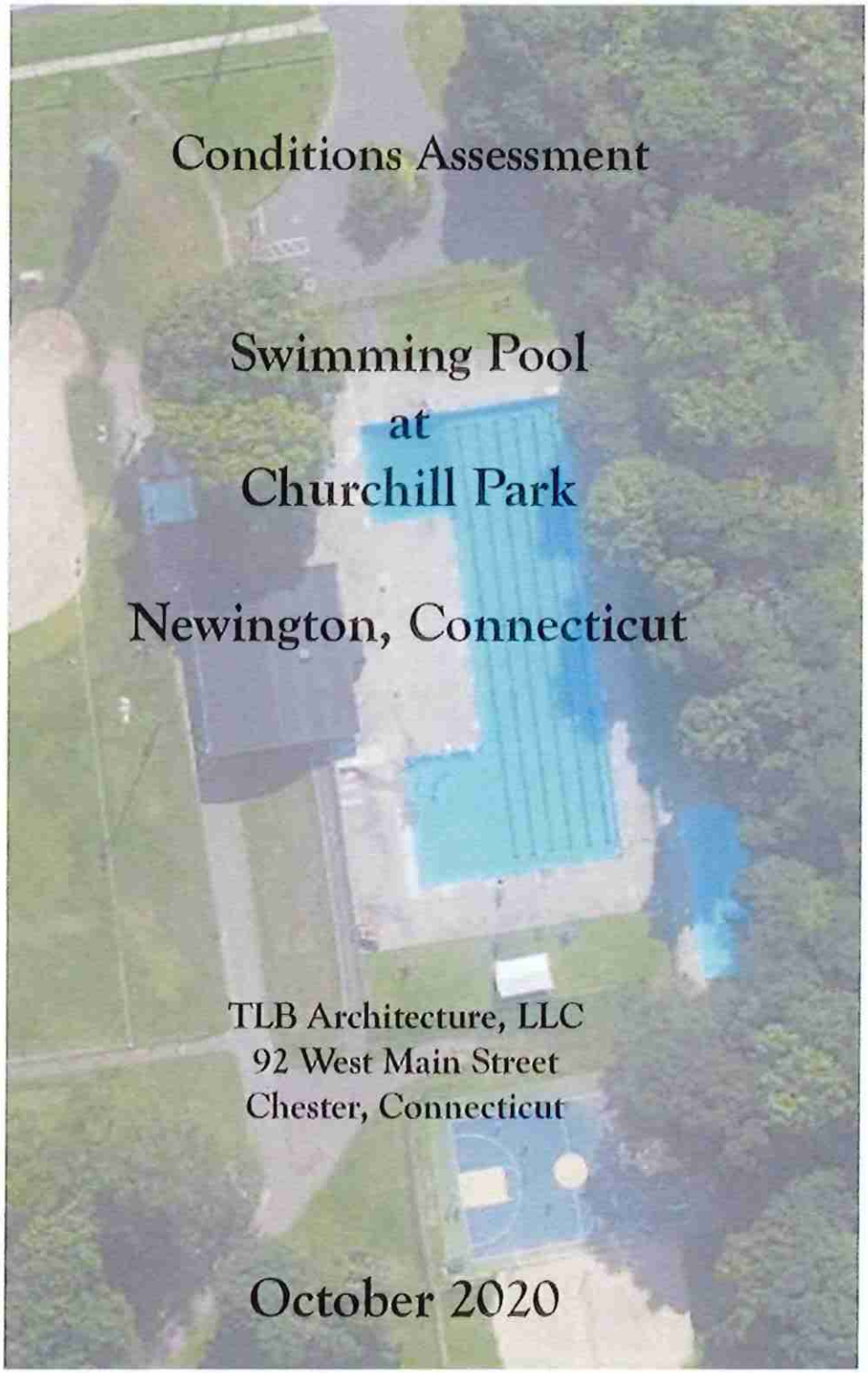
Conditions Assessment
Swimming Pool
at
Churchill Park
Newington, Connecticut
TLB Architecture, LLC
92 West Main Street
Chester, Connecticut
October 2020

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I. Introduction

Owens Realty Services has been retained to provide consulting services to provide a conditions assessment, inclusive of a visual inspection and Code compliance review of the outdoor swimming pools at Churchill Park.

The assessment includes an outdoor 'C'-shaped swimming pool and an outdoor wading pool, decks and fencing, as well as swimming pool recirculation, filtration and chemical control systems.

Random soundings of suspect areas were completed, but a complete program of soundings and invasive structural analysis was not done for this analysis.

The piping and equipment was reviewed where accessible, but camera assessment of buried piping was not provided, nor was SCUBA diving for dye-testing to find leaks. As such, information regarding leaks is based on discussions with Parks and Recreation staff and investigations done by others.

The pool was evaluated for compliance with the CT State Building Code, State of CT Department of Public Health Requirements, and the Virginia Graeme Baker Pool and Spa Safety Act and the ADA.

The goal of this effort is to identify potential concerns related to the following:

System operation and compliance with applicable Codes, including DPH
Condition of existing equipment
Condition of pool shell and deck
Condition of fencing

We also reviewed earlier reports provided by the Town of Newington and provided additional information as deemed pertinent.

II. Executive Summary

Churchill Pool was built in 1965 on an elevated parcel of land at the southeast corner of Churchill Park. As with any pool of 55 years old it has a number of issues as a result of a harsh New England environment, heavy use, wear and tear.

The pool structure, including concrete walls and floor is generally sound, with only localized areas of damage and deterioration. However, the town has reported significant leaks in excess of 30,000 gallons/day. The primary source of the leak was identified by others outside the scope of this report, as a significant break in the main drain piping that runs from the deep end pool floor back to the Filter Room. There is concern that the water loss has washed away soils below the pool and significant portions of the pool floor may currently be unsupported, and subject to eventual cracking and failure.

The pool recirculation, filtration and chemical control systems for the pool were replaced within the last few years and consist of a series of six , 36" dia. high rate sand filters. While this system is rated for commercial use, it is uncommon on a pool of this size and, as installed does not comply with DPH regulations for pipe sizes and velocities.

The wading pool is in reasonably good condition but requires crack and concrete repair. Leaks caused an early closure this season, indicating likely pipe leaks below the pool.

Pool decks are in very poor condition and are in need of complete replacement, as they are beyond what can be reasonably repaired.

Condition Codes	
Excellent	16-20 years useful life
Good	Good at present (11-15 years)
Fair	Minor / cosmetic repairs needed to maintain condition (6-10 years)
Poor	Immediate repairs needed to prevent deterioration (0-5 years)

Conditions

System	Condition	Comments
Pool Structure	Fair	Concern of wash-out must be addressed
Pool Decks	Poor	Damaged, misaligned and areas non-compliant
Wading Pool	Fair	Concrete is reparable
Wading Pool Decks	Poor	Damaged and misaligned
Perimeter Fencing	Fair	Damaged and non-compliant
Pool Systems	Fair	Condition is fair but all piping, including buried is undersized
Wading Pool Systems	Good	Not rated for commercial use

III. Existing Conditions Analysis

A. OVERVIEW

Main Pool:

The swimming pool was constructed in 1965 on an elevated parcel of land in the southeast corner of Churchill Park at 1991 Main Street. The pool provides aquatic programming to the community for both competitive and recreational activities. The pool is a 'C' shaped with the main body of water providing an 6-lane, 50 meter lap pool with a shallow wing to the west and a deeper wing to the east. Pool depth of the shallow wing is 2 1/2-feet to 3 1/2-feet. The lap lanes slope from 3 1/2-feet deep to 5-feet and then transitions to 10-feet deep at the deep wing.

The pool shell is in generally sound condition with limited cracking and few hollow areas found, primarily at the inside corners of the transition to the shallow and deep ends from the plap areas; and along cracks and expansion joints. It has been reported that the pool loses approximately 30,000 gallons of water per day. The City retained a pool contractor, outside the scope of this report to determine the cause for the leak. A significant crack in the main drain piping was identified, and the City reports there is a plan in place to line the pipe with structural epoxy. TLBA note concerns that with the order of magnitude of the water loss, there is risk of significant washout of soils below the pool. The condition is unknow, but the should large areas of the pool be unsupported, eventual structure failure at the areas of washout may result. There is also concern that the piping may be in poor condition and not conducive to lining. Depending on the location of the break, building footings may also be at risk.

The pool has skimmers and main drains to convey pool water to the filtration and chemical control systems. Filtered and treated water is returned to the pool by means of wall inlets distributed around the pool perimeter. Pool coping is integral with the pool walls. Pool finish is paint, directly on the cast-in-place concrete.

There does not appear to have been any significant renovations to the pool since the original construction, except for recirculation, filtration and chemical control systems replacement in approximately 3-years ago, as well as piping repairs at the pool perimeter. These systems are located in the basement of the adjacent bathhouse.

The recirculation system is by means of direct suction from skimmers and bottom drains to the recirculation pump. The main drain covers were removed at the time of the visit so they could not be reviewed. However, it has been reported that the covers were replaced with VGB compliant covers. Given the 6-inch diameter piping, the pool is not VGB or DPH compliant, as the pipe velocity, even at a Code minimum 8-hour turnover exceeds allowable velocity. There is no vacuum release system on the pool pump, and as such the pool presents an entrapment risk.

III. Existing Conditions Analysis

A. OVERVIEW

Main Pool (cont.)

Pool water is conveyed to the filtration system by a 15 HP pump, which is located below the water level and as such has a flooded suction, which simplifies start-up. Filtration is accomplished by means of a series of six, 36" TRC sand filters with multi-port valves. The flow rates and pipe velocities for the system are non-compliant. Refer to hydraulic analysis for calculations of flow rate, filtration rate and velocity. These systems backwash to sanitary sewer through a pit with a grate at floor level. The outlet of the backwash line is below the flood rim of the pit and as such, does not provide a compliant air-gap and presents a risk of contaminating the pool water with wastewater.

Pool chemistry is maintained by means of a calcium hypochlorite feeder for sanitizer and liquid acid for pH correction. The pool chemistry is controlled by means of a Prominent water chemistry controller. These systems appear relatively new and suitable for continued use.

The concrete decks surrounding the pool are in generally poor condition, having suffered frost damage, settlement and misalignment. Sealant joints are deteriorated allowing water to penetrate the soils below the decks, exacerbating the frost damage. There are several patches around the pool perimeter that sounded hollow with a chain drag. These area likely have poorly compacted soils below, but may the result of concrete delamination. Either way, in the short-term cracking and misalignment can be anticipated as a result.

Wading Pool:

The wading pool is a rectangular shape approximately 25-feet x 60-feet and 12-18 -inches deep. There are some cracks in the pool, but the concrete appears generally sound. Hollow areas were observed around penetrations in the floors, as well as around the skimmers. The coping is a precast type set in grout at the perimeter. The coping overhangs the pool walls in excess of 2-inches, which may pose a hazard to children.

Despite the relatively sound concrete, the Town reports the pool had to close early this summer due to excessive water loss. As such, the loss is likely through buried piping, which was not camera inspected within the scope of this report.

Pool decks surrounding the wading pool are in fair condition and need joints resealed and other minor repairs.

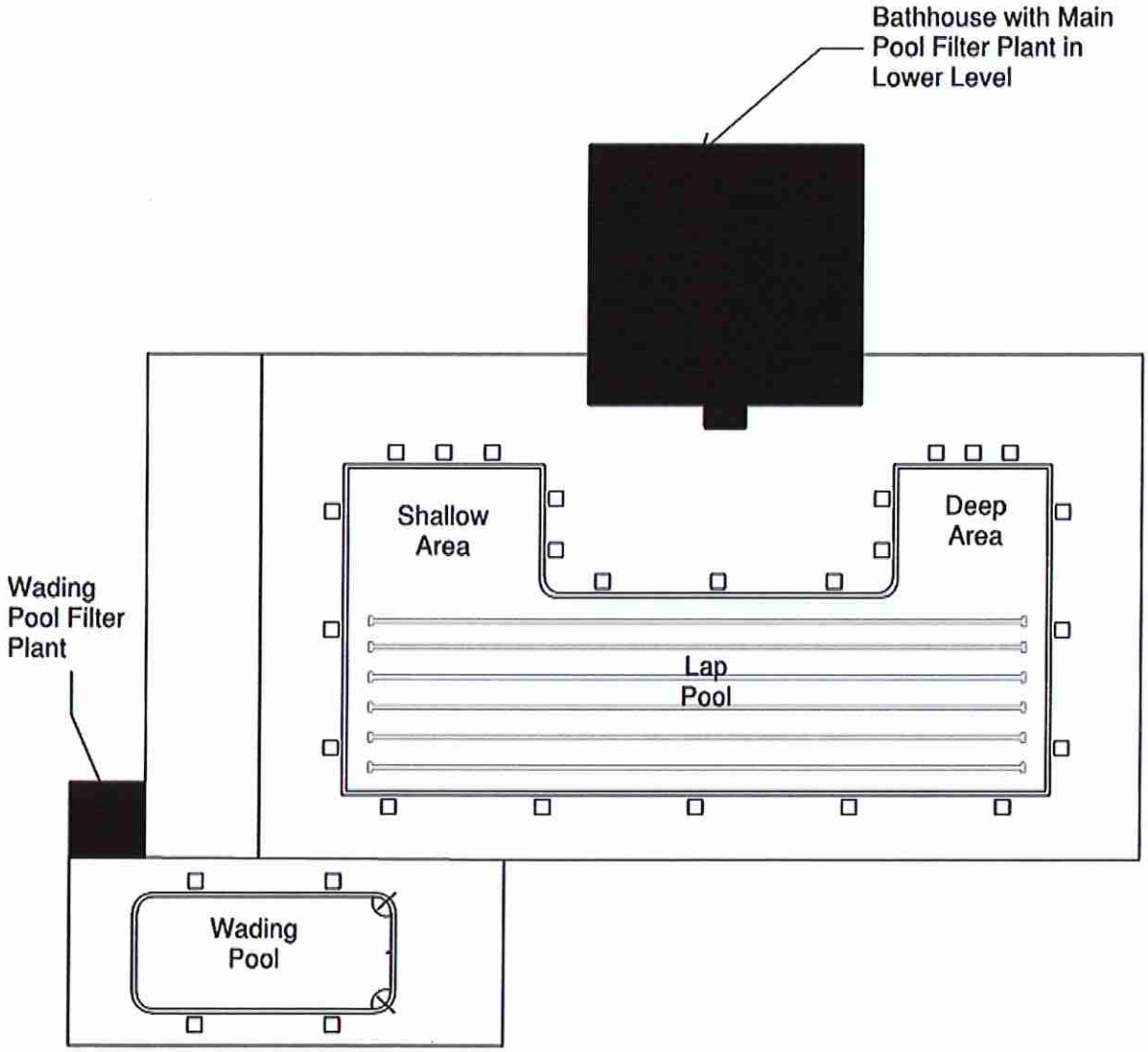
The wading pool recirculation, filtration and chemical control system is adequately sized, though the filter is not rated for commercial use. The main drains are not VGB compliant and there is no vacuum release system present. If wading pool use is to resume, this issue should be remedied as there is risk of entrapment.

III. Existing Conditions Analysis

A. OVERVIEW

Fencing:

The pool perimeter is surrounded by a six-feet high, galvanized chain-link fence. The wading pool is separated from the main pool by a 6-foot fence. The perimeter fence provides a complete enclosure, using the bathhouse and wading pool filter building as a portion of the enclosure. It is in fair condition with rusting, limited misalignment and some gaps exceeding allowable dimensions, both between posts and to grade below the fencing.



III. Existing Conditions Analysis

B. CODE ANALYSIS

1. *General Information*

The swimming pool was evaluated for Code compliance with the State of Connecticut Building and Fire Codes, CT Department of Health Requirements, the Federal Americans with Disabilities Act (ADA) and Virginia Graeme Baker Pool and Spa Safety Act (VGB) . The Scope of this report is limited to the Pools and Decks, but building compliance is also required, and is addressed by others.

Note: Red text indicates areas of hydraulic non-compliance

Basic Information:

Pool Area:	9,825 sf
Pool Perimeter:	540 lf
Pool Water Volume:	356,000 gallons
Occupant Load of Pool: (7,750 sf / 25 sf/person):	393 bathers

2. *Department of Health Requirements:*

a. Turnover Rate: Required- 8 hours max. (6-hour recommended)
b. Filtration Rate: Required- 15 GPM/sf max. (12 gpm/sf recommended)
c. Allowable Velocities:

Suction:	*Max 6 fps*
Discharge:	*Max 10 fps*
Gravity:	*Max 4 fps*

c. Actual Flow and Pipe Velocities at 8-hour turnover:

Calculated Flow Rate: 742 GPM

Suction:

	Pipe	100% Flow
Main Drains:	6":	8.42 fps
Skimmers:	5":	12.1 fps
Pump Suction:	6":	8.42 fps
Discharge:		
	2" (ea. Filter):	12.56 fps
	6":	8.42 fps

III. Existing Conditions Analysis

B. CODE ANALYSIS

2. *Department of Health Requirements (continued):*

The piping is undersized between the main drains and the pump, even if the pipe is flowing at full diameter. In actuality, the pipes are likely calcified after years of use, and as the pipe diameter decreases, velocity increases, bringing the piping further out of compliance.

The 6" piping reduces to 2-inch at each filter. There are six filters so the flow at each is 124 GPM, which places the velocity at this pipe out of compliance as well. The filtration rate is also out of compliance at 17.7 GPM/sf.

d. Depth Markings:

Depth markers are required to be in numerals of four inches minimum height and a color contrasting with the background, placed on the vertical walls above the water level or another method to be plainly visible to persons in and out of the swimming pool. Depth of water shall be plainly marked near the water surface on the vertical wall and on the edge of the deck next to the pool. Depth markers shall be placed at the following locations:

1. At the points of maximum and minimum depths.
2. At any change of pool floor slope, including the point of change of slope between the deep and shallow portions of the pool, that is the breakpoint;
3. At intermediate one-foot increments of water depth in the shallow end; and,
4. If the pool is designed for diving, at appropriate points to denote the water depths in the diving area.
5. If the pool is of constant depth, at appropriate points that will satisfactorily denote the water depth.

Currently, depth and 'No Diving' markings are not present on the pool walls, and are insufficient at the deck.

III. Existing Conditions Analysis

B. CODE ANALYSIS

2. *Department of Health Requirements (continued):*

f. Safety Requirements—Lifesaving Equipment:

Lifesaving equipment and first-aid equipment needs to be inventoried and properly located around the pool. With a pool perimeter of 540 lf, at least 6 stations are required, each unit including a ring buoy, life pole or shepherd's crook. It appears there are only three guard stations on the deck.

Every swimming pool shall have a readily accessible room or area designated and equipped for emergency care, which shall include a telephone. There is no such dedicated room or area currently at the pool.

g. Pool signage was not compliant. A sign should be visible from the pool indicating the following:

STATE POOL REGULATIONS

1. NO DIVING IS PERMITTED OFF THE DECK INTO SHALLOW AREAS OF THE POOL.
2. All Persons Shall Bathe With Warm Water and Soap Before Entering the Pool
3. Any Persons Known Or Suspected of Having a Communicable Disease Shall Not Use The Pool.
4. Spitting or Blowing the Nose in the Pool is Prohibited.

Running, Boisterous or Rough Play is Prohibited.

3. *ADA:*

a. Pool Access:

Because the pool is greater than 300 linear feet, two means of HCA access/egress is required. One means must be a lift complying with 1009.2 or a sloped entry complying with 1009.3. A compliant lift is available. The second means has been provided as steps, complying with 1009.6. The steps are removable and must be in place during operation to ensure compliance.

III. Existing Conditions Analysis

B. CODE ANALYSIS

4. *Virginia Graeme Baker Pool and Spa Safety Act:*

The existing main drain covers were removed at the time of the visit. It has been reported that VGB-compliant drain covers have been provided. The expiration date should be verified.

It should be noted, however, that the drains are direct suction and the 6-inch diameter piping has a velocity exceeding the allowable limit. It is also likely that the pool drain sumps are not compliant and, since there is no vacuum release system the pool drains are not VGB-compliant, even if covers are ANSI/ASME A112.19.8 certified.

If the pool is operated with the existing drains and piping in place, a secondary anti-entrapment system such as a supplemental vacuum release system interlocked with the pump should be installed.

The velocity through the drain grates should also be verified to ensure that flow is limited to a maximum of 1 1/2 fps to avoid both entrapment and entanglement issues.

C. ISSUES and DEFICIENCIES

This section identifies issues and deficiencies based on physical condition of systems and assemblies.

While the scope of this report is limited, it should be reviewed in the context of the overall design goals for the park Facility, as the architecture, structural components, mechanical and electrical systems all play a significant role in the overall quality, function and long-term viability of the facility.

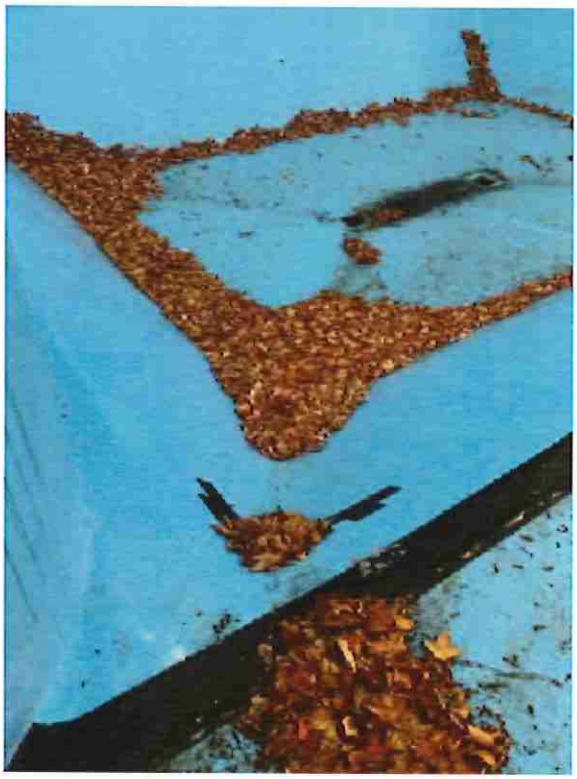
This section identifies issues and deficiencies based on the following:

- System operation and compliance with applicable Codes, including DPH
- Condition of existing equipment
- Condition of pool shell and deck
- Condition of fencing

III. Existing Conditions Analysis

C. ISSUES and DEFICIENCIES - Main Pool

The deep end geometry does not comply with current DPH regulations with regard to diving boards (they have already been removed) but also with regard to the shelf at the five-foot depth and the slope at the pool bottom. DPH regulations require walls to be vertical for a depth of 6-feet. The shelf is at 5-feet.

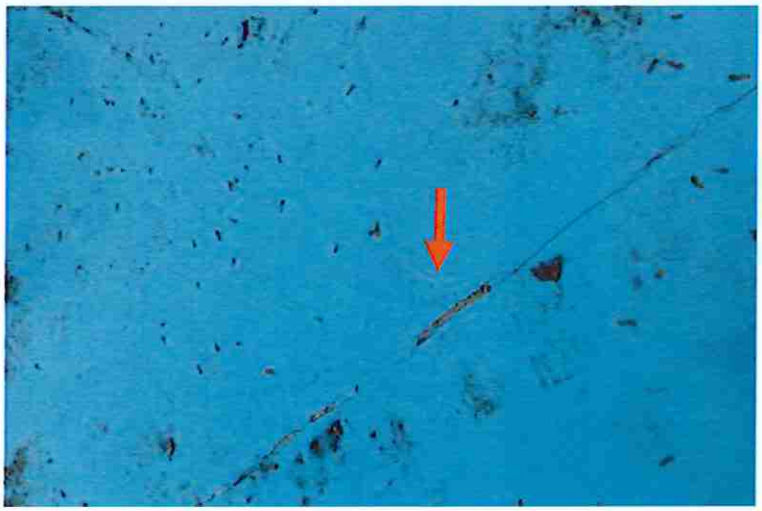


Deep end. Diving boards have been removed due to non-compliant hopper geometry

The shelf around the hopper provides an effective foot ledge, but is not compliant with current CT DPH Regulations. Should any significant work to the pool be done, which would require a new Health Permit, this condition would need to be addressed.

III. Existing Conditions Analysis

C. ISSUES and DEFICIENCIES–Main Pool

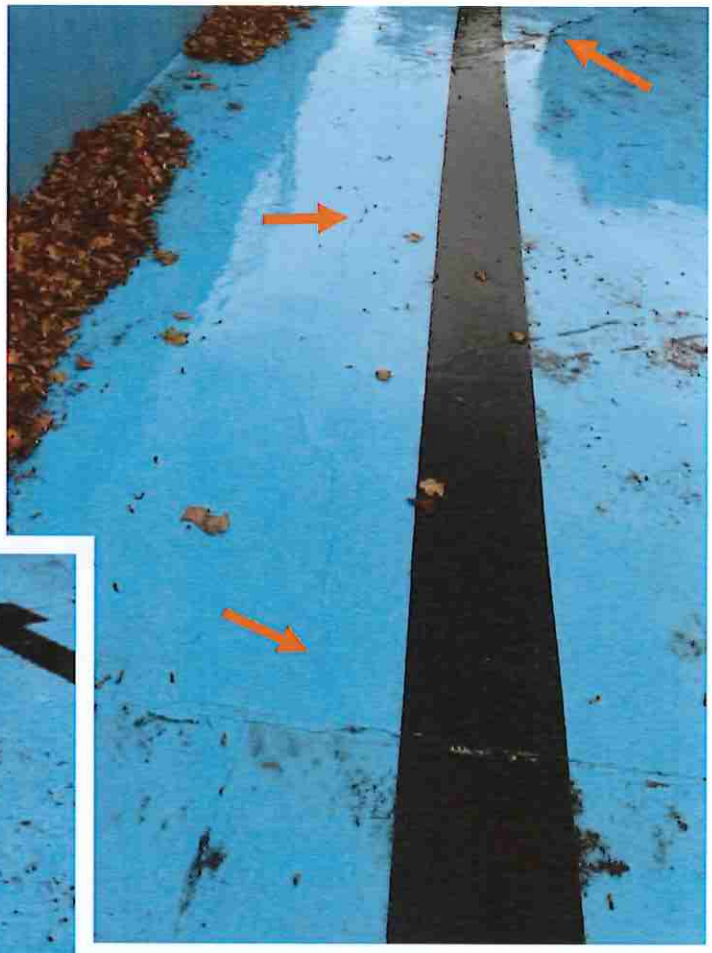


Many of the cracked and delaminated areas occur along expansion joints, where water infiltration makes the concrete susceptible to freeze/thaw damage.

All expansion joints are in need of replacement. It is recommended that sealant material is color-match to pool and not painted. The paint cannot adhere to sealant material and fails, leading to peeling paint and exposed concrete.

III. Existing Conditions Analysis

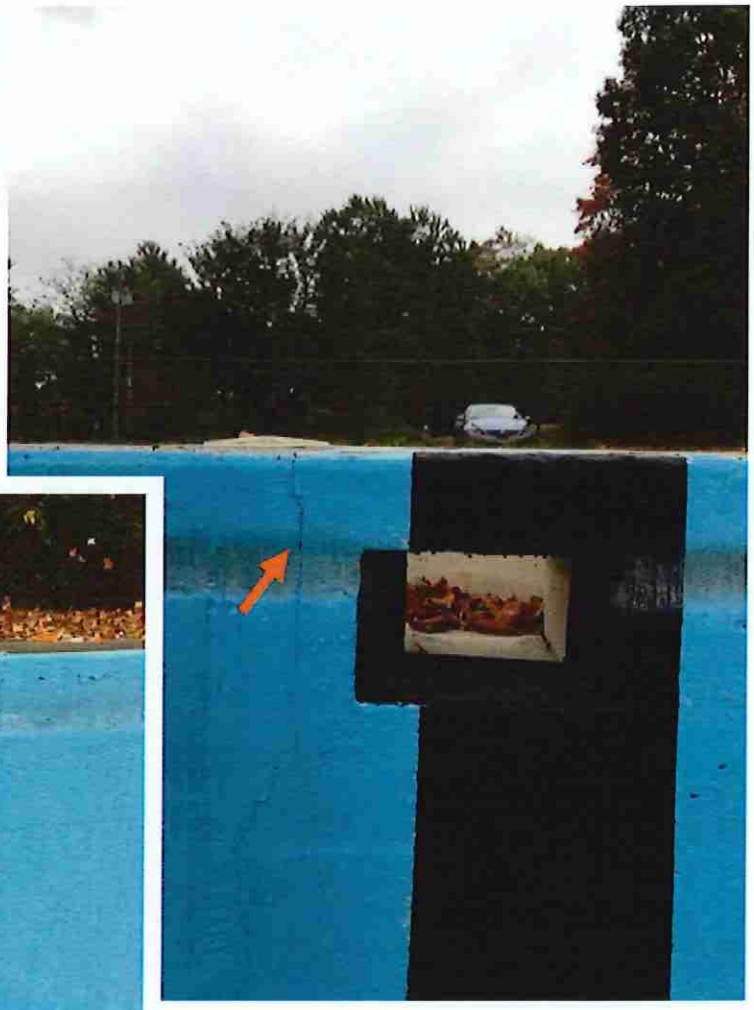
C. ISSUES and DEFICIENCIES - Main Pool



Several cracks run from expansion joint to expansion joint. Many may have occurred years ago, and are non-structural. However, they should be sealed to prevent water infiltration and corrosion of steel reinforcing, spalling and delamination of concrete.

III. Existing Conditions Analysis

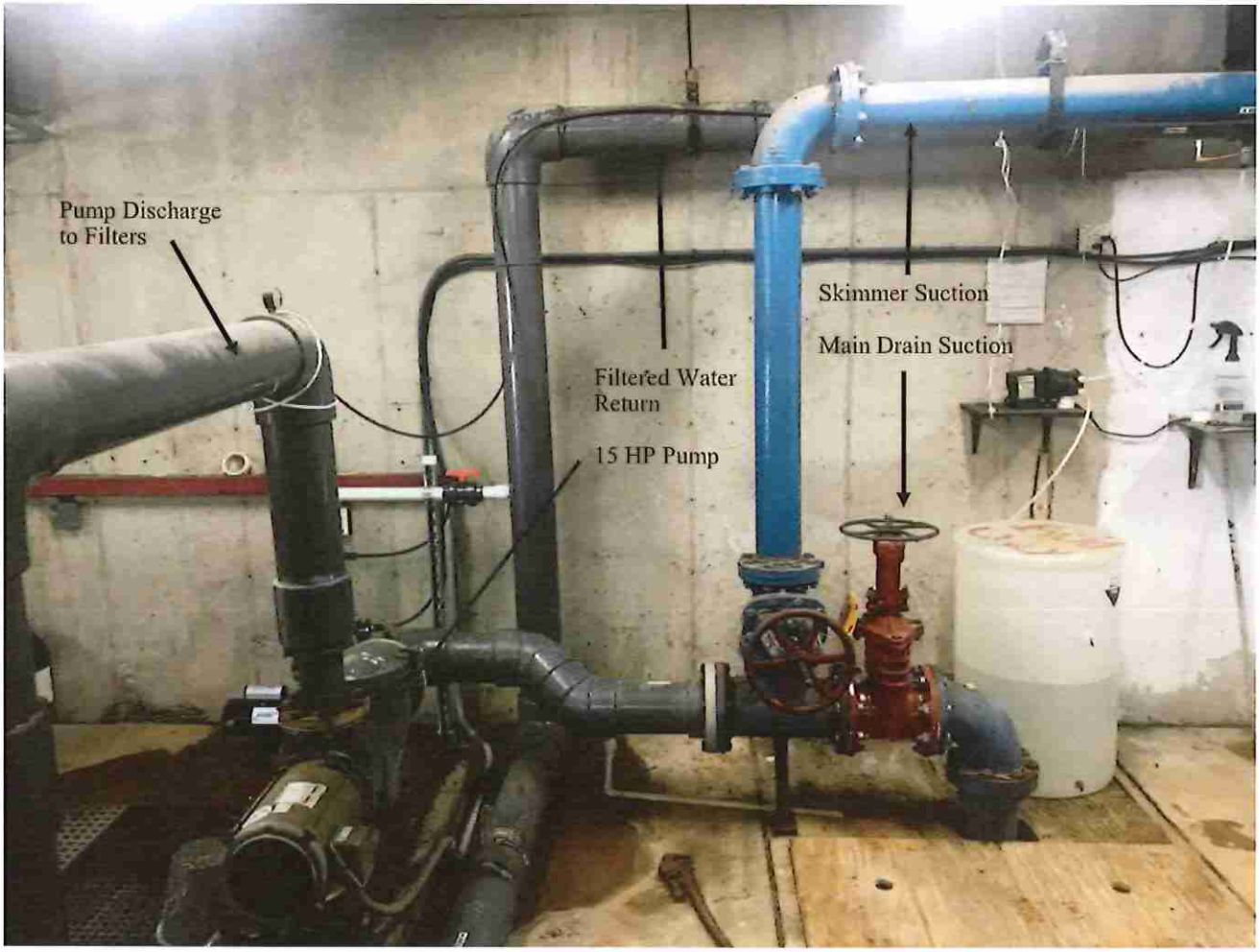
C. ISSUES and DEFICIENCIES - Main Pool



Many of the skimmers have cracked and delaminated concrete surrounding the opening.

III. Existing Conditions Analysis

C. ISSUES and DEFICIENCIES - Main Pool Systems



15 HP pool recirculation pump draws water in direct suction from skimmers and main drains.

In photo above, the blue, overhead pipe is a 5-inch cast iron pipe from the skimmers. The pipe dropping through the floor is a 6-inch cast-iron pipe form the main drains. Both are joined prior to the suction side of the pump.

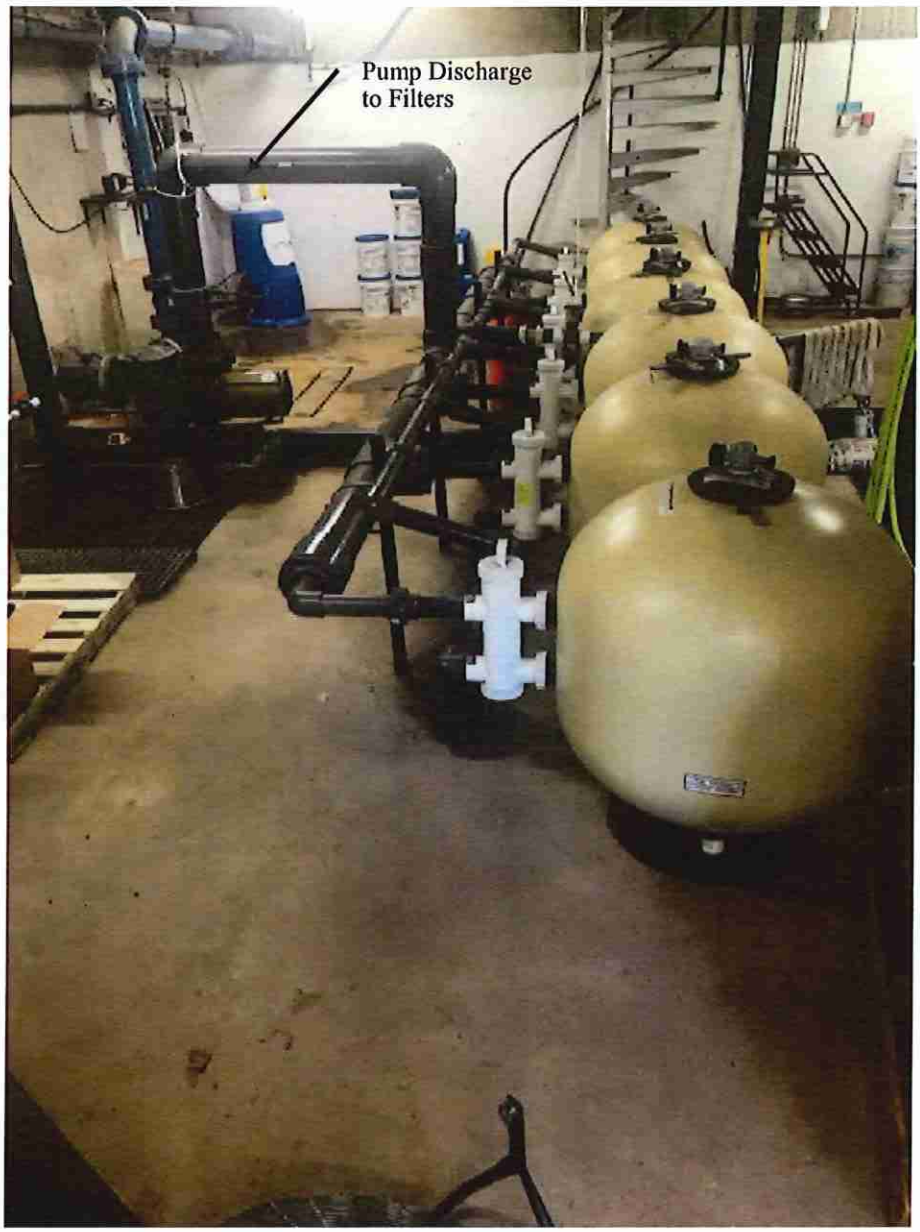
- Piping is undersized and not in compliance with DPH Regulations.
- System is in direct suction without an anti-entrapment device. At calculated velocities, the drains are not VGB compliant, even if covers are certified.

III. Existing Conditions Analysis

C. ISSUES and DEFICIENCIES - Main Pool Systems

Filtration is accomplished by means of six, Pentair TRC 140 high rate sand filters. Each is fed from a 2-inch pipe, connected to the main 6-inch return.

- Piping is undersized and not in compliance with DPH Regulations.
- There are no throttling valves or flow meters at each filter to confirm that each are flowing at the same rate.



Typical filter piping and multi-port valve. Position of the valve determines filter mode –vs– backwash mode.

III. Existing Conditions Analysis

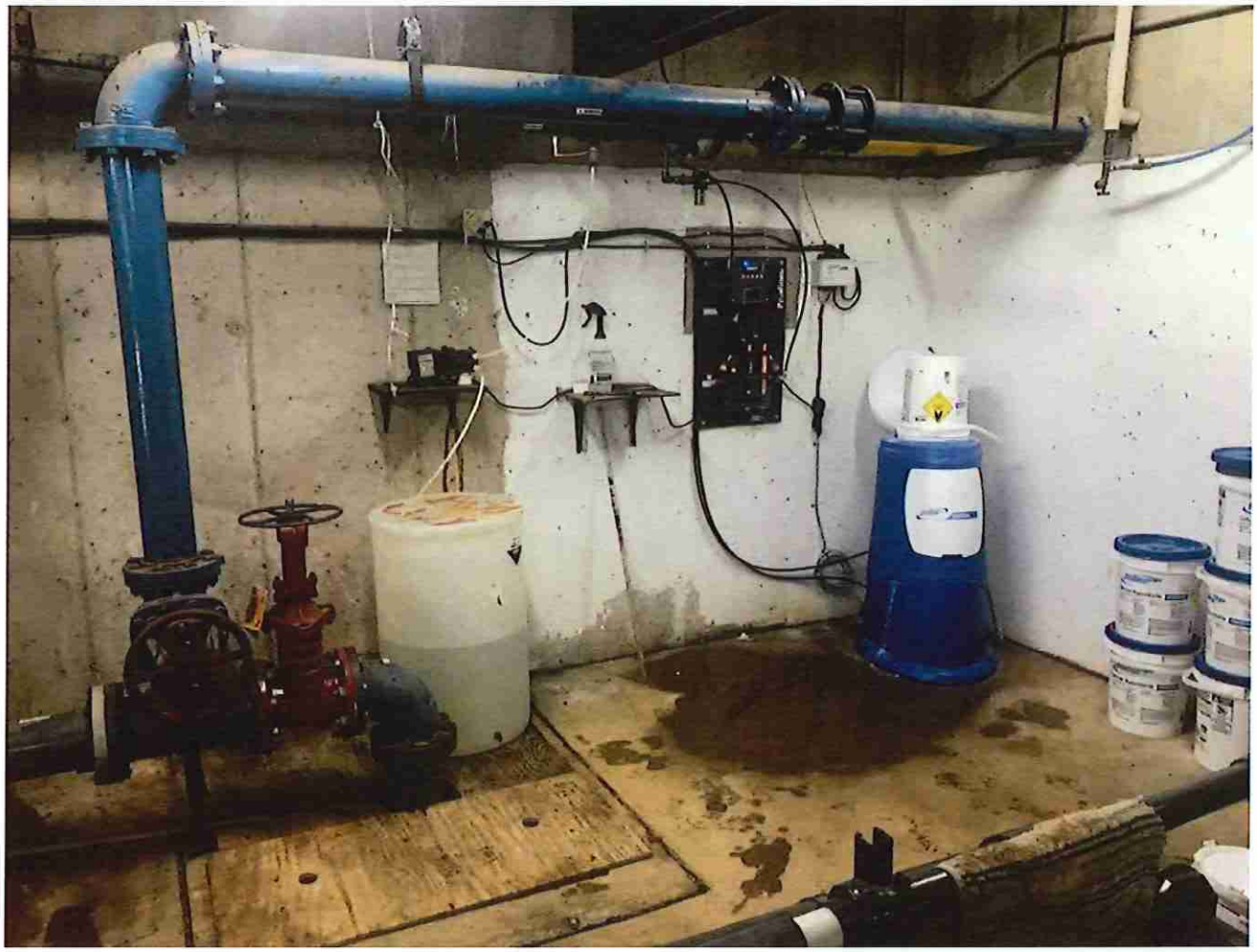
C. ISSUES and DEFICIENCIES - Main Pool Systems

When the filter is in backwash mode, it discharges dirty filter water to a collector pipe that discharges to a waste pit, covered with a floor grate. Pipe size will only allow effective backwash of one filter at a time.

- The discharge of the backwash pipe terminates below the flood rim of the pit, which is not DPH compliant, as an air-gap is required. The current arrangement could allow waste water to siphon back into the pool system.

III. Existing Conditions Analysis

C. ISSUES and DEFICIENCIES - Main Pool Systems



Pool water chemistry is maintained through an automatic water chemistry controller (Prominent CM-200). This system includes a flow-cell that monitors pool water conditions and adds chlorine for sanitizing and corrects pH by introduction of acid. This occurs continuously.

Water sanitizer is a calcium hypochlorite erosion feeder (Pulsar). pH correction is liquid acid, fed into the system through a peristaltic pump (Stenner). This system is appropriate and suitable for continued use.

III. Existing Conditions Analysis

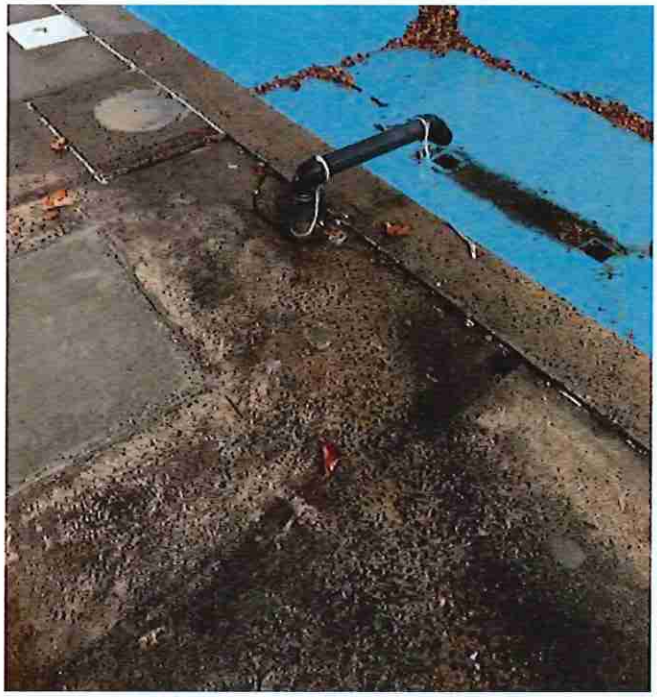
C. ISSUES and DEFICIENCIES Main Pool Decks

Above: Typical deck conditions. Note random cracking throughout deck areas. Most have been sealed with elastomeric sealants. Many have failed sealant and are allowing water penetration.

Left: Water runoff from roof is scouring the deck and eroding the concrete. Much of the water is falling onto failed sealant joints.

III. Existing Conditions Analysis

C. ISSUES and DEFICIENCIES - Main Pool Decks



The deck at the deep end is in particularly poor shape. The diving boards have been removed, though the anchors remain in the deck and pose a trip hazard. The fill line which originally was under the diving board is now exposed and also poses a trip hazard.

Top Left: Patched concrete and exposed fill line.

Top Right: Diving Board anchors remaining in deck.

Left: Patched, cracked and spalled concrete and failed joint sealant. Note sealant backer rod exposed (at arrow).

III. Existing Conditions Analysis

C. ISSUES and DEFICIENCIES - Main Pool Decks

Left: Cracked pool deck and coping, which is integral with pool wall.

Below: Miscellaneous cracks and patches. Most deck patches were found to be hollow, either due to delamination of concrete or poor compaction below deck.

Note overcuts at some patches, which provide a path of water through deck.

III. Existing Conditions Analysis

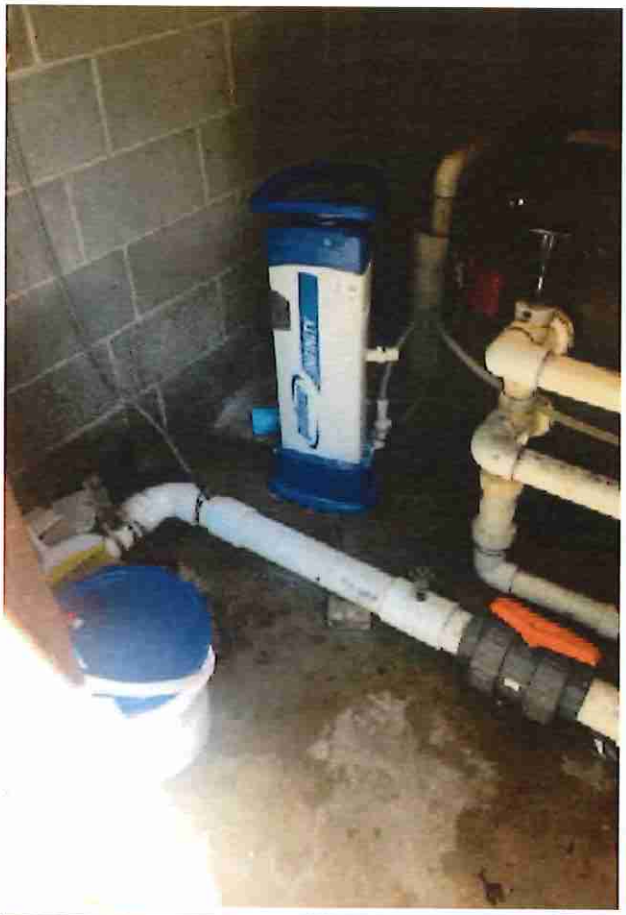
C. ISSUES and DEFICIENCIES - Wading Pool

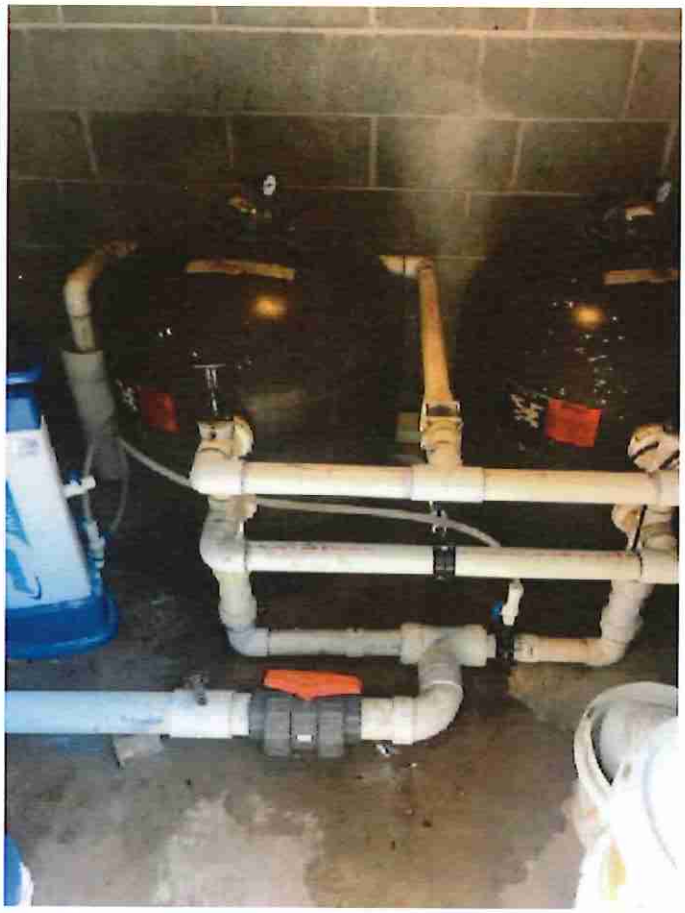
The concrete at the Wading Pool was generally sound with only minor cracking. However, reports of significant water loss closed the pool for the season, and as such, there are likely pipe leaks below the pool. As with any pipe leak below ground, there is concern for wash-out of sub-slab soils and eventual settlement of the pool, which could result in further cracking.

The spray nozzle and the coping overhang both protrude into the pool and may present a hazard (see below).

III. Existing Conditions Analysis

C. ISSUES and DEFICIENCIES - Fencing





Above Right: High rate sand filters, not rated for commercial use.

Piping and equipment is sized properly for flow, but drains are not VGB compliant and a vacuum release system should be installed.

Air gap at backwash is insufficient.

Above Left: Chemical Control System

Left: Pump with main drains and skimmers in direct suction.

III. Existing Conditions Analysis

C. ISSUES and DEFICIENCIES - Fencing

Fencing is in generally fair condition. Many areas need repair and select replacement of posts and fabric.

Areas of broken curbing at the perimeter of pool deck create gaps in the fencing that exceed allowable limits.