over time, lower annual operating expenses offset these capital costs.

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**Construct Surge Tanks****\$275,000.00 to \$375,000.00**

The function of pool perimeter gutters is one of the most important aspects of pool design. Gutters are intended to skim only the very top of the pool water from the rest of the pool. The majority of the contamination and unwanted material in a pool, such as body oils, greases and bacteria, reside at the surface of the water. Continuously removing this part of the water and sending it to the filtration and water treatment systems is crucial to maintaining a clean and healthy pool.

The current pool perimeter gutters do not drain into surge tanks. Therefore, there is little to no surge capacity in the pool system. When numerous swimmers enter the pool or there is a highly dynamic activity in the pool, the gutters will flood and will not function properly as a skimming mechanism. At the pool's busiest moments, when the most people are enjoying the pool, the pool system loses its best mechanical means of removing unclean water.

Surge tanks, one for the main pool and one for the junior pool, should be constructed to allow pool water from the gutters to flow to a holding tank with enough excess volume to accommodate the usage of the pools at maximum capacity. These surge tanks will be regulated with automatic valves and prevent excess water from remaining in the gutters.

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**Replace Pool Perimeter Gutters****\$160,000.00 to \$240,000.00**

The current pool perimeter gutters for both the main pool and junior pool are formed in concrete with a style common to pools constructed many decades ago. The gutters are undersized and the dropouts, or water exit points from the gutter, are insufficient. The style and construction of these gutters contributes to the inability to avoid a flooded gutter situation and inability to skim the water surface as discussed in the previous recommendation.

This style of gutter also presents a hazardous transition into the pool and potential injury to patrons. The gutter presents a ledge below the pool deck edge which many patrons will use as a step when entering the pool. This is not a safe ledge to use as a step, as it is too small, always slippery, and rounded. Patrons may easily slip and fall into the hard concrete surfaces of the deck and pool edge. The gutters should be replaced with modern deck-level gutters with a smooth transition from pool deck to water over PVC grating.

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**Replace Pool Return Fittings****\$20,000.00 to \$40,000.00**

The pool return fittings are styled with a fan-like cover to allow increasing or decreasing the amount of flow through the fitting. This style of fitting does not provide any directional control of the flow of return water. Also, many of the return fittings are painted in place or closed, and unable to be adjusted for flow control. New "eyeball" return fittings should be installed to allow the control of the direction of the flow of the return water.

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**Replace Pool Paint Finish****\$15,000.00 to \$30,000.00**

The current pool paint finish is badly deteriorated in all areas of the main pool and junior pool. The paint is chipping and peeling and revealing continued deteriorated paint in sub layers. All layers of the pool paint should be removed from the pool vessel surface. When new paint is applied over other deteriorating paint there does not exist a proper foundation for the new paint to adhere and chipping and peeling will continue. The pool paint should be thoroughly removed with course brushes or sand-blasting. A contingency for deterioration to the pool vessel concrete found or caused by the paint removal process is not included in this cost estimate.

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**Install UV Sanitation Systems****\$90,000.00 to \$130,000.00**

The pools do not currently use any form of supplemental sanitation. Supplementary sanitation, a secondary method of disinfecting the pool water beyond maintaining a residual of chlorine in the water, is growing in importance. The resistance



of bacteria and other pathogens to traditional disinfection methods is growing and a greater understanding of the contaminants in pool water is calling for secondary disinfection methods. Ultraviolet (UV) sanitation systems should be installed on both the main pool and junior pool. While the pools are outdoor bodies of water and experience UV radiation naturally from the sun, in the Pacific Northwest climate this exposure is limited. A UV system will provide direct radiation and provided an added level of protection against harmful microorganisms and unwanted contamination.

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**Install Chemical Balance System**

**\$10,000.00 to \$15,000.00**

Currently balancing chemicals, including acid used to maintain the pH level of the pool, are added manually to the pool water. An automatic chemical control and injection system should be installed to continuously monitor and adjust the pH of the water. Consistent chemical balance is crucial to the water clarity, sanitation, and safety.

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## New Construction

The previously discussed recommendations are necessary to maintain the aquatic components of the facility in proper working order. When a significant capital investment is considered for components of an asset, the cost to replace the complete asset is often a valuable comparative consideration. Therefore, an estimated range of probable construction cost for the replacement of the pools and associated pool systems with newly constructed pool vessels, pool piping and pool mechanical systems is provided below.

For cost purposes, newly constructed pool vessels are assumed to be substantially similar to the existing pools. Substantially similar means the pools are the same type and size as the existing pool vessels and accommodate the same program activities and events to a similar extend.

New Lap Pool	\$925,000.00 to \$1,200,000.00
New Children's Pool	\$225,000.00 to \$300,000.00
<b>Probable Cost of New Construction of Similar Pools</b>	<b>\$1,150,000.00 to \$1,500,000.00</b>

Complete replacement of the pool vessels presents an opportunity to modernize the facility. The facility may benefit from the ability to support new aquatic program activities and events, improve the current aquatic program activities and events, incorporate new trends in aquatic design, and modernize the pool mechanical systems with current advanced technology.



## Site Observation Images

47 Images  
collected on 3/7/2017